Antimicrobial Paediatric Guide UK-PAS

Sepsis

Central Nervous System

Ear, Nose and Throat / Upper Respiratory Tract Infections

Respiratory

Skin & Soft Tissue

Bone & Joint

- Recommendations for Paediatric wards (not Neonatal Units)
- See BNFc for doses, contraindications
- See BSAC Paediatric Pathways
- Antimicrobials recommended on hierarchy of national guidelines > RCTs > local practice – adjust on local resistance rates and patient’s previous and current culture results

Gastrointestinal

Eye / Orbital infections

Urinary Tract infections

Genital Tract infections

Cardiovascular

Blood

- Give oral unless only IV or IV indicated
- If on IV consider oral switch
- 48hr review: stop / oral switch / change / continue / pOPAT
- Penicillin allergy: green safe; amber caution; red do not use

Feedback
Antimicrobial Paediatric Guide UK-PAS

Abbreviations
Antimicrobial Stewardship
Allergy
Public Health
CefTRIAXone
Solid dose forms
Doxycycline
Oral switch
AWaRe
Editorial process
Sepsis

Sepsis

Haematology / Oncology Immunocompromised

Central line associated blood stream infection
Central Nervous System

Meningitis / encephalitis – empiric treatment
Meningitis / encephalitis – organism specific
Brain abscess
Ventriculo-peritoneal shunt infection
Neurosurgical
Ear, Nose and Throat / Upper Respiratory Tract Infections

Otitis media
Cochlear Implant Infection
Otitis externa
Mastoiditis
Tonsillitis / Lemierre's
Tracheitis / Epiglottitis
Retropharyngeal abscess
Lymphadenitis
Scarlet fever
Sinusitis
ENT surgical prophylaxis
Antimicrobial Paediatric Guide UK-PAS

Respiratory

Lower Respiratory Tract Infection
Community Associated Pneumonia
Hospital Associated Pneumonia
Aspiration pneumonia
Empyema / Pneumothorax
Bronchiectasis
Pneumocystis
Pertussis
Tuberculosis
Influenza
Antimicrobial Paediatric Guide UK-PAS

Skin & Soft Tissue

Cellulitis / Impetigo
Bites
Necrotising fasciitis
Pyomyositis
Burns
Soft tissue injury
Incisional Surgical Site Infection
Lyme (tick bites)
Chickenpox / Zoster
Herpes Simplex
Bone & Joint

Osteomyelitis and Septic arthritis
Discitis
Orthopaedic surgical prophylaxis
Antimicrobial Paediatric Guide UK-PAS

Gastrointestinal

Infectious Diarrhoea (including C diff, typhoid)
Helicobacter Pylori
Appendicitis / Peritonitis
Mediastinitis
Pancreatitis
Cholecystitis
Liver abscess
GI and Thoracic Surgical Prophylaxis
Eye / Orbital infections

Conjunctivitis
Orbital cellulitis
Ophthalmia neonatorum
Blepharitis
Endophthalmitis
Keratitis
Urinary Tract infections

Lower UTI (cystitis)
Upper UTI (pyelonephritis)
Catheter associated UTI
Peritoneal dialysis associated peritonitis
Urology surgical prophylaxis
Antimicrobial Paediatric Guide UK-PAS

Genital Tract infections

Chlamydia trachomatis / other urethritis
Epididymitis / orchitis
Vaginal candidiasis
Bacterial vaginosis
Genital herpes
Gonorrhoea
Trichomoniasis
Pelvic Inflammatory Disease
Balanitis

Feedback
Cardiovascular

Endocarditis

Cardiovascular surgical prophylaxis
Blood

Malaria
Sickle cell

Feedback
Sepsis

Non-neutropenic Sepsis

### Key points

**Start Smart Then Focus**
- Fever <1 month without focus treat as sepsis
- Fever 1-3 months without focus treat if unwell or WBC <5 or >15 x 10⁹/L
- Fever >3 months without focus treat if 'red' flag (see NICE NG143)

If focus, treat as per localised infection
- Obtain appropriate cultures before starting antibiotic (including blood culture, urine (catheter if necessary), lumbar puncture)
- Severe sepsis start within 1 hour
- If not severe, start within 3 hours

Check previous microbiology results to determine if recent antibiotic-resistant organisms have been identified and contact the Paed ID / Micro if: patient history of antibiotic-resistant organisms (e.g., Extended Spectrum Beta-Lactamase (ESBL) expressing organisms)
- **amoxicillin / co-trimoxazole**: stop if *Listeria* not grown after 48 hours
- Adjust empiric treatment with oral switch based on results of cultures
- Notify Public Health of suspected meningococcal
- Neonatal Units follow Neonatal Guidelines, usually *benzylpenicillin* and gentamicin
- Immunosuppression: see febrile neutropenia
- If **Sickle Cell** see below

Typhoid see Infectious Diarrhoea

### Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin / cephalosporin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cefTRIAXone</strong></td>
<td>Empiric 5 days minimum if rapid response 7-10 days usually</td>
<td>chloramphenicol IV + gentamicin OR teicoplanin + ciprofloxacin IV</td>
</tr>
<tr>
<td>+ <strong>amoxicillin IV</strong></td>
<td>Group A Strep / Pneumococcus 7-10 days total</td>
<td></td>
</tr>
<tr>
<td>&lt;1 month old</td>
<td>Group B Strep 7 days</td>
<td></td>
</tr>
<tr>
<td>+ <strong>aciclovir</strong>see below IV</td>
<td>Meningococcus 7 days</td>
<td></td>
</tr>
<tr>
<td>See below and Meningitis / encephalitis</td>
<td>MSSA 7-14 days</td>
<td></td>
</tr>
<tr>
<td>+ <strong>gentamicin</strong></td>
<td>MRSA 14 days</td>
<td></td>
</tr>
<tr>
<td>if severe sepsis requiring inotropes/critical care or likely resistant organisms e.g., frequent or prolonged hospitalisation &gt;48 hours following admission; or recent foreign travel</td>
<td>Gram negative 7-10 days</td>
<td></td>
</tr>
<tr>
<td>+ <strong>teicoplanin OR vancomycin IV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>if travel outside UK or prolonged antibiotic exposure in last 3 months or if previously MRSA positive or concern about infected prosthetic material see CLABSI below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ <strong>clindamycin IV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>if suspected staphylococcal / streptococcal toxic shock (discuss IVIG with Paed ID/ Micro if unresponsive to antibiotics or life threatening)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Antimicrobial Paediatric Guide UK-PAS

Organisms

<table>
<thead>
<tr>
<th>Age group</th>
<th>Likely organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3 months</td>
<td>Group B Streptococcus, <em>Escherichia coli</em>, <em>Listeria monocytogenes</em>, <em>Neisseria meningitidis</em>, <em>Haemophilus influenzae</em> type b (esp. if unvaccinated) and <em>Streptococcus pneumoniae</em></td>
</tr>
<tr>
<td>&gt;3 months</td>
<td><em>Neisseria meningitidis</em>, <em>Streptococcus pneumoniae</em> and <em>Haemophilus influenzae</em> type b (rare), coliforms</td>
</tr>
</tbody>
</table>

*Aciclovir: <1 month*, if any one of:
- ALT or AST >2x ULN,
- coagulopathy,
- vesicles,
- seizures,
- CSF pleocytosis
- suspected meningitis/encephalitis
- recent maternal herpes simplex disease OR
- postnatal contact with herpes simplex virus

Also strongly consider if infant presents **day 3-14 age**
with none of the above but:
- no other obvious cause OR
- not improving OR
- unexplained maternal febrile illness peripartum to 14 days postpartum, especially if premature

Stop if alternative cause found

NICE NG51 Sepsis: recognition, diagnosis and early management
NICE NG143 Fever in under 5s: assessment and initial management
NICE CG195 Neonatal infection: antibiotics for prevention and treatment
RCPCH Blue Book 4 edn p340 Ch 36 Toxic shock
Surviving Sepsis Campaign
Sepsis Trust
BSAC Paediatric Pathways Fever
BSAC Paediatric Pathways Petechial rash
IDSA 2021 Optimizing the Management of Uncomplicated Gram-Negative Bloodstream Infections: Consensus Guidance Using a Modified Delphi Process

Updated June 2023
Antimicrobial Paediatric Guide UK-PAS

Neutropenic Sepsis

Haematology / Oncology, Neutropenia <0.5 x 10⁹/L or other immune deficiency

Refer to local Paediatric Haematology / Oncology Antibiotic and Antifungal Guideline for full guideline
Refer to local severe sepsis and sepsis shock guidelines for paediatric critical care

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Line</td>
<td>piperacillin with tazobactam</td>
<td>As above for Sepsis</td>
<td>low risk allergy: meropenem</td>
</tr>
<tr>
<td>Patient-specific or local specialist unit protocols</td>
<td>gentamicin OR amikacin (discuss with Paed ID / Micro if high local rates of gentamicin resistance)</td>
<td></td>
<td>high risk allergy: chloramphenicol IV OR ciprofloxacin IV + gentamicin OR amikacin + teicoplanin OR vancomycin</td>
</tr>
<tr>
<td>2nd line / intolerance / IV methotrexate</td>
<td>meropenem + amikacin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected central venous catheter infection (see CLABSI)</td>
<td>+ teicoplanin OR vancomycin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NICE CG151 Neutropenic sepsis: prevention and management in people with cancer

ESPAUR Local resistance English surveillance programme for antimicrobial utilisation and resistance

Updated Jan 2023
**Central line associated blood-stream infection (CLABSI) Sepsis**

<table>
<thead>
<tr>
<th>Key points</th>
<th>Antibiotic</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seek Paed ID / Micro advice if isolate resistant to any of the suggested empiric agents or not listed (e.g., glycopeptide resistant Enterococcus, Gram negative organism).</td>
<td>Empiric treatment: teicoplanin or vancomycin + cefTRIAXone if septic</td>
<td>If line removed duration of antibiotics from 1st negative culture after line removal:</td>
</tr>
<tr>
<td><strong>Cultures</strong>: take repeat blood cultures from Central Venous Catheter (CVC) when the laboratory calls to say there is a positive blood culture. <strong>Two positive blood cultures with the same organism are highly suggestive of CVC infection.</strong> Repeat blood cultures (both CVC and peripheral) if fever persists and the child is not improving clinically.</td>
<td>Immunosuppressed or history of Pseudomonas sepsis: piperacillin with tazobactam + gentamicin Penicillin allergy: teicoplanin OR vancomycin + gentamicin</td>
<td>- Coagulase negative staphylococci 5-7 days</td>
</tr>
<tr>
<td>Remove non-tunnelled venous catheters associated with confirmed blood stream infection promptly if Staphylococcus aureus, Pseudomonas aeruginosa, Stenotrophomonas or Candida, or if persistently positive blood cultures, despite treatment, or clinically unstable where CLABSI is suspected.</td>
<td>Coagulase negative staphylococcus: teicoplanin OR vancomycin</td>
<td>- Staphylococcus aureus 7-14 days</td>
</tr>
<tr>
<td></td>
<td>Staphylococcus aureus: flucloxacin IV MRSA or Penicillin allergy: teicoplanin OR vancomycin</td>
<td>- MRSA 14-28 days</td>
</tr>
<tr>
<td></td>
<td>Enterococcus: amoxicillin IV if sensitive or teicoplanin OR vancomycin if amoxicillin resistant Penicillin allergy: teicoplanin OR vancomycin</td>
<td>- Enterococcus 7-14 days</td>
</tr>
<tr>
<td></td>
<td>Candida spp except C krusei / glabrata / lusitaniae: Liposomal amphotericin OR echinocandin (e.g., micafungin / caspofungin)</td>
<td>- Gram-negative bacilli 7-14 days</td>
</tr>
<tr>
<td></td>
<td>On parenteral nutrition (TPN) teicoplanin OR vancomycin + cefTRIAXone</td>
<td>- Candida 14 days if invasive fungal infection excluded</td>
</tr>
<tr>
<td></td>
<td>Consider piperacillin with tazobactam if severe sepsis</td>
<td>- Other organisms discuss with Paed ID / Micro</td>
</tr>
<tr>
<td></td>
<td>Consider echinocandin (e.g., micafungin / caspofungin) if unresponsive after 48 hrs</td>
<td>If line stays in:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coagulase negative staphylococci 10-14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enterococcus 7-14 days</td>
</tr>
</tbody>
</table>
Line lock:

- improves the chance of salvaging CVC.
- Line locks are not useful in CVCs which have been inserted <14 days previously.
- Antibiotic line-lock should be locked into the catheter lumen for as long as possible (up to 48 hours), during periods when the catheter is not being used.
- The antibiotic lock should be aspirated before the line is used for other infusions.
- The amount instilled should be equivalent to the priming volumes printed on the catheter or clamp,
- as a guide, the volume of antibiotic line locks prescribed should be no more than 1 ml for children <2 years, and 2 ml for children ≥2 years
- Ethanol in preference to antibiotics.
- Suitable 2nd line antibiotics for line locks; vancomycin (for Gram positive infections), aminoglycosides (for Gram negative infections) – discuss sensitivities with Paed ID / Micro. Refer to local guidelines.

RCPCH Blue Book 4 edn p97 Ch 9 Central Venous Catheter Infection

IDSA 2009 Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection

McMullen 2016 Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines

JAC-AMR 2021 Treatment of methicillin-resistant Staphylococcus aureus (MRSA): updated guidelines from the UK

PlosOne 2019 Ethanol locks for the prevention of catheter related infection in patients with central venous catheter: A systematic review and meta-analysis of randomized controlled trials

J Hosp Infxn 2022 Catheter salvage strategies in children with central venous catheter-related or -associated bloodstream infections: a systematic review and meta-analysis

Updated Jan 2023
**Antimicrobial Paediatric Guide UK-PAS**

## Meningitis / Encephalitis

- **Start** antimicrobial therapy <1 hour of presentation **after lumbar puncture** unless contraindicated
- Empiric treatment pending ID and/or sensitivities. See below for management of specific organisms and **shunt related meningitis**
- Oral antibiotics are not appropriate treatment for a patient with suspected or confirmed meningitis.

### Key Points

<table>
<thead>
<tr>
<th>Key points</th>
<th>Age</th>
<th>Antibiotics</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin / co-trimoxazole: stop if cultures do not show <em>Listeria</em> after 48 hours (<em>Listeria</em> rare &gt;1-month-old)</td>
<td>&lt;1 month</td>
<td>cefTRIAXone high dose + amoxicillin IV +/- aciclovir* see below IV</td>
<td>Minimum 14 days</td>
<td>Penicillin low risk allergy: cefTRIAXone high dose + co-trimoxazole if &lt;1 month old</td>
</tr>
<tr>
<td>Vancomycin: Add if recent ravel outside UK or prolonged antibiotic exposure</td>
<td>1-3 months</td>
<td>cefTRIAXone high dose</td>
<td>Minimum 14 days See targeted treatment</td>
<td>Penicillin / cephalosporin high risk allergy: chloramphenicol IV (not &lt;1 month old) OR ciprofloxacin IV + vancomycin IV +/- aciclovir IV</td>
</tr>
<tr>
<td>Dexamethasone 0.15 mg/kg to a maximum dose of 10 mg, four times daily for 4 days for children &gt;3-month-old if ≤12 hours from first antibiotics and LP shows: - Frankly purulent CSF - CSF WBC count &gt;1000/microlitre - Raised CSF WBC + protein &gt;1 g/L - Bacteria on Gram stain</td>
<td>&gt;3 months</td>
<td>cefTRIAXone high dose</td>
<td>Minimum 10 days See targeted treatment</td>
<td></td>
</tr>
<tr>
<td>Hospital Associated Infection or surgery in last 3 months</td>
<td>meropenem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encephalitis</td>
<td>aciclovir IV high dose</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Aciclovir: <1 month, if any one of:
- ALT or AST >2x ULN
- coagulopathy
- vesicles
- seizures
- CSF pleocytosis
- suspected meningitis/encephalitis
- recent maternal herpes simplex disease OR
- postnatal contact with herpes simplex virus

Also strongly consider if infant presents **day 3-14 age**
with none of the above but:
- no other obvious cause OR
- not improving OR
- unexplained maternal febrile illness peripartum to 14 days postpartum, especially if premature

Stop if alternative cause found
Antimicrobial Paediatric Guide UK-PAS

- Refer to severe sepsis and sepsis shock guidelines for paediatric critical care
- Notify Public Health
- Ventriculitis discuss with specialist

NICE CG102 Meningitis (bacterial) and meningococcal septicaemia in under 16s: recognition, diagnosis and management

RCPCH Blue Book 4 edn p49 Ch 6 Bacterial meningitis

BIA 2016 The UK joint specialist societies guideline on the diagnosis and management of acute meningitis and meningococcal sepsis in immunocompetent adults

ESCMID 2016 Diagnosis and treatment of acute bacterial meningitis

BSAC Paediatric Pathways Meningitis

IDSA 2008 The management of encephalitis

BPAIIG 2012 Management of suspected viral encephalitis in children

ADC 2012 Encephalitis in children

CID 2023 State of the art: acute encephalitis

Updated Sept 2023
<table>
<thead>
<tr>
<th>Confirmed cause</th>
<th>Treatment</th>
<th>Duration (longer if empyema)</th>
<th>Penicillin / cephalosporin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Neisseria meningitidis</em></td>
<td><em>cefTRIAXone</em></td>
<td>5-7 days</td>
<td>chloramphenicol IV OR ciprofloxacin IV</td>
</tr>
<tr>
<td>Prophylaxis contacts</td>
<td><em>ciprofloxacin</em></td>
<td>single dose</td>
<td></td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em> type b</td>
<td><em>cefTRIAXone</em></td>
<td>10 days</td>
<td>chloramphenicol IV OR ciprofloxacin IV</td>
</tr>
<tr>
<td>decolonisation to index case and prophylaxis household contacts</td>
<td><em>rifampicin</em></td>
<td>4 days</td>
<td></td>
</tr>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td><em>cefTRIAXone</em></td>
<td>14 days</td>
<td>chloramphenicol IV OR vancomycin IV</td>
</tr>
<tr>
<td><em>Group B streptococcus</em></td>
<td><em>cefTRIAXone</em></td>
<td>Minimum 14 days</td>
<td>chloramphenicol IV OR vancomycin IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Listeria monocytogenes</em></td>
<td><em>amoxicillin</em> IV</td>
<td>21 days</td>
<td>co-Trimoxazole IV</td>
</tr>
<tr>
<td>+ <em>gentamicin</em></td>
<td></td>
<td><em>gentamicin</em> for initial 7 days only</td>
<td></td>
</tr>
<tr>
<td><em>Gram negative bacillus</em></td>
<td><em>cefTRIAXone</em></td>
<td>21 days</td>
<td>chloramphenicol IV OR ciprofloxacin IV</td>
</tr>
<tr>
<td><em>Herpes simplex encephalitis</em></td>
<td><em>aciclovir</em> IV</td>
<td>&lt;12 years old or immunosuppressed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prophylaxis following treatment for HSV encephalitis:</td>
<td>21 days then repeat LP</td>
<td></td>
</tr>
<tr>
<td>&lt;3 months old: <em>aciclovir</em> po 12 months</td>
<td>&gt;12 years old</td>
<td>14 days then repeat LP</td>
<td></td>
</tr>
<tr>
<td><em>Tuberculosis</em></td>
<td>Discuss with Paed ID / TB specialist</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Culture &amp; PCR negative suspected bacterial meningitis</em></td>
<td><em>cefTRIAXone</em></td>
<td>&lt;3 months 14 days</td>
<td>chloramphenicol IV OR ciprofloxacin IV + vancomycin IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;3 months 10 days</td>
<td></td>
</tr>
</tbody>
</table>
NICE CG102 Meningitis (bacterial) and meningococcal septicaemia in under 16s: recognition, diagnosis and management

NICE NG195 Neonatal infection: antibiotics for prevention and treatment

PHE Hib 2013 Haemophilus influenzae type b (Hib): revised recommendations for the prevention of secondary cases

Updated Feb 2022
## Brain Abscess

<table>
<thead>
<tr>
<th>Brain abscess / subdural empyema</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin or cephalosporin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community associated</td>
<td>cefTRIAXone + metronidazole</td>
<td>Aspirated brain abscess 6–8 weeks</td>
<td>chloramphenicol IV OR ciprofloxacin IV + vancomycin + metronidazole</td>
</tr>
<tr>
<td>Severe immunocompromised</td>
<td>cefTRIAXone + metronidazole + cotrimoxazole + voriconazole</td>
<td>Excised brain abscess 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Post-neurosurgical</td>
<td>meropenem + vancomycin</td>
<td>Conservatively treated brain abscess 6–8 weeks</td>
<td></td>
</tr>
<tr>
<td>Chronic suppurative otitis media</td>
<td>cefTAZidime + metronidazole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Likely causative organisms**

There is often a mixture of organisms involved. The most likely pathogens are Anaerobes and Streptococci (including *Streptococcus anginosus*). Coliforms and *Staphylococcus aureus* may also be involved.

[ESCMID 2023](#) guidelines on diagnosis and treatment of brain abscess in children and adults

[IDSA 2017](#) Infectious Diseases Society of America’s Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis

[Pediatr Neurosurg 2022](#) The Case for Early Antibiotic Commencement and Source Control in Paediatric Subdural Empyema

[McMullen 2016](#) Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines

Updated Oct 2023

---

**Feedback**
## Ventriculo-peritoneal shunt infection

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin or cephalosporin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Empiric antibiotics after CSF culture</strong></td>
<td>cepTRIAXone + vancomycin IV</td>
<td>10 days</td>
<td>chloramphenicol IV OR ciprofloxacin IV</td>
</tr>
<tr>
<td><strong>Coagulase negative Staphylococcus</strong></td>
<td>vancomycin IV + rifampicin po</td>
<td></td>
<td>vancomycin IV + metronidazole if collection</td>
</tr>
<tr>
<td></td>
<td>+ (if access is available) intrathecal vancomycin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Further treatment should then be adjusted in the light of culture results and discussion with Paed ID /microbiologist. Consult laboratory for sensitivities.

### Likely causative organisms

Initial treatment of these infections should cover both Gram-positive organisms (e.g., *Staphylococcus epidermidis*) and Gram negatives (e.g., coliforms).

**IDSA 2017** Infectious Diseases Society of America’s Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis

**McMullen 2016** Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines

Updated Aug 2021
# Neurosurgical

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin or cephalosporin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF leak</td>
<td>Pneumococcal vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antibiotic prophylaxis not required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penetrating intracranial injury</td>
<td>cefTRIAxone + metronidazole</td>
<td>5 days</td>
<td>Penicillin high risk allergy or MRSA vancomycin IV + metronidazole</td>
</tr>
<tr>
<td>Clean neurosurgery including shunt</td>
<td>cefUROXime IV</td>
<td>Single dose within 60 minutes before incision</td>
<td></td>
</tr>
<tr>
<td>Neurosurgery involving mastoid/nasal sinus</td>
<td>cefUROXime + metronidazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Associated Infection</td>
<td>cefTRIAxone + vancomycin IV if device or MRSA</td>
<td></td>
<td>chloramphenicol IV OR ciprofloxacin IV + vancomycin IV + metronidazole if collection</td>
</tr>
</tbody>
</table>

**Likely causative organisms**
Initial treatment of these infections should cover both Gram-positive organisms (e.g., *Staphylococcus epidermidis*) and Gram negatives (e.g., coliforms).

Further treatment should then be adjusted in the light of culture results and discussion with the microbiologist. Consult laboratory for sensitivities.

**References**
- **IDSA 2017** Infectious Diseases Society of America’s Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis
- **McMullen 2016** Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines
- **NICE NG125** Surgical site infections: prevention and treatment
- **WHO** Global guidelines for the prevention of surgical site infection
- **Cochrane** Antibiotic prophylaxis for preventing meningitis in patients with basilar skull fractures

Updated June 2023
The majority of infections are viral. Antibiotics should only be given if there is no resolution or deterioration in symptoms over 72 hrs.

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics vs placebo 88% vs 84% no pain at 2-3 days</td>
<td>Paracetamol / ibuprofen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If no otorrhoea</td>
<td>anaesthetic and analgesic ear drops</td>
<td>4 drops 2-3x/day for 7 days</td>
<td></td>
</tr>
<tr>
<td>Systemically unwell or high risk of complications</td>
<td>amoxicillin</td>
<td>5 days</td>
<td>clarithromycin</td>
</tr>
<tr>
<td>If worsening symptoms on first choice taken for at least 2 to 3 days.</td>
<td>co-amoxiclav</td>
<td>7 days for severe or recurrent infection</td>
<td></td>
</tr>
</tbody>
</table>

**NICE NG91** Otitis media (acute): antimicrobial prescribing

**BSAC Paediatric Pathways** Otitis media

Updated Aug 2023
## Cochlear Implant Infection

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cochlear implant infection (no signs of meningitis)</td>
<td>co-amoxiclav</td>
<td>2-6 weeks according to response / deep-seated infection</td>
<td>vancomycin + ciprofloxacin</td>
</tr>
<tr>
<td>Cochlear implant infection (with meningitis) &gt; 2 weeks since surgery</td>
<td>cefTRIAXone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 weeks since surgery</td>
<td>meropenem + vancomycin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AAP 2010** Cochlear Implants in Children: Surgical Site Infections and Prevention and Treatment of Acute Otitis Media and Meningitis

Updated Oct 2023
# Otitis Externa

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First line</strong></td>
<td>Analgesia for pain relief and apply localised heat (such as a warm flannel)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second line</strong></td>
<td>Second line:</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>topical acetic acid 2% OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>topical gentamicin with hydrocortisone</td>
<td>7 -14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If perforation: ciprofloxacin ear drops</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>If cellulitis or disease extends outside ear canal, or systemic signs of infection, take deep swabs before treating</strong></td>
<td>flucloxacillin OR if unable to take tablets co-amoxiclav OR cefALEXin</td>
<td>7 days</td>
<td>Clarithromycin po OR doxycycline (&gt;8 years old)</td>
</tr>
<tr>
<td><strong>Malignant otitis externa</strong></td>
<td>Piperacillin with tazobactam + ciprofloxacin topical</td>
<td>4-6 weeks</td>
<td>Penicillin low risk allergy: cefTAZidime + ciprofloxacin topical OR: ciprofloxacin + gentamicin topical</td>
</tr>
</tbody>
</table>

Rosenfeld Otolaryngol Head Neck Surg 2014 Clinical practice guideline: acute otitis externa

ENT UK 2023 Otitis externa - Global ENT Guideline

Updated Apr 2023
Mastoiditis

### Key points

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Low risk allergy</th>
<th>Penicillin High risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastoiditis (no intracranial involvement)</td>
<td>co-amoxiclav IV</td>
<td>2 weeks</td>
<td>ciprofloxacin</td>
</tr>
<tr>
<td>Oral switch: co-amoxiclav po</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mastoiditis (with intracranial involvement)</td>
<td>cefTRIAXone + metronidazole + teicoplanin OR vancomycin IV if MRSA</td>
<td>If intracranial involvement 4 weeks</td>
<td>cefTRIAXone + metronidazole</td>
</tr>
</tbody>
</table>

### Likely causative organisms

- *Streptococcus pneumoniae*
- *Moraxella catarrhalis*
- *Haemophilus influenzae*
- *Group A Streptococcus*

Less common:
- *Staphylococcus aureus*
- Occasionally anaerobes

---

**ENT UK** Clinical Guideline: Management of acute mastoiditis in children

**BSAC Paediatric Pathways** Acute otitis media and mastoiditis pathway for children presenting to hospital

**BSO 2020** Acute mastoiditis guideline

Updated Jan 2021
Antimicrobial Paediatric Guide UK-PAS

Tonsilitis / Throat infections

- The majority of cases are viral and require no treatment
- Please use clinical decision-making tools to support your prescribing decisions.
- FeverPAIN is a validated tool to predict Streptococcal sore throats.

≥3 years old use FeverPAIN to assess symptoms:

FeverPAIN criteria (score 1 for each)

- Fever (during previous 24 hours)
- Purulence (pus on tonsils)
- Attend rapidly (within 3 days after onset of symptoms)
- Severely Inflamed tonsils
- No cough or coryza (inflammation of mucus membranes in the nose)

0-1: no antibiotic
2-3: no or back-up antibiotic
4-5: immediate or back-up antibiotic

Systemically very unwell or high risk of complications: immediate antibiotic

<3 years old:

- Fever <1 month treat
- Fever 1-3 months treat if unwell or WBC <5 or >15 x 10⁹/L
- Fever >3 months treat if 'red' flag (see NICE NG143)
**Antimicrobial Paediatric Guide UK-PAS**

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First line</strong></td>
<td>Paracetamol / ibuprofen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3 yrs old</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See NICE 143 above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 yrs old:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FeverPAIN ≥4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(score 2-3: back up prescription)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Phenoxy</em></td>
<td>5 days</td>
<td><em>Clarithromycin</em></td>
</tr>
<tr>
<td></td>
<td><em>Methylpenicillin</em></td>
<td>10 days for recurrence</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Amoxicillin</em> can be used if unable to tolerate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Phenoxy</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Methylpenicillin</em> if unable to take oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>for relapse within 2 weeks</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemierre's</td>
<td><em>CefTRIAXone</em> + <em>metronidazole</em></td>
<td>3-6 weeks</td>
<td><em>Clindamycin</em></td>
</tr>
<tr>
<td></td>
<td>Oral switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Co-amoxiclav</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Fusobacterium necrophorum* associated with septic thrombophlebitis of internal jugular vein and emboli to lungs and other organs

**NICE NG84** Sore throat (acute): antimicrobial prescribing

**NICE CG69** Respiratory tract infections (self-limiting): prescribing antibiotics

**NICE NG143** Fever in under 5s: assessment and initial management

**Cochrane 2013** Antibiotics for sore throat

**Cochrane 2012** Short-term late-generation antibiotics versus longer term penicillin for acute streptococcal pharyngitis in children

**BSAC Paediatric pathways** Tonsillitis and peritonsillar abscess (quinsy) pathway for children presenting to hospital

**J Micro, Imm, Infect 2020** Lemierre's syndrome: A forgotten and re-emerging infection

Updated Jan 2021
### Tracheitis / Epiglottitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
</table>
| If *Haemophilus influenza* type b vaccine given, *Staphylococcus aureus* more likely | cefTRIAXone  
Oral switch: co-amoxiclav  
If MRSA colonised  cefTRIAXone  
+ teicoplanin OR vancomycin  
Oral switch: cotrimoxazole (if sensitive) | 5 days    | clindamycin + ciprofloxacin |

*BMJ Best Practice 2020* Epiglottitis
Updated Oct 2023
## Retropharyngeal abscess

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration depends on drainage. Make sure any pus is sent for culture and treatment is targeted to culture results</td>
<td><strong>co-amoxiclav</strong> po (or IV if unable to swallow)</td>
<td>10-14 days</td>
<td>ciprofloxacin</td>
</tr>
<tr>
<td><strong>Severe / septic:</strong></td>
<td><strong>cefTRIAXone</strong> + metronidazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oral switch:</strong></td>
<td><strong>co-amoxiclav</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BMJ Best practice 2022** Retropharyngeal abscess

Updated Jan 2021
## Lymphadenitis / Parotitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well child</strong> with few systemic symptoms or generalised lymphadenopathy</td>
<td>no antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Systemically unwell</strong> (acute bacterial):</td>
<td>1st line: <strong>co-amoxiclav OR cefALEXin</strong></td>
<td>7 days minimum</td>
<td>clarithromycin OR clindamycin</td>
</tr>
<tr>
<td>provide antibiotics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Atypical mycobacteria, toxoplasma, <em>Bartonella</em>:</strong></td>
<td>Second choice or first choice if systemically very unwell or high risk of complications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>consult Paeds ID and ENT</td>
<td><strong>co-amoxiclav IV</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EBV serology:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>test if adolescent, pharyngitis, headache, hepatosplenomegaly, hepatitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Viral parotitis</strong> is more commonly bilateral (e.g., mumps) do not give antibiotics. Acute bacterial parotitis is often unilateral</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RCPCH Blue Book 4 edn** p146 Ch 15 Enlarged lymph nodes & 692 Ch 91 NTM Infections

**BSAC Paediatric Pathways** Cervical lymphadenitis / lymph node abscess pathway for children presenting to hospital

Updated March 2020
### Scarlet fever

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prompt treatment with appropriate antibiotics significantly reduces the risk of complications. Vulnerable individuals (immunocompromised, other conditions, or skin disease) are at increased risk of developing complications.</td>
<td>phenoxympenicillin</td>
<td>10 days</td>
<td>clarithromycin</td>
</tr>
<tr>
<td>Optimise analgesia and give safety netting advice</td>
<td>amoxicillin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notify Public Health</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UKHSA 2019** Scarlet fever: symptoms, diagnosis and treatment

Updated Jan 2023
## Sinusitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms for 10 days or less</td>
<td>paracetamol or ibuprofen for pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms with no improvement for more than 10 days</td>
<td>no antibiotic or back-up antibiotic depending on likelihood of bacterial cause. Consider high-dose nasal corticosteroid (if over 12 years).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systemically unwell</td>
<td>co-amoxiclav</td>
<td></td>
<td>clarithromycin</td>
</tr>
<tr>
<td>High risk of complications:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pre-existing illness (e.g., significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis and prematurely born infants)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT head if GCS falls or new neurological signs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NICE NG79** Sinusitis (acute): antimicrobial prescribing

Updated Aug 2021
### ENT Surgical prophylaxis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General airway procedures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Adenoidectomy</td>
<td>Not recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bronchoscopy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tonsillectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grommet insertion</strong></td>
<td>Consider topical</td>
<td>Single dose (2 drops each ear) within 60 minutes before incision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ciprofloxacin</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Major ear surgery</strong></td>
<td>co-amoxiclav IV</td>
<td>Single dose within 60 min before incision</td>
<td>low risk allergy</td>
</tr>
<tr>
<td>• Mastoid surgery</td>
<td></td>
<td></td>
<td>cefuroxime IV</td>
</tr>
<tr>
<td>• Tympanoplasty/myringoplasty</td>
<td></td>
<td></td>
<td>high risk allergy or MRSA</td>
</tr>
<tr>
<td>• Pinnaplasty</td>
<td></td>
<td></td>
<td>telicoplanin</td>
</tr>
<tr>
<td>• Cochlear implant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nasal surgery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Dermoid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Glioma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Other congenital masses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neck surgery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Lymphatic malformation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tracheostomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Branchial abnormalities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Thyroglossal cyst</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IAO 2013  Antibiotic prophylaxis in otolaryngologic surgery

Cochrane 2012  Antibiotics to reduce post-tonsillectomy morbidity

Cochrane 2013  Interventions for the prevention of postoperative ear discharge after insertion of ventilation tubes (grommets) in children
Surgical site infections: prevention and treatment

WHO Global guidelines for the prevention of surgical site infection

Laryngoscope 2009 Antibiotic Prophylaxis in Cochlear Implant Surgery

Updated June 2021
# Lower Respiratory Tract Infections

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute cough with upper respiratory tract infection</td>
<td>No antibiotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute bronchitis</td>
<td>No antibiotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute cough and higher risk of complications* or systemically very unwell (at face-to-face examination)</td>
<td><strong>amoxicillin</strong></td>
<td>5 days</td>
<td>clarithromycin OR doxycycline (&gt;8 years old)</td>
</tr>
<tr>
<td>Severe infection if completed 5 days amoxicillin</td>
<td><strong>co-amoxiclav</strong></td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Protracted bacterial bronchitis</td>
<td><strong>co-amoxiclav</strong></td>
<td>2-4 weeks: review at 2 weeks and stop if improved</td>
<td>clarithromycin OR doxycycline (&gt;8 years old)</td>
</tr>
</tbody>
</table>

*Higher risk of complications includes people with pre-existing comorbidity; young children born prematurely.

Antibiotics are not indicated in viral LRTI e.g., if coryzal symptoms and including SARS CoV-2 if not requiring oxygen

Consider also pertussis

---

**NICE NG120** Cough (acute): antimicrobial prescribing

**ERS 2017** ERS statement on protracted bacterial bronchitis in children

**Lancet Resp 2021** Duration of amoxicillin-clavulanate for protracted bacterial bronchitis in children (DACS): a multi-centre, double blind, randomised controlled trial

Updated Jan 2023

---
Antimicrobial Paediatric Guide UK-PAS

Community Associated Pneumonia

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 month old</td>
<td>cefTRIAXone Oral switch co-amoxiclav</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>&gt;1 month old</td>
<td>amoxicillin</td>
<td>3-5 days</td>
<td>clarithromycin OR doxycycline (&gt;8 years old)</td>
</tr>
</tbody>
</table>

Severe infection* | co-amoxiclav IV | 5 to 10 days total including oral switch | low risk allergy: cefUROXime IV +/- clarithromycin high risk allergy teicoplanin IV + ciprofloxacin |
If no response after 48 hours <4 months old or >5 years old | + clarithromycin |

*Severe community-associated pneumonia
- Significant tachypnoea
- Significant tachycardia
- Severe respiratory distress (significant recession (age <12 months), nasal flaring, grunting)
- Apnoeas (ages <12 months)
- Hypoxia (sustained O₂ sats ≤92% in room air)
- Cyanosis
- Signs of severe dehydration
- Capillary Refill Time >2 secs

Atypical infection:
- *Chlamydia* in under 4-month-olds
- *Mycoplasma pneumoniae* in school-aged children - in outbreaks approximately every 4 years

NICE NG138 Pneumonia (community-associated): antimicrobial prescribing
BTS 2011 Paediatric Community Associated Pneumonia
BSAC Paediatric Pathways Community acquired pneumonia (cap) and empyema pathway for children presenting to hospital
Effect of Amoxicillin Dose and Treatment Duration on the Need for Antibiotic Re-treatment in Children With Community-Acquired Pneumonia

The WHO AWaRe (Access, Watch, Reserve) antibiotic book Ch 12 p147 and Ch 27 p 362

Updated Jan 2023
## Hospital Associated Pneumonia

### Likely organisms

<table>
<thead>
<tr>
<th>Common</th>
<th>Rare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coliforms</td>
<td><em>Pseudomonas spp.</em></td>
</tr>
</tbody>
</table>

### Key points

<table>
<thead>
<tr>
<th>&lt;4 days in hospital</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat as Community Associated Pneumonia (CAP)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>≥4 days in hospital</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
</table>
| 1st line | Age <1 month: [cefTRIAXone](#) + gentamicin  
   Age >1 month: [co-amoxiclav](#) | Routine 5 days  
   Slow response up to 10 days  
   Review IV therapy after 24-48 hours | clarithromycin |

| Severe infection | Treatment | | |
|------------------|-----------|------------------|
| 1st line [cefTRIAXone](#)  
   2nd line / immunocompromised [piperacillin with tazobactam](#)  
   + [teicoplanin](#) if suspected or confirmed MRSA infection  
   Oral switch [co-amoxiclav](#) | [ciprofloxacin + teicoplanin](#) |
## Aspiration Pneumonia

### Samples / Investigations

- Sputum/respiratory cultures
- Blood cultures if septic/febrile

### Key Points

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>chemical inflammation / irritation of airways, no antibiotic required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate - Severe</td>
<td>co-amoxiclav</td>
<td>Routine 5 days</td>
<td>cefUROXime</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If no signs of infection at 72 hours STOP antibiotics</td>
<td>cefTRIAXone if severe oral switch clindamycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slow response up to 10 days</td>
<td>Penicillin high risk allergy: clindamycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+ ciprofloxacin if septic</td>
</tr>
</tbody>
</table>

### Likely causative organisms

- *Staphylococcus aureus*, *Streptococci*, *coliforms*
- Less common: *anaerobes*

---

**BTS 2023** BTS clinical statement on aspiration pneumonia

Updated Aug 2023
Empyema

Samples / Investigations
- Pleural fluid, blood cultures

Additional management: drainage; site peripherally inserted central catheter (PICC) / midline when placing chest drain

Consider TB culture and PCR if high risk group for tuberculosis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial IV therapy</td>
<td>co-amoxiclav</td>
<td>Total 2-4 weeks</td>
<td>low risk allergy cefTRIAXone</td>
</tr>
<tr>
<td></td>
<td>if toxin mediated disease: (haemodynamic instability, mucosal erythema, rash, diarrhoea) + clindamycin</td>
<td>Less for small effusion</td>
<td>ceFURoxime</td>
</tr>
<tr>
<td></td>
<td>OPAT cefTRIAXone</td>
<td>6 weeks if loculated</td>
<td>high risk allergy ciprofloxacin + clindamycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oral switch when fever resolving and CRP improving</td>
<td></td>
</tr>
</tbody>
</table>

Prophylaxis

<table>
<thead>
<tr>
<th>Spontaneous pneumothorax</th>
<th>No antibiotics</th>
<th></th>
<th>cefTRIAXone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatic pneumothorax</td>
<td>co-amoxiclav</td>
<td>Single dose at time of drain insertion</td>
<td>ceFURoxime</td>
</tr>
</tbody>
</table>

Likely organisms

-Streptococcus pneumoniae, Group A Streptococcus, Staphylococcus aureus

BTS 2005  BTS guidelines for the management of pleural infection in children

BTS 2010 Management of pleural infection in adults: British Thoracic Society pleural disease guideline

TSACO 2022 Antibiotic prophylaxis for tube thoracostomy placement in trauma

Updated Jan 2023
Antimicrobial Paediatric Guide UK-PAS

**Bronchiectasis**
*(non-cystic fibrosis)*

- Send sputum for culture: target therapy to previous culture results if available.
- If initial culture pseudomonas: attempt to eradicate.

### Likely organisms

| Common | Rare | **Haemophilus influenzae**  
| Streptococcus pneumoniae, Staphylococcus aureus, Moraxella catarrhalis, Pseudomonas aeruginosa |

### Key points

<table>
<thead>
<tr>
<th>Pseudomonas not previously isolated</th>
<th>amoxicillin</th>
<th>7-14 days</th>
<th>clarithromycin OR doxycycline (&gt;8 years old)</th>
</tr>
</thead>
<tbody>
<tr>
<td>If higher risk of treatment failure</td>
<td>co-amoxiclav if hypoxic IV</td>
<td>Review by 48 hours and consider switch to oral antibiotics</td>
<td>ciprofloxacin</td>
</tr>
<tr>
<td>If treatment failure on co-amoxiclav</td>
<td>piperacillin with tazobactam</td>
<td></td>
<td>ciprofloxacin + telcooplanin</td>
</tr>
</tbody>
</table>

### Treatment of exacerbations where pseudomonas is isolated

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Route</th>
<th>Dose</th>
<th>Frequency</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial episode</td>
<td>cefTAZidime + tobramycin</td>
<td>IV</td>
<td>50 mg/kg</td>
<td>tds</td>
<td>14 days</td>
<td>ciprofloxacin + tobramycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>7 mg/kg</td>
<td>od</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbation when chronically colonised</td>
<td>ciprofloxacin OR</td>
<td>po</td>
<td>20 mg/kg (max 750 mg)</td>
<td>bd</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cefTAZidime +/- tobramycin</td>
<td>IV</td>
<td>50 mg/kg</td>
<td>tds</td>
<td>14 days</td>
<td>ciprofloxacin + tobramycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>7 mg/kg</td>
<td>od</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• For tobramycin refer to tobramycin monitoring information
• For treatment of an initial episode when IV treatment is less suitable for an individual patient eradication may be attempted with ciprofloxacin with or without nebulised colomycin for 2 weeks.
• Do not routinely offer antibiotic prophylaxis to prevent exacerbations.

NICE NG117 Bronchiectasis (non-cystic fibrosis), acute exacerbation: antimicrobial prescribing
ERS 2021 European Respiratory Society guidelines for the management of children and adolescents with bronchiectasis

Updated Aug 2022
### Pneumocystis jirovecii pneumonia (PJP)

An opportunistic infection occurring in immunocompromised patients (including HIV)

Please refer all patients to relevant specialist / microbiology

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Dose &amp; Frequency</th>
<th>Duration</th>
<th>Additional treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month – 18 years</td>
<td><strong>co-trimoxazole</strong>&lt;br&gt;Oral route preferred</td>
<td>120 mg/kg in 2 – 4 divided doses&lt;br&gt;Reduce dose in renal impairment</td>
<td>14 – 21 days&lt;br&gt;Continue secondary prophylaxis</td>
<td><strong>Corticosteroids</strong> in moderate – severe infection with HIV&lt;br&gt;Prednisolone po 2 mg/kg (max. 80 mg daily) for 5 days or IV hydrocortisone&lt;br&gt;Reduce dose over the next 16 days and then stop&lt;br&gt;Corticosteroids should be started at the same time as the anti-pneumocystis therapy (no later than 72 hours after)&lt;br&gt;Corticosteroids should be withdrawn before anti-pneumocystis treatment is complete</td>
</tr>
</tbody>
</table>

**ECIL 2016** ECIL guidelines for treatment of *Pneumocystis jirovecii* pneumonia in non-HIV-infected haematology patients

**EACS 2022** European AIDS Clinical Society v11.1

Updated Aug 2023
# Pertussis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Macrolide contraindication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notify Health Protection Team</td>
<td>clarithromycin</td>
<td>7 days</td>
<td>co-trimoxazole</td>
</tr>
</tbody>
</table>

RCPCH Blue Book 4 edn p742 Ch 98 Pertussis

NIHP (PHE) 2018 Pertussis (whooping cough): information for healthcare professionals

Updated March 2020
# Tuberculosis

Refer all cases of suspected or proven TB to Paeds ID / TB specialist

<table>
<thead>
<tr>
<th>Body weight (kg)</th>
<th>Rifinah (R/H) 150/100</th>
<th>Isoniazid 50</th>
<th>Pyrazinamide 500</th>
<th>Ethambutol 100</th>
<th>Total tablets</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-20</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>20-25</td>
<td>2</td>
<td>2</td>
<td>1 ½</td>
<td>1</td>
<td>4 ½</td>
</tr>
<tr>
<td>25-30</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>30-35</td>
<td>3</td>
<td>2</td>
<td>1 ½</td>
<td></td>
<td>4 ½</td>
</tr>
<tr>
<td>35-40</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>40-45</td>
<td>5</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-50</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-70</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;70</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Active TB continuation phase and Latent TB

<table>
<thead>
<tr>
<th>Body weight (kg)</th>
<th>Rifinah (R/H) 150/100</th>
<th>Rifinah (R/H) 300/150</th>
<th>Total tablets</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-15</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>15-25</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>25-50</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>&gt;50</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
WHO 2022 WHO consolidated guidelines on tuberculosis: module 5: management of tuberculosis in children and adolescents

NICE NG33 Tuberculosis

BIA TBM 2009 British Infection Society guidelines for the diagnosis and treatment of tuberculosis of the central nervous system in adults and children

TB monographs

BAPT 2023 Care of children and young people exposed to or infected with tuberculosis

Updated June 2023
## Influenza

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uncomplicated</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Previously healthy</td>
<td>No treatment OR</td>
<td>Start within 48 hours of onset</td>
</tr>
<tr>
<td></td>
<td>if serious risk complications <strong>oseltamivir</strong></td>
<td>5 days</td>
</tr>
<tr>
<td>• Co-morbidity OR</td>
<td><strong>oseltamivir</strong></td>
<td></td>
</tr>
<tr>
<td>• &lt;6 months old</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Complicated</strong></td>
<td><strong>oseltamivir</strong></td>
<td>5 days</td>
</tr>
<tr>
<td>OR Severeely immunosuppressed</td>
<td>OR <strong>zanamivir inhaled / IV (2nd line)</strong></td>
<td>10 days (immunosuppressed)</td>
</tr>
<tr>
<td><strong>High risk oseltamivir resistance</strong></td>
<td><strong>zanamivir inhaled / IV (2nd line)</strong></td>
<td>5 days</td>
</tr>
<tr>
<td>OR 2nd line: poor clinical response, resistance</td>
<td></td>
<td>10 days (immunosuppressed)</td>
</tr>
</tbody>
</table>

Annual vaccination is essential for all those ‘at risk’ of influenza. Treat ‘at risk’ patients with 5 days **oseltamivir**, when influenza is circulating in the community, and ideally within 48 hours of onset (36 hours for **zanamivir** treatment in children).

At risk: children under 6 months; chronic respiratory disease (including asthma); significant cardiovascular disease (not hypertension); severe immunosuppression; chronic neurological, renal or liver disease; diabetes mellitus; morbid obesity (BMI>40). In severe immunosuppression, or **oseltamivir** resistance, use **zanamivir** 10mg BD (2 inhalations twice daily by diskhaler for up to 10 days) and seek advice.

Uncomplicated influenza: Influenza presenting with fever, coryza, generalised symptoms (headache, malaise, myalgia, arthralgia) and sometimes gastrointestinal symptoms, but without any features of complicated influenza.
**Complicated influenza:** Influenza requiring hospital admission and/or with symptoms and signs of lower respiratory tract infection (hypoxaemia, dyspnoea, lung infiltrate), central nervous system involvement and/or a significant exacerbation of an underlying medical condition

- **Low risk** oseltamivir resistance A(H3N2), influenza B
- **High risk** oseltamivir resistance A(H1N1)


*Feedback*
### Cellulitis

Cellulitis, erysipelas, impetigo, wound infections, infected eczema

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First line</strong></td>
<td>hydrogen peroxide 1% topical (e.g., Crystacide® cream)</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td><strong>Small, localised lesions</strong></td>
<td>Topical fusidic acid If MRSA: topical mupirocin</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td><strong>Extensive, severe, or bullous</strong></td>
<td>flucloxacillin po (IV if severe) or if flucloxacillin unsuitable / not tolerated: cefALEXin</td>
<td>7 days</td>
<td>clarithromycin</td>
</tr>
<tr>
<td></td>
<td>+ gentamicin if signs and symptoms of systemic sepsis</td>
<td>Single dose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ clindamycin if toxic shock</td>
<td>Until shock resolved</td>
<td></td>
</tr>
<tr>
<td><strong>Infection near eyes or nose</strong></td>
<td>co-amoxiclav po + metronidazole for wound infections if anaerobes isolated</td>
<td>Full resolution at 5 to 7 days is not expected</td>
<td>clarithromycin +/− metronidazole</td>
</tr>
<tr>
<td><strong>MRSA</strong></td>
<td>vancomycin OR teicoplanin OR linezolid specialist use only</td>
<td>A longer course (up to 14 days in total) may be needed if systemic signs but skin takes time to return to normal</td>
<td></td>
</tr>
<tr>
<td><strong>Severe OPAT</strong></td>
<td>teicoplanin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NICE NG141** Cellulitis and erysipelas: antimicrobial prescribing

**BSAC Paediatric Pathways** Cellulitis pathway for children presenting to hospital

Updated Jan 2023
Human / Animal Bites

Likely causative organisms

* Pasteurella multocida, Staphylococcus aureus and anaerobes.

See NICE guideline for information about when to give prophylaxis or treatment

- **Human**: thorough irrigation is important. Antibiotic prophylaxis is advised. Assess risk of tetanus, rabies, HIV, and hepatitis B & C
- **Cat**: always give prophylaxis
- **Dog**: give prophylaxis if: puncture wound, bite to hand, foot, face, joint, tendon, or ligament; immunocompromised; cirrhotic; asplenic; or presence of prosthetic valve/joint

**Penicillin allergy**: Review all at 24 and 48 hours, as not all pathogens are covered

**Tetanus**: ask about immunisation status and administer vaccine if not received within past 10 years

**Rabies**: consider for animal bites overseas (discuss risk assessment with Paed ID / Micro)

**Other animals** discuss with Paed ID / Micro

Surgical debridement and drainage may be required.
### Antimicrobial Paediatric Guide UK-PAS

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin</th>
<th>Penicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylaxis / Treatment</td>
<td>co-amoxiclav PO</td>
<td>Prophylaxis: 3 days</td>
<td>low risk</td>
<td>high risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active infection: 5-7 days</td>
<td>allergy</td>
<td>allergy</td>
</tr>
<tr>
<td>Deep bites</td>
<td>co-amoxiclav IV</td>
<td>Deep bites with penicillin allergy:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>cefuroxime IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR ceftriaxone if septic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ metronidazole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NICE NG184**: Human and animal bites: antimicrobial prescribing

**NICE (UKHSA)** Condensed summary of antimicrobial prescribing guidance

**UKHSA 2023** Rabies: risk assessment, post-exposure treatment, management

Updated Jan 2023
Antimicrobial Paediatric Guide UK-PAS

Necrotising fasciitis

- Discuss all suspected cases with intensive care, surgeons and Paed ID / Micro
- **Urgent** surgical debridement essential and send tissue for culture
- Local authorisation required for IVIG

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Line</td>
<td>cefTRIAXone + clindamycin IV</td>
<td>Guided by response</td>
<td>clindamycin + telcoplanin OR vancomycin + ciprofloxacin OR gentamicin</td>
</tr>
<tr>
<td>if previous antibiotics</td>
<td>piperacillin with tazobactam + clindamycin IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>if high risk ESBL or low risk penicillin allergy</td>
<td>meropenem + clindamycin IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>if severe sepsis</td>
<td>+ gentamicin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

_IDSA 2014_ Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections
Updated Jan 2023
### Pyomyositis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staphylococcus aureus isolated</strong></td>
<td>flucloxacillin IV</td>
<td>IV 7 days minimum</td>
<td>clindamycin</td>
</tr>
<tr>
<td>No organism isolated</td>
<td></td>
<td></td>
<td>+ gentamicin if septic</td>
</tr>
<tr>
<td>&lt;5 years old</td>
<td>cefTRIAXone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;5 years old</td>
<td>flucloxacillin IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If septic</td>
<td>+ gentamicin</td>
<td>Single dose</td>
<td></td>
</tr>
<tr>
<td>If suspected toxic shock</td>
<td>+ clindamycin IV</td>
<td>Until shock resolved</td>
<td></td>
</tr>
<tr>
<td>Oral switch when afebrile</td>
<td>flucloxacillin if able to swallow capsule</td>
<td>Oral 2-3 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>co-amoxiclav if suspension</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**References**

- J Ped Ortho 2021 Primary Bacterial Pyomyositis in Children: A Systematic Review
- IDSA 2014 Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections

Updated Aug 2022
Burns

Only treat if signs of clinical infection, prophylaxis is not required

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild-moderate infection</td>
<td>flucloxacillin</td>
<td>7 days</td>
<td>clindamycin</td>
</tr>
<tr>
<td>Second line</td>
<td>co-amoxiclav</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In hospital &gt;5 days</td>
<td>cefTRIAXone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>if known <em>Pseudomonas</em> colonised</td>
<td>piperacillin with tazobactam</td>
<td></td>
<td>gentamicin</td>
</tr>
</tbody>
</table>

Check tetanus immunisations status

**NHSE 2020** Clinical guidelines for major incidents and mass casualty events

**PLoS ONE 2019** Systemic antibiotic prophylaxis does not affect infectious complications in pediatric burn injury: A meta-analysis

Updated Aug 2020
## Soft Tissue Injury

Check tetanus immunisations status

<table>
<thead>
<tr>
<th></th>
<th>Antibiotic</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>No antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminated prophylaxis</td>
<td>co-amoxiclav</td>
<td>3 days</td>
<td>clindamycin</td>
</tr>
<tr>
<td>Infected</td>
<td></td>
<td>Guided by response</td>
<td></td>
</tr>
</tbody>
</table>

NHSE 2020 Clinical guidelines for major incidents and mass casualty events

Updated Aug 2023
Incisional Surgical Site Infection

Not all infections require treatment with antibiotics, minor infections may respond to drainage of pus (for example by removal of sutures) and topical antiseptics. Deep seated infections may need surgical debridement and prosthetic material should be removed where possible.

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery of trunk or extremity away from axilla or perineum</td>
<td>flucloxacillin IV</td>
<td>3 days</td>
<td>clindamycin</td>
</tr>
<tr>
<td>Surgery of Intestinal or Genitourinary Tract, axilla or perineum</td>
<td>ciprofloxacin</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ metronidazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>cefTRIAXone if sepsis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ metronidazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>oral switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>co-amoxiclav</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IDSA 2014 Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections

Updated Aug 2023
# Lyme Disease / Tick Bites

## Key points

<table>
<thead>
<tr>
<th>Prophylaxis:</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>not routinely recommended</td>
<td>doxycycline (&gt;8 years old) OR amoxicillin (&lt;8 years old)</td>
<td>stat</td>
<td>azithromycin</td>
</tr>
<tr>
<td>If immunocompromised: only if &lt;72 hours of tick removal</td>
<td>doxycycline (&lt;8 years old)</td>
<td>21 days</td>
<td>azithromycin 17 days</td>
</tr>
<tr>
<td>Treatment: exposure + erythema migrans or cranial nerves or peripheral nervous system or arthritis or acrodermatitis chronica atrophicans or stable carditis</td>
<td>doxycycline (&gt;8 years old) OR amoxicillin (&lt;8 years old)</td>
<td>21 days</td>
<td>azithromycin</td>
</tr>
<tr>
<td>Neuroborreliosis (CNS) Cardiovascular (if unstable)</td>
<td>cefTRIAXone oral switch doxycycline</td>
<td>21 days total</td>
<td></td>
</tr>
</tbody>
</table>

**NICE NG95 Lyme disease**

Updated Jan 2021
## Chickenpox / Zoster

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chickenpox</strong>&lt;br&gt;if onset of rash &lt;24 hours AND 1 of the following:&lt;br&gt;• &gt;14 years of age&lt;br&gt;• severe pain&lt;br&gt;• dense/oral rash&lt;br&gt;• taking steroids</td>
<td>aciclovir&lt;br&gt;OR valaciclovir if &gt;12 years old</td>
<td>7 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shingles</th>
<th>If onset of rash &lt;1 week AND 1 of the following:&lt;br&gt;• severe pain&lt;br&gt;• continued vesicle formation&lt;br&gt;• immunocompromised</th>
</tr>
</thead>
<tbody>
<tr>
<td>if onset of rash &lt;72 hours AND 1 of the following:&lt;br&gt;• active ophthalmic&lt;br&gt;• Ramsey Hunt syndrome&lt;br&gt;• eczema&lt;br&gt;• non-truncal involvement&lt;br&gt;• moderate or severe pain</td>
<td></td>
</tr>
</tbody>
</table>

**UKHSA 2022** Post exposure prophylaxis for chickenpox and shingles

Updated Aug 2022
## Herpes Simplex

### Key points

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye</strong></td>
<td>topical ganciclovir 3% eye ointment 6 hrly</td>
<td>7 days</td>
</tr>
<tr>
<td><strong>Neonatal</strong></td>
<td>aciclovir IV 20 mg/kg 8 hrly</td>
<td>14 days Skin Eye Mouth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21 days disseminated and encephalitis</td>
</tr>
<tr>
<td><strong>Neonatal prophylaxis</strong></td>
<td>aciclovir po</td>
<td>6 months</td>
</tr>
<tr>
<td><strong>Gingivostomatitis</strong></td>
<td>aciclovir</td>
<td>5 days</td>
</tr>
<tr>
<td>if &lt;72 hr from onset</td>
<td>OR valaciclovir if &gt;12 years old</td>
<td>If new lesions during treatment, then continue until 3 days after lesions heal over</td>
</tr>
<tr>
<td><strong>Eczema herpeticum / immunocompromised</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Skin lesions</strong></td>
<td>If severe</td>
<td></td>
</tr>
</tbody>
</table>

---

**NICE CG57** Atopic eczema in under 12s: diagnosis and management

RCPPCH [Blue Book 4 edn](#) p594 Ch 76 Herpes simplex

Updated Oct 2020
Osteomyelitis / Septic arthritis

- Take blood cultures and consult orthopaedics for samples and Paed ID / Micro before antibiotics
- **Unifocal** disease indicates “simple” disease at a single site.
- **Complex** disease includes multifocal, significant bone destruction, resistant or unusual pathogen, immunosuppression, sepsis or shock or associated with metal work

### Key points

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Oral switch</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3 months</td>
<td>cefTRIAXone</td>
<td>Oral after 14-21 days: co-amoxiclav OR cefALEXin</td>
<td>Unifocal IV to oral switch if: afebrile, pain free &gt;24 hours, CRP &lt;20 or reduced by 2/3 highest value</td>
<td>Oral switch: cotrimoxazole</td>
</tr>
<tr>
<td>3 months – 5 years</td>
<td>cefUROXime IV</td>
<td>Oral after 72 hours: co-amoxiclav OR cefALEXin</td>
<td>2-3 weeks in septic arthritis</td>
<td></td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>flucloxacillin IV</td>
<td>Oral after 72 hours: capsules: flucloxacillin suspension: co-amoxiclav OR cefALEXin</td>
<td>Complex disease IV to oral switch after 14 days; may require &gt;6 weeks of treatment.</td>
<td>cefTRIAXone Oral switch: Suspension: cotrimoxazole Capsules: clindamycin</td>
</tr>
</tbody>
</table>

**Staphylococcus aureus**

- **MSSA:** flucloxacillin
  - Oral after 72 hours: capsules: flucloxacillin suspension: co-amoxiclav OR cefALEXin
  - As above
  - cefTRIAXone Oral switch: Suspension: cotrimoxazole Capsules: clindamycin

- **PVL MSSA:** flucloxacillin + clindamycin
  - co-amoxiclav OR cefALEXin

- **MRSA:** teicoplanin OR vancomycin
  - clindamycin
### Antimicrobial Paediatric Guide UK-PAS

<table>
<thead>
<tr>
<th>Sickle cell disease or no Hib vaccine</th>
<th>Oral switch: cefTRIAXone</th>
<th>Oral switch after 1 week flucloxacillin capsules or co-amoxiclav suspension</th>
<th>Complex disease</th>
<th>As above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal work</td>
<td>cefTRIAXone + teicoplanin OR vancomycin +/- rifampicin if <em>Staphylococcus aureus</em></td>
<td>flucloxacillin OR co-amoxiclav suspension</td>
<td>ciprofloxacin + rifampicin</td>
<td></td>
</tr>
</tbody>
</table>

#### Likely causative organisms

- **<5 years of age:** *Staphylococcus aureus*, *Kingella kingae*, *Group A Streptococcus*, *Streptococcus pneumoniae*.
- **Rare causes:** *Haemophilus influenzae* type b (unvaccinated individuals) & *Salmonella* spp.
- **5-18 years:** *Staphylococcus aureus*, *Group A Streptococcus* and *Streptococcus pneumoniae*

---

RCPCH Blue Book 4 edn p65 Ch 7 Bone and Joint Infections

ESPID 2017 European society for paediatric infectious diseases: Bone and joint infections

McMullen 2016 Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines

NEJM 2019 Oral versus Intravenous Antibiotics for Bone and Joint Infection

BOAST 2022 British Orthopaedic Association Standard: The Management of Children with Acute Musculoskeletal Infection

BSAC Paediatric Pathways 2023 Bone and joint infection for children presenting to hospital

IDSA 2021 Guideline on Diagnosis and Management of Acute Hematogenous Osteomyelitis in Pediatrics

Updated Jan 2023
Antimicrobial Paediatric Guide UK-PAS

Discitis

Take blood cultures before antibiotics and if not improving. Consult Paed ID / Micro and spinal surgeons for fine needle aspiration / biopsy and molecular testing (targeted PCRs +/- 16S PCR)

**Simple discitis** - inflammation/infection of the vertebral disc with no vertebrae involvement

**Complex discitis** - inflammation/infection of the vertebral disc with involvement of the adjacent vertebrae.

If significant bony involvement / vertebral destruction, consider pathogens such as TB and discuss with paediatric infectious diseases team

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Oral switch</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple discitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 months</td>
<td>cefTRIAXone</td>
<td>cefALEXin OR co-amoxiclav</td>
<td>Oral switch: if clinically improving, aperyrexial, CRP falling from 48 – 72 hrs</td>
<td>clindamycin + ciprofloxacin</td>
</tr>
<tr>
<td>3 months – 5 years</td>
<td>cefUROXime IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>flucloxacillin IV</td>
<td></td>
<td>Total antibiotics: 3-4 weeks</td>
<td></td>
</tr>
<tr>
<td>Complex discitis</td>
<td>cefTRIAXone</td>
<td></td>
<td>Oral switch: from 2 weeks Total antibiotics: 6-12 weeks</td>
<td></td>
</tr>
<tr>
<td>Sickle cell disease</td>
<td>cefTRIAXone</td>
<td></td>
<td>ciprofloxacin</td>
<td></td>
</tr>
</tbody>
</table>

**J Paed Child Health 2022** Spondylodiscitis in children

**PIDJ 2022** Spondylodiscitis in Pediatric Age: A Retrospective Cohort Study

Updated Apr 2023

Feedback
## Orthopaedic surgical prophylaxis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin low risk allergy</th>
<th>Penicillin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean orthopaedic procedures without implant</td>
<td>Not recommended</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedic procedures with implants e.g., K wiring, circular frame application</td>
<td>flucloxacillin IV</td>
<td>Single dose within 60 minutes before incision</td>
<td>cefUROXime IV</td>
<td>teicoplanin</td>
</tr>
<tr>
<td>Open fractures requiring surgery Start within 1 hour of injury</td>
<td>co-amoxiclav IV</td>
<td>Grade 1: 24 hours</td>
<td>cefUROXime IV</td>
<td>clindamycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grade 2-3: 72 hours or until wound closure if sooner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• At first debridement</td>
<td>co-amoxiclav IV + gentamicin</td>
<td>Single dose within 60 minutes before incision</td>
<td>cefUROXime IV + metronidazole + gentamicin</td>
<td>clindamycin IV + gentamicin</td>
</tr>
<tr>
<td>• At skeletal stabilisation and closure</td>
<td>teicoplanin + gentamicin</td>
<td>Single dose within 60 minutes before incision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor fractures with open wound (no surgery)</td>
<td>co-amoxiclav PO</td>
<td>Review at 24 hours for signs of infection</td>
<td>clarithromycin PO</td>
<td></td>
</tr>
<tr>
<td>High lower-limb amputation</td>
<td>co-amoxiclav IV</td>
<td>Single dose within 30 minutes before incision and continue for at least 2 post-operative doses</td>
<td>cefUROXime IV + metronidazole</td>
<td>teicoplanin + metronidazole</td>
</tr>
<tr>
<td>Spinal surgery</td>
<td>co-amoxiclav IV</td>
<td>Single dose within 60 min before incision</td>
<td>cefUROXime IV</td>
<td>teicoplanin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Re-dose at 4 hours if surgery ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider re-dosing if significant blood loss (&gt;25 ml/kg)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BNFc NICE Antibacterial prophylaxis
NICE NG125 2020 Surgical site infections: prevention and treatment
NICE NG37 2016 Fractures (complex): assessment and management
BAPRAS 2020 Management of Open Fractures
BAPRAS 2009 Lower limb Fractures
WHO 2018 Global SSI guideline
NHSE 2023 Clinical guidelines for major incidents and mass casualty events
NASS 2013 Recommendations Regarding Antibiotic Prophylaxis in Spine Surgery

Updated June 2023
Antimicrobial Paediatric Guide UK-PAS

Infectious Diarrhoea

Antibiotic therapy is not usually indicated unless patient is systemically unwell
Risk of haemolytic uraemic syndrome increased if antibiotics given

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloody diarrhoea and severe sepsis</td>
<td>cefTRIAXone</td>
<td>5 days</td>
</tr>
<tr>
<td>Campylobacter suspected (such as undercooked</td>
<td>clarithromycin</td>
<td>5 to 7 days</td>
</tr>
<tr>
<td>meat and abdominal pain), If systemically</td>
<td></td>
<td>14 days if bacteraemia</td>
</tr>
<tr>
<td>unwell consider treatment if treated early</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(within 3 days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giardia is confirmed or suspected (diarrhoea</td>
<td>metronidazole</td>
<td>3 days</td>
</tr>
<tr>
<td>with abdominal cramps, bloating and flatulence)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmonella (non-typhoidal): self-limiting</td>
<td>azithromycin or</td>
<td>5 days</td>
</tr>
<tr>
<td>unless chronic GI tract disease, haemoglobinopathy, &lt;6 months old, malignancy or immunocompromised</td>
<td>amoxicillin if sensitive</td>
<td>14 days if immunosuppressed</td>
</tr>
<tr>
<td>Shigella self-limiting</td>
<td>if severe: ciprofloxacin</td>
<td>7 - 10 days</td>
</tr>
<tr>
<td>Only treat if severe</td>
<td>OR azithromycin if resistance</td>
<td></td>
</tr>
<tr>
<td>OR if systemically unwell</td>
<td>OR if systemically unwell</td>
<td></td>
</tr>
<tr>
<td>Listeria</td>
<td>cefTRIAXone</td>
<td></td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>amoxicillin</td>
<td>7 days</td>
</tr>
<tr>
<td>E. coli O157 H7</td>
<td>penicillin allergy:</td>
<td></td>
</tr>
<tr>
<td>Cladribidioles difficile toxin</td>
<td>co-trimoxazole</td>
<td></td>
</tr>
<tr>
<td>Severe: T &gt;38.5°C or WCC &gt;15, rising creatinine, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>signs/symptoms of severe colitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discontinue antibiotics, PPI, anti-peristaltic agent where possible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consider faecal microbiota transplant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe or type 027 or recurrence (after &gt;12 weeks):</td>
<td>oral vancomycin</td>
<td>10-14 days</td>
</tr>
<tr>
<td>Life threatening + metronidazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relapse (&lt;12 weeks after 1st episode) or second line:</td>
<td>fidaxomicin</td>
<td></td>
</tr>
</tbody>
</table>
### Typhoid enteric fever

**Complicated:** severe sepsis or shock, gastrointestinal bleeding, intestinal perforation, encephalopathy or metastatic infection

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>If uncomplicated and if sensitive</td>
<td>azithromycin</td>
<td>7 days</td>
</tr>
<tr>
<td>If complicated</td>
<td>cefTRIAXone oral switch azithromycin or ciprofloxacin if sensitive</td>
<td></td>
</tr>
<tr>
<td>If severe sepsis or from countries with cephalosporin resistance e.g.,</td>
<td>meropenem + azithromycin</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Enterocolitis

<table>
<thead>
<tr>
<th>Possible</th>
<th>metronidazole po</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definite</td>
<td>amoxicillin + gentamicin + metronidazole po</td>
</tr>
<tr>
<td>Severe</td>
<td>piperacillin with tazobactam + metronidazole po</td>
</tr>
</tbody>
</table>

---

RCPCH Blue Book 4 edn p452 Ch 50 Campylobacter, p495 Ch 58 C. diff, p808 Ch 110 Salmonella, p820 Ch 113 Shigella

NICE CG84 Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management

BIA 2022 British infection association guidelines for the diagnosis and management of enteric fever in England

Paediatr Int Child Health 2018 Guidelines for the treatment of dysentery (shigellosis): a systematic review of the evidence

Wolf J CID 2019 Safety and Efficacy of Fidaxomicin and Vancomycin in Children and Adolescents with Clostridioides (Clostridium) difficile Infection

NICE NG199 2021 Clostridioides difficile infection: antimicrobial prescribing

Paed Surg 2017 Guidelines for the Diagnosis and Management of Hirschsprung-Associated Enterocolitis

Updated Sept 2023
Antimicrobial Paediatric Guide UK-PAS

Helicobacter pylori

- Children should only be tested for *H. pylori* if they have clinical evidence of gastritis or duodenal ulcer disease, and not for mild recurrent abdominal pain.
- Always test for *H. pylori* before giving antibiotics. Treat all positives if known duodenal or gastric ulcer.
- Do not offer eradication for reflux. Number needed to treat in non-ulcer dyspepsia: 14.
- Do not use clarithromycin, metronidazole or quinolone if used in the past year for any infection.
- Eradication regimens incorporate a proton pump inhibitor in combination with antibiotic treatment for 7 days.
- If infection persists despite treatment, the possibility of non-compliance should be considered.

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Line</td>
<td>proton pump inhibitor + amoxicillin + clarithromycin OR metronidazole</td>
<td>7 days</td>
<td>proton pump inhibitor + metronidazole + clarithromycin</td>
</tr>
</tbody>
</table>

In situations where these regimens are not suitable, or patients fail to respond please consult a gastroenterologist for advice.

NIHP (PHE) Helicobacter pylori in dyspepsia: test and treat

RCPCH Blue Book 4 edn p572 Ch 72 Helicobacter pylori

Updated Aug 2021
**Appendicitis / Peritonitis**

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin low risk allergy</th>
<th>Penicillin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple appendicitis (not perforated or gangrenous)</td>
<td>co-amoxiclav</td>
<td>IV pre-op, stop immediately post op</td>
<td>ciprofloxacin IV + metronidazole</td>
<td></td>
</tr>
<tr>
<td>Conservatively managed appendicitis</td>
<td>co-amoxiclav</td>
<td>IV 24 hours minimum Oral switch when afebrile inflammatory markers improving 7 days total</td>
<td>cefUROXime IV + metronidazole</td>
<td>clindamycin + gentamicin OR if unable to take capsules ciprofloxacin + metronidazole</td>
</tr>
<tr>
<td>Perforated or gangrenous appendicitis or associated sepsis</td>
<td>amoxicillin + metronidazole + gentamicin (single dose) severe sepsis oral switch co-amoxiclav</td>
<td>Preop and 3 days postop 7 days total if white cell count raised on day 3 Oral switch when afebrile inflammatory markers improving</td>
<td>ciprofloxacin IV + metronidazole</td>
<td></td>
</tr>
<tr>
<td>Second line or underlying immunosuppression</td>
<td>piperacillin with tazobactam + gentamicin severe sepsis</td>
<td>3 days then review</td>
<td>gentamicin + clindamycin</td>
<td></td>
</tr>
</tbody>
</table>

*WHO 2022* The WHO AWaRe (Access, Watch, Reserve) antibiotic book Ch 31

*WSES 2018* WSES Jerusalem guidelines for diagnosis and treatment of acute appendicitis

*Ann Surg 2019* Antibiotic Treatment and Appendectomy for Uncomplicated Acute Appendicitis in Adults and Children

*IDSA 2010* Diagnosis and Management of Complicated Intra-abdominal Infection in Adults and Children

*J Ped Surg 2019* Prospective evaluation of a clinical response directed pathway for complicated appendicitis

*Lancet 2023* 2 days versus 5 days of postoperative antibiotics for complex appendicitis

Updated Jan 2023
## Mediastinitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oesophageal perforation</td>
<td><strong>co-amoxiclav IV</strong></td>
<td>7 days</td>
<td><strong>metronidazole po</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>+ clarithromycin po</strong></td>
</tr>
<tr>
<td>Severe sepsis</td>
<td><strong>cefTRIAXone</strong> + <strong>metronidazole</strong></td>
<td>7 days</td>
<td></td>
</tr>
</tbody>
</table>

*Clin Micro & Infxn 2020* Mediastinitis in the intensive care unit patient: a narrative review

Updated Nov 2022
Antimicrobial Paediatric Guide UK-PAS

## Pancreatitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute pancreatitis (including necrosis without evidence of infection)</td>
<td>No antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Documented infected necrosis: worsening with fevers, or with presence of</td>
<td>cefUROXime IV + metronidazole</td>
<td>Clinical response</td>
<td></td>
</tr>
<tr>
<td>gas within collections on imaging</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NICE NG104** Pancreatitis

**NASPGHAN 2018** Management of Acute Pancreatitis in the Pediatric Population: A Clinical Report From the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition Pancreas Committee

Updated May 2021
## Cholecystitis / Biliary Infection

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Line</td>
<td>co-amoxiclav IV + metronidazole if collection present + gentamicin if severe sepsis or shock</td>
<td>5 days Longer if abscess present</td>
<td>cefUROXime IV + metronidazole</td>
</tr>
</tbody>
</table>

**Likely causative organisms**
Polymicrobial and include coliforms, enterococci and anaerobes

[IDSA 2010](#) Diagnosis and Management of Complicated Intra-abdominal Infection in Adults and Children

Updated Jan 2021

[Feedback](#)
**Liver abscess**

Source control with drainage procedures

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyogenic</td>
<td>co-amoxiclav IV</td>
<td>4 weeks minimum depending on repeat imaging</td>
<td>cefuroxime IV</td>
</tr>
<tr>
<td>If risk of amoebae</td>
<td>co-amoxiclav IV + metronidazole</td>
<td></td>
<td>cefuroxime IV + metronidazole</td>
</tr>
<tr>
<td></td>
<td>Oral switch according to sensitivities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amoebic</td>
<td>metronidazole</td>
<td>10 days</td>
<td></td>
</tr>
</tbody>
</table>

*WHO 2022* The WHO AWaRe (Access, Watch, Reserve) antibiotic book Ch 29

Updated Jan 2023
## GI / Thoracic Surgical Prophylaxis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin low risk allergy</th>
<th>Penicillin high risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clean e.g.:</strong> PICC / TIVAD insertion</td>
<td>Not recommended</td>
<td>Not recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Clean - contaminated e.g.:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Upper GI (stomach, oesophagus)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Low risk thoracic procedure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- video-assisted thoracoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- excision of neurogenic tumour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- decortication / lobectomy</td>
<td>co-amoxiclav IV</td>
<td>Single dose within 60 minutes before incision</td>
<td>cefuroxime IV</td>
<td>gentamicin</td>
</tr>
<tr>
<td><strong>Lower GI including appendicectomy</strong></td>
<td>co-amoxiclav IV</td>
<td>Single dose within 60 minutes before incision</td>
<td>cefuroxime IV + metronidazole</td>
<td>gentamicin + metronidazole</td>
</tr>
<tr>
<td>- Intussusception</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Open cholecystectomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High risk thoracic procedures</strong></td>
<td>flucloxacillin IV + gentamicin</td>
<td>Single dose within 60 minutes before incision and continue flucloxacillin or cefuroxime IV for 24 hours post op</td>
<td>cefuroxime IV + gentamicin</td>
<td>teicoplanin + gentamicin</td>
</tr>
<tr>
<td>- emergency thoracotomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nuss Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Splenectomy</strong></td>
<td>Surgical prophylaxis as per  abdominal procedures Post operatively phenoxymethylpenicillin BD to at least 16 years old</td>
<td>1 month prior to operation if elective, postop if emergency: pneumococcal (Prevenar 13®) + meningococcal A, C, W, Y + meningococcal B</td>
<td>erythromycin BD</td>
<td></td>
</tr>
</tbody>
</table>

---

*The Open Orthopaedics Journal - 2012* Current Concepts of Prophylactic Antibiotics in Trauma: A Review

BNFc NICE Antibacterial prophylaxis

*Haem-Onc Task Force 2011* Review of guidelines for the prevention and treatment of infection in patients with an absent or dysfunctional spleen

Updated May 2021

Feedback
## Conjunctivitis

### Samples / Investigations
- Eye swab – bacterial culture
- NAAT swab for *Chlamydia* and gonococcus
- Viral swab for HSV

**Treat only if severe** as most cases are viral or self-limiting.

**Bacterial conjunctivitis**: usually unilateral and self-limiting. It is characterised by red eye with mucopurulent, not watery discharge. 65% and 74% resolve on placebo by days 5 and 7.

### Likely organisms

<table>
<thead>
<tr>
<th>Common</th>
<th><em>Staphylococcus aureus, Streptococcus pneumoniae</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rare</td>
<td>Haemophilus, coliforms, gonorrhoea, chlamydia</td>
</tr>
</tbody>
</table>

### Treatment

<table>
<thead>
<tr>
<th>Key points</th>
<th>1st line</th>
<th>2nd line</th>
<th>3rd line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sterile saline or cooled boiled water</td>
<td>chloramphenicol (topical) 0.5% eye drops or 1% ointment</td>
<td>fusidic acid 1% eye drops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One drop 4 times a day. In severe infection administer DROPS initially every 2 hours</td>
<td>One drop twice a day</td>
</tr>
<tr>
<td>Duration</td>
<td>Continue for 48 hours after healing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Chlamydial conjunctivitis**: neonates and <9 years old: *erythromycin* po; >8 years old: *doxycycline* po
- **Gonococcal conjunctivitis**: *cefOTAXime*
- **Herpes simplex**: <1 month: *aciclovir* IV; >1 month: *aciclovir* po; Older children: *ganciclovir* 0.15% eye gel; Severe: *aciclovir* IV THEN po OR >12 years old *valaciclovir* po
RCPCH Blue Book 4 edn p501 Ch 59 Conjunctivitis

College of Optometrists Conjunctivitis, Bacterial; Conjunctivitis, Chlamydial

BASHH HSV 2014 Management of Genital Herpes in Pregnancy

MHRA 2021 Chloramphenicol eye drops containing borax or boric acid buffers: use in children younger than 2 years

Cochrane 2012 Antibiotics versus placebo for acute bacterial conjunctivitis

GG&C Eye infections in the neonate: Ophthalmia Neonatorum and the management of systemic Gonococcal and Chlamydial infections

CDC 2021 Gonococcal Infections Among Neonates

AAO 2022 Neonatal conjunctivitis

Updated May 2021
Orbital cellulitis and Pre-septal cellulitis

Refer urgently to Ophthalmologists (sight threatening)

Samples / Investigations

- Blood cultures
- Pus / swab

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low grade pre-septal disease</td>
<td>co-amoxiclav po</td>
<td>5 days</td>
<td>clarithromycin</td>
</tr>
<tr>
<td>High grade pre-septal</td>
<td>co-amoxiclav IV</td>
<td>IV 24-48 hours then oral 7 days</td>
<td>clindamycin + ciprofloxacin</td>
</tr>
<tr>
<td>Orbital cellulitis</td>
<td>cefTRIAXone</td>
<td>Continue until clinical resolution. A total of 2 to 4 weeks may be required.</td>
<td></td>
</tr>
<tr>
<td>Oral switch</td>
<td>co-amoxiclav</td>
<td></td>
<td>clindamycin + ciprofloxacin</td>
</tr>
</tbody>
</table>

RCPCH Blue Book 4 edn p156-159 Ch 16 Ocular infections

BSAC Paediatric Pathways Pre-septal and postseptal (orbital) cellulitis pathway for children presenting to hospital

AAO 2022 American Academy of Ophthalmology Orbital Cellulitis

Updated Jan 2023
## Ophthalmia Neonatorum

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent ophthalmology review</td>
<td>cefOTAXime single dose IV immediately + chloramphenicol eye drops + aciclovir if concern HSV OR + erythromycin po if concern chlamydia</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>NAAT swab for <em>Chlamydia</em> and gonococcus</td>
<td></td>
<td></td>
<td>Longer if abscess present</td>
</tr>
<tr>
<td>Consider HSV if vesicles (see <a href="#">Conjunctivitis</a>)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CDC 2021** Gonococcal Infections Among Neonates

**GG&C** Eye infections in the neonate: Ophthalmia Neonatorum and the management of systemic Gonococcal and Chlamydial infections

**AAO 2022** Neonatal conjunctivitis

Updated Feb 2022
Blepharitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First line</strong>: lid hygiene for symptom control, including: warm compresses; lid massage and scrubs; gentle washing; avoiding cosmetics.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second line</strong>: topical antibiotics if hygiene measures are ineffective after 2 weeks.</td>
<td><strong>Second line:</strong> topical chloramphenicol OR azithromycin eye drops</td>
<td>6 weeks</td>
<td></td>
</tr>
<tr>
<td><strong>Signs of meibomian gland dysfunction, or acne rosacea</strong>: consider oral antibiotics.</td>
<td><strong>Third line</strong>: oral doxycycline (&gt;8 years old)</td>
<td>4 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>erythromycin (&lt;8 years old)</td>
<td>8 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 weeks</td>
<td></td>
</tr>
</tbody>
</table>

College of Optometrists  
Blepharitis

Updated Oct 2023
# Endophthalmitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Result of external source</strong></td>
<td><strong>Intravitreal injection:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g., penetrating eye trauma, post operative or keratitis</td>
<td>vancomycin + cefTAZidime</td>
<td>Single dose</td>
<td></td>
</tr>
<tr>
<td><strong>Endogenous</strong></td>
<td>+ cefTRIAXone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g., bacteraemia</td>
<td>+ vancomycin</td>
<td></td>
<td>(see Sepsis)</td>
</tr>
</tbody>
</table>

*WHO 2022* The WHO AWaRe (Access, Watch, Reserve) antibiotic book Ch 10 p111

Updated Jan 2023
## Keratitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start treatment only on ophthalmology advice as cultures may need to be taken first</td>
<td>ofloxacin eye drops</td>
<td>10 days</td>
<td></td>
</tr>
</tbody>
</table>

**BJO 2014** Topical antibiotics for the management of bacterial keratitis: an evidence-based review of high quality randomised controlled trials

**WHO 2022** The WHO AWaRe (Access, Watch, Reserve) antibiotic book Ch 10 p113

Updated Jan 2023
Lower Urinary Tract Infections

Patients admitted from the community

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st line</td>
<td>cefALEXin</td>
<td>3 days for uncomplicated infections.</td>
<td>Trimethoprim OR nitrofurantoin</td>
</tr>
<tr>
<td>If low risk of resistance*</td>
<td>trimethoprim</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If able to swallow solid forms</td>
<td>nitrofurantoin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If culture result susceptible ESBL</td>
<td>amoxicillin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>fosfomycin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Uncomplicated infections: stat dose
Complex / recurrent / infection: total of 3 doses.
Reduce dose frequency for patients with CrCl < 50 ml/min
Dissolve each 3 gram sachet in 75ml of water.
2 g dose = 50 ml of solution
1 gram = 25 ml of solution May be added to other aqueous solutions (cordial etc.)

*Low risk of resistance: if trimethoprim not used in the past 3 months, previous urine culture suggests susceptibility (but this was not used) and in younger people in areas where data suggest resistance is <30%

NICE CG160 Fever in under 5’s

NICE NG109 Urinary tract infection (lower): antimicrobial prescribing

Updated Jan 2023
**Antimicrobial Paediatric Guide UK-PAS**

**Pyelonephritis / Upper Urinary Tract Infection**

Infants and children who have bacteriuria and any of:
- fever of ≥38°C
- loin pain/tenderness

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;3 months</strong></td>
<td>Not severe sepsis</td>
<td><strong>cefTRIAXone</strong></td>
<td>Review IV therapy at 24 to 48 hours for oral switch</td>
</tr>
<tr>
<td></td>
<td>if severe sepsis</td>
<td>+ <strong>gentamicin</strong> single dose</td>
<td>7 to 10 days in total</td>
</tr>
<tr>
<td><strong>&gt;3 months</strong></td>
<td>Able to take orally</td>
<td><strong>cefALEXin</strong></td>
<td>gentamicin</td>
</tr>
<tr>
<td></td>
<td>if vomiting, unable to take oral antibiotics</td>
<td><strong>cefUROXime</strong></td>
<td></td>
</tr>
<tr>
<td>If sepsis</td>
<td><strong>cefTRIAXone</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If severe sepsis</td>
<td>+ <strong>gentamicin</strong> single dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oral switch</strong></td>
<td>culture guided</td>
<td><strong>cefALEXin</strong> if sensitive</td>
<td>gentamicin</td>
</tr>
</tbody>
</table>

**NICE NG111** Pyelonephritis (acute): antimicrobial prescribing

**BSAC Paediatric Pathways** Pyelonephritis / upper UTI pathway for children presenting to hospital

**McMullen 2016** Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines

Updated Jan 2023
# Catheter Associated Urinary Tract Infections

**Patients admitted from the community**

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin High risk allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st line</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If low risk of resistance</td>
<td>trimethoprim</td>
<td>7-10 days</td>
<td></td>
</tr>
<tr>
<td>If culture result susceptible</td>
<td>co-amoxiclav</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If culture result susceptible</td>
<td>amoxicillin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If culture result susceptible</td>
<td>cefUROXime IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If vomiting, unable to take oral antibiotics or severely unwell</td>
<td></td>
<td>Review IV antibiotics by 48 hours and consider switch to oral where possible for a total of 10 days</td>
<td></td>
</tr>
<tr>
<td>If culture result susceptible</td>
<td>co-amoxiclav IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If sepsis</td>
<td>cefTRIAXone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If severe sepsis</td>
<td>gentamicin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If high rates gentamicin resistance</td>
<td>amikacin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Antibiotic treatment is not routinely needed for asymptomatic bacteriuria in people with a urinary catheter.
- Consider removing or, if not possible, changing the catheter if it has been in place for more than 7 days. Do not delay antibiotic treatment if symptomatic.
- Advise paracetamol for pain.
- Advise drinking enough fluids to avoid dehydration.
- Offer an antibiotic for a symptomatic infection.
- When prescribing antibiotics, take account of severity of symptoms, risk of complications, previous urine culture and susceptibility results, previous antibiotic use which may have led to resistant bacteria and local antimicrobial resistance data.
- Do not routinely offer antibiotic prophylaxis to people with a short-term or long-term catheter.

**NICE NG113** Urinary tract infection (catheter-associated): antimicrobial prescribing

Updated March 2020
**Peritoneal dialysis associated peritonitis**

- Send peritoneal dialysis fluid for culture before antibiotics
- If entry site infection or systemic sepsis, iv or oral antibiotics may also be required (see Sepsis)
- Consider removing catheter

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add antibiotics to dialysis fluid</td>
<td>teicoplanin OR vancomycin + cefTAZidime</td>
<td>14 days</td>
<td></td>
</tr>
</tbody>
</table>

**ISPD 2016** International Society for Peritoneal Dialysis Peritonitis recommendations (Table 5 p489 for IP dosing)

Updated Jan 2021
# Urology Surgical Prophylaxis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clean Urological Procedures</strong></td>
<td>Not recommended</td>
<td>Not recommended</td>
<td></td>
</tr>
<tr>
<td>- Circumcision</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hydrocele/Hernia Repair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Orchidopexy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Urological Procedures entering urinary tract</strong></td>
<td><strong>co-amoxiclav IV</strong></td>
<td>Single dose within 60 min before procedure</td>
<td><strong>gentamicin</strong></td>
</tr>
<tr>
<td>- Pyeloplasty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nephrectomy/Heminephrectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Other Renal Surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Bladder Augmentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Bladder Augmentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Posterior Urethral Valve Ablation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cystoscopy with minor manipulation/biopsy</strong></td>
<td><strong>co-amoxiclav IV</strong></td>
<td>Single dose within 60 min before procedure</td>
<td><strong>cefuroxime IV</strong></td>
</tr>
<tr>
<td>- Hypospadias repair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Epispadias repair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Only if surgery is thought to be extensive and patient at a high risk of infection</td>
<td></td>
<td></td>
<td><strong>penicillin high risk allergy</strong></td>
</tr>
</tbody>
</table>

**References**

- J Ped Urol 2018: Is surgical antibiotic prophylaxis necessary for pediatric orchiopexy?
- J Urol 2020: Best Practice Statement on Urologic Procedures and Antimicrobial Prophylaxis
- NHSGGC: Hypospadias repair, post-op pharmaceutical management

Updated Jan 2023
Antimicrobial Paediatric Guide UK-PAS

Chlamydia trachomatis / other urethritis

- Opportunistically screen all sexually active patients for *Chlamydia* annually and on change of sexual partner.
- If positive, treat index case, refer to Sexual Health clinic and initiate partner notification, testing and treatment. Consider safeguarding.
- As single dose azithromycin has led to increased resistance in GU infections, doxycycline should be used first line for *Chlamydia* and urethritis.
- Advise patient with chlamydia to abstain from sexual intercourse until doxycycline is completed or for 7 days after treatment with azithromycin (14 days after azithromycin started and until symptoms resolve if urethritis).
- If chlamydia, test for re-infection at 3 to 6 months following treatment.
- Consider referring all patients with symptomatic urethritis to GUM as testing should include *Mycoplasma genitalium* and gonorrhoea.
- If *M. genitalium* is proven, use doxycycline, followed by azithromycin using the same dosing regimen and avoid sex for 14 days after start of treatment and until symptoms have resolved.

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First line</td>
<td>doxycycline</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(&gt;8 years old)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second line</td>
<td>azithromycin</td>
<td>3 days</td>
<td></td>
</tr>
</tbody>
</table>

**BASHH 2015** UK national guideline for the management of infection with Chlamydia trachomatis

**BASHH 2018** Update on the treatment of Chlamydia trachomatis (CT) infection

Updated March 2020
## Epididymitis / Orchitis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to Sexual Health clinic</td>
<td>doxycycline (&gt;8 years old) OR ciprofloxacin (&lt;8 years old)</td>
<td>10 to 14 days</td>
<td></td>
</tr>
<tr>
<td>High risk of STI</td>
<td>cefTRiAXone + doxycycline (&gt;8 years old)</td>
<td>Single dose 10 days</td>
<td></td>
</tr>
</tbody>
</table>

**EAU 2016** Guidelines on Urological Infections

**BASHH 2020** United Kingdom British association for sexual health and HIV national guideline for the management of epididymo-orchitis

Updated Jan 2023
### Vaginal candidiasis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1\textsuperscript{st} episode</td>
<td>clotrimazole OR fenticonazole OR oral fluconazole</td>
<td>stat</td>
<td></td>
</tr>
<tr>
<td>Recurrent (&gt;4 episodes per year)</td>
<td>fluconazole</td>
<td>3 doses – once every 72 hours then weekly for 6 months</td>
<td></td>
</tr>
</tbody>
</table>

**NICE (UKHSA)** Condensed summary of antimicrobial prescribing guidance

**BASHH 2019** British Association for Sexual Health and HIV national guideline for the management of vulvovaginal candidiasis

Updated March 2020
### Bacterial Vaginosis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral <strong>metronidazole</strong> is as effective as topical treatment and is cheaper</td>
<td><strong>metronidazole</strong> po</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>7 days results in fewer relapses than 2g stat at 4 weeks</td>
<td>OR <strong>metronidazole</strong> 0.75% vaginal gel</td>
<td>5 nights</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR <strong>clindamycin</strong> 2% cream</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BASHH 2012** UK National Guideline for the management of Bacterial Vaginosis

Updated March 2020
Genital Herpes

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advise: saline bathing, analgesia, or topical</td>
<td>aciclovir po</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>lidocaine for pain, and discuss transmission.</td>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First episode: treat within 5 days if new</td>
<td>valaciclovir (licensed &gt;12 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lesions or systemic symptoms, and refer to</td>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Health clinic, consider safeguarding.</td>
<td>famciclovir (licensed &gt;12 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurrent: self-care if mild or immediate short</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>course antiviral treatment, or suppressive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>therapy if more than 6 episodes per year.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BASHH 2014 UK national guideline for the management of anogenital herpes

Updated March 2020
### Gonorrhoea

#### Key points
- Antibiotic resistance is high.
- Use IM cefTRIAXone if susceptibility not known prior to treatment.
- Use ciprofloxacin only if susceptibility is known prior to treatment and the isolate is sensitive to ciprofloxacin at all sites of infection.
- Refer to Sexual Health Clinic. Test of cure is essential. Consider safeguarding.

#### Treatment
- cefTRIAXone
- OR
- ciprofloxacin (only if known to be sensitive)

#### Duration
- Stat

---

**Antimicrobial Paediatric Guide UK-PAS**

**BASHH 2018** UK national guideline for the management of infection with Neisseria gonorrhoeae

Updated March 2020
### Trichomoniasis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral treatment needed as extra-vaginal infection common. Treat partners and refer to GUM for other STIs. Consider safeguarding.</td>
<td><strong>metronidazole</strong></td>
<td>5 to 7 days</td>
<td></td>
</tr>
</tbody>
</table>

**BASHH 2021** British Association for Sexual Health and HIV (BASHH) United Kingdom national guideline on the management of *Trichomonas vaginalis* 2021

Updated Aug 2023
Pelvic Inflammatory Disease

- Refer women and sexual contacts to Sexual Health clinic, consider safeguarding.
- Raised CRP supports diagnosis, absent pus cells in high vaginal swab smear good negative predictive value.
- Moxifloxacin has greater activity against likely pathogens, but always test for gonorrhoea, *Chlamydia*, and *Mycoplasma genitalium*.
- If *M. genitalium* tests positive use moxifloxacin.

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First line therapy</td>
<td><strong>cefTRIAXone</strong> + metronidazole + doxycycline (&gt;8 years old) OR azithromycin if &lt;9 years old</td>
<td>stat + gentamicin + clindamycin IV 24 hours</td>
<td>Oral: metronidazole + doxycycline (&gt;8 years old) OR azithromycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td>Second line therapy</td>
<td><strong>metronidazole + ofloxacin OR moxifloxacin alone</strong> (first line for <em>M. genitalium</em> associated PID)</td>
<td>14 days</td>
<td></td>
</tr>
</tbody>
</table>

BASHH 2019 United Kingdom National Guideline for the Management of Pelvic Inflammatory Disease (2019 Interim Update)

Updated March 2020
### Balanitis

- Do not attempt to retract the foreskin
- Do not use soap
- **Bacterial**: painful redness of the glans penis, oedema, erosions, purulent exudate

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-specific</strong></td>
<td><strong>clotrimazole</strong> 1% cream 8-12 hourly + hydrocortisone 1% cream or ointment daily</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td><strong>Bacterial</strong></td>
<td><strong>flucloxacillin</strong></td>
<td>7 days</td>
<td>clindamycin</td>
</tr>
</tbody>
</table>

**NICE CKS** Balanitis

Updated June 2020
# Endocarditis

<table>
<thead>
<tr>
<th>Empiric treatment</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Native valve</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take at least 3 aerobic blood cultures with maximum volume of blood for bottle and consult Paed ID / Micro prior to starting antibiotics</td>
<td>amoxicillin (high dose) IV + flucloxacillin (high dose) IV + gentamicin (low dose)</td>
<td>Until pathogen identification</td>
<td>Low risk penicillin allergy: cefazolin + gentamicin 7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High risk penicillin allergy: teicoplanin OR vancomycin + gentamicin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Native valve + severe sepsis and risk factors for ESBL</strong></td>
<td>teicoplanin OR vancomycin IV + meropenem (high dose)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prosthetic valve</strong></td>
<td>teicoplanin OR vancomycin IV + gentamicin + rifampicin po</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organism specific Native valve</strong></td>
<td>benzylpenicillin 25 mg/kg 4-hourly IV OR cefTRIAXone 100 mg/kg daily OR benzylpenicillin 25 mg/kg 4-hourly IV OR cefTRIAXone 100 mg/kg daily + gentamicin 3 mg/kg daily IV</td>
<td>4 weeks</td>
<td>teicoplanin OR vancomycin 6 weeks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>benzylpenicillin 50 mg/kg 4-hourly IV OR cefTRIAXone 100 mg/kg daily + gentamicin</td>
<td>2 weeks</td>
<td></td>
</tr>
<tr>
<td><strong>Streptococcus gallolyticus (Group D) and oral Streptococci with penicillin MIC &lt;0.125mg/L</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>flucloxacinil 50 mg/kg 6-hourly IV</td>
<td>4-6 weeks</td>
<td>Low risk penicillin allergy: cefazolin + rifampicin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High risk penicillin allergy: teicoplanin OR vancomycin + gentamicin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Methicillin resistant *Staphylococcus aureus* (MRSA) | vancomycin | 4-6 weeks |
---|---|---|
**Enterococci** (beta-lactam and aminoglycoside sensitive) | amoxicillin IV + gentamicin | 6 weeks | 2 weeks gentamicin + teicoplanin OR vancomycin IV + gentamicin IV |
**Enterococci with high level aminoglycoside resistance** | amoxicillin IV + cefTRIAXone | 6 weeks |
**Enterococcus faecium** | vancomycin + gentamicin IV | 6 weeks | 2 weeks gentamicin |
**Prosthetic valve** | **Treatment** | **Duration** | **Penicillin allergy** |
**Staphylococcus aureus** (MSSA) | flucloxacillin IV + rifampicin PO + gentamicin IV | >6 weeks | 2 weeks gentamicin | see MRSA |
Methicillin resistant *Staphylococcus aureus* (MRSA) | teicoplanin OR vancomycin IV + rifampicin PO + gentamicin IV | >6 weeks | 2 weeks gentamicin |

**American Heart Assoc 2015** Infective Endocarditis in Childhood

**European Society of Cardiology 2023** Guidelines for the management of infective endocarditis

Updated Oct 2023
## Cardiac Surgical Prophylaxis

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sternotomy</td>
<td>cefUROXime IV</td>
<td>Single dose within 60 min before incision and continue for total of 48 hours</td>
<td>teicoplanin OR vancomycin IV + gentamicin IV</td>
</tr>
<tr>
<td>Pacemaker Insertion</td>
<td>cefUROXime IV</td>
<td>Single dose within 60 minutes before incision</td>
<td>teicoplanin IV</td>
</tr>
<tr>
<td>Explant epicardial pacemaker</td>
<td>cefUROXime IV</td>
<td>Single dose within 60 minutes before incision</td>
<td>teicoplanin IV</td>
</tr>
</tbody>
</table>

**NICE NG125 2020** Surgical site infections: prevention and treatment  
**AHA Journal 1998** Antibiotic Prophylaxis for Permanent Pacemaker Implantation

Updated May 2021
Falciparum is a medical emergency: immediate treatment essential. Discuss with Paed ID / Micro

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plasmodium falciparum</strong></td>
<td><strong>Severe</strong></td>
<td>When parasitaemia resolving and patient improving, switch to oral</td>
</tr>
<tr>
<td></td>
<td>artemesunate IV</td>
<td>artemether with lumefantrine to complete 3 days</td>
</tr>
<tr>
<td></td>
<td>if artesunate unavailable:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>quinine IV</td>
<td></td>
</tr>
<tr>
<td><strong>No severe features</strong></td>
<td><strong>artemether with lumefantrine (Riamet®)</strong></td>
<td>6 doses:</td>
</tr>
<tr>
<td></td>
<td>if artemether with lumefantrine unavailable:</td>
<td>(0, 8, 24, 36, 48 and 60 hr)</td>
</tr>
<tr>
<td></td>
<td>atovaquone-proguanil (Malarone®)</td>
<td>3 days</td>
</tr>
<tr>
<td><strong>Non-falciparum malaria</strong></td>
<td><strong>artemether with lumefantrine (Riamet®)</strong></td>
<td>6 doses:</td>
</tr>
<tr>
<td></td>
<td>if artemether with lumefantrine not available</td>
<td>(0, 8, 24, 36, 48 and 60 hr)</td>
</tr>
<tr>
<td></td>
<td>chloroquine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if Plasmodium vivax or Plasmodium ovale and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glucose-6-Phosphate Dehydrogenase (G6PD) levels</td>
<td></td>
</tr>
<tr>
<td></td>
<td>normal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ primaquine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1st dose 10 mg/kg (max 620 mg)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd dose 5 mg/kg (max 310 mg) after 6 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>then once daily for 2 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P. ovale 0.25mg/kg (max 15mg per dose)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P. vivax 0.5mg/kg (max 30mg per dose)</td>
<td></td>
</tr>
</tbody>
</table>

BIA 2016 UK malaria treatment guidelines 2016

WHO 2023 WHO Guidelines for malaria

Updated April 2023
### Sickle Cell

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever with no focus</td>
<td>co-amoxiclav OR</td>
<td>If no bacterial focus identified and clinically improving, consider stopping antibiotic</td>
<td>clarithromycin</td>
</tr>
<tr>
<td></td>
<td>if severe cepTRIAXone + clarithromycin (if chest involvement)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Septic arthritis / osteomyelitis</td>
<td>cepTRIAXone</td>
<td>Seek urgent Paed ID / Orthopaedic input</td>
<td></td>
</tr>
<tr>
<td>Pneumonia (acute chest syndrome)</td>
<td>cepTRIAXone + clarithromycin</td>
<td>5-7 days</td>
<td></td>
</tr>
<tr>
<td>Prophylaxis</td>
<td>phenoxympenylpenicillin (penicillin V)</td>
<td>After completing treatment To continue</td>
<td>clarithromycin</td>
</tr>
</tbody>
</table>

BJHaem 2015. Guideline on the management of acute chest syndrome in sickle cell disease

Updated June 2020
Likely causative organisms:

<table>
<thead>
<tr>
<th>Key points</th>
<th>Treatment</th>
<th>Duration</th>
<th>Penicillin allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Updated

[Feedback]
Antimicrobial Paediatric Guide UK-PAS

Abbreviations

BASHH: British Association of Sexual Health and HIV
BPAIIG: British Paediatric Allergy Immunology Infection Group
BTS: British Thoracic Society
CLABSI: Central Line Associated Bloodstream Infection
Hib: Haemophilus influenzae type b
IDSA: Infectious Disease Society of America
MHRA: Medicines and Healthcare products Regulatory Agency
MRSA: Methicillin Resistant *Staphylococcus aureus*
MSSA: Methicillin Sensitive *Staphylococcus aureus*
NICE: National Institute for Health and Care Excellence
NIHP: National Institute for Health Protection
OPAT: Outpatient Parenteral Antimicrobial Therapy
PHE: Public Health England
Paed ID/Micro: Paediatric Infectious Diseases / Microbiology
SARC: Sexual Assault Referral Centre
UKHSA: United Kingdom Health Security Agency
ULN: Upper Limit of Normal
ANTIMICROBIAL STEWARDSHIP
Treatment algorithm

Start Smart → Then Focus

DO NOT START ANTIBIOTICS IN THE ABSENCE OF CLINICAL EVIDENCE OF BACTERIAL INFECTION

1. Take thorough drug allergy history
2. Initiate prompt effective antibiotic treatment within one hour of diagnosis (or as soon as possible) in patients with severe sepsis or life-threatening infections
3. Comply with local antimicrobial prescribing guidance
4. Document clinical indication (and disease severity if appropriate), dose and route on drug chart and in clinical notes
5. Include review or stop date or duration
6. Obtain cultures prior to commencing therapy where possible (but do not delay therapy)

CLINICAL REVIEW & DECISION AT 48-72 HOURS

Clinical review, check microbiology and make a clear plan. Document this decision

1. STOP
2. IV to oral switch
3. Change antibiotic
4. Continue
5. OPAT*

Document Decision & Next Review Date or Stop Date

DOCUMENT ALL DECISIONS

* In accordance with surviving sepsis patient safety alert
† According to weightage in children refer to local formulary or BNFC
‡ Use appropriate route in line with severity/patient factors
§ Outpatient Parenteral Antibiotic Therapy
Prescribing in penicillin allergy (if low risk de-label the penicillin allergy)

Low risk:

- Minor gastro-intestinal symptoms (nausea, abdominal pain, diarrhoea)
- *Candidiasis* (thrush)
- Minor symptoms unrelated to any form of allergic reaction, for example headache, arthralgia, strange taste in mouth
- Family history of penicillin allergy but without personal history of allergy
- Patient has taken and tolerated the same penicillin subsequent to the index reaction
- Patient reports “benign” rash which developed more than 1 h after the first dose of a course of penicillin
- Patient reports a childhood rash with no other history available
- Patient cannot remember what happened during index reaction but was told it was not serious and did not require hospital treatment

High risk:

- Rash occurring within 1 h of the first dose of penicillin
- Rash lasting more than 24 h and/or affecting more than 10% of body surface.
- Rash associated with blisters, skin peeling, mucosal inflammation (eyes, mouth, genitals), purpura.
- Patients reporting any symptoms suggestive of a type 1 immediate hypersensitivity reaction to penicillin, including swelling, urticaria, angioedema, shortness of breath, wheeze, loss of consciousness, or collapse.
- Patients who required hospital treatment due to their reaction
- Patients who required treatment with adrenaline for their reaction
- Patients who cannot remember what happened during the index reaction but were told it was serious and/or required medical intervention
- Unable to give informed consent
- Severe or uncontrolled asthma
- Severe chronic obstructive airways disease
- Severe aortic stenosis
- Patients who, at the time they are being considered for DPT, are acutely unwell or clinically unstable. This includes patients with respiratory and/or cardiac compromise
- Pregnancy
- Previous penicillin allergy testing which concluded that the patient was allergic to penicillin
### DO NOT USE
Contra-indicated if history of allergy to penicillin

### CAUTION
Contra-indicated if **high risk allergy** to penicillin

### SAFE
Examples include

| Amoxicillin | Piperacillin+Tazobactam | Cefuroxime IV (2nd Generation) |
| Benzylpenicillin | Tazocin® | Cefixime (3rd Generation) |
| Co-amoxiclav | Temocillin | Cefotaxime (3rd Generation) |
| Flucloxacillin | Ticarcillin+Clavulanic acid | Ceftriaxone (3rd Generation) |
| Penicillin G | Timentine | Ertapenem |
| Penicillin V | Cefalexin (1st Generation) | Imipenem+Cilastatin |
| Phenoxymethylpenicillin | | Meropenem |

Lists are not exhaustive – see current BNF for full details

---

**BSACI 2015** Management of allergy to penicillins and other beta-lactams

**BSACI 2022** guideline for the set-up of penicillin allergy de-labelling services by non-allergists working in a hospital setting

Feedback
CefTRIAXone: initial dose (80 mg/kg; neonates 50 mg/kg)
2 doses can be given up to 12 hrs apart once at 50 mg/kg for suitable timing of OPAT

Contraindications to cefTRIAXone: give cefOTAXime
- Concomitant treatment with intravenous calcium (including total parenteral nutrition containing calcium) in premature and full-term neonates
- Full-term neonates with jaundice, hypoalbuminaemia, acidosis, unconjugated hyperbilirubinaemia (bilirubin ≥200 umol/L), or impaired bilirubin binding
- <41 weeks corrected gestational age

Solid dose forms
Children should be encouraged to swallow oral solid dose forms (tablets and capsules) where possible:
- Medicines for Children has useful guides on how to give medicines, including giving tablets and giving capsules.
- KidzMed is an e-Learning resource from Health Education England for healthcare professionals teaching children to swallow pills.

Doxycycline
See AAP Red Book, Sanford, for evidence of safety <9 years old

IV to Oral switch
IV indicated: need high concentration immediately, e.g., bacteraemia/sepsis
- unable to tolerate/absorb
- unstable haemodynamics / ICU where distribution of drug is less predictable
PO in all other scenarios: when a switch to PO can be safely made
- e.g., patient now stable, full feeds or taking another medicine PO
- encourage pharmacists and nurses to administer/suggest switch with minimal doctor involvement
- National antimicrobial intravenous-to-oral switch (IVOS) criteria for early switch - GOV.UK (www.gov.uk)
<table>
<thead>
<tr>
<th>Watch</th>
<th>Access, Watch, Reserve</th>
<th>Reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>Clindamycin</td>
<td>Ceftazidime + avibactam</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Erythromycin</td>
<td>Colistin</td>
</tr>
<tr>
<td>Amoxicillin +</td>
<td>Levofloxacin</td>
<td>Dalbavancin</td>
</tr>
<tr>
<td>clavulanic acid</td>
<td>Lymecycline</td>
<td>Doripenem</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>Minocycline</td>
<td>Ertapenem</td>
</tr>
<tr>
<td>Cefaclor</td>
<td>Moxifloxacin</td>
<td>Fosfomycin</td>
</tr>
<tr>
<td>Cefadroxil</td>
<td>Ofloxacin</td>
<td>Linezolid</td>
</tr>
<tr>
<td>CefALEXin</td>
<td>Oxytetracycline</td>
<td>Imipenem</td>
</tr>
<tr>
<td>Cefamandole</td>
<td>Piperacillin + tazobactam</td>
<td>Meropenem</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>Pristinamycin</td>
<td>Meropenem + vaborbactam</td>
</tr>
<tr>
<td>Cefixime</td>
<td>Quinupristin</td>
<td>Plazomicin</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>Rifabutin</td>
<td>Polymyxin b</td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>Rifampicin</td>
<td>Telavancin</td>
</tr>
<tr>
<td>Cefprozil</td>
<td>Streptomycin</td>
<td></td>
</tr>
<tr>
<td>Cefradine</td>
<td>Temocillin</td>
<td></td>
</tr>
<tr>
<td>Ceftriaxide</td>
<td>Tetracycline</td>
<td></td>
</tr>
<tr>
<td>CefuroXime</td>
<td>Ticarcillin</td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>Tobramycin</td>
<td></td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>Vancomycin</td>
<td></td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Access**

- Amoxicillin
- Ampicillin
- Ampicillin + sulbactam
- Benzathine benzylpenicillin
- Benzylpenicillin
- Cloxacillin
- Doxycycline
- Fosfomycin
- Fusidic acid
- Gentamicin
- Metronidazole
- Neomycin
- Nitrofurantoin
- Phenoxymethylpenicillin
- Pivmecillinam
- Procaine benzylpenicillin
- Spectinomycin
- Sulfamethoxazole + trimethoprim

**Watch**

- Amikacin
- Amoxicillin + clavulanic acid
- Azithromycin
- Cefaclor
- Cefadroxil
- CefALEXin
- Cefamandole
- Cefazolin
- Cefixime
- Cefotaxime
- Cefoxitin
- Cefprozil
- Cefradine
- Ceftriaxide
- CefuroXime
- Ciprofloxacin
- Clarithromycin
- Chloramphenicol
- Clindamycin
- Erythromycin
- Levofloxacin
- Lymecycline
- Minocycline
- Moxifloxacin
- Ofloxacin
- Oxytetracycline
- Piperacillin + tazobactam
- Pristinamycin
- Quinupristin
- Rifabutin
- Rifampicin
- Streptomycin
- Temocillin
- Tetracycline
- Ticarcillin
- Tobramycin
- Vancomycin

**Reserve**

- Ceftazidime + avibactam
- Colistin
- Dalbavancin
- Doripenem
- Ertapenem
- Fosfomycin
- Linezolid
- Imipenem
- Meropenem
- Meropenem + vaborbactam
- Plazomicin
- Polymyxin b
- Telavancin

**Not recommended**

- Fixed dose combinations of broad-spectrum antibiotics
Antimicrobial Paediatric Guide UK-PAS

Editorial review process
• The aim of the summary is to reduce antimicrobial resistance by decreasing inappropriate prescribing as a result of unnecessary variance between guidelines in different hospitals.
• Empiric recommendations are given which need to be reviewed with results of cultures taken before antibiotics are started, previous culture results for that patient and local resistance patterns in the context of severity of infection.
• Individual patient advice should be sought from specialists in Paediatric Infectious Diseases and Microbiology.

Recommendations on hierarchy of national guidelines > RCTs > local practice
• NICE > SIGN > RCPCH >
• National specialist society >
• BNFC >
• International guideline
• Cochrane > meta-analysis > systematic review >
• RCT > other peer review research > review >
• local practice

Antimicrobial prescribing table (rcgp.org.uk)

Disclaimer
This summary is not intended as a sole source of guidance in managing infections in children. Rather, it is designed to assist clinicians by providing an evidence-based framework for decision-making strategies. The summary is not intended to replace clinical judgment or establish a protocol for all individuals with this condition and may not provide the only appropriate approach to diagnosing and managing this problem.

Contact details:
Please find latest version at:
Paediatrics - British Society for Antimicrobial Chemotherapy (bsac.org.uk)
UK PAS (scroll down to Guidelines for latest version, no need to register, but please register for notification of monthly meeting to discuss Summary)
Send comments to Paed.ID@mft.nhs.uk or contact for record of comments, Track Change and for editable Word version

Individual Trust governance and ratification processes are still required
Please disseminate the guidance to associated organisations, departments and individuals

Changes discussed by UK PAS editorial committee
Updates discussed on 3rd Wednesday of the month at UK PAS webinar

Feedback
Antimicrobial Paediatric Guide UK-PAS
Contributors

NWPAIIG: North West Paediatric Allergy Immunology and Infection Group

Cheshire & Merseyside
Countess of Chester NHS Foundation Trust
East Cheshire NHS Trust
Mid Cheshire Hospitals NHS Trust
Warrington & Halton Hospitals NHS Foundation Trust
Alder Hey Children’s NHS Foundation Trust
Southport & Ormskirk Hospitals NHS Trust
St Helens & Knowsley Teaching Hospitals NHS Trust
Wirral University Teaching Hospital NHS Foundation Trust

Greater Manchester
Bolton Hospitals NHS Foundation Trust
Manchester University NHS Foundation Trust
Salford Royal NHS Foundation Trust
Stockport Foundation Trust
Tameside and Glossop Integrated Care NHS Foundation Trust
The Pennine Acute Hospitals NHS Trust
Wrightington, Wigan and Leigh NHS Foundation Trust

Lancs & South Cumbria
Blackpool, Fylde & Wyre NHS Trust
East Lancashire Hospitals NHS Trust
Lancashire Teaching Hospitals NHS Trust
University Hospitals of Morecambe Bay NHS Trust

North Wales
Betsi Cadwaladr University Health Board

Isle of Man
Isle of Man

ECH: Evelina Children’s Hospital, Antibiotic Use in Paediatrics, Clinical Guideline
GOSH: Great Ormond Street Hospital
RACH: Royal Alexandra Children’s Hospital, Brighton and Sussex University Hospitals
SMH: St Mary’s Hospital, Imperial College London

Birmingham: Heart of England NHS Foundation Trust
Bristol: University Hospitals Bristol NHS Foundation Trust
Cardiff: Noah's Ark Children’s Hospital for Wales
Edinburgh: Royal Hospital for Sick Children NHS Lothian
Glasgow: Royal Hospital for Children NHS Greater Glasgow
Leeds: Leeds Children’s Hospital
Newcastle: Great North Children’s Hospital
Southampton: University Hospital of Southampton NHS Foundation (Microguide)
Sheffield: Sheffield Children’s NHS Foundation Trust
St George’s: St George’s University Hospital NHS Foundation Trust (Microguide)
Letterkenny, Ireland: Health Service Executive
Dublin, Ireland: Children’s Health Ireland at Temple Street

Feedback
Antimicrobial Paediatric Guide UK-PAS

Scope and purpose

1. Objectives
   a. Health intent
      i. Prevention of antimicrobial resistance
   b. Expected benefits and outcomes
      i. Reduced variance in prescribing

2. Recommendations
   a. Interventions
      i. Antimicrobial recommendations
   b. Comparisons
      i. References given
   c. Outcomes
      i. Resolution of infection
   d. Health care setting or context
      i. Hospitals, both district general and tertiary

3. Population
   a. Target population
      i. Children
   b. Clinical condition
      i. Infections
   c. Severity
      i. Inpatient and outpatient
   d. Excluded populations
      i. Neonatal units

4. Stakeholder Involvement
   a. See ‘Contributors’
   b. See ‘Comments’ spreadsheet

5. Public engagement
   a. Strategy
      i. National guidelines e.g., NICE
   b. Methods
      i. Lay member on NICE Common Infections Committee
   c. Outcomes
      i. In reference documents
   d. Input
      i. Recommendations include input e.g., palatability

6. Target users
   a. Audience
      i. Paediatric prescribers
   b. Use
      i. Treatment recommendations

7. Rigour of development
   a. Database
      i. Source document search
   b. Time period
      i. Not time limited
   c. Terms
      i. Dependent on infection
   d. Strategy
      i. In reference document
8. Evidence
   a. Target
      i. Paediatric
   b. Design
      i. Priority given to published guidance over research over local opinion
   c. Comparisons
      i. Adult guidance where necessary
   d. Outcomes
      i. Resolution of infection
   e. Language
      i. Not limited
   f. Context
      i. Priority to UK over other industrialised setting over global

9. Strengths & limitations
   a. Design
      i. Meta-analysis if available
   b. Methodology
      i. Randomised controlled trials data limited
   c. Outcomes
      i. Systematic reviews if available
   d. Consistency
      i. Cohort data compared across studies
   e. Direction
      i. Published reviews across studies
   f. Magnitude
      i. Specialist opinion of benefit versus harm
   g. Applicability
      i. Consensus if different views for practice context

10. Formulation
    a. Process
       i. Specialist review committee
    b. Outcomes
       i. Comments recorded in spreadsheet
    c. Influence
       i. Rapid update process

11. Benefits & harms
    a. Benefits
       i. Expert guidance from ID, Micro and pharmacy nationally
    b. Harms
       i. Change in practice for some infections
    c. Reporting
       i. Monthly open meeting to discuss changes
    d. Recommendations
       i. Local variation (e.g., resistance differences)

12. Link evidence
    a. How
       i. Suggestions reviewed, changes made where appropriate
    b. List
       i. Spreadsheet of comments and changes
    c. Table
       i. Track change versions available
       ii. Supporting Information for national guidance, not for full reference list
13. External
   a. Purpose
      i. Multiple hospital Trusts around the UK involved
   b. Methods
      i. Open to comments on any aspect or section
   c. Reviewers
      i. 12 specialists on virtual committee
   d. Outcomes
      i. Changes sent with track changes and listed in spreadsheet
   e. Inform
      i. Monthly update as necessary

14. Updating
   a. Statement
      i. See Editorial Review Process
   b. Interval
      i. Monthly
   c. Methodology
      i. UK PAS teleconference

Clarity

15. Recommendations
   a. Statement
      i. Medicine section for recommendation
   b. Purpose
      i. Key points section
   c. Population
      i. Age groups where appropriate
   d. Caveats
      i. Length in different scenarios
   e. Uncertainty
      i. Options given where necessary

16. Management options
   a. Description
      i. Key points recommendation on self-care
   b. Situation
      i. Options where appropriate

17. Recommendations
   a. Presentation
      i. Antibiotics in bold
   b. Grouped
      i. In Medicines section

Applicability

18. Application
   a. Facilitators and barriers
      i. Specialists involved
      ii. Resistance to change
   b. Methods
      i. MS Word document distributed for comments and edits
   c. Types
      i. Infectious Disease specialists, microbiologists and pharmacists
   d. Influence
      i. Feedback from users where already adopted
19. Tools
   a. Materials
      i. Evolution of summary from North West regional guideline used for 2 years

20. Resource implications
   a. Cost
      i. NICE recommendations where available
   b. Method
      i. Pharmacists involved
   c. Description
      i. E.g., nitrofurantoin suspension cost
   d. Development
      i. Engagement with local Antimicrobial Committees

21. Monitoring
   a. Implementation
      i. Local audit
   b. Impact
      i. Audit tool to be developed
   c. Frequency
      i. Allow at least 1 year to gain familiarity
   d. Definitions
      i. Adherence and feedback

22. Funding
   a. No funding

23. Competing interests
   a. Types
      i. Financial
      ii. Professional and personal
      iii. Indirect
   b. Methods
      i. Self-declaration
   c. Description
      i. none
   d. Influence
      i. Process and development

Feedback