Antimicrobial Paediatric Guide UK-PAS

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Sepsis


Central Nervous System


Ear, Nose and Throat / Upper Respiratory Tract Infections


Respiratory


Skin & Soft Tissue


Bone & Joint


Gastrointestinal


Eye / Orbital infections


Urinary Tract infections


Genital Tract infections


Cardiovascular


Blood

- 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

- 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

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Abbreviations

Antimicrobial Stewardship

Allergy

Public Health

CefTRIAXone

Solid dose forms

Doxycycline

Oral switch

AWaRe

Editorial process

Feedback

Antimicrobial Paediatric Guide UK-PAS

Sepsis

Sepsis

Haematology / Oncology Immunocompromised

Central line associated blood stream infection

Feedback

Antimicrobial Paediatric Guide UK-PAS

Central Nervous System

Meningitis / encephalitis – empiric treatment

Meningitis / encephalitis – organism specific

Brain abscess

Ventriculo-peritoneal shunt infection

Neurosurgical

Feedback

Antimicrobial Paediatric Guide UK-PAS

Ear, Nose and Throat / Upper Respiratory Tract Infections

Otitis media

Cochlear Implant Infection

Otitis externa

Mastoiditis

Tonsilitis / Lemierre’s

Tracheitis / Epiglottitis

Retropharyngeal abscess

Lymphadenitis

Scarlet fever

Sinusitis

ENT surgical prophylaxis

Feedback

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

Feedback

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Bone & Joint

Osteomyelitis and Septic arthritis

Discitis

Orthopaedic surgical prophylaxis

Feedback

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Gastrointestinal

Infectious Diarrhoea (including C diff, typhoid)

Helicobacter Pylori

Appendicitis / Peritonitis

Mediastinitis

Pancreatitis

Cholecystitis

Liver abscess

GI and Thoracic Surgical Prophylaxis

Feedback

Antimicrobial Paediatric Guide UK-PAS

 Eye / Orbital infections

Conjunctivitis

Orbital cellulitis

Ophthalmia neonatorum

Blepharitis

Endophthalmitis

Keratitis

Feedback

Antimicrobial Paediatric Guide UK-PAS

Urinary Tract infections

Lower UTI (cystitis)

Upper UTI (pyelonephritis)

Catheter associated UTI

Peritoneal dialysis associated peritonitis

Urology surgical prophylaxis

Feedback

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

Antimicrobial Paediatric Guide UK-PAS

Cardiovascular

Endocarditis

Cardiovascular surgical prophylaxis

Feedback

Antimicrobial Paediatric Guide UK-PAS

Blood

Malaria

Sickle cell

Feedback

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Sepsis

Non-neutropenic Sepsis

Key points	Treatment	Duration	Penicillin / cephalosporin high risk allergy
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 10^9/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	**cefTRIAXone** + **amoxicillin** IV <1 month old + **aciclovir***see below IV See below and Meningitis / encephalitis + **gentamicin** • if severe sepsis requiring inotropes/critical care or • likely resistant organisms e.g., frequent or prolonged hospitalisation • >48 hours following admission; or • recent foreign travel + **teicoplanin** OR **vancomycin** IV • 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 + **clindamycin** IV if suspected staphylococcal / streptococcal toxic shock (discuss IVIG with Paed ID/ Micro if unresponsive to antibiotics or life threatening)	**Empiric** 5 days minimum if rapid response 7-10 days usually **Group A Strep** / **Pneumococcus** 7-10 days total **Group B Strep** 7 days **Meningococcus** 7 days **MSSA** 7-14 days **MRSA** 14 days **Gram negative** 7-10 days Oral switch if - improve <72 hrs - source control - not immune-compromised	**chloramphenicol** IV + **gentamicin** OR **teicoplanin** **+** **ciprofloxacin** IV

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Organisms

Age group	Likely organisms
<3 months	Group B Streptococcus, *Escherichia coli*, *Listeria monocytogenes*, *Neisseria meningitidis*, *Haemophilus influenzae* type b (esp. if unvaccinated) and *Streptococcus pneumoniae*
>3 months	*Neisseria meningitidis, Streptococcus pneumoniae* and *Haemophilus influenzae* type b (rare), coliforms

***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

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Neutropenic Sepsis

Haematology / Oncology, Neutropenia <0.5 x 10^9/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

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

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

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Central line associated blood-stream infection (CLABSI) Sepsis

Key points	Antibiotic	Duration
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). **Cultures**: take repeat blood cultures from Central Venous Catheter (CVC) when the laboratory calls to say there is a positive blood culture. **Two positive blood cultures with the same organism are highly suggestive of CVC infection**. Repeat blood cultures (both CVC and peripheral) if fever persists and the child is not improving clinically. **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.	**Empiric treatment:** **teicoplanin** or **vancomycin** + **cefTRIAXone** if septic **Immunosuppressed or history of *Pseudomonas* sepsis:** **piperacillin with tazobactam** + **gentamicin** **Penicillin allergy:** **teicoplanin** OR **vancomycin** + **gentamicin** **Coagulase negative staphylococcus:** **teicoplanin** OR **vancomycin** ***Staphylococcus aureus*:** **flucloxacillin** IV **MRSA or Penicillin allergy:** **teicoplanin** OR **vancomycin** **Enterococcus:** **amoxicillin** IV if sensitive or **teicoplanin** OR **vancomycin** if amoxicillin resistant **Penicillin allergy:** **teicoplanin** OR **vancomycin** **Candida spp** except *C krusei / glabrata / lusitaniae*: **Liposomal amphotericin** OR **echinocandin** (e.g., **micafungin / caspofungin**) **On parenteral nutrition (TPN)** **teicoplanin** OR **vancomycin** **+ cefTRIAXone** Consider **piperacillin with tazobactam** if severe sepsis Consider **echinocandin** (e.g., **micafungin / caspofungin**) if unresponsive after 48 hrs	**If line removed duration of antibiotics from 1st negative culture after line removal:** - Coagulase negative staphylococci 5-7 days -*Staphylococcus aureus* 7-14 days - MRSA 14-28 days - *Enterococcus* 7-14 days - Gram-negative bacilli 7-14 days - Candida 14 days if invasive fungal infection excluded - Other organisms discuss with Paed ID / Micro **If line stays in:** - Coagulase negative staphylococci 10-14 days - *Enterococcus* 7-14 days

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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 Feedback

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Meningitis / Encephalitis

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

***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

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- 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 Feedback

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Meningitis / Encephalitis Organism Targeted

Confirmed cause	Treatment	Duration (longer if empyema)	Penicillin / cephalosporin high risk allergy
Neisseria meningitidis	cefTRIAXone	5-7 days	**chloramphenicol** IV OR **ciprofloxacin** IV
Prophylaxis contacts	**ciprofloxacin**	single dose	
***Haemophilus influenzae* type b**	cefTRIAXone	10 days	**chloramphenicol** IV OR **ciprofloxacin** IV
decolonisation to index case and prophylaxis household contacts	rifampicin	4 days	
Streptococcus pneumoniae	cefTRIAXone	14 days	**chloramphenicol** IV OR **vancomycin** IV
Group B streptococcus	cefTRIAXone	Minimum 14 days	**chloramphenicol** IV OR **vancomycin** IV
Listeria monocytogenes	**amoxicillin** IV + **gentamicin**	21 days **gentamicin** for initial 7 days only	**co-trimoxazole** IV **+ gentamicin**
Gram negative bacillus	cefTRIAXone	21 days	**chloramphenicol** IV OR **ciprofloxacin** IV
Herpes simplex encephalitis	**aciclovir** IV **Prophylaxis following treatment for HSV encephalitis:** <3 months old: **aciclovir** po 12 months	**<12 years old or immunosuppressed** 21 days then repeat LP **>12 years old** 14 days then repeat LP	
Tuberculosis	Discuss with Paed ID / TB specialist		
Culture & PCR negative suspected bacterial meningitis	cefTRIAXone	**<3 months** 14 days **>3 months** 10 days	**chloramphenicol** IV OR **ciprofloxacin** IV **+ vancomycin** IV

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

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Brain Abscess

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

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

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Ventriculo-peritoneal shunt infection

Key points	Treatment	Duration	Penicillin or cephalosporin high risk allergy
Empiric antibiotics after CSF culture	**cefTRIAXone** + **vancomycin** IV	10 days	**chloramphenicol** IV OR **ciprofloxacin** IV **+ vancomycin** IV **+ metronidazole if collection**
Coagulase negative Staphylococcus	**vancomycin** IV + **rifampicin** po + (if access is available) intrathecal **vancomycin**		

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

Feedback

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Neurosurgical

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

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.

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

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Otitis Media

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

Key points	Treatment	Duration	Penicillin allergy
Antibiotics vs placebo 88% vs 84% no pain at 2-3 days	**Paracetamol / ibuprofen**		
If no otorrhoea	anaesthetic and analgesic ear drops (phenazone with lidocaine e.g., Otigo™)	4 drops 2-3x/day for 7 days	
Systemically unwell or high risk of complications	**amoxicillin**	5 days 7 days for severe or recurrent infection	**clarithromycin**
if worsening symptoms on first choice taken for at least 2 to 3 days.	**co-amoxiclav**		

NICE NG91 Otitis media (acute): antimicrobial prescribing

BSAC Paediatric Pathways Otitis media

Updated Aug 2023

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Cochlear Implant Infection

Key points		Treatment	Duration	Penicillin allergy
Cochlear implant infection (no signs of meningitis)		**co-amoxiclav**	2-6 weeks according to response / deep-seated infection	**vancomycin** + **ciprofloxacin**
Cochlear implant infection (with meningitis)	> 2 weeks since surgery	**cefTRIAXone**		
	< 2 weeks since surgery	**meropenem** + **vancomycin**		

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

Updated Oct 2023

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Otitis Externa

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

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

ENT UK 2023 Otitis externa - Global ENT Guideline

Updated Apr 2023

Feedback

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Mastoiditis

Key points	Treatment	Duration	Penicillin Low risk allergy	Penicillin High risk allergy
Mastoiditis (no intracranial involvement)	**co-amoxiclav** IV **Oral switch:** **co-amoxiclav** po	2 weeks	**ciprofloxacin**	
Mastoiditis (with intracranial involvement)	cefTRIAXone + **metronidazole** + **teicoplanin** OR **vancomycin** IV if MRSA	If intracranial involvement 4 weeks	cefTRIAXone + **metronidazole**	**vancomycin** IV + **ciprofloxacin**

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

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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)

- **F**ever (during previous 24 hours)
- **P**urulence (pus on tonsils)
- **A**ttend rapidly (within 3 days after onset of symptoms)
- Severely **I**nflamed tonsils
- **N**o 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 10^9/L
- Fever >3 months treat if 'red' flag (see NICE NG143)

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Key points	Treatment	Duration	Penicillin allergy
First line	**Paracetamol / ibuprofen**		
<3 yrs old See NICE 143 above **≥3 yrs old:** FeverPAIN ≥4 (score 2-3: back up prescription)	**phenoxymethylpenicillin** **amoxicillin** can be used if unable to tolerate phenoxymethylpenicillin **benzylpenicillin** if unable to take oral	5 days 10 days for recurrence /relapse within 2 weeks	**clarithromycin**

Key points	Treatment	Duration	Penicillin allergy
Lemierre's	**cefTRIAXone** + **metronidazole** Oral switch **co-amoxiclav**	**3-6 weeks**	 **clindamycin**

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Tracheitis / Epiglottitis

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

BMJ Best Practice 2020 Epiglottitis

Updated Oct 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Retropharyngeal abscess

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

BMJ Best practice 2022 Retropharyngeal abscess

Updated Jan 2021

Feedback

Antimicrobial Paediatric Guide UK-PAS

Lymphadenitis / Parotitis

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

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Scarlet fever

Key points	Treatment	Duration	Penicillin allergy
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. Optimise analgesia and give safety netting advice **Notify Public Health**	**phenoxymethylpenicillin** **amoxicillin** can be used if unable to tolerate phenoxymethylpenicillin	10 days	**clarithromycin**

UKHSA 2019 Scarlet fever: symptoms, diagnosis and treatment

Updated Jan 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Sinusitis

Key points	Treatment	Duration	Penicillin allergy
Symptoms for 10 days or less	paracetamol or ibuprofen for pain		
Symptoms with no improvement for more than 10 days	no antibiotic or back-up antibiotic depending on likelihood of bacterial cause. Consider high-dose nasal corticosteroid (if over 12 years).		
	phenoxymethylpenicillin **amoxicillin** can be used if unable to tolerate phenoxymethylpenicillin	5 days	**clarithromycin**
Systemically unwell High risk of complications: pre-existing illness (e.g., significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis and prematurely born infants) CT head if GCS falls or new neurological signs	**co-amoxiclav**		

NICE NG79 Sinusitis (acute): antimicrobial prescribing

Updated Aug 2021

Feedback

Antimicrobial Paediatric Guide UK-PAS

ENT Surgical prophylaxis

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

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

NICE NG125 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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Lower Respiratory Tract Infections

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

*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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Community Associated Pneumonia

Key points	Treatment	Duration	Penicillin Allergy
<1 month old	**cefTRIAXone** Oral switch **co-amoxiclav**	5 days	
>1 month old	**amoxicillin**	3-5 days	**clarithromycin** **OR** **doxycycline** (>8 years old)

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 O_2 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

CAP-IT 2021 Effect of Amoxicillin Dose and Treatment Duration on the Need for Antibiotic Re-treatment in Children With Community-Acquired Pneumonia

WHO 2022 The WHO AWaRe (Access, Watch, Reserve) antibiotic book Ch 12 p147 and Ch 27 p 362

Updated Jan 2023 Feedback

Antimicrobial Paediatric Guide UK-PAS

Hospital Associated Pneumonia

Likely organisms	
Common Rare	Coliforms *Pseudomonas spp.*

Key points	Treatment	Duration	Penicillin allergy
<4 days in hospital	Treat as Community Associated Pneumonia (CAP)		
≥4 days in hospital 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	1st line **cefTRIAXone** 2nd line / immunocompromised **piperacillin with tazobactam** + **teicoplanin** if suspected or confirmed MRSA infection Oral switch **co-amoxiclav**		**ciprofloxacin** + **teicoplanin**

NICE NG139 Pneumonia (hospital-associated): antimicrobial prescribing

Updated Jan 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Aspiration Pneumonia

Samples / Investigations

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

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

Likely causative organisms
Staphylococcus aureus, Streptococci, coliforms Less common: anaerobes

BTS 2023 BTS clinical statement on aspiration pneumonia

Updated Aug 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

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

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

Prophylaxis	Treatment	Duration	Penicillin allergy
Spontaneous pneumothorax	No antibiotics		
Traumatic pneumothorax	**co-amoxiclav**	Single dose at time of drain insertion	**ceFURoxime**

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

Feedback

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

Key points	Treatment	Duration	Penicillin allergy
Pseudomonas not previously isolated	**amoxicillin**	7-14 days	**clarithromycin** OR **doxycycline** (>8 years old)
If higher risk of treatment failure	**co-amoxiclav** if hypoxic IV	Review by 48 hours and consider switch to oral antibiotics	**ciprofloxacin**
If treatment failure on co-amoxiclav	**piperacillin with tazobactam**		**ciprofloxacin** **+ teicoplanin**

Treatment of exacerbations where pseudomonas is isolated

Key points	Treatment	Route	Dose	Frequency	Duration	Penicillin allergy
Initial episode	**cefTAZidime** + **tobramycin**	IV IV	50 mg/kg 7 mg/kg	tds od	14 days	**ciprofloxacin** + **tobramycin**
Exacerbation when chronically colonised	**ciprofloxacin** OR	po	20 mg/kg (max 750 mg)	bd	14 days	
	cefTAZidime +/- **tobramycin**	IV IV	50 mg/kg 7 mg/kg	tds od	14 days	**ciprofloxacin** + **tobramycin**

- 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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Pneumocystis jirovecii pneumonia (PJP)

An opportunistic infection occurring in immunocompromised patients (including HIV)
Please refer all patients to relevant specialist / microbiology

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

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Pertussis

Key points	Treatment	Duration	Macrolide contraindication
Notify Health Protection Team	**clarithromycin**	7 days	**co-trimoxazole**

RCPCH Blue Book 4 edn p742 Ch 98 Pertussis

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

Updated March 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

Tuberculosis

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

Rifampicin 100mg/5ml; 300mg, 150mg tab

Isoniazid 50mg/5ml; 300mg; 100mg, 50mg tab

Pyrazinamide 500mg/5ml; 500mg tab

Ethambutol 400mg/5ml; 400mg, 100mg tab

Pyridoxine 10 mg once/day with isoniazid
5 mg <6 months old (10mg tab)

	mg/kg	range (mg/kg)	max	Voractiv 1 tab
Isoniazid (H)	10	10-15	300 mg	75 mg
Rifampicin (R)	15	10-20	450 mg (<50kg) 600 mg (>50kg)	150 mg
Pyrazinamide (Z)	35	30-40	1.5 g (<50kg) 2 g (>50kg)	400 mg
Ethambutol (E)	20	15-25		275 mg
CNS TB prednisolone 4 mg/kg/24 h or equivalent dose dexamethasone 0.6 mg/kg/24 h for 4 weeks followed by a reducing course over 4 weeks				

Latent TB
RH 3 months OR
H 6 months
Non-CNS TB
2 months RHZE +
2-4 months RH
CNS TB
2 months RHZE +
10 months RH

Active TB first 2 months (use combinations to simplify treatment and reduce pill burden – example below)

Body weight (kg)	Rifinah (R/H) 150/100	Voractiv	Isoniazid 50	Pyrazinamide 500	Ethambutol 400	Total tablets
15-20	1	1	1			3
20-25	2			1 ½	1	4 ½
25-30	1	2				3
30-35	1	2	1	½		4 ½
35-40	1	3				4
40-45	1	3				4
45-50		4				4
50-70		4				4
>70		5				

Active TB continuation phase and Latent TB

Body weight (kg)	Rifinah (R/H) 150/100	Rifinah (R/H) 300/150	Total tablets
10-15	1		1
15-25	2		2
25-50	3		3
>50		2	2

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Influenza

Key points	Treatment	Duration
Uncomplicated • Previously healthy	No treatment OR if serious risk complications **oseltamivir**	Start within 48 hours of onset 5 days
• Co-morbidity OR • <6 months old	**oseltamivir**	
Complicated OR Severely immunosuppressed	**oseltamivir** OR **zanamivir inhaled / IV (2nd line)**	5 days 10 days (immunosuppressed)
High risk oseltamivir resistance OR **2nd line:** poor clinical response, resistance	**zanamivir inhaled / IV (2nd line)**	5 days 10 days (immunosuppressed)

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)

UKHSA Guidance on use of antiviral agents for the treatment and prophylaxis of seasonal influenza

Updated Aug 2022 Feedback

Antimicrobial Paediatric Guide UK-PAS

Cellulitis

Cellulitis, erysipelas, impetigo, wound infections, infected eczema

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

NICE NG141 Cellulitis and erysipelas: antimicrobial prescribing

BSAC Paediatric Pathways Cellulitis pathway for children presenting to hospital

Updated Jan 2023

Feedback

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Human / Animal Bites

Likely causative organisms
Pasteurella multocida, *Staphylococcus aureus* and anaerobes.

See NICE guideline for information about when to give prophylaxis or treatment Overview | Human and animal bites: antimicrobial prescribing | Guidance | NICE

- **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.

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Key points	Treatment	Duration	Penicillin low risk allergy	Penicillin high risk allergy
Prophylaxis / Treatment	**co-amoxiclav** PO	Prophylaxis: 3 days Active infection: 5-7 days	Human bite: <12 years old: **co-trimoxazole** ≥12 years old: **doxycycline + metronidazole**	
Deep bites	**co-amoxiclav** IV		**Deep bites with penicillin allergy:** **cefUROXime** IV **OR** **cefTRIAXone if septic** **+** **metronidazole**	**clindamycin** **+ ciprofloxacin**

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

Feedback

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

Key points	Treatment	Duration	Penicillin high risk allergy
1st Line	**cefTRIAXone** + **clindamycin** IV	Guided by response	**clindamycin** + **teicoplanin** OR **vancomycin** + **ciprofloxacin** OR **gentamicin**
if previous antibiotics	**piperacillin with tazobactam** + **clindamycin** IV		
if high risk ESBL or low risk penicillin allergy	**meropenem** + **clindamycin** IV		
if severe sepsis	+ **gentamicin**		

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

Updated Jan 2023

Feedback

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Pyomyositis

Key points	Treatment	Duration	Penicillin allergy
***Staphylococcus aureus* isolated**	**flucloxacillin** IV	IV 7 days minimum	**clindamycin** + **gentamicin** if septic
No organism isolated **<5 years old**	**cefTRIAXone**		
>5 years old	**flucloxacillin** IV		
If septic	+ **gentamicin**	Single dose	
If suspected toxic shock	+ **clindamycin** IV	Until shock resolved	
Oral switch when afebrile	**flucloxacillin** if able to swallow capsule **co-amoxiclav** if suspension	Oral 2-3 weeks	

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Burns

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

Key points	Treatment	Duration	Penicillin allergy
Mild-moderate infection	**flucloxacillin**	7 days	**clindamycin**
Second line	**co-amoxiclav**		
In hospital >5 days	**cefTRIAXone**		
if known *Pseudomonas* colonised	**piperacillin with tazobactam**		**gentamicin**

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Soft Tissue Injury

Check tetanus immunisations status

	Antibiotic	Duration	Penicillin allergy
Clean	**No antibiotics**		
Contaminated prophylaxis	**co-amoxiclav**	**3** days	**clindamycin**
Infected		Guided by response	

NHSE 2020 Clinical guidelines for major incidents and mass casualty events

Updated Aug 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

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.

Key points	Treatment	Duration	Penicillin allergy
Surgery of trunk or extremity away from axilla or perineum	**flucloxacillin** IV	3 days	**clindamycin**
Surgery of Intestinal or Genitourinary Tract, axilla or perineum	**ciprofloxacin** + **metronidazole** cefTRIAXone if sepsis + **metronidazole** oral switch **co-amoxiclav**	5 days • longer for deep surgical infection • longer if prosthetic material	

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

Updated Aug 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Lyme Disease / Tick Bites

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

NICE NG95 Lyme disease

Updated Jan 2021

Feedback

Antimicrobial Paediatric Guide UK-PAS

Chickenpox / Zoster

Key points	Treatment	Duration
Chickenpox if onset of rash <24 hours AND 1 of the following: • >14 years of age • severe pain • dense/oral rash • taking steroids	**aciclovir** OR **valaciclovir** if >12 years old	7 days
Shingles if onset of rash <72 hours AND 1 of the following: • active ophthalmic • Ramsey Hunt syndrome • eczema • non-truncal involvement • moderate or severe pain If onset of rash <1 week And 1 of the following: • severe pain • continued vesicle formation • immunocompromised		

UKHSA 2022 Post exposure prophylaxis for chickenpox and shingles

Updated Aug 2022

Feedback

Antimicrobial Paediatric Guide UK-PAS

Herpes Simplex

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

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

RCPCH Blue Book 4 edn p594 Ch 76 Herpes simplex

Updated Oct 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

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	Treatment	Oral switch	Duration	Penicillin allergy
<3 months	**cefTRIAXone**	**Oral after 14-21 days:** **co-amoxiclav** OR **cefALEXin**	**Unifocal** IV to oral switch if: afebrile, pain free >24 hours, CRP <20 or reduced by 2/3 highest value 2-3 weeks in septic arthritis 3-4 weeks in osteomyelitis **Complex disease** IV to oral switch after 14 days; may require >6 weeks of treatment.	Oral switch: **cotrimoxazole**
3 months – 5 years	**cefUROXime** IV	**Oral after 72 hours:** **co-amoxiclav** OR **cefALEXin**		
>5 years	**flucloxacillin** IV	**Oral after 72 hours:** capsules: **flucloxacillin** suspension: **co-amoxiclav** OR **cefALEXin**		**cefTRIAXone** Oral switch: Suspension: **cotrimoxazole** Capsules: **clindamycin**
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**		**clindamycin**
	MRSA*:* teicoplanin OR **vancomycin**	**clindamycin**		

Antimicrobial Paediatric Guide UK-PAS

Sickle cell disease or no Hib vaccine	**cefTRIAXone**	**Oral switch:** **ciprofloxacin**	As above	

Metal work	**cefTRIAXone** + **teicoplanin** OR **vancomycin** **+/- rifampicin** if *Staphylococcus aureus*	**Oral switch after 1 week** **flucloxacillin** capsules OR **co-amoxiclav** suspension	Complex disease	**ciprofloxacin** **+ rifampicin**

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

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

Key points		Treatment	Oral switch	Duration	Penicillin allergy
Simple discitis	**< 3 months**	**cefTRIAXone**	**cefALEXin** OR **co-amoxiclav**	**Oral switch** if clinically improving, apyrexial, CRP falling from 48 – 72 hrs Total antibiotics: 3-4 weeks	**clindamycin** + **ciprofloxacin**
	3 months – 5 years	**cefUROXime** IV			
	>5 years	**flucloxacillin** IV			
Complex discitis		**cefTRIAXone**		**Oral switch:** from 2 weeks **Total antibiotics:** 6-12 weeks	
Sickle cell disease		**cefTRIAXone**	**ciprofloxacin**		

J Paed Child Health 2022 Spondylodiscitis in children

PIDJ 2022 Spondylodiscitis in Pediatric Age: A Retrospective Cohort Study

Updated Apr 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Orthopaedic surgical prophylaxis

Key points	Treatment	Duration	Penicillin low risk allergy	Penicillin high risk allergy
Clean orthopaedic procedures without implant	Not recommended			
Orthopaedic procedures with implants e.g., K wiring, circular frame application	**flucloxacillin** IV	Single dose within 60 minutes before incision	**cefUROXime** IV	**teicoplanin**
Open fractures requiring surgery Start within 1 hour of injury	**co-amoxiclav** IV	Grade 1: 24 hours Grade 2-3: 72 hours or until wound closure if sooner	**cefUROXime** IV	**clindamycin**
• At first debridement	**co-amoxiclav** IV + **gentamicin**	Single dose within 60 minutes before incision	**cefUROXime** IV + **metronidazole** + **gentamicin**	**clindamycin** IV + **gentamicin**
• At skeletal stabilisation and closure	**teicoplanin** + **gentamicin**	Single dose within 60 minutes before incision		
Minor fractures with open wound (no surgery)	**co-amoxiclav** PO	Review at 24 hours for signs of infection	**clarithromycin** PO	
High lower-limb amputation	**co-amoxiclav** IV	Single dose within 30 minutes before incision and continue for at least 2 post-operative doses	**cefUROXime** IV + **metronidazole**	**teicoplanin** + **gentamicin** + **metronidazole**
Spinal surgery	**co-amoxiclav** IV	Single dose within 60 min before incision Re-dose at 4 hours if surgery ongoing Consider re-dosing if significant blood loss (>25 ml/kg)	**cefUROXime** IV	**teicoplanin**

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

Feedback

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

Key points	Treatment	Duration
Bloody diarrhoea and severe sepsis	**cefTRIAXone**	5 days
Campylobacter suspected (such as undercooked meat and abdominal pain), If systemically unwell consider treatment if treated early (within 3 days)	**clarithromycin**	5 to 7 days 14 days if bacteraemia
Giardia is confirmed or suspected (diarrhoea with abdominal cramps, bloating and flatulence)	**metronidazole**	3 days
Salmonella (non-typhoidal): self-limiting unless chronic GI tract disease, haemoglobinopathy, <6 months old, malignancy or immunocompromised	**azithromycin** or **amoxicillin** if sensitive	5 days 14 days if immunosuppressed
Shigella self-limiting Only treat if severe	**if severe: ciprofloxacin** OR **azithromycin** if resistance **OR if systemically unwell cefTRIAXone**	7 - 10 days
Listeria	**amoxicillin** penicillin allergy: **co-trimoxazole**	7 days
Cryptosporidium	Self-limiting	
E. coli O157 H7	do not give antibiotics	
Clostridioides difficile toxin **Severe: T >38.5ºC or WCC >15, rising creatinine, or signs/symptoms of severe colitis** Discontinue antibiotics, PPI, anti-peristaltic agent where possible Consider faecal microbiota transplant	**Severe or type 027 or recurrence (after >12 weeks)**: oral **vancomycin** Life threatening **+ metronidazole** **Relapse (<12 weeks after 1st episode) or second line**: **fidaxomicin**	10-14 days

Antimicrobial Paediatric Guide UK-PAS

Key points		Treatment	Duration
Typhoid enteric fever *Complicated*: severe sepsis or shock, gastrointestinal bleeding, intestinal perforation, encephalopathy or metastatic infection		if uncomplicated and if sensitive **azithromycin** **if complicated** **cefTRIAXone** oral switch **azithromycin** or **ciprofloxacin** if sensitive If severe sepsis or from countries with cephalosporin resistance e.g., Pakistan **meropenem** + **azithromycin**	7 days
Enterocolitis	**Possible**	**metronidazole** po	
	Definite	**amoxicillin** + **gentamicin** + **metronidazole** po	
	Severe	**piperacillin with tazobactam** + **metronidazole** po	

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

Feedback

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.

Key points	Treatment	Duration	Penicillin Allergy
1st Line	proton pump inhibitor + **amoxicillin** **+** **clarithromycin** OR **metronidazole**	7 days	proton pump inhibitor + **metronidazole** **+** **clarithromycin**

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Appendicitis / Peritonitis

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

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Mediastinitis

Key points	Treatment	Duration	Penicillin Allergy
Oesophageal perforation	**co-amoxiclav** IV	7 days	**metronidazole** po **+** **clarithromycin** po
Severe sepsis	**cefTRIAXone** + **metronidazole**	7 days	

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

Updated Nov 2022

Feedback

Antimicrobial Paediatric Guide UK-PAS

Pancreatitis

Key points	Treatment	Duration	Penicillin Allergy
Acute pancreatitis (including necrosis without evidence of infection)	**No antibiotics**		
Documented infected necrosis: worsening with fevers, or with presence of gas within collections on imaging	**cefUROXime** IV + **metronidazole**	Clinical response	

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Cholecystitis / Biliary Infection

Key points	Treatment	Duration	Penicillin allergy
1st Line	**co-amoxiclav** IV + **metronidazole** if collection present + **gentamicin** if severe sepsis or shock	5 days Longer if abscess present	**cefUROXime** IV **+** **metronidazole**

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

Antimicrobial Paediatric Guide UK-PAS

Liver abscess

Source control with drainage procedures

Key points	Treatment	Duration	Penicillin allergy
Pyogenic	**co-amoxiclav** IV	4 weeks minimum depending on repeat imaging	**cefUROXime** IV
If risk of amoebae	**co-amoxiclav** IV + **metronidazole** Oral switch according to sensitivities		**cefUROXime** IV + **metronidazole**
Amoebic	**metronidazole**	10 days	

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

Updated Jan 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

GI / Thoracic Surgical Prophylaxis

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

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

Antimicrobial Paediatric Guide UK-PAS

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.

Key points	Treatment	Dose and frequency	Duration
1st line	sterile saline or cooled boiled water		
2nd line	**chloramphenicol** (topical) 0.5% eye drops or 1% ointment	One drop 4 times a day. In severe infection administer **DROPS** initially every 2 hours	Continue for 48 hours after healing
3rd line	**fusidic acid** 1% eye drops	One drop twice a day	
	gentamicin 0.3% eye drops	One drop 4 times a day, may be used more often depending on the clinical condition	
Chlamydial conjunctivitis	**neonates and <9 years old: erythromycin** po >8 years old: **doxycycline** po		14 days 7 days
Gonococcal conjunctivitis	**cefOTAXime**		Stat dose
Herpes simplex	**<1 month: aciclovir** IV **>1 month: aciclovir** po **Older children: ganciclovir** 0.15% eye gel **Severe: aciclovir** IV THEN po O**R** >12 years old **valaciclovir** po		14 days

Likely organisms	
Common	*Staphylococcus aureus*, *Streptococcus pneumoniae*
Rare	Haemophilus, coliforms, gonorrhoea, chlamydia

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Orbital cellulitis and Pre-septal cellulitis

Refer urgently to Ophthalmologists (sight threatening)

Samples / Investigations

- Blood cultures
- Pus / swab

Key points	Treatment	Duration	Penicillin allergy
Low grade pre-septal disease	**co-amoxiclav** po	5 days	**clarithromycin**
High grade pre-septal	**co-amoxiclav** IV	IV 24-48 hours then oral 7 days	**clindamycin** + **ciprofloxacin**
Orbital cellulitis	**cefTRIAXone** if >7 years old + **clindamycin** OR **metronidazole**	Continue until clinical resolution. A total of 2 to 4 weeks may be required.	
Oral switch if no intracranial involvement and improving	**co-amoxiclav**		**clindamycin** + **ciprofloxacin**

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Ophthalmia Neonatorum

Key points	Treatment	Duration	Penicillin allergy
Urgent ophthalmology review NAAT swab for *Chlamydia* and gonococcus Consider HSV if vesicles (see Conjunctivitis)	**cefOTAXime** single dose IV immediately + **chloramphenicol eye drops** **+ aciclovir** if concern HSV OR **+ erythromycin** po if concern chlamydia	5 days Longer if abscess present	

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Blepharitis

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

College of Optometrists Blepharitis

Updated Oct 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Endophthalmitis

Key points	Treatment	Duration	Penicillin allergy
Result of external source e.g., penetrating eye trauma, post operative or keratitis	**Intravitreal injection:** **vancomycin** **+ cefTAZidime**	Single dose	
Endogenous e.g., bacteraemia	+ **cefTRIAXone** **+ vancomycin**	(see Sepsis)	

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

Updated Jan 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

Keratitis

Key points	Treatment	Duration	Penicillin allergy
Start treatment only on ophthalmology advice as cultures may need to be taken first	**ofloxacin eye drops**	10 days	

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Lower Urinary Tract Infections

Patients admitted from the community

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

Feedback

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

Key points		Treatment	Duration	Penicillin Allergy
<3 months	Not severe sepsis	**cefTRIAXone**	Review IV therapy at 24 to 48 hours for oral switch 7 to 10 days in total	
	if severe sepsis	+ **gentamicin** single dose		
>3 months	Able to take orally	**cefALEXin**		**gentamicin**
	if vomiting, unable to take oral antibiotics	**cefUROXime**		
	If sepsis	**cefTRIAXone**		
	If severe sepsis	+ **gentamicin** single dose		
Oral switch		culture guided **cefALEXin** if sensitive		**gentamicin**

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Catheter Associated Urinary Tract Infections

Patients admitted from the community

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

- 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

Feedback

Antimicrobial Paediatric Guide UK-PAS

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

Key points	Treatment	Duration	Penicillin Allergy
Add antibiotics to dialysis fluid	**teicoplanin** OR **vancomycin** **+** **cefTAZidime**	14 days	

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

Updated Jan 2021

Feedback

Antimicrobial Paediatric Guide UK-PAS

Urology Surgical Prophylaxis

Key points	Treatment	Duration	Penicillin Allergy
Clean Urological Procedures • Circumcision • Hydrocoele/Hernia Repair • Orchidopexy	Not recommended	Not recommended	
Urological Procedures entering urinary tract • Pyeloplasty • Nephrectomy/Heminephrectomy • Other Renal Surgery • Bladder Augmentation • Bladder Exstrophy Closure • Posterior Urethral Valve Ablation	**co-amoxiclav** IV	Single dose within 60 min before procedure	**gentamicin**
Cystoscopy with minor manipulation/biopsy Hypospadias repair Epispadias repair Only if surgery is thought to be extensive and patient at a high risk of infection	**co-amoxiclav** IV + **teicoplanin** if MRSA	Single dose within 60 min before procedure	**cefUROXime** IV **penicillin high risk allergy** **gentamicin**

J Ped Urol 2017 Adverse events associated with surgical antibiotic prophylaxis for outpatient circumcisions at US children's hospitals

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

Feedback

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.

Key points	Treatment	Duration	Penicillin Allergy
First line	**doxycycline** (>8 years old)	7 days	
Second line	**azithromycin**	3 days	

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Epididymitis / Orchitis

Key points	Treatment	Duration	Penicillin Allergy
Refer to Sexual Health clinic	**doxycycline** (>8 years old) **OR** **ciprofloxacin** (<8 years old)	10 to 14 days	
High risk of STI	**cefTRIAXone** **+ doxycycline** (>8 years old)	Single dose 10 days	

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Vaginal candidiasis

Key points	Treatment	Duration	Penicillin Allergy
1st episode	**clotrimazole OR fenticonazole OR oral fluconazole**	stat	
Recurrent (>4 episodes per year)	**fluconazole**	3 doses – once every 72 hours then weekly for 6 months	

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

Feedback

Antimicrobial Paediatric Guide UK-PAS

Bacterial Vaginosis

Key points	Treatment	Duration	Penicillin Allergy
Oral **metronidazole** is as effective as topical treatment and is cheaper 7 days results in fewer relapses than 2g stat at 4 weeks	**metronidazole** po **OR** **metronidazole** 0.75% vaginal gel **OR** **clindamycin** 2% cream	7 days 5 nights 7 nights	

BASHH 2012 UK National Guideline for the management of Bacterial Vaginosis

Updated March 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

Genital Herpes

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

BASHH 2014 UK national guideline for the management of anogenital herpes

Updated March 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

Gonorrhoea

Key points	Treatment	Duration	Penicillin Allergy
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.	**cefTRIAXone** **OR** **ciprofloxacin** (only if known to be sensitive)	Stat	

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

Updated March 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

Trichomoniasis

Key points	Treatment	Duration	Penicillin Allergy
Oral treatment needed as extra-vaginal infection common. Treat partners and refer to GUM for other STIs. Consider safeguarding.	**metronidazole**	5 to 7 days	

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

Updated Aug 2023

Feedback

Antimicrobial Paediatric Guide UK-PAS

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.
- **Exclude**: ectopic pregnancy, appendicitis, endometriosis, UTI, irritable bowel, complicated ovarian cyst, functional pain.
- Moxifloxacin has greater activity against likely pathogens, but always test for gonorrhoea, *Chlamydia*, and *Mycoplasma genitalium*.
- If *M. genitalium* tests positive use moxifloxacin.

Key points	Treatment	Duration	Penicillin Allergy
First line therapy	**cefTRIAXone** + **metronidazole** + **doxycycline** (>8 years old) OR **azithromycin** if <9 years old	stat 14 days 14 days	**gentamicin** + **clindamycin** IV 24 hours Oral: **metronidazole** + **doxycycline** (>8 years old) OR **azithromycin**
Second line therapy	**metronidazole** + **ofloxacin** **OR** **moxifloxacin** alone **(**first line for *M. genitalium* associated PID**)**	14 days	

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

Updated March 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

Balanitis

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

Key points	Treatment	Duration	Penicillin Allergy
Non-specific	**clotrimazole** 1% cream 8-12 hourly **+** hydrocortisone 1% cream or ointment daily	14 days	
Bacterial	**flucloxacillin**	7 days	**clindamycin**

NICE CKS Balanitis

Updated June 2020

Feedback

Antimicrobial Paediatric Guide UK-PAS

Endocarditis

Empiric treatment	Treatment	Duration	Penicillin allergy
Native valve Take at least 3 aerobic blood cultures with maximum volume of blood for bottle and consult Paed ID / Micro prior to starting antibiotics	**amoxicillin** (high dose) IV + **flucloxacillin** (high dose) IV **+ gentamicin** (low dose)	Until pathogen identification **gentamicin** 7 days	Low risk penicillin allergy: **cefazolin** + **gentamicin** High risk penicillin allergy: **teicoplanin** OR **vancomycin** **+ gentamicin**
Native valve + severe sepsis and risk factors for ESBL	**teicoplanin** OR **vancomycin** IV + **meropenem** (high dose)		
Prosthetic valve	**teicoplanin** OR **vancomycin** IV + **gentamicin** + **rifampicin** po		
Organism specific Native valve	**Treatment**	**Duration**	**Penicillin allergy**
Streptococcus gallolyticus (Group D) and oral *Streptococci* with penicillin MIC <0.125mg/L	**benzylpenicillin** 25 mg/kg 4-hourly IV OR cefTRIAXone 100 mg/kg daily OR	4 weeks	**teicoplanin** OR **vancomycin** 6 weeks
	benzylpenicillin 25 mg/kg 4-hourly IV OR cefTRIAXone 100 mg/kg daily + **gentamicin** 3 mg/kg daily IV	2 weeks	
Streptococcus gallolyticus (Group D) and oral *Streptococci* with penicillin MIC 0.25-2 mg/L	**benzylpenicillin** 50 mg/kg 4-hourly IV OR cefTRIAXone 100 mg/kg daily + **gentamicin**	4 weeks IV course 2 weeks of **gentamicin** only	**teicoplanin** OR **vancomycin** + **gentamicin**
Staphylococcus aureus (flucloxacillin (Methicillin) sensitive *S. aureus* MSSA)	**flucloxacillin** 50 mg/kg 6-hourly IV	4-6 weeks	Low risk penicillin allergy: **cefazolin** + **rifampicin** High risk penicillin allergy: **teicoplanin** OR **vancomycin** if vancomycin MIC >0.1 mg/L: **daptomycin** IV **+ clindamycin**

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 Feedback

Antimicrobial Paediatric Guide UK-PAS

Cardiac Surgical Prophylaxis

Key points	Treatment	Duration	Penicillin allergy
Sternotomy	**cefUROXime** IV	Single dose within 60 min before incision and continue for total of 48 hours	**teicoplanin** OR **vancomycin** IV + **gentamicin** IV
Pacemaker Insertion	**cefUROXime** IV	Single dose within 60 minutes before incision	**teicoplanin** IV
Explant epicardial pacemaker	**cefUROXime** IV	Single dose within 60 minutes before incision	**teicoplanin** IV

NICE NG125 2020 Surgical site infections: prevention and treatment

AHA Journal 1998 Antibiotic Prophylaxis for Permanent Pacemaker Implantation

Updated May 2021

Feedback

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Malaria

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

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

BIA 2016 UK malaria treatment guidelines 2016

WHO 2023 WHO Guidelines for malaria

Updated April 2023

Feedback

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Sickle Cell

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

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

Updated June 2020

Feedback

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Infection

Likely causative organisms:

Key points	Treatment	Duration	Penicillin allergy

Updated

Feedback

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

RCPCH Blue Book 4 edn: Manual of Childhood Infections 2016 4th edition

SARC: Sexual Assault Referral Centre

UKHSA: United Kingdom Health Security Agency

ULN: Upper Limit of Normal

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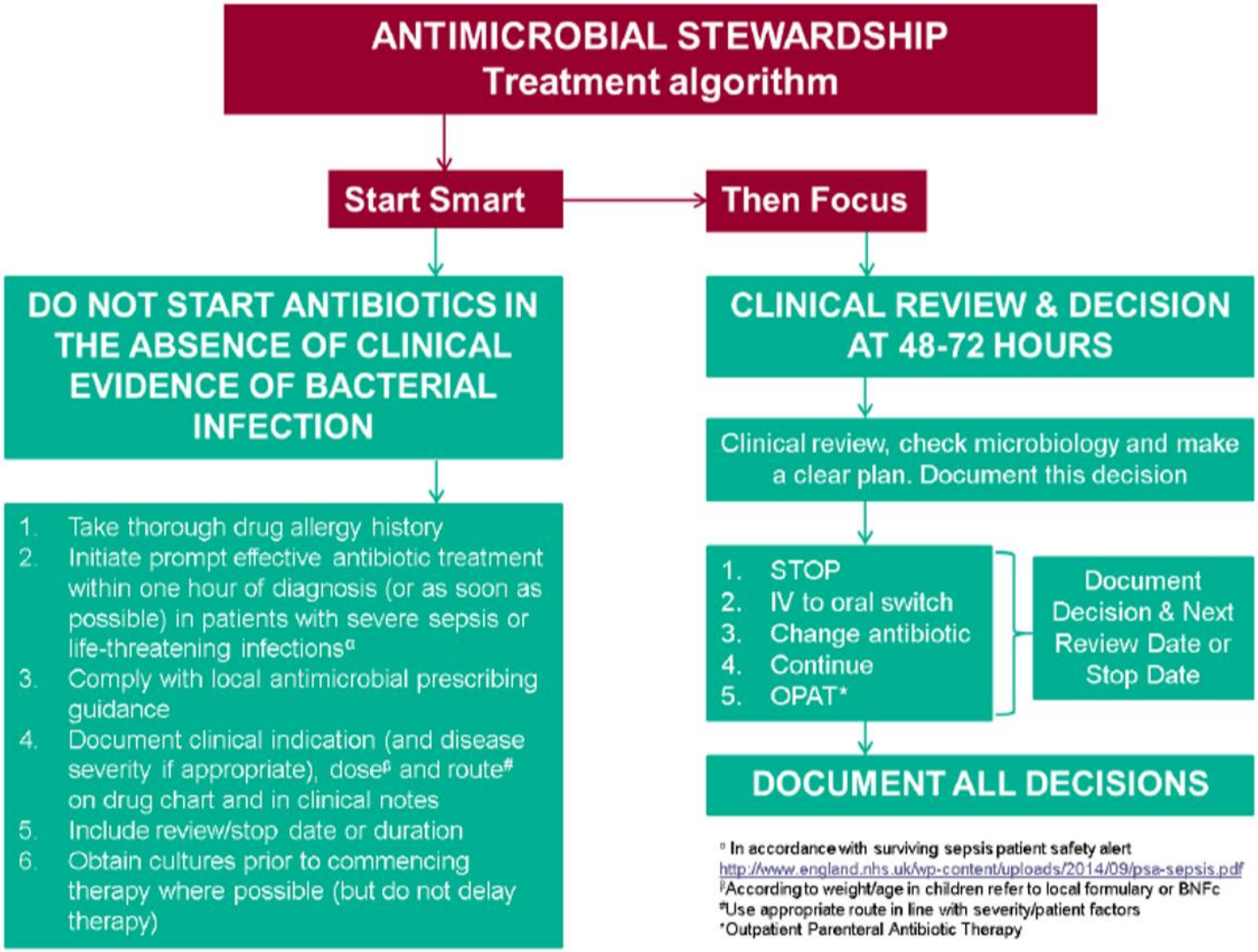

Feedback

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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	
Lists are not exhaustive – see current BNF for full details				
Amoxicillin **Benzylpenicillin** **Co-amoxiclav** **Flucloxacillin** **Penicillin G** **Penicillin V** **Phenoxymethylpenicillin**	**Piperacillin+Tazobactam Tazocin®** **Temocillin** **Ticarcillin+Clavulanic acid Timentin®** **CefALEXin** (1st Generation)	**CefUROXime IV** (2nd Generation) **CefIXime** (3rd Generation) **CefOTAXime** (3rd Generation) **CefTAZidime** (3rd Generation) **CefTRIAXone** (3rd Generation) **Ertapenem** **Imipenem+Cilastatin** **Meropenem**	**Amikacin** **Ciprofloxacin** **Clarithromycin** **Clindamycin** **Daptomycin** **Doxycycline** **Fosfomycin**	**Gentamicin** **Levofloxacin** **Metronidazole** **Nitrofurantoin** **Teicoplanin** **Trimethoprim** **Vancomycin**

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

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Notify Public Health

UK Health Security Agency 0344 225 0562
All Wales Acute Response team 0300 003 0032
Health Protection Scotland via local Health Board
Northern Ireland Public Health Agency 0300 555 0119

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
Todd, S.R., Dahlgren, F.S., Traeger, M.S., Beltrán-Aguilar, E.D., Marianos, D.W., Hamilton, C., McQuiston, J.H. and Regan, J.J., 2015. No visible dental staining in children treated with doxycycline for suspected Rocky Mountain spotted fever. The Journal of pediatrics, 166(5), pp.1246-1251

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)

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World Health Organization

Access

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

AWaRe

Watch

Amikacin
Amoxicillin + clavulanic acid
Azithromycin
Cefaclor
Cefadroxil
CefALEXin
Cefamandole
Cefazolin
Cefixime
Cefotaxime
Cefoxitin
Cefprozil
Cefradine
Ceftazidime
Ceftriaxone
CefUROXime
Ciprofloxacin
Clarithromycin
Chloramphenicol

Access, Watch, Reserve

Home AWaRe (adoptaware.org)

Clindamycin
Erythromycin
Levofloxacin
Lymecycline
Minocycline
Moxifloxacin
Ofloxacin
Oxytetracycline
Piperacillin + tazobactam
Pristinamycin
Quinupristin
Rifabutin
Rifampicin
Streptomycin
Temocillin
Tetracycline
Ticarcillin
Tobramycin
Vancomycin

AWaRe England

2021 AWaRe classification (who.int)

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

Feedback

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

Stakeholder Involvement

4. Group membership
    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

Rigour of development

7. Search methods
    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

Independence

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