

This guide does NOT apply to NICU or immunocompromised patients.

A thorough clinical assessment is required to identify any complicating factors which may necessitate alternative/additional therapy
Selection of empiric regimens may need to be tailored according to current local antibiogram or individual clinical factors.

Before starting anti-microbial therapy, take blood/urine/CSF and/or other relevant samples for culture wherever possible. Obtain appropriate dosage from current "Drug Dosage Guidelines". Consider the need for dose adjustments (e.g. renal impairment) and age-related contraindications for antimicrobials.

REVIEW DAILY - Adjust treatment according to microbiologic results as soon as they become available.

Consult ID and/or relevant subspecialty team(s) if required

All drugs IV unless stated (links to PEDIATRIC Drug Dosage Guidelines, 6th edition)

| Infection | Most likely pathogens | First choice | Penicillin allergy [^] | Refs** |
|---|---|--|--|--|
| Sepsis - unknown source | | | | |
| Sepsis (<4 weeks) | <i>Streptococcus agalactiae</i> (GBS) <i>Escherichia coli</i> <i>Listeria monocytogenes</i> Herpes simplex virus (HSV) | Ampicillin + (Gentamicin or Cefotaxime) ± Acyclovir | Vancomycin + (Gentamicin or Cefotaxime) ± Acyclovir | BCCH AAP SSC |
| Sepsis (≥4 weeks) | <i>Neisseria meningitidis</i> <i>Streptococcus pneumoniae</i> <i>Escherichia coli</i> <i>Staphylococcus aureus</i> | Cefotaxime [±] ± Vancomycin* | Cefotaxime [±] ± Vancomycin | BCCH SSC |
| CNS | | | | |
| Meningitis (<4 weeks) | <i>Streptococcus agalactiae</i> (GBS) <i>Escherichia coli</i> <i>Listeria monocytogenes</i> Herpes simplex virus (HSV) | Ampicillin + Cefotaxime + Acyclovir | Vancomycin + Cefotaxime ± Acyclovir | AAP IDSA |
| Meningitis (≥4 weeks) | <i>Neisseria meningitidis</i> <i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> | Cefotaxime [±] + Vancomycin ± Acyclovir | Cefotaxime [±] + Vancomycin ± Acyclovir | IDSA CPS |
| Encephalitis | Herpes simplex virus (HSV) | Acyclovir + Antibiotics as for "Meningitis" | Acyclovir + Antibiotics as for "Meningitis" | IDSA |
| Cerebral abscess or subdural empyema | <i>Streptococcus</i> spp. <i>Staphylococcus aureus</i> Anaerobic organisms Gram-negative organisms <i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> | Cefotaxime [±] + Vancomycin + Metronidazole | Cefotaxime [±] + Vancomycin + Metronidazole | FC |
| ENT, ocular and dental | | | | |
| Streptococcal pharyngitis / tonsillitis | <i>Streptococcus pyogenes</i> (Group A Strep) | Penicillin V PO or Amoxicillin PO or Penicillin G | Cephalexin PO or Clindamycin PO or Clarithromycin PO or Cefazolin | IDSA RB |
| Bacterial acute otitis media | <i>Haemophilus influenzae</i> <i>Streptococcus pneumoniae</i> <i>Moraxella catarrhalis</i> | Amoxicillin PO or Amoxicillin-clavulanate PO | Cefprozil PO or Clarithromycin PO | CPS AAP |
| Mastoiditis | <i>Streptococcus pneumoniae</i> <i>Streptococcus pyogenes</i> (Group A Strep) <i>Staphylococcus aureus</i> | Cefotaxime [±] ± Vancomycin ± Metronidazole | Cefotaxime [±] ± Vancomycin ± Metronidazole | FC |
| Sinusitis | <i>Haemophilus influenzae</i> <i>Streptococcus pneumoniae</i> <i>Moraxella catarrhalis</i> <i>Staphylococcus aureus</i> <i>Streptococcus pyogenes</i> (Group A Strep) Anaerobic organisms (older children) | Amoxicillin PO or Amoxicillin-clavulanate PO If IV treatment required, treat as for mastoiditis | Cefprozil PO or Clarithromycin PO or Cefixime PO + Clindamycin PO If IV treatment required, treat as for mastoiditis | IDSA AAP BD CFM |
| Cervical lymphadenitis | <i>Staphylococcus aureus</i> <i>Streptococcus pyogenes</i> (Group A Strep) | Cephalexin PO or Clindamycin PO* or Cefazolin | Clindamycin PO or Cefazolin | BD FC |
| Preseptal cellulitis | <i>Streptococcus pneumoniae</i> <i>Staphylococcus aureus</i> | Cephalexin PO or Clindamycin PO* or Cefazolin or Vancomycin* | Cefprozil PO or Clindamycin PO* or Cefazolin or Vancomycin* | AAP Long |
| Orbital cellulitis | <i>Staphylococcus aureus</i> <i>Streptococcus pneumoniae</i> Other <i>Streptococcus</i> spp. <i>Haemophilus influenzae</i> | Cefotaxime [±] ± Vancomycin ± Metronidazole | Cefotaxime [±] ± Vancomycin ± Metronidazole | AAP Long |
| Dental abscess with fever and/or extensive spread | Viridans streptococci <i>Peptostreptococcus</i> spp. <i>Prevotella</i> spp. <i>Porphyromonas melaninogenicus</i> <i>Fusobacterium</i> spp. Usually polymicrobial | Amoxicillin-clavulanate PO or Penicillin G + Metronidazole PO | Clindamycin PO/IV | BD FC |

[^]Avoid all beta-lactam antibiotics (i.e. cephalosporins, carbapenems) if anaphylaxis to penicillins - **consult ID; consider allergy assessment.**

Empiric antimicrobial therapy at BCCH. Version 5.3 updated June 20, 2017 by the PHSA Antimicrobial Stewardship Program

Approved by: ID, Micro, All Divisions within UBC Department of Pediatrics

All drugs IV unless stated

| Infection | Most likely pathogens | First choice | Penicillin allergy [^] | Refs** |
|--|--|---|---|--|
| Lower respiratory tract | | | | |
| Community-acquired pneumonia (<1 month) | <i>Streptococcus agalactiae</i> (GBS) <i>Escherichia coli</i> <i>Listeria monocytogenes</i> | Ampicillin + (Gentamicin or Cefotaxime [‡]) | Vancomycin + (Gentamicin or Cefotaxime [‡]) | BCCH BD |
| Community-acquired pneumonia (1-3 months) | <i>Streptococcus pneumoniae</i> <i>Streptococcus agalactiae</i> (GBS) <i>Staphylococcus aureus</i> <i>Escherichia coli</i> <i>Chlamydia trachomatis</i> | Cefotaxime [‡] ± Vancomycin ± Clarithromycin_PO | Cefotaxime [‡] ± Vancomycin ± Clarithromycin_PO | BCCH BD |
| Community-acquired pneumonia (>3 months) - mild | <i>Respiratory viruses</i> <i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> <i>Staphylococcus aureus</i> <i>Streptococcus pyogenes</i> <i>Mycoplasma pneumoniae</i> <i>Chlamydia pneumoniae</i> | Amoxicillin PO | Cefprozil PO | IDSA CPS |
| Community-acquired pneumonia (>3 months) - moderate | | Ampicillin ± Clarithromycin PO ± Oseltamivir_PO | Cefotaxime ± Clarithromycin_PO ± Oseltamivir_PO | AAP IDSA CPS BCCH |
| Community-acquired pneumonia (>3 months) - severe | | Cefotaxime [‡] ± Vancomycin ± Clarithromycin_PO ± Oseltamivir_PO | Cefotaxime [‡] ± Vancomycin ± Clarithromycin_PO ± Oseltamivir_PO | IDSA CPS BCCH |
| Parapneumonic empyema | <i>Staphylococcus aureus</i> <i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> | Cefotaxime [‡] ± Vancomycin | Cefotaxime [‡] ± Vancomycin | CPS IDSA BCCH |
| Hospital-acquired pneumonia | <i>Staphylococcus aureus</i> <i>Haemophilus influenzae</i> <i>Enterobacter</i> spp. <i>Pseudomonas aeruginosa</i> | (Cefotaxime [‡] or Piperacillin-tazobactam) ± Vancomycin* | Cefotaxime [‡] ± Vancomycin ± Gentamicin | BCCH IDSA |
| Aspiration pneumonitis | Oral streptococci Oral anaerobes (not established until after teeth erupt) <i>Streptococcus pneumoniae</i> <i>Staphylococcus aureus</i> <i>Haemophilus influenzae</i> | Not required | Not required | Mandell BD |
| Aspiration pneumonia – mild/moderate/ Community-acquired | | Amoxicillin PO or Amoxicillin-clavulanate PO or Ampicillin ± Metronidazole_PO or Clindamycin PO | Cefprozil PO or Cefuroxime IV/PO ± Metronidazole_PO or Clindamycin PO | |
| Aspiration pneumonia – severe/ Hospital-acquired | | Cefotaxime [‡] + Metronidazole PO | Cefotaxime [‡] + Metronidazole PO | |
| Cardiac | | | | |
| Infective endocarditis | Viridans streptococci <i>Staphylococcus aureus</i> | As guided by blood culture results Consult ID & Cardiology | As guided by blood culture results Consult ID & Cardiology | AHA |
| Genito-urinary tract | | | | |
| Urinary tract infection (<2 months) | <i>Escherichia coli</i> <i>Klebsiella</i> spp. <i>Proteus</i> spp. <i>Enterobacter</i> spp. <i>Enterococcus</i> spp. | Ampicillin + Gentamicin Imperative to check blood and CSF cultures. If positive, exit UTI pathway. | Cefotaxime or Gentamicin Imperative to check blood and CSF cultures. If positive, exit UTI pathway. | AAP CPS |
| Urinary tract infection – mild (≥2 months) | <i>Escherichia coli</i> <i>Klebsiella</i> spp. <i>Proteus</i> spp. <i>Enterobacter</i> spp. <i>Enterococcus</i> spp. <i>Staphylococcus saprophyticus</i> (adolescents) | Cephalexin PO | Cephalexin PO | AAP BD CPS |
| Urinary tract infection – severe (≥2 months) | <i>Escherichia coli</i> <i>Klebsiella</i> spp. <i>Proteus</i> spp. <i>Enterobacter</i> spp. | Cefotaxime or Gentamicin | Cefotaxime or Gentamicin | AAP CPS |
| Pelvic inflammatory disease | <i>Neisseria gonorrhoeae</i> <i>Chlamydia trachomatis</i> Anaerobic organisms | (Cefixime PO or Ceftriaxone IM) + (Doxycycline PO or Azithromycin PO) ± Metronidazole PO | (Cefixime PO or Ceftriaxone IM) + (Doxycycline PO or Azithromycin PO) ± Metronidazole PO | BCCDC BD RB |
| Intra-abdominal | | | | |
| Bacterial gastroenteritis | <i>Salmonella</i> spp. <i>Shigella</i> spp. <i>Campylobacter</i> spp. <i>Escherichia coli</i> <i>Plesiomonas shigelloides</i> <i>Aeromonas hydrophila</i> | Treatment not routinely required. If severe then treat according to susceptibilities of organism isolated | Treatment not routinely required. If severe then treat according to susceptibilities of organism isolated | IDSA |
| Secondary peritonitis (excluding peritoneal dialysis patients) | <i>Escherichia coli</i> <i>Klebsiella</i> spp. <i>Pseudomonas aeruginosa</i> <i>Enterococcus</i> spp. <i>Bacteroides fragilis</i> <i>Peptostreptococcus</i> spp. | Piperacillin-tazobactam or Ampicillin + Gentamicin + Metronidazole | Cefotaxime [‡] + Metronidazole | IDSA |
| Primary peritonitis | <i>Streptococcus pneumoniae</i> <i>Escherichia coli</i> | Cefotaxime [‡] | Cefotaxime [‡] | FC Mandell |

[^]Avoid all beta-lactam antibiotics (i.e. cephalosporins, carbapenems) if anaphylaxis to penicillins - **consult ID; consider allergy assessment.**

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|--|--|--|---|---|
| Ascending cholangitis | <i>Escherichia coli</i> <i>Klebsiella pneumoniae</i> <i>Enterobacter</i> spp. <i>Pseudomonas aeruginosa</i> <i>Enterococcus</i> spp. Anaerobic organisms | Ampicillin + Cefotaxime [‡] ± Metronidazole or Piperacillin-tazobactam | Vancomycin ± Cefotaxime [‡] ± Metronidazole | FC Long |
| Antibiotic-associated colitis (<i>Clostridium difficile</i> infection) | <i>Clostridium difficile</i> | Metronidazole PO Stop all other antibiotics if possible | Metronidazole PO Stop all other antibiotics if possible | BCCH IDSA CPS |
| Skin and soft tissue | | | | |
| Cellulitis - mild | <i>Streptococcus pyogenes</i> (Group A Strep) <i>Staphylococcus aureus</i> | Cephalexin PO or Trimethoprim-Sulfamethoxazole PO* | Cephalexin PO or Trimethoprim-Sulfamethoxazole PO* | IDSA CPS |
| Cellulitis - severe | <i>Streptococcus pyogenes</i> (Group A Strep) <i>Staphylococcus aureus</i> | Cefazolin or Vancomycin* | Cefazolin or Vancomycin* | IDSA BD |
| Soft tissue injury - clean | Not infected | Not required | Not required | FC |
| Dog / cat / human bites - mild | <i>Staphylococcus aureus</i> <i>Streptococcus</i> spp. <i>Eikenella corrodens</i> (human) <i>Pasteurella</i> spp. (dog/cat) <i>Capnocytophaga cynodegmi</i> (dog/cat) Anaerobic organisms Usually polymicrobial | Amoxicillin-clavulanate PO | Clindamycin PO* +Trimethoprim-Sulfamethoxazole PO* | IDSA FC |
| Dog / cat / human bites - severe | <i>Staphylococcus aureus</i> <i>Streptococcus</i> spp. <i>Eikenella corrodens</i> (human) <i>Pasteurella</i> spp. (dog/cat) <i>Capnocytophaga cynodegmi</i> (dog/cat) Anaerobic organisms Usually polymicrobial | Piperacillin-tazobactam | Clindamycin* +Trimethoprim-Sulfamethoxazole* | IDSA FC Mandell |
| Necrotising fasciitis (unknown etiology) | <i>Streptococcus pyogenes</i> (Group A Strep) <i>Staphylococcus aureus</i> Aerobic and Anaerobic organisms May be polymicrobial | Piperacillin-tazobactam + Vancomycin + Clindamycin | Ciprofloxacin + Vancomycin + Clindamycin | IDSA FC |
| Documented group A streptococcal necrotising fasciitis | <i>Streptococcus pyogenes</i> (Group A Strep) | Penicillin + Clindamycin | Cefazolin + Clindamycin | IDSA FC |
| Musculoskeletal | | | | |
| Osteomyelitis or septic arthritis (≥3 months) | <i>Staphylococcus aureus</i> <i>Streptococcus pyogenes</i> (Group A Strep) <i>Streptococcus pneumoniae</i> <i>Kingella kingae</i> <i>Neisseria</i> spp. <i>Salmonella</i> spp. | Cefazolin or Vancomycin* | Cefazolin or Vancomycin* | FC Mandell |

‡ Cefotaxime may be interchanged with ceftriaxone for children over 30 days old and not on calcium-containing parenteral products (e.g. TPN).

*As anti-MRSA agent. **Current local MRSA rates are available via the hospital antibiogram.** The following factors have been associated with MRSA in previous studies:

- Previous known MRSA infection in child or a significant contact (e.g. family member)
- Family member is a healthcare worker
- First nations child or Pacific Island origin (e.g. Samoan)
- Day care attendance
- Prolonged hospitalization in the last 1 year
- Antibiotic therapy in the last 2 months
- Critically ill
- Chronic skin condition (e.g. atopic eczema)

**References:

- [AAP = American Academy of Pediatrics Guidelines](#)
- [BCCDC = BC Centre for Disease Control](#)
- [BCCH = Pre-existing BC Children's Hospital Guidelines \(sepsis guideline, PICU guideline\)](#)
- [BD = Bugs & Drugs. Blondel-Hill and Fryters](#)
- [CFM = Canadian Family Physician, by the College of Family Physicians of Canada](#)
- [CPS = Canadian Pediatric Society Guidelines](#)
- [IDSA = Infectious Diseases Society of America Guidelines](#)
- [RB = Red book. American Academy of Pediatrics \(2015\)](#)
- [FC = Textbook of Pediatric Infectious Diseases. Feigin and Cherry, 7th ed. \(2014\)](#)
- [Mandell = Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 8th ed. \(2015\)](#)
- [Long = Principles and Practice of Pediatric Infectious Diseases. Long, Pickering and Prober, 4th ed. \(2012\)](#)
- [SSC = Surviving Sepsis Campaign: International Guidelines for the Management of Severe Sepsis and Septic Shock: 2016](#)

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