Antimicrobial resistance (AMR) has emerged as a major public health issues all over the world. Though it is a global problem, the major brunt of AMR is borne by developing countries. It is estimated that 50% or more of hospital antimicrobial use is inappropriate and more alarming was from the developing countries, where more than 90% of antibiotics used in surgical prophylaxis were inappropriate. This results in treatment failure or ineffective management of infectious diseases. Antimicrobial resistance makes the treatment of patients difficult, costly and sometimes impossible. Resistance has emerged even to newer and more potent antimicrobial agents like carbapenems. It has been reported that almost USD 5.6 million per year per hospital is spent because of AMR.

An important strategy in combatting the development and spread of antimicrobial resistance is optimisation of prescribing of antimicrobials in all clinical settings, ensuring antimicrobials are prescribed and utilised according to principles of evidence based medicine. Therefore, rational prescription of antibiotics not only will help minimize the morbidity and mortality due to resistant microbial infections but also curtail the cost incurred on patient management. In line with the rational prescription of antibiotics, Essential Medicines & Technology Division, Department of Medical Services under the guidance of the national experts from Jigme Dorji Wangchuck National Referral Hospital (JDWNRH) have come up with the 3rd Edition of the National Antibiotic Guideline based on scientific evidence, literature review and consistent with the already existing international guidelines as well as the local antibiogram of JDWNRH.

The treatment recommendations in this guideline for infectious diseases are grouped by organ systems and presented in a tabular format for ease of use. Brief descriptions of disease categories with their etiologic agents, corresponding antibiotic regimens (dose, route, frequency and duration) for adult, paediatric and neonate patients, with relevant comments are presented. A section on surgical prophylaxis has been added since antibiotic misuse to prevent surgical site infections also needs urgent attention.

We are confident that the guideline will rationalize the usage of antibiotics and establish consistency in the treatment of various infectious conditions in the country.

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Director General
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We gratefully acknowledge the significant effort of all those who have contributed to the development and production of this edition. In addition, the efforts of contributors to past editions are acknowledged. Contributions to this edition (3rd) have been made by:

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The content of this guideline will undergo a process of continuous review. Comments or suggestions for improvement are welcome.
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GENERAL PRINCIPLES OF ANTIMICROBIAL THERAPY

Antibiotic use should be evidence based.

The antimicrobial spectrum of the medicine used should be the narrowest to cover the known or likely pathogen(s).

Single agent should be used unless it has been proven that combination therapy is required to ensure efficacy or reduce the selection of clinically significant resistance.

The dose, frequency and route should be most appropriate to the clinical presentation.

Microbiology guided therapy should be used, where possible.

Duration of therapy should be as short as possible. Do not exceed 7 days without a clear indication.

Do not use antibiotic prophylaxis unless there is a clear indication.

Single dose of surgical prophylaxis is recommended for majority of procedures.

Most viral and some bacterial diseases are self-limiting and does not require antimicrobials. Inappropriate use of antimicrobials contributes to the development of resistance, unnecessary adverse effects and costs. When an antimicrobial is prescribed, the indication and intendent duration of therapy should be documented.

PROPHYLACTIC, EMPIRICAL OR DIRECTED ANTIMICROBIAL THERAPY

Prophylactic therapy
Prophylactic use of antimicrobial is to prevent infection when there is a significant clinical risk.

- Restrict to situations in which it has been shown to be effective or where the consequences of infection are disastrous
- Surgical prophylaxis should be parenteral and commenced at least 1 hour before the surgical incision
- Base antimicrobial choice on likely pathogen.

Empirical therapy
Empirical therapy involves treatment of infections when the causative organism has not been identified.

- Specimen for culture should be sent prior to initiation of antimicrobials
- It should be guided by local epidemiological data and their patterns of antimicrobial susceptibility.
- Once commenced, review empirical therapy at 48 - 72 hours:
  - Stop therapy, if diagnosis excludes infection;
  - If causative organism is identified, follow directed therapy; and
  - If no causative organism is identified, re-evaluate the clinical and microbiological investigations.

Directed/Targeted therapy
Directed/targeted therapy is the treatment of infections where the causative organism has been identified and its sensitivity determined.

- Evaluate the results of culture and other clinical parameters to distinguish infections from colonization/contamination.
- Antimicrobial therapy directed at specific organisms should include the most effective, least toxic, narrowest spectrum medicine available.
- Consider de-escalation (e.g. change parenteral therapy to oral therapy, or change a broad to narrow spectrum)
ROUTES OF ADMINISTRATION

Oral therapy should be used in preference to parenteral therapy unless:

- oral administration is not tolerated or is not possible, e.g. swallowing difficulties;
- gastrointestinal absorption is an obvious problem (e.g. vomiting, severe diarrhoea);
- an oral antimicrobial with a suitable spectrum of activity is unavailable;
- high tissue concentrations are essential and are not readily achievable by oral administration, e.g. endocarditis, meningitis, osteomyelitis, septic arthritis and deep seated abscesses;
- urgent treatment is required due to severe and rapidly progressing illness;
- the patient is unlikely to adhere to the treatment; and
- it is not a preferred route of therapy e.g. in neonates.

Antibiotics such as ciprofloxacin and metronidazole have excellent oral bioavailability and are equally effective both orally as well as parenteral therapy.

Topical therapy should be restricted to proven indications, e.g. bacterial conjunctivitis. Antimicrobials for topical use should not be from classes used in systemic therapy.

DURATION OF THERAPY

Shortest possible duration of therapy should be used; in majority of infections, this should not exceed 7 days.

Response to antimicrobial therapy can be assessed with clinical and laboratory parameters as follows:

- patient becomes afebrile;
- general condition improves and patient starts to accept oral feeds;
- leucocytosis, neutrophilia resolves; and
- ESR and/or CRP settles down towards normal.
- Use of novel markers like procalcitonin for de escalation

However, actual duration of antimicrobial therapy depends on the specific diagnosis, causative organism and the therapeutic response.

SINGLE OR COMBINATION THERAPY

Antimicrobial combinations should be avoided, unless indicated:

- To extend the spectrum of cover, e.g. empirical therapy of suspected mixed infections such as pelvic inflammatory disease;
- To achieve a bactericidal effect (synergy), e.g. enterococcal endocarditis;
- To prevent the emergence of resistant organisms, e.g. therapy of tuberculosis;
- To treat critically ill patients; and
- have proven pharmacokinetic enhancement.

ADVERSE EFFECTS

Adverse effects caused by antimicrobials can be classified as direct or indirect. Direct adverse effects include hypersensitivity, toxicity and interactions. Indirect adverse effects include effects on both commensal and environmental floras.

For detail, please refer Appendix II.

HYPERSENSITIVITY

Antibiotic hypersensitivity is common, and most frequently involves beta-lactams (Penicillins and Cephalosporins). While many nonspecific reactions are labelled as ‘allergic’, true type I (IgE-mediated) antibiotic hypersensitivity is strongly suggested by the development of urticaria, angioedema, bronchospasm, or anaphylaxis (with objectively demonstrated hypotension, hypoxia or tryptase elevation) within 1 hour of medicine administration (immediate/life threatening). Some instances of ‘pseudo-allergy’ (e.g. anaphylactoid responses to vancomycin infusions such as
‘red-man syndrome’) involve direct release of vasoactive mediators by non-IgE mechanisms. While not truly allergic, these responses may still be prevented by avoiding rapid infusions and administering of antihistamines if required. Allergy to medicine is more commonly seen with certain infections, particularly with HIV and Epstein Barr virus infections, and allergic reactions are more likely to be severe in individuals receiving beta-blocker therapy.

**Penicillin hypersensitivity**

Between 1-10% of beta-lactam, antibiotic courses result in manifestations interpreted as due to hypersensitivity. Most reactions are late, non-IgE mediated and involve rash. Other later manifestations include fever, haemolysis and serum sickness-like reactions. The minority of reactions are immediate hypersensitivity reactions. Anaphylactic responses to penicillin occur approximately one in every 10,000 courses administered, with 10% of these reactions being fatal, most often associated with parenteral rather than oral administration.

Most of these reactions occur in people without a history of prior penicillin allergy. Notwithstanding this, a detailed history of penicillin reaction should always be sought before a course of penicillin is commenced.

A history of an immediate hypersensitivity reaction (urticaria, angioedema, bronchospasm, or anaphylaxis within 1 hour of medicine administration) contraindicates further exposure to penicillin and other beta-lactams. Late manifestations are only a relative contraindication.

Rashes, especially with amoxicillin/ampicillin are much less predictive of future reactions. Between 3 - 6% of patients hypersensitive to penicillin exhibit cross-reactivity with cephalosporins and a smaller percentage to carbapenems.

**ANTIMICROBIAL RESISTANCE**

The development and spread of antimicrobial resistance is a growing concern. Use of antimicrobials unnecessarily exposes patients to adverse effects with no clinical benefits. Although complex mechanisms are involved, use of antibiotics essentially exerts a selective pressure for emergence of resistant pathogens, the spread of which is facilitated by transfer of organisms between staffs and patients.

Causal association between antimicrobial use and the emergence of resistant organisms can be ascertained from the findings of resistance being more common with Healthcare Associated Infections (HAIs), compared to community-acquired infections. Patients with HAIs are more likely to have received prior antimicrobials whilst the increased duration of exposure to antimicrobials increases the likelihood of colonization with resistant organisms. Multidrug resistant organisms include multi-resistant Acinetobacter sp. and *Pseudomonas aeruginosa*, extended-spectrum β-lactamase (ESBL), methicillin-resistant *Staphylococcus aureus* (MRSA), Carbapenem-resistant *Enterobacteriaceae* (CRE), vancomycin-resistant *Enterococcus faecium* (VRE).

Antimicrobials are different from other categories of medications that their use in one patient can influence their effects in other patients in future. Considering the rapid rate at which resistant pathogens can spread, the misuse of antimicrobials can adversely impact the health of patients who are not even exposed to them. Since there is only limited number of antimicrobials available and that they are safe and cost-effective when their effectiveness is preserved, they are a valuable resource.

**ANTIMICROBIAL STEWARDSHIP**

It is an interdisciplinary approach aimed at ensuring the responsible use of antimicrobials. It includes interventions to monitor and direct antimicrobial use within a healthcare setting and community, so that an evidenced-based approach of antimicrobials use can be implemented.

Effective antimicrobial stewardship programs have been shown to improve the quality of patient care through optimization of treatment of infections and reduction in adverse effects following the use of antimicrobials.

The Antimicrobial Management Team should ideally include an infectious disease physician, a clinical microbiologist or any other clinicians and a clinical pharmacist as the core members with representations from primary care, and infection control. The program is usually governed within the hospital’s quality improvement and patient safety governance structure.

Following are the stewardship strategies generally recommended:

- Implementing Antibiotic Guidelines based on local antibiogram;
Establishing formulary restriction and approval systems for higher generation antibiotics; 
Reviewing of antimicrobial prescribing for feedbacks and interventions; and 
Monitoring antimicrobial resistance and use.

CATEGORIES OF ANTIBIOTICS
As per the report of the WHO Expert Committee, 2017, the antibiotics have been categorized in three groups in order to ensure access to necessary antibiotics and appropriate prescribing as follows:

1. Access: first- and second-choice antibiotics for the empirical treatment of most common infectious syndromes;
2. Watch: antibiotics with higher resistance potential whose use as first- and second-choice treatment should be limited to a small number of syndromes or patient groups; and
3. Reserve: antibiotics to be used mainly as “last-resort” treatment options.

Access
The Access group includes antibiotics that are recommended as empirical first- or second-choice treatment options for common infectious syndromes. They should be widely available, at an affordable price, in appropriate formulations and of assured quality. First choices are usually narrow spectrum agents with positive risk–benefit ratios and low resistance potential; second choices are generally broader-spectrum antibiotics with higher resistance potential or less favourable risk–benefit ratios.

<table>
<thead>
<tr>
<th>Access group antibiotics</th>
<th>Other antibacterials</th>
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<tbody>
<tr>
<td>Beta-lactam medicines</td>
<td>Other antibacterials</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Amikacin</td>
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<tr>
<td>Ampicillin</td>
<td>Azithromycin*</td>
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<tr>
<td>Benzathine benzylpenicillin</td>
<td>Chloramphenicol</td>
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<tr>
<td>Benzylpenicillin</td>
<td>Ciprofloxacin*</td>
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<tr>
<td>Cephalexin</td>
<td>Clarithromycin*</td>
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<tr>
<td>Cefazolin</td>
<td>Doxycycline</td>
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<tr>
<td>Cefixime*</td>
<td>Gentamicin</td>
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<tr>
<td>Cefotaxime*</td>
<td>Sulfamethoxazole + Trimethoprim</td>
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<tr>
<td>Ceftriaxone*</td>
<td>* Watch group antibiotics for specific, limited indications</td>
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<tr>
<td>Cloxacillin</td>
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<tr>
<td>Phenoxymethylpenicillin</td>
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<tr>
<td>Procaine benzylpenicillin</td>
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Watch
The Watch group includes antibiotic classes that are considered generally to have higher resistance potential and that are still recommended as first- or second-choice treatments but for a limited number of indications. The group includes the highest priority agents on the List of critically important antimicrobials for human medicine (CIA). The CIA list ranks antimicrobials according to their relative importance in human medicine and can be used in the development of risk management strategies for the use of antimicrobials in food-production animals. Seven pharmacological classes were identified for this group. As noted above, monitoring systems should be in place to ensure that their use is in line with recommended indications.
Watch group antibiotics

- Quinolones and fluoroquinolones
  e.g. ciprofloxacin, norfloxacin
- 3rd generation cephalosporins (with or without beta-lactamase inhibitor)
  e.g. Cefixime, ceftriaxone, Cefotaxime
- Glycopeptides
  e.g. teicoplanin, vancomycin
- Antipseudomonal penicillins with beta-lactamase inhibitor
  e.g. piperacillin + tazobactam
- Carbapenems
  e.g. meropenem, imipenem + cilastatin
- Penems
  e.g. faropenem

Reserve
The Reserve group includes antibiotics that should be treated as “last-resort” options, or tailored to highly specific patients and settings, when other alternatives would be inadequate or had already failed (e.g. serious life-threatening infections due to multidrug-resistant bacteria). To preserve their effectiveness, these medicines should be protected and prioritized as key targets of high-intensity national and international stewardship programmes involving monitoring and utilization reporting. Eight antibiotics or antibiotic classes were identified for this group.

Reserve group ("last-resort") antibiotics

- Aztreonam
- 4th-generation cephalosporins
  e.g. cefepime
- 5th-generation cephalosporins
  e.g. cefaroline
- Polymyxins
  e.g. Polymyxin B, colistin
- Fosfomycin (IV)
- Oxazolidinones
  e.g. linezolid
- Tigecycline
- Daptomyacin

GETTING TO KNOW YOUR ANTIMICROBIALS
ANTIBACTERIALS

Penicillins
Narrow spectrum penicillin
These are mainly active against Gram-positive organisms, but are inactivated by beta-lactamases. Benzathine benzylpenicillin is given by IM and provides low levels of benzylpenicillin for up to 4 weeks. Benzylpenicillin (penicillin G) is administered parenterally and remains the treatment of choice for susceptible infections. Phenoxymethylpenicillin (penicillin V) is acid-stable and is given orally, although food impairs absorption. It is intrinsically less active than benzylpenicillin. Procaine penicillin is an IM preparation designed to extend the half-life of benzylpenicillin. It provides blood levels for up to 24 hours, but these are adequate only against highly susceptible organisms.
Cloxacillin is a narrow spectrum penicillin with specific anti-staphylococcal activity. It should ideally be dosed at 6 hourly intervals.
Moderate spectrum penicillin
The aminopenicillins, amoxicillin and ampicillin, have greater activity than benzylpenicillin against some Gram-negative organisms, e.g. *Escherichia coli*, *Haemophilus influenzae*, but are destroyed by beta-lactamase producing strains. They have no anti-pseudomonal activity. They are medicines of choice for enterococcal infections. Amoxicillin is better absorbed orally than ampicillin, not affected significantly by food and requires fewer oral doses per day, but when administered parenterally they are equivalent.

Extended spectrum penicillin
Extended spectrum Penicillins like piperacillin have additional anti-pseudomonal activities. Piperacillin is usually combined with beta-lactamase inhibitors. Additional treatment for anaerobes is not required.

Cephalosporins
First generation cephalosporin
Cephalexin and cephazolin have a similar range of antimicrobial activity. They are active against streptococci and staphylococci, including beta-lactamase-producing staphylococci, but inactive against enterococci or *Listeria monocytogenes*. Their Gram-negative spectrum includes mainly *Escherichia coli* and Klebsiella species, but they are inactive against other Gram-negative aerobes including Serratia, Enterobacter and Pseudomonas species. They are not effective against Gram-negative anaerobes. First generation cephalosporins have no activity against *H. influenza*, a common cause of pneumonia and meningitis. Cephazolin doses recommended are lower when treatment is for Gram-positive pathogens (1g, IV, 8H) than for Gram-negative pathogens (2g, IV, 8H).

Second generation cephalosporin
This group has broader spectrum of activity than the first generation. Their activity includes *S. aureus*, Streptococcus, Enterobacteriaceae, *H. influenzae*, *Moraxella catarrhalis* but not MRSA, enterococci, pseudomonas, *B. fragilis* and acinetobacter. Cefuroxime and Cefaclor are the commonly used second generations.

Third generation cephalosporin
Cefotaxime and ceftriaxone have a wide spectrum of activity covering the majority of community acquired enteric Gram-negative rods. The activity of these medicines against *Bacteroides fragilis* varies. These medicines are less active against staphylococci than earlier cephalosporins. None has clinically useful activity against enterococci or MRSA. However, unlike earlier cephalosporins, which do not enter the cerebrospinal fluid in therapeutically useful concentrations, these cephalosporins are effective in meningitis because of better penetration and higher intrinsic activity. Some organisms, e.g. Serratia, Citrobacter and Enterobacter species, have chromosomal cephalosporinases and resistance may develop during treatment. Plasmid mediated extended spectrum beta-lactamases (ESBLs) also inactivate all of these medicines (e.g. in *Escherichia coli*, *Klebsiella pneumoniae*) so alternative therapy is indicated.
Ceftriaxone is now the medicine of choice for treatment of gonococcal infections. Ceftriaxone is highly protein bound and can displace bilirubin from albumin, therefore its use in neonates is not recommended.
Ceftazidime, another member of the generation has similar activities and in addition has good activity against Pseudomonas.
Higher generation cephalosporins including cefepime, cefpirome, ceftobiprole have wider spectrum of activity.

Aminoglycosides
Aminoglycosides are amongst the most rapidly bactericidal agents available for treatment of aerobic Gram-negative sepsis.
Gentamicin has a broad gram-negative spectrum, including *Pseudomonas aeruginosa*, and is the aminoglycoside of choice for most cases of aerobic Gram-negative sepsis. Gram-negative isolates remain largely sensitive to gentamicin; therefore, it should be the aminoglycoside of choice.
Amikacin is more resistant to enzymatic inactivation than gentamicin, so it should be reserved for treating infections resistant to other aminoglycosides. All aminoglycosides are potentially ototoxic and nephrotoxic. Clinically significant adverse effects are more likely with advancing age, pre-existing renal impairment or hearing loss. Once-daily dosing of aminoglycosides is as efficacious and less nephrotoxic than the administration in divided daily doses. Therefore, once-daily dosing has been recommended throughout this guideline except in the following situations:

- There is insufficient evidence to justify change to a once-daily dose in pregnant women, patients with burns or cystic fibrosis; and
- In severely impaired renal function, the optimal dosage is not clearly established and needs to be adjusted with the creatinine clearance.

**Chloramphenicol**

Chloramphenicol is a broad-spectrum antibiotic with a range of activity that includes Gram-positive and Gram-negative bacteria, rickettsia and chlamydia. Infections due to *Salmonella typhi*, *Haemophilus influenzae* and *Bacteroides fragilis* have previously been the principal indications for chloramphenicol use. Chloramphenicol causes a reversible dose-dependent bone marrow hypoplasia and rare, irreversible, dose-independent (idiosyncratic) aplasia (1 in 30 000 courses) that is sometimes fatal. In is also known to cause grey baby syndrome in neonates. Therefore, it is given only in severe infections and when there is no suitable alternative.

**Glycopeptides**

Vancomycin is active against Gram-positive organisms and reserved for infections caused by Methicillin-resistant *Staphylococcus aureus* (MRSA) and ampicillin-resistant enterococci. It is also used in prophylaxis and treatment of infection caused by Gram-positive bacteria in patients allergic to all other appropriate therapies. It can be used for orally for treatment of *Clostridium difficile* colitis that has not responding to metronidazole or is failing with a potentially life threatening colitis. It should be given as a slow IV infusion to prevent ‘red-man’ syndrome. Teicoplanin has similar activity to vancomycin but does not penetrate CSF. It is more renal friendly and is administered once daily. Glycopeptides should be administered as slow IV infusions.

**Macrolides**

Erythromycin has a wide spectrum of activity covering both Gram-positive and Gram-negative cocci, Legionella, Bordetella, Corynebacterium, Mycoplasma, Chlamydia and anaerobes (both Gram-positive and negative), but not enteric Gram-negative rods. Community acquired respiratory infections are thus major indications. Erythromycin has an antibacterial spectrum that is similar but not identical to penicillin; it is thus an alternative in penicillin allergic patients. CSF penetration is poor. Newer macrolides like azithromycin and clarithromycin have fewer side effects, wider spectrum; need less frequent dosing and duration of treatment than erythromycin. Clarithromycin is active against *Mycobacterium avium* complex (MAC) and *Helicobacter pylori*.

**Nitrofurantoin**

Nitrofurantoin is useful for treatment and prophylaxis of infections of the lower urinary tract. It is not indicated for treatment of complicated urinary tract infection. Effective treatment of urinary tract infection depends on an adequate concentration in the urine. Therefore, in renal impairment, treatment is much less effective and carries an increased risk of toxicity because of impaired excretion of the medicine. Alkaline urine reduces its antibacterial activity and should not be used in urinary infections caused by Proteus species (they makes urine alkaline due to its urease activity).

**Nitroimidazoles**

Metronidazole has spectra of activity that encompass Gram-negative anaerobes such as *Bacteroides fragilis*, Gram-positive anaerobes such as *Clostridium* species and anaerobic protozoa including *Trichomonas vaginalis*, *Giardia lamblia* and *Entamoeba histolytica*. These medicines may cause a disulfiram-like reaction with alcohol and patients
must be instructed to abstain from alcohol during the course of treatment. Metronidazole has excellent oral (and rectal) absorption with equal bioavailability to intravenous route and can thus be an effective alternative when IV administration is not possible.

Metronidazole is an alternative to penicillin for the treatment of many oral infections where the patient is allergic to penicillin or the infection is due to beta-lactamase producing anaerobes. It is the medicine of choice for the treatment of acute necrotizing ulcerative gingivitis (Vincent’s infection) and pericoronitis.

**Quinolones**

Ciprofloxacin has a wide range of activity against Gram-negative bacteria including *Haemophilus influenzae*, enteric Gram-negative rods, *Pseudomonas aeruginosa*, Gram-negative cocci, some Gram-positive cocci and intracellular organisms including *Legionella* and various species of mycobacteria. It has poor activity against streptococci and do not make a good choice for treatment of respiratory tract infections. However, newer quinolones like levofloxacin, moxifloxacin and others have emerged as alternative treatment choices for respiratory infections due to their improved spectrum against Gram-positive organisms. Quinolones are not useful against anaerobes. Quinolones should be reserved for treatment of infections resistant to other antibiotics or where an oral medicine with this particular antibacterial spectrum is essential. Emerging resistance to quinolones, especially in enteric Gram-negative rods is a concern. They cause arthropathy in the weight bearing joints of immature animals and are therefore, generally not recommended for children and growing adolescents. However, the significance of this effect in humans is uncertain and in some specific circumstances, short-term use may be justified in children. They are also known to cause tendon damage including rupture and should be used with caution especially in patients with tendon disorders, elderly and concomitant steroid use.

**Rifamycins**

Rifampicin is active against Gram-positive organisms, including staphylococci, and against mycobacteria. Rapid emergence of resistance means that they must always be used in combination with unrelated antimicrobials. Rifampicin is used for treatment of tuberculosis with other agents, treatment of selected MRSA infections and for chemoprophylaxis of contacts of *Haemophilus influenzae* type b and meningococcal disease. Once daily dosing is recommended for most susceptible infections, but evidence favours 12-hourly dosing in *S. aureus* infections. Thrombocytopenia, acute renal failure and an influenza-like syndrome occur, particularly with intermittent therapy. Rifampicin can cause hepatitis and liver function should therefore be checked before commencing treatment. Transient rise in transaminases are common and no action is required unless the patient is developing severe hepatitis. The patient should be informed about orange discoloration of urine and possible staining of soft contact lenses. Rifampicin is a potent inducer of cytochrome P450 and has a significant medicine interaction issues. Therefore, medicine interaction should be checked when starting or stopping rifampicin in patients on other medications.

**Sulphonamide and trimethoprim**

Sulfamethoxazole combined with the dihydrofolate reductase inhibitor trimethoprim, has in the past found widespread use as a broad-spectrum agent, particularly in respiratory and urinary tract infections but no longer preferred due to frequent hypersensitivity reactions. It is currently used in the treatment and prophylaxis of *Pneumocystis jiroveci* infection and the treatment of *Listeria monocytogenes, toxoplasma and Nocardia* infection. Trimethoprim alone is as effective as sulfamethoxazole + trimethoprim in treatment and prophylaxis of uncomplicated urinary tract infection. Hypersensitivity reactions to trimethoprim + sulfamethoxazole are common.

**Tetracyclines**

Tetracyclines have a broad spectrum of activity, which includes Gram-positive and Gram-negative bacteria, *Chlamydia, Rickettsia, Mycoplasma*, spirochetes, some non-tuberculous mycobacteria and some protozoa. They have good tissue penetration but do not enter CSF. Their main includes the treatment of pelvic inflammatory disease,
acne, periodontal disease, community acquired pneumonia, brucellosis, plague, cholera and Lyme disease. They are contraindicated in children less than 8 years of age. Tetracyclines are safe for use during the first 18 weeks of pregnancy (16 weeks’ post-conception) after which they cause discoloration of the baby’s teeth. They may be used for short courses in breastfeeding women. Photosensitivity reactions and candida/yeast overgrowth may occur with any tetracycline.

Doxycycline has a longer half-life, and absorption is not significantly affected by the presence of food. It is the preferred tetracycline in most situations, as once-daily dosing enhances adherence. Oesophagitis can occur with doxycycline, so it should be washed down with a glass of water and the patient instructed to remain upright for at least 30 minutes after administration. Doxycycline acts as a blood schizonticide, and is used for malaria prophylaxis.

Carbapenem
This group of antibiotics has the widest spectrum of activity including many Gram-positives, Gram-negatives and anaerobes. They are active against Pseudomonas aeruginosa, Acinetobacter and ESBLs but not against MRSA. They have good tissue and CSF penetration. They are particularly useful for the treatment of severe Hospital acquired infections and polymicrobial infections including septicaemia, hospital acquired pneumonia, intra-abdominal infections, skin and soft tissue infections and complicated urinary tract infections. However, their use should be strictly guided by culture and susceptibility reports. Meropenem and imipenem are the commonly used carbapenems and the later has higher tendency to cause seizures especially in children.

Polymyxins
Polymyxin B has activity against many gram-negative organisms including Acinetobacter baumannii and Pseudomonas aeruginosa. However, due to toxicity (nephrotoxicity and neurotoxicity) its use is limited to infections caused by gram-negative organisms’ resistant to other class of antimicrobials.

ANTIFUNGAL MEDICINES

Azoles
Clotrimazole and ketoconazole are used in mucocutaneous candidiasis, dermatophytosis and tinea versicolor. Fluconazole has additional activity against Cryptococcus. It has a good penetration of tissues and central nervous system. It is not significantly excreted in the urine. Azoles also have significant medicine interaction issues.

Polynes
Amphotericin B has a good activity against wide range of yeasts (Candida and Cryptococcus species) and other fungi. It is also used in treatment of Leishmaniosis. However, it is associated with significant toxicity, which include nephrotoxicity, dyselectrolytemia and gastrointestinal side effects. Liposomal formulation of amphotericin B is associated with lesser incidences of adverse effects. Nystatin is mainly active against Candida species. It is poorly absorbed from the gastrointestinal tract and is not absorbed through skin or mucous membranes when applied topically.

ANTIVIRALS

Antiviral medicines for herpes simplex virus infection
Acyclovir is active against herpes simplex virus and to a lesser extent varicella-zoster virus. It is poorly and erratically absorbed from the gut and even less through the skin. Ganciclovir is used for treatment of infections caused by cytomegalovirus (CMV).

ANTIPROTOZOAL MEDICINES

Amoebicide and anti giardial medicines
Metronidazole is the medicine of choice for acute invasive amoebic dysentery since it is very effective against vegetative forms of Entamoeba histolytica. It is also active against amoeba, which may have migrated to the liver. In addition, metronidazole is also the treatment of choice for Giardia lamblia.
**Trichomonacides**
Metronidazole is the medicine of choice for *Trichomonas vaginalis* infections. Contact tracing is recommended and sexual contacts should be treated simultaneously.

**Leishmaniacides**
Sodium stibogluconate, an organic pentavalent antimony compound is used in visceral leishmaniasis. It is given by IV or IM injection for 28 days for visceral and 20 days for cutaneous infections.
Amphotericin (particularly liposomal formulation), and Miltefosine are useful for antimony resistant infections.

**ANTHELMINTICS**

**Benzimidazoles**
Albendazole is used predominantly in intestinal nematode infections such as ascariasis, enterobiasis, hookworm and trichuris. Albendazole is preferred in systemic cestode (tapeworm) and nematode infections, such as hydatids (in conjunction with surgery), cysticercosis, strongyloidiasis and capillariasis. It may also be effective in trichinosis, toxocariasis and cutaneous larva migrans. The main adverse effect with albendazole is raised transaminases, gastrointestinal upset and haematological abnormalities, e.g. leucopenia. Albendazole should be avoided in pregnancy and in children less than 6 months of age.

**Taenicides**
Niclosamide is the most widely used medicine for tapeworm infections. An antiemetic can be given before treatment and a laxative can be given 2 hours after niclosamide.
<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BONE AND JOINT INFECTIONS</strong></td>
<td></td>
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<tr>
<td><strong>Acute Osteomyelitis</strong></td>
<td>80% caused by <em>Staphylococcus</em></td>
<td>Cloxacillin 2g, IV, Q6H</td>
<td>Cephazolin 2g, IV, Q8H</td>
<td>4 - 6 weeks (initially IV then oral depending on response)</td>
<td>Obtain blood, pus and bone culture and sensitivity</td>
</tr>
<tr>
<td>Hypersensitive to penicillin:</td>
<td>For delayed/non-life threatening</td>
<td></td>
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<tr>
<td>For immediate/life threatening</td>
<td></td>
<td>Cephazolin 2g, IV, Q8H</td>
<td>As above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methicillin-resistant <em>Staphylococcus aureus</em></td>
<td>(MRSA)</td>
<td>Vancomycin 1g, IV, Q12H</td>
<td>As above</td>
<td></td>
<td>Vancomycin should be given as slow IV infusion, at least over an hour</td>
</tr>
<tr>
<td>Chronic osteomyelitis and osteomyelitis involving bone &amp; joint prostheses</td>
<td>*Staphylococcus aureus, Enterobacteriaceae, Pseudomonas</td>
<td>Empirical therapy is not usually recommended; treatment must be guided by the susceptibility of the organism isolated from aspirations, biopsies and prosthetic materials.</td>
<td>Cotrimoxazole 960mg, PO, Q12H PLUS Rifampicin 600mg PO, Q24H</td>
<td>6 weeks to 6 months depending on clinical response</td>
<td>Therapy should be based on proper culture and sensitivity report</td>
</tr>
<tr>
<td><strong>Septic arthritis</strong></td>
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<tr>
<td><strong>Gonococcal arthritis</strong></td>
<td><em>Neisseria gonorrhoeae</em></td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td></td>
<td>At least 7 days</td>
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<tr>
<td><strong>Open fracture</strong></td>
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<tr>
<td>General</td>
<td><em>Staphylococcal</em></td>
<td>Cephazolin 1g, IV, Q6H</td>
<td></td>
<td>5 days; longer, if infection is established</td>
<td>Debridement and irrigation of the wound has to be done before referral; Where cephalzin are not available, a dose of Benzylopenicillin 3 - 4 MU,</td>
</tr>
<tr>
<td>Type I and II Open fracture</td>
<td></td>
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<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td><strong>Type III Open fracture</strong></td>
<td></td>
<td>Cephazolin 1g, IV, Q6H PLUS</td>
<td>Gentamicin 5mg/kg, IV, Q8H</td>
<td></td>
<td>IM ORAMPicillin 1g, IV PLUS Gentamicin 5mg/kg, IV can be given STAT and refer to specialist</td>
</tr>
<tr>
<td>Open fracture with organic contamination</td>
<td></td>
<td>Cephazolin 1g, IV, Q6H PLUS</td>
<td>Gentamicin 5mg/kg, IV, Q8H PLUS</td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td></td>
</tr>
<tr>
<td><strong>CARDIOVASCULAR SYSTEM INFECTIONS</strong></td>
<td></td>
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<tr>
<td>Native valve endocarditis:</td>
<td>Streptococcus, Enterococcus, Staphylococcus aureus, Coagulase Negative Staphylococci (CoNS)</td>
<td>Ampicillin 2g, IV, Q4H PLUS</td>
<td>Gentamicin 3mg/kg, IV, Q24H PLUS</td>
<td>Gentamicin 3mg/kg, IV, Q24H PLUS</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Gentamicin 3mg/kg, IV, Q24H PLUS 2 to 4 weeks Stop gentamicin after 2 weeks</td>
</tr>
<tr>
<td>Initial empirical therapy awaiting culture results</td>
<td></td>
<td>Ceftriaxone 1g, IV, Q12H PLUS</td>
<td>Gentamicin 3mg/kg, IV, Q24H PLUS</td>
<td></td>
<td>Take 4 (10ml) samples 15 minutes apart; 3 samples (ESC 2015 and AHA guidelines)</td>
</tr>
<tr>
<td>Viridans streptococci</td>
<td>Benzy1penicillin 4MU, IV, Q4H OR Amoxicillin 25 - 50mg/kg, PO, Q4H PLUS Gentamicin 3mg/kg, IV, Q24H</td>
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<tr>
<td>Penicillin resistant</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS</td>
<td>Vancomycin 15mg/kg, IV, Q12H</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td><strong>Enterococcal endocarditis</strong></td>
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<tr>
<td>For penicillin susceptible isolates</td>
<td><em>Enterococcus faecalis</em>, <em>Enterococcus faecium</em></td>
<td>Gentamicin 3mg/kg, IV, Q24H</td>
<td>PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For penicillin resistant isolates</td>
<td></td>
<td>Ampicillin 2g, IV, Q4H</td>
<td>PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td>4 - 6 weeks; stop gentamicin after 2 weeks</td>
<td></td>
</tr>
<tr>
<td>For High Level gentamicin resistant isolates</td>
<td></td>
<td>Vancomycin 15mg/kg, IV, Q12H</td>
<td>PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td>6 weeks</td>
<td></td>
</tr>
<tr>
<td><strong>Staphylococcal endocarditis</strong></td>
<td></td>
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</tr>
<tr>
<td>Left-sided</td>
<td><em>Methicillin-susceptible Staphylococcus aureus</em> (MSSA)</td>
<td>Cloxacillin, 2g, IV, Q4H</td>
<td>Cephazolin 2g, IV, Q8H</td>
<td>6 weeks</td>
<td></td>
</tr>
<tr>
<td>Right-sided</td>
<td><em>Methicillin-resistant Staphylococcus aureus</em> (MRSA)</td>
<td>Vancomycin, 15mg/kg, IV, Q12H</td>
<td></td>
<td>6 weeks</td>
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<tr>
<td><strong>Endocarditis caused by the HACEK group</strong></td>
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<tr>
<td></td>
<td>Haemophilus, Aggregatibacter, Cardiobacterium,</td>
<td>Ceftriaxone, 1g, IV, Q12H</td>
<td></td>
<td>4 weeks</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td>Common Causative Antimicrobial Therapy</td>
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<tr>
<td>Eikenella, Kingella (HACEK group)</td>
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<tr>
<td><strong>Prosthetic valve endocarditis</strong> (valve replacement less than 1 year)</td>
<td><em>Staphylococcus epidermidis, Staphylococcus aureus, rarely enterobacteriaceae, diphtheroids</em></td>
<td>Vancomycin 15mg/kg IV, Q12H <strong>PLUS</strong> Gentamicin 3mg/kg, IV, Q24H <strong>PLUS</strong> Rifampicin 300mg, PO, Q8H</td>
<td></td>
<td>6 - 8 weeks; Stop gentamicin after 2 weeks</td>
<td>Rifampicin should be started after 3 days of starting vancomycin; If valve replacement is more than 1 year, treat as empirical regime as above</td>
</tr>
<tr>
<td>Blood culture-negative infective endocarditis</td>
<td></td>
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<tr>
<td>Brucella spp.</td>
<td>Doxycycline 200mg, PO, Q24H <strong>PLUS</strong> Cotrimoxazole 960mg, PO, Q12H <strong>PLUS</strong> Rifampicin 300-600mg, PO, Q24H</td>
<td></td>
<td></td>
<td>≥ 3-6 months</td>
<td></td>
</tr>
<tr>
<td>Bartonella spp.</td>
<td>Doxycycline 100mg, PO, Q12H <strong>PLUS</strong> Gentamicin 3mg, IV, Q24H</td>
<td></td>
<td></td>
<td>4 weeks</td>
<td>Stop gentamycin after 2 weeks</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Legionella spp.</td>
<td></td>
<td>Levofloxacin 500mg, PO, Q12H PLUS Rifampicin 300 - 1200mg, PO, Q24H</td>
<td></td>
<td>≥ 6 weeks</td>
<td></td>
</tr>
<tr>
<td>Mycoplasma spp.</td>
<td></td>
<td>Levofloxacin 500mg, PO, Q12H</td>
<td></td>
<td>6 months</td>
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</tr>
<tr>
<td>T. whipplei</td>
<td></td>
<td>Doxycycline 200mg, PO, Q12H PLUS Hydroxychloroquine 200 - 600mg, PO, Q24H</td>
<td></td>
<td>≥ 18 months</td>
<td></td>
</tr>
<tr>
<td>Rheumatic fever</td>
<td>Group A streptococcus</td>
<td>Benzathine benzylpenicillin, 1.2MU, IM, STAT OR Penicillin V 500mg, PO, Q6H</td>
<td></td>
<td>10 days only for PO</td>
<td>In case of penicillin sensitivity, use erythromycin.</td>
</tr>
<tr>
<td>Acute</td>
<td></td>
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<tr>
<td>Secondary prophylaxis</td>
<td>Benzanilene benzylpenicillin Body wt. &gt; 27kg: 1.2MU, every 3 weeks; Body wt. &lt; 27kg: 0.6MU, every 4 weeks</td>
<td>Penicillin V, 250mg, PO, Q12H OR Erythromycin 250mg, PO, Q12H</td>
<td></td>
<td>Without carditis: for 5 years after the last attack or 21 years of age (whichever is longer); With carditis but no residual valvular disease: for 10 years after the last attack, or 21 years of age (whichever is longer); With persistent valvular disease: for 10 years after last attack, or 40 years or lifelong prophylaxis</td>
<td></td>
</tr>
<tr>
<td>Central Nervous System Infections</td>
<td>Meningitis: Initial empirical therapy</td>
<td>Streptococcus pneumoniae, Haemophilus influenzae, Neisseria meningitidis</td>
<td>Benzylpenicillin 4MU, IV, Q4H PLUS Gentamicin 3mg, IV, Q24H</td>
<td>Cefotaxime 2g, IV, Q6H OR Ceftriaxone 1g, IV,</td>
<td>10 - 14 days Adjunctive therapy with dexamethasone 10mg, IV, Q6H should be initiated 20 minutes before the 1st dose.</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<td></td>
<td>dose of antibiotics and continued for 4 days</td>
</tr>
<tr>
<td><strong>Organism specific therapy</strong></td>
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<tr>
<td><strong>Streptococcus pneumoniae</strong></td>
<td>Benzylpenicillin 4MU, IV, Q4H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td></td>
<td>10 - 14 days</td>
<td>If isolate resistant to penicillin, patient may need alternative regimen like 3rd generation cephalosporins and/or vancomycin</td>
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</tr>
<tr>
<td></td>
<td>Neisseria meningitidis</td>
<td>Benzylpenicillin 4MU, IV, Q4H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>7 days</td>
<td>Note: Close contacts and patients treated with penicillins should receive prophylaxis with rifampicin 600mg, PO, Q12H for 2 days or ciprofloxacin 500 mg, PO, STAT OR ceftriaxone 250 mg, IM STAT.</td>
</tr>
</tbody>
</table>

**Haemophilus influenzae**

| Ampicillin 2g, IV, Q4H | Cefotaxime 2g, IV, Q6H | 7 days |

**Listeria monocytogenes**

| Ampicillin 2g, IV, Q4H | Benzylpenicillin 4MU, IV, Q4H | 21 days (may need up to 6 weeks in immunocompromised patients) | Commonly seen in neonates and immunocompromised adults |

**Gram-negative bacilli**

| Cefotaxime 2g, IV, Q6H | 21 days |

**Pseudomonas**

<p>| Ciprofloxacin 400mg, IV, Q8H | Ceftazidime 2g, IV, Q8H | 21 days |</p>
<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Due to post-neurosurgery, post head trauma, cochlear implant</strong></td>
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<tr>
<td>Cryptococcal meningitis</td>
<td>Group B Streptococcus</td>
<td>Benzylpenicillin 4MU, IV, Q4H</td>
<td>Cefotaxime, 2g, IV, Q6H</td>
<td>21 days</td>
<td>Common cause of meningitis in neonates</td>
</tr>
<tr>
<td></td>
<td>Staphylococcus aureus</td>
<td>Cloxacillin 2g, IV, Q4H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methicillin-resistant <em>Staphylococcus aureus</em> (MRSA)</td>
<td>Vancomycin 15mg/kg, IV, Q12H</td>
<td></td>
<td></td>
<td>7 - 10 days</td>
</tr>
<tr>
<td></td>
<td>Streptococcus pneumoniae most common especially if CSF leakage; <em>Staphylococcus aureus</em>, coliforms and pseudomonas</td>
<td>Vancomycin 15mg/kg, IV, Q12H PLUS Ceftazidime 2g, IV, Q8H</td>
<td>Vancomycin 15mg/kg, IV, Q12H PLUS Meropenem 2g, IV, Q8H</td>
<td>Depend on surgical intervention and clinical response</td>
<td>Monitor renal function in patients receiving vancomycin and/or meropenem</td>
</tr>
<tr>
<td></td>
<td>Cryptococcus neoformans (especially in immunocompromised patients including HIV/AIDS)</td>
<td>Amphotericin B liposomal 3 - 4mg/kg, IV, Q24H</td>
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<td></td>
<td>6 - 8 weeks followed by long-term suppressive therapy with oral fluconazole especially in AIDS</td>
</tr>
<tr>
<td>Encephalitis</td>
<td><em>Herpes simplex</em></td>
<td>Acyclovir, 10mg/kg, IV, Q8H</td>
<td></td>
<td></td>
<td>Administered as infusion over 1 hour</td>
</tr>
<tr>
<td>Brain Abscess</td>
<td>Polymicrobial including <em>Streptococcus anginosus</em>, anaerobic bacteria, <em>Staphylococcus aureus</em> and gram-negatives</td>
<td>Benzylpenicillin 4MU, IV, Q4H PLUS Metronidazole 1g, IV as loading dose; and then 500mg, IV, Q8H</td>
<td>Ceftriaxone, 1g, IV, Q12H PLUS Metronidazole 1g, IV as loading dose; and then 500mg, IV, Q8H</td>
<td>4 to 8 weeks (Duration of treatment depends upon surgical intervention, clinical response and radiological evidence of resolution)</td>
<td>Early surgical consultation is essential</td>
</tr>
<tr>
<td>Neurocysticercosis</td>
<td><em>Taenia solium</em></td>
<td>Albendazole 400mg, PO, Q12H</td>
<td></td>
<td></td>
<td>Prednisolone 1mg/kg, PO one day prior to starting albendazole and continue for 10 days</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td><strong>GASTROINTESTINAL TRACT INFECTIONS</strong></td>
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<tr>
<td>Cholera</td>
<td><strong>Vibrio cholerae</strong></td>
<td>Doxycycline 300mg, PO, STAT</td>
<td>Ciprofloxacin 1g, PO, STAT</td>
<td></td>
<td>Stool culture should be done; Fluid replacement is the mainstay therapy.</td>
</tr>
<tr>
<td>In pregnancy</td>
<td></td>
<td>Erythromycin 12.5mg/kg, PO, Q6H</td>
<td></td>
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</tr>
<tr>
<td>Diverticulitis (Severe)</td>
<td><strong>Escherichia coli, Coliforms, Enterococci, Anaerobes</strong></td>
<td>Ampicillin 1g, IV, Q6H PLUS Gentamicin 7.5mg/kg, IV, Q24H PLUS Metronidazole 400mg, PO, Q12H</td>
<td>Ciprofloxacin 400mg, IV, Q12H PLUS Metronidazole 400mg, PO, Q12H</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Eradication of <strong>Helicobacter pylori</strong></td>
<td><strong>Helicobacter pylori</strong></td>
<td>Omeprazole 20mg, PO, Q12H PLUS Clarithromycin 500mg, PO, Q12H PLUS Amoxicillin 1g, PO, Q12H</td>
<td>Omeprazole 20mg, PO, Q12H PLUS Metronidazole 400mg, PO, Q12H PLUS Amoxicillin 1g, PO, Q12H</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td>Infective Diarrhoea</td>
<td></td>
<td>Norfloxacin 400mg, PO, STAT</td>
<td>Ciprofloxacin 500mg, PO, Q12H</td>
<td>3 days</td>
<td>Stool culture to be done; fluid replacement is main component of therapy</td>
</tr>
<tr>
<td>Traveller’s diarrhoea:</td>
<td>Mild (Non dysenteric)</td>
<td></td>
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<tr>
<td>Severe (Dysenteric)</td>
<td></td>
<td>Norfloxacin 400mg, PO, Q12H</td>
<td>Ciprofloxacin 500mg, PO, Q12H</td>
<td>3 days</td>
<td></td>
</tr>
<tr>
<td>Organism specific</td>
<td><strong>Yersinia, Escherichia coli</strong></td>
<td>Cotrimoxazole 960mg, PO, Q12H</td>
<td>Norfloxacin 400mg, PO, Q12H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td>Campylobacter</td>
<td>Norfloxacin 400mg, PO, Q12H</td>
<td></td>
<td>OR Ciprofloxacin 500mg, PO, Q12H</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Salmonella, Shigella</td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td></td>
<td>OR Cotrimoxazole 960mg, PO, Q12H</td>
<td>5 - 7</td>
<td></td>
</tr>
<tr>
<td>Giardia</td>
<td>Metronidazole 400mg, PO, Q8H</td>
<td></td>
<td>OR Metronidazole 2g, PO, Q24H</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Entamoeba histolytica</td>
<td>Metronidazole 800mg, PO, Q8H</td>
<td></td>
<td></td>
<td>7 - 10</td>
<td>If blood culture positive for the organisms, treat for 14 days;</td>
</tr>
<tr>
<td>Clostridium difficile</td>
<td>Metronidazole 400mg, PO, Q8H</td>
<td></td>
<td>Vancomycin 125mg, PO*, Q6H</td>
<td>10 - 14</td>
<td>* Break the ampoule and give orally</td>
</tr>
<tr>
<td>Peritonitis: Primary</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td></td>
<td>Ampicillin 500mg, IV, Q8H</td>
<td>7 - 10</td>
<td>Primary prophylaxis</td>
</tr>
<tr>
<td>(Spontaneous bacterial</td>
<td></td>
<td></td>
<td>PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td></td>
<td>Treatment</td>
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<tr>
<td>peritonitis)</td>
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<td></td>
</tr>
<tr>
<td>Enterobacteriaceae,</td>
<td>Norfloxacin 400mg, PO, Q12H</td>
<td></td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>5</td>
<td>For cirrhotic patient with upper GI bleed</td>
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<tr>
<td>Streptococcus pneumoniae,</td>
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<tr>
<td>Enterococci, anaerobes</td>
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<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td>Secondary prophylaxis</td>
<td></td>
<td>Norfloxacin 400mg, PO, Q12H</td>
<td>Cotrimoxazole 960mg, PO, Q24H</td>
<td>Lifelong</td>
<td></td>
</tr>
<tr>
<td>Enteric Fever</td>
<td><em>Salmonella typhi,</em></td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>10 - 14 days</td>
<td>Culture and sensitivity is essential</td>
</tr>
<tr>
<td></td>
<td><em>Salmonella paratyphi</em></td>
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<tr>
<td>Vaginal candidiasis</td>
<td><em>Candida albicans</em></td>
<td>Clotrimazole 100mg vaginal pessary at night for 7 nights OR Vaginal pessary 400mg daily (4 x 100mg) for 3 nights OR Vaginal pessary 500mg single dose for 1 night (Choose depending on severity, compliance)</td>
<td>Fluconazole 150mg, PO, STAT (in chronic and resistant cases)</td>
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<td></td>
<td>All topical and oral azoles give 80 - 95% cure; In pregnancy, avoid oral azoles.</td>
</tr>
<tr>
<td>Balanitis</td>
<td><em>Candidal balanitis</em> is commoner than bacterial cause</td>
<td>Topical Clotrimazole 1% Ointment, Q12H</td>
<td>Fluconazole 150mg, PO, STAT (in chronic and resistant cases)</td>
<td>At least 7 days</td>
<td></td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td><em>Gardnerella vaginalis,</em></td>
<td>Metronidazole 2g, PO, STAT OR Metronidazole 400mg, PO, Q12H</td>
<td>Fluconazole 150mg, PO, STAT (in chronic and resistant cases)</td>
<td>7 days</td>
<td>A 7 days course of oral metronidazole is slightly more effective than 2g stat; Avoid 2g stat dose in pregnancy.</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Gonococcal urethritis, Cervicitis</td>
<td>Neisseria gonorrhoeae</td>
<td>Ceftriaxone 250 mg, IM, STAT</td>
<td>Ciprofloxacin 500mg, PO, STAT</td>
<td></td>
<td>Take samples for gram stain and culture wherever applicable; When specific diagnosis is difficult, follow syndromic treatment guideline as per National STI management guideline</td>
</tr>
<tr>
<td>Chlamydia trachomatis urethritis, Cervicitis</td>
<td>Chlamydia trachomatis</td>
<td>Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Trichomoni asis</td>
<td>Trichomonas vaginalis</td>
<td>Metronidazole 2g, PO, STAT</td>
<td></td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Pelvic inflammatory disease (PID)</td>
<td>Chlamydia and Neisseria gonorrhoeae</td>
<td>Ceftriaxone 250mg, IM, STAT PLUS Metronidazole 400mg, PO, Q12H PLUS Doxycycline 100mg, PO, Q12H</td>
<td></td>
<td>14 days</td>
<td></td>
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<tr>
<td>If pregnant</td>
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<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td><strong>Chancroid</strong></td>
<td><em>Haemophilus ducreyi</em></td>
<td>Erythromycin 500mg, PO, Q6H for 7 days</td>
<td>Ceftriaxone 250mg, IM, STAT OR Ciprofloxacin 500mg, PO, Q12H for 3 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Donovanosis</strong></td>
<td><em>Klebsiella granulomatis</em></td>
<td>Doxycycline 100mg, PO, Q12H</td>
<td>Erythromycin 500mg, PO, Q6H OR Cotrimoxazole 960mg, PO, Q12H</td>
<td>All for minimum 3 weeks</td>
<td></td>
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<tr>
<td><strong>Syphilis</strong></td>
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<tr>
<td>Early Syphilis</td>
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<tr>
<td>If allergic to penicillin</td>
<td></td>
<td>Doxycycline 100mg, PO, Q12H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>14 days</td>
<td>Use erythromycin, if pregnant</td>
</tr>
<tr>
<td>Late Latent Syphilis</td>
<td><em>Treponema pallidum</em></td>
<td>Benzathine benzylpenicillin 2.4MU, IM, STAT, divided equally at 2 different sites</td>
<td>Procaine penicillin 1.2MU, IM, Q24H</td>
<td>10 days</td>
<td>Primary, secondary or early latent syphilis of not more than 2 years duration</td>
</tr>
<tr>
<td>If allergic to penicillin</td>
<td></td>
<td>Doxycycline 100mg, PO, Q12H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>14 days</td>
<td>Use erythromycin, if pregnant</td>
</tr>
<tr>
<td>Neurosyphilis</td>
<td></td>
<td>Benzylpenicillin 4MU, IV, Q6H for 14 days</td>
<td>Doxycycline 100mg, PO, Q8H for 30 days OR Erythromycin 500mg, PO, Q6H for 30 days in pregnancy</td>
<td>Give prednisolone 20mg, Q12H for 2 days before starting antibiotics and continue for next 48 hrs after commencing antibiotics.</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td><strong>INTRA-ABDOMINAL INFECTIONS</strong></td>
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<tr>
<td><strong>Appendicitis:</strong></td>
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<tr>
<td><em>Uncomplicated/Unclassified</em></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Cefazolin 1g, IV, Q8H</td>
<td>Single dose preoperatively and continue 5 to 7 days if managed conservatively</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PLUS Metronidazole 7.5mg/kg, IV, Q8H</td>
<td>PLUS Metronidazole 7.5mg/kg, IV, Q8H</td>
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<tr>
<td></td>
<td></td>
<td>Gentamicin 5mg/kg, IV, Q24H</td>
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<tr>
<td></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Culture based</td>
<td>5 - 7 days</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PLUS Metronidazole 7.5mg/kg, IV, Q8H</td>
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<tr>
<td></td>
<td></td>
<td>Gentamicin 5mg/kg, IV, Q24H</td>
<td></td>
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<tr>
<td><strong>Complicated</strong></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>5 - 7 days</td>
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<td></td>
<td></td>
<td>PLUS Metronidazole 7.5mg/kg, IV, Q8H</td>
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<td></td>
<td></td>
<td>Gentamicin 5mg/kg, IV, Q24H</td>
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<tr>
<td><strong>Cholecystitis</strong></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Ciprofloxacin 500mg, IV, Q12H</td>
<td>5 - 7 days</td>
<td></td>
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<td></td>
<td></td>
<td>PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td></td>
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<tr>
<td><strong>If severe</strong></td>
<td></td>
<td>Ciprofloxacin 500mg, IV, Q12H</td>
<td></td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Cholangitis</strong></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>5 - 7 days</td>
<td>In patient with chronic biliary obstruction, add Metronidazole 7.5mg/kg, IV, Q8H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PLUS Metronidazole 7.5mg/kg, IV, Q8H</td>
<td></td>
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</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Liver abscess</td>
<td>Pyogenic</td>
<td>Ciprofloxacin 400mg, IV, Q12H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>4 - 6 weeks</td>
<td>Should be followed by metronidazole 7.5mg/kg, IV, Q8H for 10 days</td>
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<td></td>
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<td>PLUS</td>
<td>PLUS</td>
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<td></td>
<td></td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
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<tr>
<td></td>
<td>Amoebic</td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td></td>
<td>10 days</td>
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<td></td>
<td>Should be followed by diloxanide furoate 500 mg, PO, Q8H for 10 days</td>
</tr>
<tr>
<td>Duodenal perforation with peritonitis</td>
<td></td>
<td>Ampicillin 1g, IV, Q6H PLUS</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>Until patient is put on oral diet</td>
<td>Should be followed by ( H. pylori ) eradication regimen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td>PLUS</td>
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<tr>
<td></td>
<td></td>
<td>Gentamicin 5mg/kg, IV, Q24H</td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td></td>
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</tr>
<tr>
<td>Intestinal obstruction</td>
<td></td>
<td>Ampicillin 1g, IV, Q6H PLUS</td>
<td></td>
<td>5 - 7 days</td>
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<td></td>
<td></td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
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<td>PLUS</td>
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<td></td>
<td></td>
<td>Gentamicin 5mg/kg, IV, Q24H</td>
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<tr>
<td>Bowel injury:</td>
<td>Non-penetrating</td>
<td>Ampicillin 1g, IV, Q6H</td>
<td>Cefazolin 1g, IV, Q8H</td>
<td>5 - 7 days</td>
<td></td>
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<tr>
<td></td>
<td>Penetrating</td>
<td></td>
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<td></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H PLUS</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>5 - 7 days</td>
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</tr>
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<td></td>
<td></td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td>PLUS</td>
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<td></td>
<td></td>
<td></td>
<td>Metronidazole 7.5mg/kg, IV, Q8H</td>
<td></td>
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</tr>
<tr>
<td>Pancreatitis: Complicated</td>
<td>(with abscess/necrosis)</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H</td>
<td></td>
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<td></td>
<td></td>
<td>Imipenem 1g, IV, 8QH</td>
<td></td>
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<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td><strong>OBSTETRICS AND GYNAECOLOGY INFECTIONS</strong></td>
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<tr>
<td><strong>UTI in pregnancy</strong></td>
<td>Usual urinary pathogens</td>
<td>Nitrofurantoin 50 - 100mg, PO, Q6H OR Amoxicillin 500mg, PO, Q8H</td>
<td>Cephalexin 500mg, PO, Q8H</td>
<td>5 days</td>
<td>Take urine for culture and sensitivity test before starting antibiotics; Ideally 2 post treatment cultures should be sterile</td>
</tr>
<tr>
<td>Post-abortal Infection: Mild infection, non-septic</td>
<td><em>Escherichia coli</em>, <em>Staphylococcus aureus</em>, <em>Streptococcus</em>, <em>Pseudomonas</em></td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Metronidazole 500mg, PO, Q8H</td>
<td>Doxycycline 100mg, PO, Q12H</td>
<td>5 - 7 days</td>
<td>Take culture before starting antibiotics</td>
</tr>
<tr>
<td>Severe infections or septic</td>
<td></td>
<td>Ampicillin 1g, IV, Q6H PLUS Metronidazole 500mg, IV, Q8H</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Metronidazole 500mg, IV, Q8H</td>
<td>5 - 7 days</td>
<td>Early surgical intervention should be done</td>
</tr>
<tr>
<td><strong>Chorioamnionitis, puerperal sepsis and infections after pelvic surgery</strong></td>
<td></td>
<td>Ampicillin 1g, IV, Q6H PLUS Metronidazole 500mg, IV, Q8H PLUS Gentamicin 5mg/kg, IV, STAT</td>
<td></td>
<td>IV antibiotics for 48 hours only; then switch to oral for 5 - 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>OPHTHALMIC INFECTIONS</strong></td>
<td></td>
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<tr>
<td><strong>Conjunctivitis</strong></td>
<td><em>Staphylococcus aureus</em>, <em>Streptococcus pneumoniae</em>, <em>Haemophilus influenzae</em>, Coliforms (in contact lens users)</td>
<td>Chloramphenicol eye drops: 1 drop, Q2H, if severe; and Q6H when controlled; Ointment: at night if used alone, apply 3 - 4 times daily</td>
<td>Ciprofloxacin eye drops Q6H</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td>Pseudomonas</td>
<td>Topical Ciprofloxacin 1 drop, Q2H; reduce frequency as infection is controlled.</td>
<td>Tobramycin eye drop, Q6H</td>
<td>5 - 7 days; Continue for 48 hours after healing</td>
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<tr>
<td>Corneal Infections</td>
<td></td>
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<tr>
<td>Corneal ulcers</td>
<td>Moxifloxacin 0.5% eye drop: Apply eye drops throughout day and night; <em>Day 1:</em> apply every 15 min for 6H then, 30 minutes; <em>Day 3:</em> apply Q1H; <em>Day 4 - 14:</em> apply Q4H; <strong>ADD</strong> Fluconazole 0.3% eye drop: Apply 1 - 8H depending on severity (only in clinical suspicion or culture proven fungal cause)</td>
<td>Topical chloramphenicol 0.4% eye drop/ 1% eye ointment OR Ciprofloxacin 0.3% eye drop</td>
<td>Maximum duration of treatment 21 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ocular Herpes simplex</td>
<td></td>
<td>Acyclovir ointment, 5 times daily</td>
<td>14 days or at least up to 3 days after healing</td>
<td></td>
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<tr>
<td>Dental infections</td>
<td></td>
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<tr>
<td>Mild</td>
<td>Viridians, Streptococcus spp., Anaerobic streptococcus, Bacteroides</td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Erythromycin, PO, Q6H</td>
<td>500mg, 5 days</td>
<td>Antibiotics are required only in spreading infections and systemic involvements</td>
</tr>
<tr>
<td>Moderate/ Severe</td>
<td></td>
<td>Amoxicillin 500mg, PO, Q8H PLUS</td>
<td>Erythromycin, PO, Q6H PLUS</td>
<td>500mg, 5 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Facial cellulitis</td>
<td>Beta-haemolytic streptococcus and <em>Staphylococcus aureus</em></td>
<td>Metronidazole 400mg, PO, Q8H</td>
<td>Metronidazole 400mg, PO, Q8H</td>
<td></td>
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</tr>
<tr>
<td>Acute necrotizing ulcerative gingivitis (Vincent's gingivitis)</td>
<td>Fusiform bacteria and spirochetes</td>
<td>Amoxicillin 500mg, PO, Q8H OR Cloxacillin 500mg, PO, Q6H</td>
<td>Cephalexin 500mg, PO, Q8H</td>
<td>5 days</td>
<td>Antibiotic alone will not respond without local measures such as scaling, irrigation and oral hygiene advice</td>
</tr>
<tr>
<td>Pericoronitis</td>
<td>Mixed infections</td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Metronidazole 400mg, PO, Q8H</td>
<td>Doxycycline 200mg, STAT, and then, Q12H PLUS Chlorhexidine mouthwash (0.2%) or Hydrogen peroxide mouthwash (6%)</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Periodontitis</td>
<td>Mixed infections</td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Metronidazole 400mg, PO, Q8H</td>
<td>Doxycycline 100mg, PO, Q12H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Periodontal/Periapical abscess</td>
<td><em>Viridans, Streptococcus species, anaerobic streptococcus, Bacteroides</em></td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Cloxacillin 500mg, PO, Q6H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
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<td>Remarks</td>
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<tr>
<td>Osteomyelitis of the jaw</td>
<td><em>Staphylococcus aureus</em>, <em>Haemolytic streptococcus</em>, <em>Bacteroides</em>, <em>Actinomyces</em></td>
<td>Amoxicillin 500mg, PO, Q6H OR Ampicillin 1g, IV, Q6H PLUS Cloxacillin 1g, IV, Q6H</td>
<td>Metronidazole 400mg, IV, Q6H PLUS Cloxacillin 1g, IV, Q6H</td>
<td>7 - 10 days</td>
<td></td>
</tr>
<tr>
<td>Antibiotic prophylaxis against infective endocarditis for dental procedures</td>
<td></td>
<td>Amoxicillin 2g, PO, STAT</td>
<td>Erythromycin 500mg, PO STAT OR Cephalexin 2g, PO, STAT</td>
<td>30 - 60 minutes before procedure</td>
<td></td>
</tr>
<tr>
<td>Soft Tissue Infection</td>
<td></td>
<td>Cloxacillin 2g, IV, Q6H</td>
<td>Culture based</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Skin surface infection</td>
<td></td>
<td></td>
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<tr>
<td>Deep skin infection</td>
<td></td>
<td>Ampicillin 25mg/kg, IV, Q6H PLUS Metronidazole 7.5mg/kg, IV, 8H PLUS Gentamicin 7.5mg/kg, IV, Q24H</td>
<td>Culture based</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Gas gangrene</td>
<td></td>
<td>Ceftriaxone 2g, IV, Q12H</td>
<td></td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Impetigo Impetigo contagiosa</td>
<td><em>Streptococcus pyogenes</em></td>
<td>Penicillin V 500mg, PO, Q6H</td>
<td>Amoxicillin, PO, Q8H</td>
<td>500mg, 7 days</td>
<td>Where oral administration is not possible, procaine penicillin 0.6MU, IM, Q24H may be substituted; Where infection is widespread or</td>
</tr>
<tr>
<td><em>Bullous impetigo</em></td>
<td><em>Staphylococcus aureus</em></td>
<td>Cloxacillin, 500mg, PO, Q6H</td>
<td>Erythromycin, PO, Q6H</td>
<td>500mg, 7 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
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<tr>
<td>Boils, Folliculitis</td>
<td>Staphylococcus aureus</td>
<td>Cloxacillin 500mg, PO, Q6H</td>
<td>Cephalixin PO, Q6H OR Erythromycin PO, Q6H OR Cotrimoxazole 480mg, PO, Q12H</td>
<td>5 days</td>
<td>severe, combine cloxacillin with amoxicillin</td>
</tr>
<tr>
<td>Burns</td>
<td></td>
<td>Cloxacillin 2g, IV, Q6H</td>
<td>Ampicillin 25mg/kg, IV, Q6H</td>
<td></td>
<td>Boils usually require I &amp; D</td>
</tr>
<tr>
<td>Erythrasma</td>
<td>Corynebacterium minutissimum</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td></td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Erysipelas</td>
<td>Commonly Streptococcus pyogenes; occasionally Staphylococcus aureus alone or co-infection with Streptococcus pyogenes</td>
<td>Penicillin V 500mg, PO, Q6H</td>
<td>Erythromycin PO, Q6H</td>
<td>7 - 10 days</td>
<td>Add cloxacillin, if Staphylococcus aureus suspected</td>
</tr>
</tbody>
</table>
| Cellulitis
Following surgical procedure, cuts abrasions, crush injury, insect bites, limb oedema | Staphylococcus aureus, Streptococcus pyogenes | Cloxacillin 500mg, PO, Q6H | Erythromycin PO, Q6H OR Cephalexin 500 mg, PO, Q6H | 7 days | Surgical referral where appropriate |
<p>| Following complicated surgical and orofacial cellulitis | Staphylococcus aureus, Streptococcus pyogenes and anaerobes | Cloxacillin 500mg, PO, Q6H PLUS Metronidazole 500mg, PO, Q8H | Cephalexin PO, Q6H PLUS Metronidazole 500mg, PO, Q8H | 7 days |                                             |</p>
<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paronychia (Nail infection)</td>
<td><em>Staphylococcus aureus, Streptococcus pyogenes</em></td>
<td>Cloxacillin 500mg, PO, Q6H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Leg ulcer and foot infections in diabetes</td>
<td><em>Staphylococcus aureus, Streptococcus A, B, C, G; plus, in severe infections anaerobes, coliforms</em></td>
<td>based on culture</td>
<td></td>
<td></td>
<td>Assess for tetanus and rabies risk; Thorough wound cleaning with antiseptics/soap and water immediately after the bite is mandatory; Replace penicillins with doxycycline in penicillin allergy</td>
</tr>
<tr>
<td>Bites:</td>
<td><em>Staphylococcus aureus, alpha-and beta-haemolytic streptococci, anaerobes, Pasteurella multocida, Capnocytophaga spp.</em></td>
<td>Penicillin V 500mg, PO, Q6H PLUS Metronidazole 500mg, PO, Q8H</td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Metronidazole 500mg, PO, Q8H</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Animal</td>
<td><em>Staphylococcus aureus, alpha - &amp; beta - haemolytic streptococci, anaerobes</em></td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
<td></td>
</tr>
<tr>
<td>Human</td>
<td><em>Staphylococcus aureus, alpha - &amp; beta - haemolytic streptococci, anaerobes</em></td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
<td>Assess for Hepatitis B &amp; C risk; HIV risk</td>
</tr>
<tr>
<td>Snake</td>
<td>Gram-negative bacteria, Pseudomonas and Staphylococcus</td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Ceftriaxone 1g, IV, Q12H</td>
<td>5 - 7 days</td>
<td>Consider antibiotic therapy only when there is risk of secondary infection; Consider anti-venom therapy where indicated</td>
</tr>
<tr>
<td>Necrotising fasciitis and soft tissue infection or synergistic gangrene</td>
<td>Mixed anaerobes and aerobes</td>
<td>Benzylpenicillin 2.4MU, IV, Q6H PLUS Metronidazole 7.5mg/kg, IV, Q8H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Meropenem 1g, IV, Q8H PLUS Clindamycin 600-900mg, IV, Q8H PLUS Vancomycin 15mg/kg, IV, Q6 - 8H</td>
<td>Treatment should be individualized and continued until no further debridement are needed and patient's haemodynamic has normalised. Surgical intervention usually required</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
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</tr>
<tr>
<td>Acne: Moderate to severe</td>
<td>Propionibacterium acnes</td>
<td>Doxycycline 100mg, PO, Q12H for the first day followed by Q24H</td>
<td>Erythromycin 500mg, PO, Q12H</td>
<td>At least for 3 months</td>
<td>If there is no improvement after the first 3 months, consider another oral agent.</td>
</tr>
<tr>
<td>Otitis externa</td>
<td>Staphylococcus aureus, Streptococcus A,C,G</td>
<td>Amoxicillin, 500mg, PO, Q8H OR Penicillin V, 500mg, PO, Q6H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Scabies</td>
<td>Mite (Sarcoptes scabiei)</td>
<td>Gamma Benzene Hexachloride Apply thinly over whole body, omitting head and neck, wash off using cool water after 24 hours; Repeat if necessary after 7 days.</td>
<td>Sulphur 6 % ointment Apply Q12H after bath</td>
<td>3 days</td>
<td>Treat all members of the household &amp; close contacts simultaneously; Wash all clothing in hot water and sundry all beddings and linens.</td>
</tr>
<tr>
<td>In pregnancy/ lactating mother</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Infectious Atopic Dermatitis</td>
<td></td>
<td>Cloxacillin, 500mg, PO, Q6H OR Cephalexin 500mg, PO, Q8H</td>
<td>[ ]</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Acute bronchitis</td>
<td>Mostly viral; Bordetella pertussis, Chlamyphila pneumoniae, and Mycoplasma pneumonia</td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>5 days</td>
<td>Antibiotics may be considered for acute bronchitis in someone with significant comorbidity or secondary infections.</td>
</tr>
</tbody>
</table>

**LOWER RESPIRATORY TRACT INFECTIONS**

*Oral antibiotics are used when the dermatitis has not settled with other measures and there is suspicion that infection is contributing to the dermatitis; and there is obvious secondary infection, particularly if using wet dressings.*
<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute infective exacerbation of COPD</td>
<td><em>Streptococcus pneumoniae,</em> <em>Haemophilus influenzae,</em> <em>Moraxella catarrhalis</em></td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q24H</td>
<td>Ampicillin 1g, IV, Q6H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>5 days</td>
<td>Antibiotic therapy should not be used unless patient has clinical signs of infections: 1. Increased sputum purulent; 2. Increased sputum; and 3. Increased breathlessness and cough</td>
</tr>
<tr>
<td>Infective exacerbation of COPD:</td>
<td></td>
<td>Doxycycline 200mg, PO, STAT then 100mg, PO, Q24H</td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Erythromycin 500mg, PO, Q6H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Presence of comorbidities, such as chronic heart, liver, or renal disease; diabetes mellitus; alcoholism; malignancies; asplenia; immunosuppressing conditions or use of immunosuppressants; use of antimicrobials within the previous 3 months</td>
<td><em>Resistant streptococci</em></td>
<td>Ampicillin 1g, IV, Q8H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q24H</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q24H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Community acquired pneumonia</td>
<td><em>Streptococcus pneumoniae,</em> <em>Haemophilus influenzae,</em> <em>Moraxella catarrhalis,</em> <em>Mycoplasma</em></td>
<td>Doxycycline 100mg, PO, Q12H</td>
<td>Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>No comorbidities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
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<tr>
<td>With comorbidities like heart disease, chronic lung diseases, liver, renal disease, DM, Malignancies and Immunocompromised</td>
<td><em>pneumoniae, Chlamydia psittaci and pneumoniae, Coxiella burnetii</em></td>
<td>Amoxicillin 1g, PO, Q8H PLUS Doxycycline 100mg, PO, Q12H</td>
<td>Ciprofloxacin 500mg, PO, Q12H</td>
<td>7 days</td>
<td>Wherever <em>Staphylococcal pneumoniae</em> is suspected or proven by culture, add cloxacillin</td>
</tr>
<tr>
<td>Inpatient (Non-ICU)</td>
<td></td>
<td>Amoxicillin 1g, IV, Q8H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q24H</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Inpatient (ICU)</td>
<td></td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Erythromycin 500mg, PO, Q6H</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H</td>
<td>Take sputum and blood cultures before initiation of antibiotics</td>
<td></td>
</tr>
<tr>
<td>Hospital acquired pneumonia: Not high risk of mortality and no factors increasing the likelihood of MRSA</td>
<td>Hospital pathogens such as Coliforms, Pseudomonas, Acinetobacter, <em>Staphylococcus aureus</em> including MRSA</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Not at high risk of mortality but with factors increasing the likelihood of MRSA</td>
<td>Hospital pathogens such as Coliforms, Pseudomonas, Acinetobacter, <em>Staphylococcus aureus</em> including MRSA</td>
<td>Ceftrazidine 2g, IV, Q8H PLUS Vancomycin 15mg/kg, IV, Q12H</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H PLUS Vancomycin 15mg/kg, IV, Q12H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>High risk of mortality or receipt of intravenous antibiotics during the prior 90 days</td>
<td>Hospital pathogens such as Coliforms, Pseudomonas, Acinetobacter, <em>Staphylococcus aureus</em> including MRSA</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Meropenem 1g, IV, Q8H PLUS Vancomycin 15mg/kg, IV, Q12H</td>
<td>If MRSA suspected/isolated, add vancomycin 15mg/kg, IV, Q12H</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Ventilator associated pneumonia (VAP)</td>
<td>Staphylococcus aureus, Streptococcus pneumoniae, anaerobes, gram-negative rods</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Meropenem 1g, IV, Q8H PLUS Amikacin 15mg/kg, IV, Q24H</td>
<td>7 - 14 days</td>
<td>If MRSA suspected/isolated, add vancomycin 15mg/kg, IV, Q12H</td>
</tr>
<tr>
<td>Lung abscess</td>
<td>Staphylococcus aureus, Streptococcus pneumoniae, anaerobes, gram-negative rods</td>
<td>Ampicillin 1g, IV, Q6H PLUS Metronidazole 500mg, IV or 400mg, PO, Q8H</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Metronidazole 500mg, IV or 400mg, PO, Q8H</td>
<td>4 - 6 weeks (IV plus oral)</td>
<td>Drainage may be required along with antimicrobial therapy for abscess size 6 - 8cm or larger</td>
</tr>
<tr>
<td>Parapneumonic effusion:</td>
<td><strong>Community acquired</strong> Staphylococcus pneumoniae, Streptococcus milleri group, Staphylococcus aureus</td>
<td>Ampicillin 1g, IV, Q6H PLUS Metronidazole 500mg, IV, Q8H</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Metronidazole 500mg, IV, Q8H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Hospital acquired:</strong> Hospital pathogens such as Coliforms, Pseudomonas, Acinetobacter, Staphylococcus aureus including MRSA</td>
<td>Ceftriaxone 1g, IV, Q12H PLUS Gentamicin 5mg/kg, IV, Q24H PLUS Metronidazole 500mg, IV, Q8H</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H PLUS Vancomycin 15mg/kg, IV, Q12H</td>
<td>7 days</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ceftazidime 2g, IV, Q8H PLUS Vancomycin 15mg/kg, IV, Q12H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness</td>
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</tr>
<tr>
<td>High risk of mortality or receipt of intravenous antibiotics during the prior 90 days</td>
<td><strong>Streptococcus pneumoniae</strong>, <strong>Streptococcus milleri group</strong>, <strong>Staphylococcus aureus</strong>, <strong>anaerobes</strong></td>
<td><strong>PLUS</strong>&lt;br&gt;Metronidazole 500mg, IV, Q8H&lt;br&gt;&lt;br&gt;Piperacillin/tazobactam 4.5g, IV, Q6H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Gentamicin 5mg/kg, IV, Q24H</td>
<td><strong>Meropenem</strong> 1g, IV, Q8H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Amikacin 15mg/kg, IV, Q24H</td>
<td></td>
<td>If MRSA suspected /isolated, add vancomycin 15mg/kg, IV, Q12H</td>
</tr>
<tr>
<td><strong>Empyema:</strong>  &lt;br&gt;Community acquired</td>
<td></td>
<td><strong>Ampicillin</strong> 1g, IV, Q6H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Metronidazole 500mg, IV, Q8H</td>
<td><strong>Ceftriaxone</strong> 1g, IV, Q12H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Metronidazole 500mg, IV or 400mg, PO, Q8H</td>
<td>2 - 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Hospital acquired:  &lt;br&gt;Not high risk of mortality and no factors increasing the likelihood of MRSA</td>
<td><strong>Methicillin-resistant Staphylococcus aureus</strong> and <strong>Pseudomonas Aeruginosa</strong></td>
<td><strong>Ceftriaxone</strong> 1g, IV, Q12H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Gentamicin 5mg/kg, IV, Q24H</td>
<td><strong>Piperacillin/tazobactam</strong> 4.5g, IV, Q6H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at high risk of mortality but with factors increasing the likelihood of MRSA</td>
<td></td>
<td><strong>Ceftazidime</strong> 2g, IV, Q8H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Vancomycin 15mg/kg, IV, Q12H</td>
<td><strong>Piperacillin/tazobactam</strong> 4.5g, IV, Q6H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Vancomycin 15mg/kg, IV, Q12H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>High risk of mortality or receipt of intravenous antibiotics during the prior 90 days</td>
<td></td>
<td><strong>Piperacillin/tazobactam</strong> 4.5g, IV, Q6H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Gentamicin 5mg/kg, IV, Q24H</td>
<td><strong>Meropenem</strong> 1g, IV, Q8H&lt;br&gt;&lt;br&gt;<strong>PLUS</strong>&lt;br&gt;Amikacin 15mg/kg, IV, Q24H</td>
<td></td>
<td>If MRSA suspected /isolated, add vancomycin 15mg/kg, IV, Q12H</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Bronchiectasis (infective exacerbation)</td>
<td>Staphylococcus aureus, Streptococcus pneumoniae, anaerobes, gram-negative rods, Haemophilus</td>
<td>Amoxicillin 1g, PO, Q8H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>Amoxicillin 1g, PO, Q8H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
<td>14 days</td>
<td>Sputum culture should be taken</td>
</tr>
<tr>
<td>B</td>
<td>Inpatient</td>
<td>Ciprofloxacin 500mg, IV, Q12H OR Ceftriaxone 1g, IV, Q12H PLUS Doxycycline 200mg, PO, STAT then 100mg, PO, Q12H</td>
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<tr>
<td></td>
<td>Sore throat/Pharyngitis/ Tonsillitis</td>
<td>Streptococcus pyogenes</td>
<td>Amoxicillin 500mg, PO, Q8H OR Penicillin V 500mg, PO, Q12H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>10 days</td>
</tr>
</tbody>
</table>

**UPPER RESPIRATORY TRACT INFECTIONS**

The majority of sore throat is viral, but there is clinical overlap between viral and bacterial infections.
<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corynebacterium diphtheriae</td>
<td>Benzyldpenicillin 1MU, IV, Q6H</td>
<td></td>
<td></td>
<td>14 days</td>
<td>Once patient is able to swallow, switch to penicillin V 250mg, PO, Q6H</td>
</tr>
<tr>
<td>Sinusitis</td>
<td></td>
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</tr>
<tr>
<td>Acute</td>
<td>Corynebacterium diphtheriae</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Amoxicillin/clavulanate (500mg/125mg), PO, Q8H</td>
<td>5 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic (more than 12 weeks)</td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Amoxicillin/clavulanate (500mg/125mg), PO, Q8H</td>
<td>3 - 10 weeks</td>
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<tr>
<td>Otitis media</td>
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<tr>
<td>Acute</td>
<td>Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis</td>
<td>Amoxicillin 500mg, PO, Q8H</td>
<td>Erythromycin 500mg, PO, Q6H</td>
<td>5 days</td>
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<tr>
<td>Chronic</td>
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<tr>
<td>Acute epiglottitis</td>
<td>Haemophilus influenzae, Streptococcus pneumoniae, Streptococcus pyogenes, Staphylococcus aureus</td>
<td>Ampicillin 1g, IV, Q6H OR Chloramphenicol 500mg, IV, Q6H</td>
<td>Cefotaxime 1g, IV, Q8H</td>
<td>5 - 7 days</td>
<td>It is a medical emergency; Avoid throat examination; Be prepared for emergency intubation.</td>
</tr>
<tr>
<td>Uncomplicated Cystitis in women</td>
<td>Escherichia coli, Klebsiella spp., Staphylococcus aureus</td>
<td>Nitrofurantoin 100mg, PO, Q6H</td>
<td>Cotrimoxazole 960mg, PO, Q12H for 3 days OR</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>saprophyticus, Enterococcus faecalis</td>
<td>Cephalexin 500mg, PO, Q12H</td>
<td>Ciprofloxacin 500mg, PO, Q12H</td>
<td>500mg, PO, Q12H</td>
<td>7 days</td>
<td>If prostate involved, extend to 14 days.</td>
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<tr>
<td>UTI in men</td>
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<tr>
<td>Acute Pyelonephritis:</td>
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<tr>
<td>Uncomplicated</td>
<td>Coliforms, Pseudomonas</td>
<td>Ciprofloxacin 500mg, PO, Q12H</td>
<td>10 days</td>
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<tr>
<td>Complicated</td>
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<tr>
<td>Acute Prostatitis:</td>
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<tr>
<td>Mild to moderate</td>
<td>Usual UTI causing pathogens and occasionally STI causing</td>
<td>Cotrimoxazole 960mg, PO, Q12H</td>
<td>14 days</td>
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<tr>
<td>Severe case</td>
<td>organisms</td>
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<tr>
<td>Chronic Bacterial Prostatitis</td>
<td>Cotrimoxazole 960mg, PO, Q12H</td>
<td>Ciprofloxacin 500mg, PO, Q12H</td>
<td>500mg, PO, Q12H</td>
<td>4 weeks</td>
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<td>OR</td>
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<td></td>
<td>Norfloxacin 400mg, PO, Q12H</td>
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<tr>
<td>Epididymo-orchitis</td>
<td>Chlamydia, trachomatis, Neisseria gonorrhoea, Escherichia coli</td>
<td>Ceftriaxone 250mg, IM, STAT</td>
<td>7 days</td>
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<td></td>
<td>PLUS</td>
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<td></td>
<td>Doxycycline 100mg, PO, Q12H</td>
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</table>
## RECOMMENDED ANTIMICROBIAL THERAPY FOR PAEDIATRICS

<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td><strong>Acute osteomyelitis</strong></td>
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<tr>
<td>For patients hypersensitive to penicillin</td>
<td>80% caused by Staphylococcus</td>
<td>Cloxacillin 50mg/kg, IV, Q6H (Max.), Then PO dose</td>
<td>Cefazolin 25mg/kg, IV, Q8H</td>
<td>IV for at least 3 days then oral depending on response; 3 - 4 weeks of oral if good response; 4 - 6 weeks if slow response and involvement of pelvis and spine.</td>
<td>Obtain blood, pus and bone culture and sensitivity; Switch to oral therapy after 72 hours; 72 hours, if afebrile and pain-free for 24 hours, and CRP decreased by two third of the highest value</td>
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<td>For delayed/non-life threatening</td>
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<tr>
<td>For immediate/ life threatening</td>
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<tr>
<td>Methicillin-resistant Staphylococcus aureus</td>
<td>Vancomycin 15mg/kg, IV, Q6H</td>
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<td></td>
<td>As above; Switch to oral cotrimoxazole, if response is good to vancomycin and if sensitive to cotrimoxazole.</td>
<td>Therapy should be based on proper culture and sensitivity report.</td>
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<tr>
<td>(MRSA)</td>
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<tr>
<td><strong>Chronic osteomyelitis and osteomyelitis involving bone &amp; joint prostheses</strong></td>
<td>Staphylococcus aureus, Enterobacteriaceae including pseudomonas</td>
<td>Treatment must be guided by the susceptibility of the organism isolated from aspirations, biopsies and prosthetic materials</td>
<td>6 weeks to 6 months depending on clinical response</td>
<td>Consult specialists</td>
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</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
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<tr>
<td>Septic arthritis</td>
<td></td>
<td>Management is same as acute osteomyelitis; Urgent consultation when the hip is involved; At least 2 weeks for <em>Streptococcus pneumoniae</em>, <em>kingella</em>, <em>Streptococci</em>; Longer if <em>Staphylococcus aureus</em>, gram negative and if arthrotomy done</td>
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<tr>
<td>Native valve endocarditis: Initial empirical therapy awaiting culture results</td>
<td><em>Streptococcus viridans</em> (after dental procedures) <em>Staphylococcus aureus</em> (no underlying heart disease), <em>Enterococci</em>, <em>CoNS</em> (presence of an indwelling central venous catheter)</td>
<td>Ampicillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day) PLUS Gentamicin 3mg/kg, IV, Q24H PLUS Cloxacillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day)</td>
<td>Benzylpenicillin 0.05MU/kg, IV, Q6H; (Max. 0.2 MU/kg/day) PLUS Gentamicin 3mg/kg, IV, Q24H PLUS Cloxacillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day)</td>
<td>4 - 6 weeks; Stop Gentamicin after 14 days</td>
<td>Take at least 3 blood cultures at least 30 minutes apart from different sites prior to initiation of antibiotics;</td>
</tr>
<tr>
<td>Native valve-streptococcal endocarditis: For penicillin sensitive isolates</td>
<td><em>Viridans streptoccci</em></td>
<td>Ampicillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day) OR Benzylpenicillin 0.05MU/kg, IV, Q6H; (Max. 0.2 MU/kg/day) PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td>Ceftriaxone 100mg/kg, IV, Q24H PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td>4 weeks; Stop Gentamicin after 2 weeks</td>
<td>In all patients receiving gentamicin and/or vancomycin periodic monitoring of hearing and kidney function is essential.</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td>For penicillin resistant isolates</td>
<td>Ceftriaxone 100mg/kg, IV, Q24H PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td>Vancomycin 15mg/kg, IV, Q6H (if unable to tolerate or resistant to penicillins or cephalosporins and/or no improvement)</td>
<td>4 weeks; Stop gentamicin after 2 weeks</td>
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</tr>
<tr>
<td>Staphylococcal endocarditis</td>
<td>Methicillin-susceptible <em>Staphylococcus aureus</em> (MSSA)</td>
<td>Cloxacillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day) Cefazolin 100mg/kg, IV, Q8H</td>
<td>6 weeks for left sided IE; 2 weeks for right sided IE</td>
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</tr>
<tr>
<td>Staphylococcal endocarditis Methicillin-resistant <em>Staphylococcus aureus</em> (MRSA)</td>
<td>Vancomycin 15mg/kg, IV, Q6H</td>
<td>6 weeks</td>
<td></td>
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</tr>
<tr>
<td>Enterococcal endocarditis</td>
<td>Ampicillin 50mg/kg, IV, Q6H PLUS Gentamicin 1mg/kg, IV, Q8H</td>
<td>Benzylpenicillin 0.05MU/kg, IV, Q6H PLUS Gentamicin 3mg/kg, IV, Q24H</td>
<td>4 - 6 weeks</td>
<td>In cases where response to appropriate treatment is poor, surgical removal of the valves may be indicated</td>
<td></td>
</tr>
<tr>
<td>Enterococcus faecalis, Enterococcus faecium</td>
<td>Vancomycin 15mg/kg, IV, Q6H PLUS Gentamicin 1mg/kg, IV, Q8H</td>
<td>4 - 6 weeks</td>
<td></td>
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<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
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<td>Remarks</td>
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<tr>
<td>Prosthetic valve endocarditis</td>
<td><em>Staphylococcus epidermidis, Staphylococcus aureus, rarely enterobacteriaceae, diphtheroids and fungi</em></td>
<td>Cloxacillin 50mg/kg, IV, Q6H <strong>PLUS</strong> Gentamicin 3mg/kg, IV, Q24H <strong>PLUS</strong> Rifampicin 20mg/kg, PO, Q8H (start 3 - 4 days later)</td>
<td>Vancomycin 15mg/kg, IV, Q6H <strong>PLUS</strong> Gentamicin 3mg/kg, IV, Q24H <strong>PLUS</strong> Rifampicin 20mg/kg, PO, Q8H (start 3 - 4 days later)</td>
<td>6 - 8 weeks; Stop gentamicin after 2 weeks</td>
<td>Change to appropriate regimen after culture and sensitivity results; If valve replacement is more than 1 year, treat on empirical regime as above</td>
</tr>
<tr>
<td>Rheumatic fever: Acute</td>
<td>Group A Streptococcus</td>
<td>Penicillin V 12.5mg/kg, PO, Q6H; <em>Body wt. &lt; 27kg</em>: 250mg, PO, Q12H/Q8H; <em>Body wt. &gt; 27kg</em>: 500mg, PO, Q12H/Q8H <strong>OR</strong> Benzathine benzylpenicillin 1.2MU, IM, STAT</td>
<td>Erythromycin 2.5mg/kg, PO, Q8H</td>
<td>10 days</td>
<td></td>
</tr>
<tr>
<td>Secondary prophylaxis</td>
<td>Group A Streptococcus</td>
<td>Benzathine benzylpenicillin <em>Body wt. &gt;27kg</em>: 1.2MU, every 3 weeks; <em>Body wt. &lt; 27kg</em>: 0.6MU, every 3 weeks</td>
<td>Penicillin V 250mg, PO, Q12H <strong>OR</strong> Erythromycin 250mg, PO, Q12H</td>
<td><em>Without carditis</em>: 5 years or until 21 years (or longer); <em>With carditis but no valvular disease</em>: 10 years or until 21 years (or longer); <em>With persistent valvular disease</em>: lifelong</td>
<td></td>
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</tbody>
</table>

**CENTRAL NERVOUS SYSTEM INFECTIONS**

<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningitis: Initial empirical therapy</td>
<td><em>Haemophilus influenzae, Streptococcus pneumoniae, Neisseria meningitidis</em></td>
<td>Ampicillin 50mg/kg, IV, Q6H; <em>Max.</em> 200mg/kg/day <strong>PLUS</strong></td>
<td>Ceftriaxone 50mg/kg, IV, Q12H; <em>Max. 100mg/kg/day</em></td>
<td>10 - 14 days</td>
<td>No proven benefit of steroids in bacterial meningitis in children (<a href="https://www.cochranelibrary.com/crl/index.html">Brouwer MC, Cochrane Review 2015</a>)</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
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<td>Alternative Antibiotic Therapy</td>
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<tr>
<td>Organism specific therapy</td>
<td></td>
<td>Chloramphenicol</td>
<td>Ceftriaxone</td>
<td>10 - 14 days</td>
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<td>25mg/kg, IV, Q6H; (Max. 100mg/kg/day)</td>
<td>25mg/kg, IV, Q12H; (Max. 100mg/kg/day)</td>
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<td>Ampicillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day)</td>
<td>OR Benzylopenicillin 0.1MU/kg, IV, Q6H; (Max. 0.4MU/kg/day)</td>
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<tr>
<td></td>
<td></td>
<td>Ceftriaxone</td>
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<td></td>
<td>25mg/kg, IV, Q12H; (Max. 100mg/kg/day)</td>
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<td></td>
<td></td>
<td>Neisseria meningitidis</td>
<td>Ceftriaxone</td>
<td>5 - 7 days, if uncomplicated; (can increase to 7 - 10 days)</td>
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<tr>
<td></td>
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<td>Ampicillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day)</td>
<td>OR Benzylopenicillin 0.1MU/kg, IV, Q6H; (Max. 0.4MU/kg/day)</td>
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<td>Ceftriaxone</td>
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<td></td>
<td>25mg/kg, IV, Q12H; (Max. 100mg/kg/day)</td>
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<td>Patients treated with penicillins and chloramphenicol, and close contacts of patient should receive rifampicin 10mg/kg, PO, Q12H for 2 days OR ciprofloxacin 20mg/kg, STAT as prophylaxis</td>
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<td>Gram negative bacilli</td>
<td>Ceftriaxone</td>
<td>21 days</td>
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<td>Ampicillin 50mg/kg, IV, Q6H; (Max. 200mg/kg/day)</td>
<td>PLUS Gentamicin 7.5mg/kg, IV, Q24H</td>
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<td>Ciprofloxacin 10mg/kg, IV, Q8H</td>
<td>Ceftazidime</td>
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<td>50mg/kg, IV, Q8H;</td>
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<td>21 days</td>
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<td>(Max. 150mg/kg/day)</td>
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<tr>
<td>Methicillin-sensitive</td>
<td>Staphylococcus aureus (MSSA)</td>
<td>Cloxacillin 50mg/kg, IV, Q6H;</td>
<td>Canalicillin 200mg/kg/day</td>
<td>7 - 10 days</td>
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<td>(Max. 200mg/kg/day)</td>
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<tr>
<td>Methicillin-resistant</td>
<td>Staphylococcus aureus (MRSA)</td>
<td>Vancomycin 15mg/kg, IV, Q6H;</td>
<td>Canalicillin 60g/kg/day</td>
<td>7 - 10 days</td>
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<td></td>
<td></td>
<td>(Max. 60g/kg/day)</td>
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</tr>
<tr>
<td>Encephalitis</td>
<td>Herpes simplex</td>
<td>Acyclovir 20mg/kg, IV, Q8H;</td>
<td>Benzylenicillin 0.5MU/kg, IV, Q6H;</td>
<td>14 - 21 days</td>
<td>Administered as infusion over one hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Max. 60mg/kg/day)</td>
<td>(Max. 0.2MU/kg/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain abscess</td>
<td>Polymicrobial including Streptococcus anginosus, anaerobic</td>
<td>Ceftriaxone 50mg/kg, IV, Q12H;</td>
<td>Metronidazole 7.5mg/kg, IV, Q6H;</td>
<td>4 - 8 weeks (Duration of treatment depends upon surgical intervention, clinical response and radiological evidence of resolution.)</td>
<td>If culture positive, add Cloxacillin; Early surgical consultation is essential.</td>
</tr>
<tr>
<td></td>
<td>bacteria, Staphylococcus aureus and gram negative bacteria</td>
<td>PLUS Metronidazole 7.5mg/kg, IV, Q6H;</td>
<td>PLUS Metronidazole 15mg/kg, IV, Q12H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurocysticercosis</td>
<td>Taenia solium</td>
<td>Albendazole 7.5mg/kg, PO, Q12H</td>
<td></td>
<td>8 - 28 days; 7 days (longer if multiple lesion and subarachnoid)</td>
<td>Prednisolone 1-2 mg/kg/day for 2 weeks; Seek specialist advice</td>
</tr>
</tbody>
</table>

**GASTROINTESTINAL TRACT INFECTIONS**

<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera</td>
<td>Vibrio cholera</td>
<td>Erythromycin 12.5mg/kg, PO, Q6H</td>
<td>Ciprofloxacin 20mg/kg, PO, STAT</td>
<td>3 days</td>
<td>Stool culture should be done; Fluid replacement is the mainstay therapy</td>
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<tr>
<td></td>
<td>Bacillary dysentery</td>
<td>Cotrimoxazole 4 - 5mg/kg, PO, Q12H</td>
<td>Ceftriaxone 50 - 75mg/kg, IV, Q24H</td>
<td>5 days</td>
<td>If culture and sensitivity is available, treat accordingly</td>
</tr>
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</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Giardia</td>
<td>Metronidazole 10mg/kg, PO, Q8H</td>
<td></td>
<td></td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Entamoeba histolytica</td>
<td>Metronidazole 10mg/kg, PO, Q8H</td>
<td></td>
<td></td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Peritonitis: Primary (Spontaneous bacterial peritonitis)</td>
<td>Streptococcus pneumoniae is the commonest organism, enterobacteriaceae</td>
<td>Ceftriaxone 100mg/kg/day, IV, Q12 - 24H</td>
<td>Cefotaxime 100mg/kg/day, IV, Q8H</td>
<td>7 - 10 days</td>
<td>Culture and sensitivity essential;</td>
</tr>
<tr>
<td>Enteric fever</td>
<td>Salmonella typhi, Salmonella paratyphi</td>
<td>Ampicillin 100mg/kg/day, IV, Q6H OR Cotrimoxazole 8 - 10mg/kg, PO, Q12H</td>
<td>Ceftriaxone 75 - 100mg/kg/day, IV, Q24H</td>
<td>10 - 14 days</td>
<td></td>
</tr>
<tr>
<td>Impetigo</td>
<td>Streptococcus pyogenes, Staphylococcus aureus</td>
<td>Clexacillin 12.5mg/kg, PO, Q6H</td>
<td>Cotrimoxazole 4mg/kg, PO, Q12H</td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Boils</td>
<td>Staphylococcus aureus</td>
<td>Clexacillin 12.5mg/kg, PO, Q6H</td>
<td>Cotrimoxazole 4mg/kg, PO, Q12H</td>
<td>5 - 7 days</td>
<td>Boils usually require I &amp; D</td>
</tr>
<tr>
<td>Cellulitis: Following surgical procedure, cuts abrasions, crush injury, insect bites, limb oedema</td>
<td>Staphylococcus aureus, Streptococcus pyogenes</td>
<td>Clexacillin 12.5mg/kg, PO, Q6H</td>
<td>Cephalexin 50mg/kg, PO, Q6H</td>
<td>7 days</td>
<td>If culture is streptococcus positive, switch to benzylpenicillin IV; Surgical referral where appropriate</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Following complicated surgical and orofacial cellulitis</td>
<td>Staphylococcus aureus, Streptococcus pyogenes and anaerobes</td>
<td>Cloxacillin 50 mg/kg, IV Q6H; (Max. 200mg/kg/day) PLUS Metronidazole 10mg/kg, IV, Q8H</td>
<td>Cephalexin 50mg/kg, PO, Q6H PLUS Metronidazole 15mg/kg, IV, Q12H</td>
<td>7 days</td>
<td>Metronidazole may be added if involvement of oral cavity.</td>
</tr>
<tr>
<td>Periorbital cellulitis</td>
<td>Staphylococcus aureus</td>
<td>Cloxacillin 150mg/kg/day, IV, Q6H</td>
<td>Ceftriaxone 50mg/kg, IV, Q24H</td>
<td>7 days</td>
<td>Rule out meningitis</td>
</tr>
<tr>
<td>With entry site skin lesion</td>
<td>Haemophilus influenzae, Streptococcus pneumoniae, Streptococcus, Staphylococcus</td>
<td>Ceftriaxone 50mg/kg, IV, Q24H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without skin lesion (bloodstream infections)</td>
<td>Staphylococcus aureus</td>
<td>Cloxacillin 50mg/kg/day, PO, Q6H</td>
<td>Erythromycin 50mg/kg, PO, Q6H</td>
<td>7 days</td>
<td>May need I &amp; D; If no improvement with antibiotics, consider candida and herpes</td>
</tr>
<tr>
<td>Paronychia (nail infection)</td>
<td>Staphylococcus aureus, Streptococcus pyogenes</td>
<td>Cloxacillin 12.5mg/kg/k, PO, Q6H</td>
<td>Apply thinly over whole body, omitting head and neck, wash off using cool water after 12 hours; repeat if necessary after 7 days</td>
<td>3 days</td>
<td>Treat all members of the household &amp; close contacts simultaneously; Wash all clothing in hot water and sun dry all beddings and linens.</td>
</tr>
<tr>
<td>Scabies</td>
<td>Mite (Sarcoptes scabiei)</td>
<td>Gamma benzene hexachloride</td>
<td>Apply HS after bath</td>
<td>3 days</td>
<td></td>
</tr>
<tr>
<td>For children more than 2 years</td>
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<tr>
<td>Children below 2 years</td>
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<tr>
<td>Infectious atopic dermatitis</td>
<td>Cloxacillin 12.5mg/kg, PO, Q6H</td>
<td></td>
<td></td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td><strong>Congenital syphilis:</strong></td>
<td></td>
<td>Benzathine benzylpenicillin 0.05MU/kg, IM, STAT</td>
<td>Procaine benzylpenicillin 0.05MU/kg, IM, Q24H</td>
<td>Single dose</td>
<td>This is an epidemiological treatment irrespective of mothers treatment status</td>
</tr>
<tr>
<td><em>For infants born to seropositive mothers</em></td>
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<tr>
<td><strong>Early congenital syphilis (&lt; 2 years)</strong></td>
<td></td>
<td>Benzylpenicillin 0.05MU/kg, IV, Q12H for first 7 days, then Q8H for next 3 days</td>
<td></td>
<td>10 days</td>
<td>Periodic follow up of the child is important</td>
</tr>
<tr>
<td><strong>Congenital syphilis ( &gt;2 years duration)</strong></td>
<td></td>
<td>Benzylpenicillin 0.05MU/kg, IV, Q4 - 6H for 10 - 14 days</td>
<td>Erythromycin 12.5mg/kg, PO, Q6H for 30 days</td>
<td>7 days</td>
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</tr>
<tr>
<td><strong>LOWER RESPIRATORY TRACT INFECTIONS</strong></td>
<td></td>
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<tr>
<td>Pneumonia</td>
<td></td>
<td>Amoxicillin 25 - 40mg/kg, PO, Q12H</td>
<td>Amoxicillin/clavulanate 80 - 90mg/kg/day, PO, Q8H</td>
<td>7 days</td>
<td>If pertussis suspected, use erythromycin 12.5mg/kg, PO, Q6H for 14 days</td>
</tr>
<tr>
<td><em>1 - 3 months (pneumonitis syndrome)</em>; Afebrile</td>
<td></td>
<td>Ampicillin 25mg/kg, IV, Q6H PLUS Gentamicin 7.5mg/kg, IV, Q24H</td>
<td>Ceftriaxone 80mg/kg, IV, Q24H</td>
<td></td>
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</tr>
<tr>
<td><em>If febrile</em></td>
<td><em>Chlamydia trachomatis,</em> <em>Streptococcus pneumoniae,</em> <em>Staphylococcus aureus</em> (rare), <em>Bordetella pertussis</em></td>
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<tr>
<td><em>4 months - 5 years</em></td>
<td></td>
<td>Amoxicillin 25 - 40mg/kg, PO, Q12H</td>
<td>Amoxicillin/clavulanate 80 - 90mg/kg/day, PO, Q8H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td><em>Outpatient</em></td>
<td><em>Haemophilus influenzae,</em> <em>Streptococcus pneumoniae,</em> mycoplasma</td>
<td></td>
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</tr>
<tr>
<td><em>In-patient (Non ICU)</em></td>
<td></td>
<td>Ampicillin 25mg/kg, IV, Q8H</td>
<td>Ceftriaxone 80mg/kg, IV, Q24H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td><em>In-patient (ICU)</em></td>
<td></td>
<td>Ceftriaxone 80mg/kg, IV, Q24H</td>
<td>As per the sensitivity report</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>5 - 15 years</td>
<td><strong>Outpatient</strong></td>
<td>Amoxicillin 15mg/kg, PO, Q8H</td>
<td>Erythromycin 12.5mg/kg, PO, Q6H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Hospitalized</strong></td>
<td>Ampicillin 25mg/kg, IV, Q6H PLUS Erythromycin 12.5mg/kg, PO, Q6H</td>
<td>Ceftriaxone 80mg/kg, IV, Q24H PLUS Metronidazole 10mg/kg, IV, Q8H</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Empyema/parapneumonic effusion</strong></td>
<td>Ampicillin 25mg/kg, IV, Q6H PLUS Metronidazole 10mg/kg, IV, Q8H</td>
<td>Ceftriaxone 80mg/kg, IV, Q24H PLUS Metronidazole 10mg/kg, IV, Q8H</td>
<td>2 - 4 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lung abscess</strong></td>
<td>Ampicillin 25mg/kg, IV, Q6H PLUS Metronidazole 10mg/kg, IV, Q8H</td>
<td>Ceftriaxone 80mg/kg, IV, Q24H PLUS Metronidazole 10mg/kg, IV, Q8H</td>
<td>2 - 3 weeks for total duration of 4 - 6 weeks; Change antibiotic according to sensitivity report; Surgical intervention if no response after 7-10 days of appropriate antimicrobial therapy</td>
<td></td>
</tr>
<tr>
<td><strong>UPPER RESPIRATORY TRACT INFECTIONS</strong></td>
<td></td>
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<tr>
<td>Sore throat/ pharyngitis/ tonsillitis</td>
<td>The majority of sore throat is viral, but there is clinical overlap between viral and bacterial infections.</td>
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</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td></td>
<td><strong>Streptococcus pyogenes</strong></td>
<td>Amoxicillin 15mg/kg, PO, Q8H <strong>OR</strong> Penicillin V 15mg/kg, PO, Q12H; <strong>Body wt. &lt; 27kg:</strong> 250mg, Q12H; <strong>Body wt. &gt; 27kg:</strong> 500mg, Q12H</td>
<td>Erythromycin 12.5mg/kg, PO, Q6H</td>
<td>10 days (given 10 days to prevent immunological sequelae for most patients)</td>
<td>Antibiotics should be used only if there is strong suspicion of bacterial infections</td>
</tr>
<tr>
<td></td>
<td><strong>Corynebacterium diphtheriae</strong></td>
<td>Benzylpenicillin 0.025 - 0.04MU/kg, IV/IM, Q6H <strong>OR</strong> Procaine penicillin, <strong>Body wt.&lt;10kg:</strong> 0.3MU/day, IM; <strong>Body wt.&gt;10kg:</strong> 0.6MU/day</td>
<td>Erythromycin 12.5mg/kg, PO, Q6H</td>
<td>14 days</td>
<td>Discuss urgently with microbiology unit if diphtheria is suspected; Anti-toxin is an essential component of the treatment.</td>
</tr>
<tr>
<td>Sinusitis</td>
<td><strong>Moraxella catarrhalis,</strong> <strong>Haemophilus influenzae,</strong> <strong>Staphylococcus aureus,</strong> <strong>Streptococcus pneumoniae</strong></td>
<td>Amoxicillin 15mg/kg, PO, Q8H</td>
<td>Amoxicillin/clavulanate 80 - 90 mg/kg/day, PO, Q8H</td>
<td>7 - 10 days</td>
<td><strong>Otitis media</strong></td>
</tr>
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<td></td>
<td></td>
<td><strong>Acute</strong></td>
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<td></td>
<td></td>
<td><strong>Streptococcus pneumoniae,</strong> <strong>Haemophilus influenzae,</strong> <strong>Moraxella catarrhalis</strong></td>
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<td></td>
<td><strong>Chronic</strong></td>
</tr>
</tbody>
</table>

Bacterial sinusitis is uncommon in children under 7 years, therefore routine antibiotic therapy is not recommended. Most sinusitis does not require antibiotics except in:
1. Symptoms lasting longer than 7 days with purulent nasal discharge, sinus tenderness or maxillary toothache;
2. Severe symptoms and high fever more than 39°C or higher at onset of illness and lasting for more than 3 days; and
3. Worsening symptoms after initial improvement.
<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute epiglottitis</strong></td>
<td><em>Haemophilus influenzae</em>, <em>Streptococcus pneumoniae</em>, <em>Streptococcus pyogenes</em>, <em>Staphylococcus aureus</em></td>
<td>Ampicillin 25mg/kg, IV, Q6H <strong>PLUS</strong> Chloramphenicol 25mg/kg, IV, Q6H</td>
<td>Ceftriaxone 100mg/kg, IV, Q24H</td>
<td>5 - 7 days</td>
<td>It is a medical emergency; Avoid throat examination</td>
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<tr>
<td><strong>UTI in children:</strong></td>
<td><strong>Well or mildly unwell child or age &gt;3 months</strong></td>
<td>Nitrofurantoin 5 - 7 mg/kg, PO, Q6H <strong>OR</strong> Cotrimoxazole 8 - 12 mg/kg, PO, Q12H</td>
<td>Cephalexin 25 - 100 mg/kg/day, PO, Q6H</td>
<td>3 - 5 days</td>
<td>Avoid norfloxacin in children; In cases where urine culture grows proteus species, do not use nitrofurantoin</td>
</tr>
<tr>
<td></td>
<td><strong>Unwell child or age &lt;3 months</strong></td>
<td>Gentamicin 7.5mg/kg, IV, Q24H</td>
<td>Ceftriaxone 50 - 75 mg/kg, IV, Q24H</td>
<td>5 - 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Acute pyelonephritis</strong></td>
<td>Coliforms, Pseudomonas</td>
<td>Ampicillin 25mg/kg, IV, Q6H <strong>PLUS</strong> Gentamicin 7.5mg/kg, IV, Q24H</td>
<td>Ceftriaxone 50 - 75 mg/kg, IV, Q24H</td>
<td>7 - 14 days</td>
<td>Send urine and blood cultures; Investigate for any functional or anatomical abnormalities with an USG KUB</td>
</tr>
</tbody>
</table>
### RECOMMENDED ANTIMICROBIAL THERAPY FOR NEONATES

*For dosages, refer to appendix I*

<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>** Conjunctivitis**</td>
<td></td>
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</tr>
<tr>
<td>Chlamydial</td>
<td></td>
<td>Erythromycin, PO</td>
<td></td>
<td>10 - 14 days</td>
<td></td>
</tr>
<tr>
<td>Gonococcal</td>
<td></td>
<td>Ceftriaxone 25 - 50 mg/kg (Max. 125mg) IV/IM, STAT</td>
<td>Cefotaxime, for neonates with hyperbilirubinemia</td>
<td>Single dose</td>
<td>Saline irrigation of eyes</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>Mild</td>
<td>Topical therapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em> (MSSA)</td>
<td>Moderate to severe</td>
<td>Oral or IV therapy</td>
<td></td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Methicillin-sensitive</td>
<td></td>
<td>Cloxacillin, PO, IV OR</td>
<td>Cefazolin (for non-CNS infections), IM/IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methicillin-resistant</td>
<td></td>
<td>Vancomycin, IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em> (MRSA)</td>
<td></td>
<td>Neomycin + Polymixin + Bacitracin eye ointment</td>
<td>Systemic therapy</td>
<td>Duration of therapy dependent on clinical course</td>
<td></td>
</tr>
<tr>
<td>** Gastrointestinal infections**</td>
<td></td>
<td>Ampicillin, IV PLUS Gentamicin, IM/IV for ≥10 days</td>
<td>Cefotaxime, IV/IM PLUS Gentamicin, IM/IV ± Metronidazole</td>
<td>Duration of therapy dependent on clinical response and risk of persisting intra-abdominal abscess.</td>
<td>Surgical drainage</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Salmonella</td>
<td>Ampicillin, IM/IV</td>
<td>Cefotaxime, IM/IV</td>
<td></td>
<td>7 - 10 days</td>
<td>Observe for focal complications (e.g., meningitis, arthritis)</td>
</tr>
<tr>
<td><strong>Omphalitis and funisitis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Empiric therapy</td>
<td>Coliform bacilli, <em>Staphylococcus aureus</em> and anaerobes</td>
<td>Cloxacillin, PO/IV</td>
<td>Gentamicin, IM/IV</td>
<td>≥10 days</td>
<td>For suspected MRSA: add vancomycin; Appropriate wound management for infected cord and necrotic tissue.</td>
</tr>
<tr>
<td><strong>Organism specific therapy</strong></td>
<td></td>
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</tr>
<tr>
<td>Group A or B streptococci</td>
<td>Benzylpenicillin, IV</td>
<td></td>
<td></td>
<td>≥7 - 14 days (shorter course for superficial funisitis without invasive infection)</td>
<td>Group A streptococcus usually causes “wet cord” without pus and with minimal erythema; single dose of Benzathine benzylpenicillin, IM adequate.</td>
</tr>
<tr>
<td>Methicillin-sensitive <em>Staphylococcus aureus</em> (MSSA)</td>
<td>Cloxacillin, IM/IV</td>
<td></td>
<td></td>
<td>≥5 - 7 days (shorter course for without invasive infection)</td>
<td>Assess for bacteraemia and other focus of infection</td>
</tr>
<tr>
<td>Methicillin-resistant <em>Staphylococcus aureus</em> (MRSA)</td>
<td>Vancomycin, IV</td>
<td></td>
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</tr>
<tr>
<td><strong>Osteomyelitis, suppurative arthritis</strong></td>
<td></td>
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<tr>
<td>Empiric therapy</td>
<td>Coloxacillin, IV PLUS Gentamicin, IM/IV</td>
<td>Coloxacillin, IV PLUS Gentamicin, IM/IV</td>
<td>Minimum 3 weeks for osteomyelitis and 2 - 3 weeks for arthritis therapy</td>
<td>Surgical drainage of pus; Physical therapy may be needed</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
</tr>
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</tr>
<tr>
<td>Organism specific therapy</td>
<td><em>Escherichia coli</em> and <em>Klebsiella spp.</em></td>
<td>Ampicillin, IM/IV PLUS Gentamicin, IM/IV</td>
<td>Cefotaxime, IM/IV OR Gentamicin, IM/IV</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Enterobacter, Serratia, or Citrobacter</td>
<td>Ampicillin, IM/IV PLUS Gentamicin, IM/IV</td>
<td>Cefotaxime, IM/IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gonococcal arthritis and tenosynovitis</td>
<td>Cefotaxime, IM/IV</td>
<td></td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methicillin-sensitive <em>Staphylococcus aureus</em> (<em>MSSA</em>)</td>
<td>Cloxacillin, IV</td>
<td>Cefazolin, IV</td>
<td></td>
<td>Add rifampicin, if persistently positive cultures</td>
</tr>
<tr>
<td></td>
<td>Methicillin-resistant <em>Staphylococcus aureus</em> (<em>MRSA</em>)</td>
<td>Vancomycin, IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B streptococcus</td>
<td>Benzylpenicillin, IV</td>
<td>Ampicillin, IM/IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Haemophilus influenzae</em></td>
<td>Ampicillin, IV</td>
<td>Amoxicillin, PO OR Amoxicillin + Clavulanate, PO</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For penicillin resistant isolates</td>
<td>Cefotaxime, IM/IV</td>
<td></td>
<td></td>
<td>Start with IV therapy and switch to oral therapy when clinically stable</td>
</tr>
<tr>
<td>Otitis media: Empiric therapy</td>
<td>Pneumococcus, <em>Haemophilus</em>, Coliforms and <em>Staphylococcus aureus</em></td>
<td>Cloxacillin, IV PLUS Gentamicin, IM/IV</td>
<td>Cloxacillin, IV PLUS Cefotaxime, IM/IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td><strong>Pulmonary infections:</strong></td>
<td></td>
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<tr>
<td>Empiric therapy with early</td>
<td></td>
<td>Ampicillin, IM/IV PLUS</td>
<td>Cefotaxime, IM/IV</td>
<td>7 days</td>
<td>Early onset neonatal pneumonia may represent aspiration of amniotic fluid, particularly if fluid is not sterile; Mild aspiration episodes may not require antibiotic therapy.</td>
</tr>
<tr>
<td>onset of pulmonary infiltrates (within the first 48 - 72 hour of life)</td>
<td>Gentamicin, IM/IV</td>
<td></td>
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</tr>
<tr>
<td>Aspiration pneumonia</td>
<td></td>
<td>Ampicillin, IM/IV PLUS</td>
<td>Gentamicin, IM/IV</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gentamicin, IM/IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organism specific therapy</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Chlamydia trachomatis</em></td>
<td></td>
<td>Erythromycin, PO</td>
<td></td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td>Pertussis</td>
<td></td>
<td>Erythromycin, PO</td>
<td></td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td></td>
<td>Ciprofloxacin, IV PLUS</td>
<td>Ceftazidime, IM/IV +/-</td>
<td>≥10 - 14 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gentamicin, IM/IV</td>
<td>Gentamicin, IM/IV</td>
<td></td>
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<tr>
<td>Methicillin-sensitive</td>
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</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
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</tr>
<tr>
<td>(MSSA)</td>
<td></td>
<td>Cloxacillin, IV</td>
<td>Cefazolin, IV</td>
<td>Duration of therapy depends on extent of disease; should be individualized with therapy up to 21 days or greater.</td>
<td>Thoracostomy drainage of empyema; Add rifampicin if persistently positive cultures</td>
</tr>
<tr>
<td>Methicillin-resistant</td>
<td></td>
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</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(MRSA)</td>
<td></td>
<td>Vancomycin, IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B streptococcus</td>
<td></td>
<td>Benzylpenicillin, IV</td>
<td>Ampicillin, IM/IV</td>
<td>10 days</td>
<td>For serious infections, ADD gentamicin for synergy until clinically improved.</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<tr>
<td>Sepsis (With or without meningitis)</td>
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</tr>
<tr>
<td>Initial therapy, organism unknown</td>
<td></td>
<td>Ampicillin, IM/IV PLUS Gentamicin, IM/IV</td>
<td>Cefotaxime, IV</td>
<td>10 days for sepsis without a focus; minimum of 21 days for gram-negative meningitis (or at least 14 days after CSF is sterile) and 14 - 21 days for GBS meningitis and other gram - positive bacteria</td>
<td>If clinically suspected meningitis, increase dose till meningitis is excluded; Cefotaxime preferred if meningitis suspected or cannot be excluded.</td>
</tr>
<tr>
<td>Early onset</td>
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<tr>
<td>Late onset</td>
<td></td>
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<tr>
<td>Organism specific therapy</td>
<td></td>
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</tr>
<tr>
<td>Enterococcus spp.</td>
<td></td>
<td>Ampicillin, IM/IV PLUS Gentamicin, IM/IV</td>
<td>Cefotaxime, IV</td>
<td></td>
<td>Start high dose of ampicillin for all LOS till meningitis excluded.</td>
</tr>
<tr>
<td>Penicillin resistant</td>
<td></td>
<td>Vancomycin, IV PLUS Gentamicin, IM/IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escherichia coli</td>
<td></td>
<td>Gentamicin, IM/IV, if no CNS infection; Cefotaxime, IM/IV, if CNS infection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gonococcal</td>
<td></td>
<td>Cefotaxime, IM/IV</td>
<td></td>
<td>10 - 14 days</td>
<td></td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td></td>
<td>Ampicillin, IM/IV PLUS Gentamicin, IM/IV</td>
<td></td>
<td>14 days (Sepsis); 2 - 4 weeks for CNS infection</td>
<td></td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td></td>
<td>Ciprofloxacin, IV PLUS Gentamicin, IM/IV</td>
<td>Ceftazidime, IM/IV PLUS Amikacin, IM/IV</td>
<td></td>
<td>Piperacillin/tazobactam should not be used for CNS infection.</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Methicillin-sensitive Staphylococcus aureus (MSSA)</td>
<td>Cloxacillin, IM/IV</td>
<td>Cefazolin, IM/IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methicillin-resistant Staphylococcus aureus (MRSA)</td>
<td>Vancomycin, IV</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Staphylococcus epidermidis (or any coagulase-negative staphylococci)</td>
<td>Cloxacillin, IM/IV</td>
<td>Vancomycin, IV</td>
<td></td>
<td></td>
<td>Cefazolin does not enter CNS; Add rifampicin if cultures persistently positive.</td>
</tr>
<tr>
<td>Group A streptococcus</td>
<td>Benzylicillin, IV</td>
<td>Ampicillin, IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B streptococcus</td>
<td>Benzylicillin, IV PLUS Gentamicin, IM/IV</td>
<td>Ampicillin, IV PLUS Gentamicin, IM/IV</td>
<td></td>
<td>10 days for bacteraemia/sepsis; minimum of 14 days for meningitis</td>
<td>Continue gentamicin until clinical and microbiological response documented</td>
</tr>
<tr>
<td>Breast abscess</td>
<td>Methicillin-sensitive Staphylococcus aureus (MSSA)</td>
<td>Cloxacillin, IM/IV</td>
<td></td>
<td></td>
<td>Treatment duration individualized until clinical findings have completely resolved.</td>
</tr>
<tr>
<td></td>
<td>Methicillin-resistant Staphylococcus aureus (MRSA)</td>
<td>Vancomycin, IV PLUS Cefotaxime, IM/IV</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Gram-negative rods</td>
<td>Gentamicin, IV</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Impetigo neonatorum</td>
<td>Methicillin-sensitive Staphylococcus aureus (MSSA)</td>
<td>Cloxacillin, IM/IV</td>
<td></td>
<td>5 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
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</tr>
<tr>
<td>Methicillin-resistant <em>Staphylococcus aureus</em> (MRSA)</td>
<td>Vancomycin, IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B streptococcus</td>
<td>Benzylpenicillin, IV</td>
<td>Ampicillin, IM/IV</td>
<td></td>
<td>7 - 14 days</td>
<td></td>
</tr>
</tbody>
</table>

**Syphilis:**

*Congenital (<1 month of age)*
- Proven or highly probable disease: (1) abnormal physical examination; (2) serum quantitative nontreponemal serologic titre 4-fold higher than mother’s titre

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</table>

- Evaluation abnormal or not done completely: Benzylpenicillin 0.05MU/kg, IV, Q12H (day of life 1 - 7), Q8H (>7 days) | OR | Procaine benzylpenicillin 0.05MU/kg, IM Q24H; | 10 days | |

**Remarks**

- Normal physical examination, serum quantitative nontreponemal serologic titre ≤ maternal titre, and maternal treatment was (1) none, inadequate, or undocumented; (2) erythromycin, azithromycin, or other non-penicillin regimen; or
<table>
<thead>
<tr>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3) &lt;4 weeks before delivery</td>
<td>Evaluation normal: Benzylpenicillin 0.05 MU/kg, IV, Q12H (day of life 1 - 7), Q8H (&gt;7 days) OR Procaine benzylpenicillin 0.05MU/kg, IM, Q24H OR Benzathine benzylpenicillin 0.05MU/kg, IM STAT</td>
<td>Benzathine benzylpenicillin 0.05MU/kg, IM, STAT</td>
<td>10 days</td>
<td>Reliable follow-up important if only a single dose of Benzathine penicillin given</td>
</tr>
<tr>
<td>Normal physical examination, serum quantitative nontreponemal serologic titre ≤ maternal titre, mother treated adequately during pregnancy and &gt;4 weeks before delivery; no evidence of reinfection or relapse in mother</td>
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</tr>
<tr>
<td>Normal physical examination, serum quantitative nontreponemal serologic titre ≤ maternal titre, mother’s treatment adequate before pregnancy</td>
<td>No treatment; But if follow-up of maternal serology is uncertain; Benzathine benzylpenicillin 0.05MU/kg, IM, STAT</td>
<td></td>
<td></td>
<td>Single dose</td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
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</tr>
<tr>
<td>Tetanus neonatorum</td>
<td>Metronidazole, IV/PO PLUS Human TIG 3,000 - 6,000IU, IM, STAT</td>
<td>Benzylpenicillin 200 - 400mg/kg, IV (200 - 400mg/kg), if TIG not available</td>
<td>10 - 14 days</td>
<td>Wound cleaning and debridement vital</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>Ampicillin, IV PLUS Gentamicin, IM/IV</td>
<td>Ampicillin, IV PLUS Gentamicin, IM/IV</td>
<td>7 - 10 days</td>
<td>Recurrent UTI in neonates may need causative evaluation</td>
</tr>
<tr>
<td>Organism specific therapy</td>
<td><strong>Escherichia coli, Klebsiella, Enterobacter, Serratia</strong></td>
<td>Ampicillin, IM/IV</td>
<td>Cefotaxime, IM/IV</td>
<td>7 - 10 days</td>
</tr>
<tr>
<td><strong>Enterococcus</strong></td>
<td>Ampicillin, IM/IV; <em>For pyelonephritis</em>, ADD Gentamicin, IM/IV until cultures are sterile</td>
<td></td>
<td></td>
<td>7 days for cystitis; 10 - 14 days for pyelonephritis</td>
</tr>
<tr>
<td>Penicillin resistant</td>
<td>Vancomycin, IV; <em>For pyelonephritis</em>, ADD Gentamicin, IM/IV until cultures are sterile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pseudomonas aeruginosa</strong></td>
<td>Ciprofloxacin, IV OR Meropenem, IV</td>
<td>Ceftazidime, IM/IV</td>
<td></td>
<td>7 - 10 days</td>
</tr>
</tbody>
</table>
Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection. Organ dysfunction can be identified as an acute change in total SOFA score ≥2 points consequent to the infection. The baseline SOFA score can be assumed zero in patients not known to have pre-existing organ dysfunction. A SOFA score ≥2 reflects an overall mortality risk of approximately 10% in a general hospital population with suspected infection. Even patients presenting with modest dysfunction can deteriorate further, emphasizing the seriousness of this condition and the need for prompt and appropriate intervention, if not already being instituted.

Septic shock is a subset of sepsis in which underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase mortality. Patients with septic shock can be identified with a clinical construct of sepsis with persisting hypotension requiring vasopressors to maintain MAP ≥65 mmHg and having a serum lactate level >2 mmol/L (18 mg/dL) despite adequate volume resuscitation. With these criteria, hospital mortality is in excess of 40%.

### The Sequential Organ Failure Assessment (SOFA) Score*

<table>
<thead>
<tr>
<th>Variables</th>
<th>SOFA Score</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Respiratory</td>
<td></td>
</tr>
<tr>
<td>PaO²/FIO₂, mmHg</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Coagulation</td>
<td></td>
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<tr>
<td>Platelets x 10³/µL**</td>
<td>&gt;150</td>
</tr>
<tr>
<td>Liver</td>
<td></td>
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<tr>
<td>Bilirubin, mg/dL***</td>
<td>&lt;1.2</td>
</tr>
<tr>
<td>Cardiovascular Hypotension</td>
<td>No hypotension</td>
</tr>
<tr>
<td>Central Nervous System</td>
<td></td>
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<tr>
<td>Glasgow Coma Score Scale</td>
<td>15</td>
</tr>
<tr>
<td>Renal</td>
<td></td>
</tr>
<tr>
<td>Creatine, mg/dL** or urine output, mL/d*****</td>
<td>&lt;1.2</td>
</tr>
</tbody>
</table>

* Norepi indicates norepinephrine; Dob, dobutamine; Dop, dopamine; Epi, epinephrine; and FIO₂, fraction of inspired oxygen
** Values are with respiratory support
*** To convert bilirubin from mg/dL to µmol/L, multiply by 17.1
****Adrenergic agents administered for at least 1 hour (doses are given in µg/kg per minute)
***** To convert creatine from mg/dL to µmol/L, multiply by 88.4

<table>
<thead>
<tr>
<th>Illness</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
<th>Alternative Antibiotic Therapy</th>
<th>Recommended Duration of Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septicaemia: Community acquired: Non-neutropenic patient</td>
<td>Streptococcus, Haemophilus, <em>Staphylococcus aureus</em>, Coliforms</td>
<td>Ampicillin 1g, IV, Q6H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Ceftriaxone 2g, IV, Q24H</td>
<td>Minimum 7 days</td>
<td>In all septic patients, thorough septic screening to locate focus of infection is mandatory; Change to appropriate antibiotics depending on culture and sensitivity results; Though antibiotic therapy is the mainstay of treatment, substantial benefit can be achieved by removing/changing catheters, removing foreign bodies, draining abscess etc.; If response is inadequate after 3-4 days of treatment, review antibiotic regimen; If MRSA suspected or proven, appropriate therapy with Vancomycin is warranted.</td>
</tr>
<tr>
<td>Neutropenic patients</td>
<td><em>Pseudomonas aeruginosa</em>, Enterobacteriaceae, <em>Staphylococcus aureus</em></td>
<td>Ciprofloxacin 500mg, IV, Q12H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Meropenem 1g, IV, Q6H</td>
<td>Till afebrile for 5 days and neutrophil count is &gt;500/µl</td>
<td></td>
</tr>
<tr>
<td>Asplenic patients</td>
<td>Pneumococcus, Haemophilus, Meningococcus</td>
<td>Benzylpenicillin 2MU, IV, Q4H</td>
<td>Ceftriaxone 2g, IV, Q12H</td>
<td>7 - 10 days</td>
<td></td>
</tr>
<tr>
<td>Septic shock</td>
<td>Streptococcus, <em>Staphylococcus</em> and Gram-negatives</td>
<td>Ceftriaxone 2g, IV, Q12H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H</td>
<td>7 - 10 days</td>
<td></td>
</tr>
<tr>
<td>Hospital acquired: Non-neutropenic</td>
<td>Pseudomonas, Acinetobacter, Coliforms, <em>Enterococcus</em>, <em>Staphylococcus aureus</em> including MRSA</td>
<td>Ceftazidime 2g, IV, Q8H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>7 - 10 days</td>
<td></td>
</tr>
<tr>
<td>Neutropenic</td>
<td></td>
<td>Piperacillin/tazobactam 4.5g, IV, Q6H OR Ceftazidime 2g, IV, Q8H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Meropenem 1g, IV, Q6H</td>
<td>7 - 10 days</td>
<td></td>
</tr>
<tr>
<td>Illness</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
<td>Alternative Antibiotic Therapy</td>
<td>Recommended Duration of Treatment</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------------</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sepsis in burns</td>
<td>Pseudomonas, Staphylococcus and Streptococcus</td>
<td>Ampicillin 1g, IV, Q6H OR Cloxacillin 1g, IV, Q6H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Ceftriaxone 2g, IV, Q24H PLUS Gentamicin 5mg/kg, IV, Q24H</td>
<td>Add vancomycin where MRSA suspected or confirmed by culture; Prophylactic antibiotics have no proven role in burns.</td>
<td></td>
</tr>
</tbody>
</table>
SURGICAL PROPHYLAXIS

Surgical antibiotic prophylaxis is defined as the use of antibiotics to prevent infections at the surgical site. Prophylaxis has become the standard of care for contaminated and clean contaminated surgery and for surgery involving insertion of artificial devices. The antibiotic selected should only cover the likely pathogens.

Principles of surgical antibiotic prophylaxis

1. Decide if prophylaxis is appropriate. Only use antibiotic prophylaxis if there is a significant risk of infection.
2. Determine the bacterial flora most likely to cause the postoperative infection (not every species needs to be covered). Antibiotic selection may need to be modified according to patient risk factors.
3. Surgical antibiotic prophylaxis should not be the only strategy used to reduce the risk of postoperative infection. Minimising the risk requires a comprehensive approach to patient management, including optimal perioperative medical management (e.g. perioperative glycaemic control in patients with diabetes), adequate debridement, and good surgical technique. Do not use antibiotic prophylaxis to overcome poor surgical technique or preparation.
4. Preoperative intravenous (IV) antibiotic administration should occur up to 60 minutes (ideally 15-30 minutes) before surgical incision.
5. A single dose of antibiotic(s) is sufficient for the majority of procedures. Prophylaxis should not extend beyond 24 hours. Postoperative doses of IV antibiotics of up to 24 hours are only required in defined circumstances, such as some vascular surgeries or a lower limb amputation, for which a benefit for up to 24 hours of prophylaxis.
6. Urinary or intravascular catheters or indwelling surgical drains that remain in situ are not a justification to extend the duration of antibiotic prophylaxis.
7. Antibiotic prophylaxis with urinary catheter insertion or removal is not recommended with the exception of some high-risk patients following urological procedures.
8. Antibiotics for infective endocarditis prophylaxis may be needed for patients with specific cardiac conditions (see Prophylaxis for Endocarditis section).
9. Review antibiotic prophylaxis protocols regularly as both cost and hospital antibiotic resistance patterns may change.
10. A second dose of antibiotic dose may be given if:
   i. Significant delay (60 minutes) in starting the operation after initial dose given;
   ii. Operation is prolonged beyond 3 hours (for cephalozin); and
   iii. Excessive blood loss (≥ 1500 ml) during the operation
11. If MRSA proven or suspected, add Vancomycin 1g IV over at least 1 hour completing infusion by time of induction.

Patient care recommendations for reducing surgical site infections

- Advise patients to shower using a soap containing antiseptic on the day of surgery.
- It is not necessary to remove hair in order to reduce surgical site infection. If hair removal is required prior to surgery, use hair clippers on the day of surgery. Do not use razors for hair removal as they increase the risk of surgical site infections. There is a risk of skin reactions with depilatory creams.
- Treat any existing infections prior to elective surgery e.g. Dental caries, UTI.
- Screen preoperative blood glucose levels and maintain glycaemic control.
- Intraoperative oxygenation and body temperature should be maintained.
- Maintain perioperative normothermia. It is important to understand that infections due to lapses in surgical technique, operating theatre procedures, and aseptic technique during and after operation cannot be prevented by use of prophylactic antibiotics.
Indications for surgical antibiotic prophylaxis
Surgical procedures are usually ranked as clean, clean-contaminated and contaminated. Widely accepted indications for antibiotic prophylaxis are contaminated and clean-contaminated surgery and operations involving the insertion of an artificial device or prosthetic material.

### RECOMMENDED ANTIMICROBIAL THERAPY FOR SURGICAL PROPHYLAXIS

<table>
<thead>
<tr>
<th>Surgical Procedures</th>
<th>Common Causative Agents</th>
<th>Recommended Antibiotic Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abdominal surgery:</strong> Biliary surgery including laparoscopic cholecystectomy</td>
<td><em>Escherichia coli</em>, Klebsiella spp.</td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td>Gastroduodenal and oesophageal surgery</td>
<td><em>Escherichia coli</em>, Klebsiella spp., <em>Streptococci</em></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td>Colorectal surgery, appendectomy and small intestinal surgery</td>
<td><em>Escherichia coli</em>, Klebsiella spp. and anaerobic gram-negative bacteria like <em>Bacteroides</em> spp.</td>
<td>Cephazolin 2g, IV PLUS Metronidazole 500mg, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td>Endoscopic retrograde cholangiopancreatography (ERCP)</td>
<td></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td><strong>Head and neck surgery</strong></td>
<td><em>Staphylococci</em>, <em>Streptococci</em>, anaerobes</td>
<td>Cephazolin 2g, IV PLUS Metronidazole 500mg, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td><strong>Lower limb amputation</strong></td>
<td>Risk of clostridial infection</td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia, then 2 further doses Q8H after; <em>For ischaemic limb,</em> ADD Metronidazole 500mg, IV then another dose Q12H later</td>
</tr>
<tr>
<td><strong>Neurosurgery</strong></td>
<td><em>Staphylococcus aureus</em>, Coagulase-negative staphylococci (CoNS), Diphtheroids</td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td><strong>Obstetric and gynaecological surgery:</strong> Caesarean Section (elective &amp; emergency)</td>
<td></td>
<td>Cephazolin, <em>Body wt.</em>&lt;120: 2g; <em>Body wt.</em>&gt;120kg: 3g; IV at the time of induction of anaesthesia *Metronidazole 500mg, IV PLUS Gentamicin 5mg/kg, IV, when cephazolin is not available</td>
</tr>
<tr>
<td>Dilatation and curettage (D/C) or Dilatation and evacuation (D/E)</td>
<td></td>
<td>Doxycycline 100mg, PO one hour before procedure and 200mg, PO after 2 hours</td>
</tr>
<tr>
<td>Postpartum evacuation with breast feeding</td>
<td></td>
<td>Metronidazole 500mg, PO, Q12H for 5 days and azithromycin 1g, PO one hour before procedure</td>
</tr>
<tr>
<td>Hysterosalpingography (HSG)/lap and dye test</td>
<td></td>
<td>Doxycycline 100mg, PO, Q12H for 5 days</td>
</tr>
<tr>
<td>Surgical Procedures</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Loop Electrosurgical Excision Procedure (LEEP)</td>
<td></td>
<td>No antibiotics needed, unless features symptoms suggestive of PID</td>
</tr>
<tr>
<td>Laparoscopy</td>
<td></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia; For vaginal hysterectomy, ADD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metronidazole 500mg, IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Metronidazole 500mg, IV PLUS Gentamicin 5mg/kg, IV, when cephazolin is not available</td>
</tr>
<tr>
<td>Normal vaginal delivery:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First and second degree tear, episiotomy</td>
<td></td>
<td>No antibiotics required</td>
</tr>
<tr>
<td>Third and fourth degree tear after repair</td>
<td></td>
<td>Amoxicillin 500mg, PO, Q8H PLUS Metronidazole 400mg Q12H for 5 days</td>
</tr>
<tr>
<td>Instrumental delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ophthalmic surgery:</td>
<td><em>Staphylococcus aureus, Coagulase-negative staphylococci (CoNS), Pseudomonas</em></td>
<td>Cephazolin 1-2.5mg, IV into anterior chamber at the end of surgery, STAT</td>
</tr>
<tr>
<td>Cataract surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedic surgery</td>
<td><em>Staphylococcus aureus, Gram-negative bacilli</em></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td>Urological surgery:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transurethral resection of Prostate (TURP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedure where urological tract NOT entered and urine is sterile</td>
<td></td>
<td>Antibiotic prophylaxis often NOT required</td>
</tr>
<tr>
<td>For implantation of prosthetic devices</td>
<td><em>Coliforms, Staphylococcus aureus</em></td>
<td>Cephazolin 2g, IV PLUS Gentamicin 2mg/kg, IV at the time of induction of anaesthesia</td>
</tr>
<tr>
<td>Procedure where urological tract is entered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transrectal prostate biopsy</td>
<td><em>Staphylococcus aureus</em></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia; For radical prostatectomy, ADD</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td><em>Staphylococcus aureus</em></td>
<td>Cephazolin 2g, IV at the time of induction of anaesthesia; then 2 further doses Q8H</td>
</tr>
<tr>
<td>Infective endocarditis prophylaxis:</td>
<td><em>Staphylococcus aureus</em></td>
<td></td>
</tr>
<tr>
<td>Upper respiratory tract procedures</td>
<td></td>
<td>Amoxicillin 3g, PO, 4H pre-operatively, then 3g after procedure OR Ampicillin 1g, IV at the time of induction; then 500mg, 6 hours later</td>
</tr>
<tr>
<td>Surgical Procedures</td>
<td>Common Causative Agents</td>
<td>Recommended Antibiotic Therapy</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Special risk: patients with prosthetic valve endocarditis/undergoing genitourinary/GI and other procedures</td>
<td>Ampicillin 1g, IV at the time of induction of anaesthesia; followed by amoxicillin 500mg, 6H later PLUS Gentamicin 120mg, IV at the time of induction of anaesthesia</td>
<td>Vancomycin 1g, IV, 1H pre-operatively PLUS Gentamicin 120mg, IV at the time of induction of anaesthesia</td>
</tr>
</tbody>
</table>
## APPENDIX I
### ANTIMICROBIAL DOSAGES AND DOSING ADJUSTMENT FOR RENAL INSUFFICIENCY FOR NEONATES

Estimated GFR (eGFR)/Creatinine Clearance (CrCl) from plasma creatinine

\[
eGFR (\text{mL/min/1.73m}^2) = k L / Pcr
\]

- \(k = 0.33\) (Low birth weight during first year of life)
- \(0.45\) (Term AGA during first year of life)
- \(L = \text{length (cm)}\)
- \(Pcr = \text{plasma creatinine (mg/dL)}\)

### Antibiotics Dosages (mg/kg/day) and Intervals of Administration

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Route</th>
<th>Body Weight =&lt; 2000g</th>
<th>Body Weight &gt;2000g</th>
<th>Chronological age 29-60 days</th>
<th>Renal Dose / Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 - 7 days</td>
<td>8 - 28 days</td>
<td>0 - 7 days</td>
<td></td>
</tr>
<tr>
<td>Amoxicillin and Clavulinate, Amphotericin B Deoxycholate</td>
<td>PO</td>
<td>-</td>
<td>-</td>
<td>15mg/kg/day, 15mg/kg/day, 15mg/kg/day, 15mg/kg/day, 15mg/kg/day, 15mg/kg/day, 15mg/kg/day, 15mg/kg/day, 15mg/kg/day</td>
<td>CrCl (mL/min)</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>1mg/kg/day, Q24H</td>
<td>1mg/kg/day, Q24H</td>
<td>1mg/kg/day, Q24H</td>
<td></td>
</tr>
<tr>
<td>Ampicillin (Non-meningitis)</td>
<td>IM, IV</td>
<td>50mg/kg/day, Q12H</td>
<td>75mg/kg/day, Q12H</td>
<td>50mg/kg/day, Q8H</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50mg/kg/day, Q6H</td>
<td></td>
</tr>
<tr>
<td>Ampicillin (Meningitis)</td>
<td>IV</td>
<td></td>
<td></td>
<td>100mg/kg/dose (Interval A)*</td>
<td></td>
</tr>
<tr>
<td>Azithromycin</td>
<td>PO</td>
<td>10mg/kg/day, Q24H</td>
<td>10mg/kg/day, Q24H</td>
<td>10mg/kg/day, Q24H</td>
<td></td>
</tr>
<tr>
<td>Cefazolin</td>
<td>IM, IV</td>
<td>25mg/kg/day, Q12H</td>
<td>25mg/kg/day, Q12H</td>
<td>25mg/kg/day, Q12H</td>
<td></td>
</tr>
<tr>
<td>Cefotaxime (Non-meningitis)</td>
<td>IM, IV</td>
<td>50mg/kg/day, Q12H</td>
<td>50mg/kg/day, Q12H</td>
<td>50mg/kg/day, Q12H</td>
<td></td>
</tr>
</tbody>
</table>

*Over 30 min*

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose</th>
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<tbody>
<tr>
<td>&gt;50</td>
<td>Q6H</td>
</tr>
<tr>
<td>Drug</td>
<td>Route</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>IM, IV</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>IM, IV</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>IM, IV</td>
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<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>IV, PO</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Clindamycin</td>
<td>IM, IV, PO</td>
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<td></td>
<td></td>
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<tr>
<td>Erythromycin</td>
<td>PO</td>
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<tr>
<td>Meropenem</td>
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</tr>
<tr>
<td>Erythromycin</td>
<td>PO</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Metronidazole</td>
<td>IV, PO</td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

CrCl (mL/min): 10-50 = 100% Q12H, <10 = 50% Q24H

Footnote: See foot note.
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th>CrCl (mL/min)</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloxacillin</td>
<td>IM, IV</td>
<td>25mg/kg/day, Q12H</td>
<td>25mg/kg/day, Q8H</td>
<td>25mg/kg/day, Q8H</td>
<td>25mg/kg/day, Q6H</td>
<td>37.5mg/kg/day, Q6H</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzathine benzylpenicillin</td>
<td>IM</td>
<td>0.05MU</td>
<td>0.05MU</td>
<td>0.05MU</td>
<td>0.05MU</td>
<td>0.05MU</td>
<td></td>
</tr>
<tr>
<td>Benzylpenicillin</td>
<td>IV</td>
<td>0.05MU, Q12H</td>
<td>0.05MU, Q8H</td>
<td>0.05MU, Q12H</td>
<td>0.05MU, Q8H</td>
<td>0.05MU, Q6H</td>
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</tr>
<tr>
<td>(GBS sepsis, congenital syphilis)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Benzylpenicillin</td>
<td>IV</td>
<td>0.1 MU, Q12H</td>
<td>0.1 MU, Q8H</td>
<td>0.1 MU, Q12H</td>
<td>0.1 MU, Q8H</td>
<td>0.1 MU, Q6H</td>
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<tr>
<td>(GBS meningitis)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Procaine benzylpenicillin</td>
<td>IM</td>
<td>0.05MU, Q24H</td>
<td>0.05MU, Q24H</td>
<td>0.05MU, Q24H</td>
<td>0.05MU, Q24H</td>
<td>0.05MU, Q24H</td>
<td></td>
</tr>
<tr>
<td>Piperacillin/tazobactam</td>
<td>IV</td>
<td>100mg/kg/day, Q8H</td>
<td>80mg/kg/day, Q6H</td>
<td>80mg/kg/day, Q6H</td>
<td>80mg/kg/day, Q6H</td>
<td>80mg/kg/day, Q6H</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rifampicin</td>
<td>IV, PO</td>
<td>10mg/kg/day, Q24H</td>
<td>10mg/kg/day, Q24H</td>
<td>10mg/kg/day, Q24H</td>
<td>10mg/kg/day, Q24H</td>
<td>10mg/kg/day, Q24H</td>
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</tr>
</tbody>
</table>

**Age specific intervals**

<table>
<thead>
<tr>
<th>Corrected gestational age (weeks)</th>
<th>Postnatal age (Days)</th>
<th>Interval A</th>
<th>Interval B</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=29</td>
<td>0 - 28</td>
<td>Q12H</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td>&gt;28</td>
<td>Q8H</td>
<td>Q8H</td>
</tr>
<tr>
<td>30 - 36</td>
<td>0 - 14</td>
<td>Q12H</td>
<td>Q8H</td>
</tr>
<tr>
<td></td>
<td>&gt;14</td>
<td>Q8H</td>
<td>Q6H</td>
</tr>
<tr>
<td>37 - 44</td>
<td>0 - 7</td>
<td>Q12H</td>
<td>Q8H</td>
</tr>
<tr>
<td></td>
<td>&gt;7</td>
<td>Q8H</td>
<td>Q6H</td>
</tr>
</tbody>
</table>

*CrCl (mL/min) <10: Use lower range of usual dose*
<table>
<thead>
<tr>
<th>Corrected gestational age (weeks)</th>
<th>Postnatal age (Days)</th>
<th>Interval A</th>
<th>Interval B</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=45</td>
<td>All</td>
<td>Q6H</td>
<td>Q6H</td>
</tr>
</tbody>
</table>

### Aminoglycosides

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Route</th>
<th>&lt;32 weeks</th>
<th>32 - 36 weeks</th>
<th>&gt;=37 weeks (Term)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 - 14 days</td>
<td>&gt;14 days</td>
<td>0 - 7 days</td>
</tr>
<tr>
<td>Amikacin</td>
<td>IM, IV</td>
<td>15mg/kg, Q48H</td>
<td>15mg/kg, Q24H</td>
<td>15mg/kg, Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15mg/kg, Q24H</td>
<td>15mg/kg, Q24H</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>IM, IV</td>
<td>5mg/kg, Q48H</td>
<td>5mg/kg, Q36H</td>
<td>4mg/kg, Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4mg/kg, Q36H</td>
<td>4mg/kg, Q24H</td>
</tr>
</tbody>
</table>
1. Amikacin

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50%</td>
<td>90%, single dose</td>
</tr>
<tr>
<td>10 - 50</td>
<td>70%, single dose</td>
</tr>
<tr>
<td>&lt;10</td>
<td>30%, single dose</td>
</tr>
</tbody>
</table>

2. Gentamicin

<table>
<thead>
<tr>
<th>CrCl (mL/min)</th>
<th>Dose modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50%</td>
<td>100%</td>
</tr>
<tr>
<td>10 - 50</td>
<td>2mg/kg, Q12H</td>
</tr>
<tr>
<td>&lt;10</td>
<td>1mg/kg, Q24H - 48H</td>
</tr>
</tbody>
</table>

3. Vancomycin

<table>
<thead>
<tr>
<th>Empiric Dosage (mg/kg/dose) by Gestational and Serum Creatinine</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=28 weeks</td>
</tr>
<tr>
<td>Serum Creatinine</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>&lt; 0.5</td>
</tr>
<tr>
<td>0.5 - 0.7</td>
</tr>
<tr>
<td>0.8 - 1</td>
</tr>
<tr>
<td>1.1 - 1.4</td>
</tr>
<tr>
<td>&gt; 1.4</td>
</tr>
<tr>
<td>&gt;28 weeks</td>
</tr>
<tr>
<td>Serum Creatinine</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>&lt; 0.5</td>
</tr>
<tr>
<td>0.5 - 0.7</td>
</tr>
<tr>
<td>0.8 - 1</td>
</tr>
<tr>
<td>1.1 - 1.4</td>
</tr>
<tr>
<td>&gt; 1.4</td>
</tr>
</tbody>
</table>
# Appendix II

## Dosing Adjustment for Renal Insufficiency

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Normal T1/2 (H)</th>
<th>Normal dose interval</th>
<th>Creatinine clearance (mL/min)</th>
<th>Dose</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acyclovir</td>
<td>2 - 4</td>
<td>8H</td>
<td>25 - 50</td>
<td>NI</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 - 25</td>
<td>NI</td>
<td>Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 10</td>
<td>Reduce by 50%</td>
<td>Q24H</td>
</tr>
<tr>
<td>Amikacin</td>
<td>1.5 - 3</td>
<td>Q8H - Q12H</td>
<td>10 - 50</td>
<td>Loading dose 5 - 7.5 mg/kg; subsequent doses are best determined by serum levels and assessment of renal insufficiency.</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;10</td>
<td></td>
<td>Q24H</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>0.7 - 2</td>
<td>Q8H - Q12H</td>
<td>10 - 50</td>
<td>NI</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;10</td>
<td></td>
<td>Q24H</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>1 - 4</td>
<td>Q6H - Q12H</td>
<td>10 - 50</td>
<td>NI</td>
<td>Q6H - Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;10</td>
<td></td>
<td>Q12H</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>1.5 - 2.5</td>
<td>Q6H - 8H</td>
<td>35 - 54</td>
<td>NI</td>
<td>Q8H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11 - 34</td>
<td>reduce by 50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 10</td>
<td>reduce by 50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Note: Give initial loading dose, then adjust subsequent doses for renal function.</td>
<td></td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>1 - 3.5</td>
<td>Q6H - Q12H</td>
<td>&lt; 20</td>
<td>Reduce by 50%</td>
<td>Q12H</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>1 - 2</td>
<td>Q8H - Q12H</td>
<td>30 - 50</td>
<td>NI</td>
<td>Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 - 30</td>
<td></td>
<td>Q24H - Q48H</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>0.5 - 1.2</td>
<td>Q6H - Q8H</td>
<td>10 - 40</td>
<td>NI</td>
<td>Q8H - Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 40</td>
<td></td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Q24H</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>1.2 - 5</td>
<td>Q8H - Q12H</td>
<td>&lt; 30 (IV)</td>
<td>Reduce by 50%</td>
<td>Q8H - Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 - 50 (PO)</td>
<td>Reduce by 50%</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 30 (PO)</td>
<td>Reduce by 50%</td>
<td>Q24H</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>1.5 - 2</td>
<td>Q6H - Q12H</td>
<td>&lt; 10</td>
<td>Reduce by 25 - 50%</td>
<td>Q12H</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>1.5 - 3</td>
<td>Q8H - 12H</td>
<td>&gt;50</td>
<td>NI</td>
<td>Q8H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;50</td>
<td></td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Give usual initial dose and monitor levels.</td>
<td></td>
</tr>
<tr>
<td>Imipenem/cilastatin</td>
<td>1 - 1.4</td>
<td>Q6H - Q8H</td>
<td>41 - 70</td>
<td>Reduce by 50%</td>
<td>Q6H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>21 - 40</td>
<td>Reduce by 63%</td>
<td>Q8H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 - 20</td>
<td>Reduce by 75% in max daily dose</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>≤5</td>
<td>Should not receive imipenem unless on hemodialysis</td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>Normal T1/2 (H)</td>
<td>Normal dose interval</td>
<td>Creatinine clearance (mL/min)</td>
<td>Dose</td>
<td>Interval</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------</td>
<td>----------------------</td>
<td>-------------------------------</td>
<td>----------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Meropenem</td>
<td>1 - 1.5</td>
<td>Q8H</td>
<td>26 - 50</td>
<td>NI</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 - 25</td>
<td>Reduce by 50%</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 10</td>
<td>Reduce by 50%</td>
<td>Q24H</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>6 - 12</td>
<td>Q6H - Q12 H</td>
<td>&lt; 10</td>
<td>Reduce by 50%</td>
<td>NI</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>3 - 4</td>
<td>Q12H</td>
<td>10 - 50</td>
<td>NI</td>
<td>Q12H - Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 10</td>
<td>NI</td>
<td>Q24H</td>
</tr>
<tr>
<td>Oxacillin</td>
<td>23 - 45 minutes</td>
<td>Q4H - Q12H</td>
<td>&lt; 10</td>
<td>Use lower range of the normal dose</td>
<td>NI</td>
</tr>
<tr>
<td>Benzylpenicillin</td>
<td>20 - 50 minutes</td>
<td>Q4H - Q6 H</td>
<td>10 - 50</td>
<td>Reduce by 25%</td>
<td>NI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 10</td>
<td>Reduce by 50-80%</td>
<td>NI</td>
</tr>
<tr>
<td>Penicillin V</td>
<td>30 - 40 minutes</td>
<td>Q6H - Q8 H</td>
<td>&lt; 10</td>
<td>NI</td>
<td>Q8H</td>
</tr>
<tr>
<td>Piperacillin/tazobactam</td>
<td>0.5 - 1.5/0.7 - 1.6</td>
<td>Q6H - Q8 H</td>
<td>20 - 40</td>
<td>Reduce by 30%</td>
<td>Q6H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 20</td>
<td>Reduce by 30%</td>
<td>Q8H</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>1.5 - 5</td>
<td>Q12H - Q24H</td>
<td>10 - 50</td>
<td>Reduce by 50%</td>
<td>NI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;10</td>
<td>Reduce by 50%</td>
<td>NI</td>
</tr>
<tr>
<td>Sulfamethoxazole/trimethoprim</td>
<td>9 - 12/6 - 11</td>
<td>Q12H</td>
<td>15 - 30</td>
<td>Reduce by 50%</td>
<td>NI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;15</td>
<td>Not recommended</td>
<td>NI</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>2.2 - 8</td>
<td>Q6H - Q12 H</td>
<td>&gt;90</td>
<td>NI</td>
<td>Q6H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70 - 89</td>
<td>NI</td>
<td>Q8H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>46 - 69</td>
<td>NI</td>
<td>Q12H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 - 45</td>
<td>NI</td>
<td>Q18H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15 - 29</td>
<td>NI</td>
<td>Q24H</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;15</td>
<td>10 - 20mg/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Subsequent doses best determined by levels.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Alternative would be to give single dose and then check a trough level.
## COMMON ADVERSE EFFECTS, MEDICINE INTERACTIONS AND SPECIAL CONSIDERATIONS OF ANTI-INFECTIVES

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Adverse Effects</th>
<th>Interactions</th>
<th>Cautions/Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aminoglycosides:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Nephrotoxicity, ototoxicity. Nephrotoxicity can be anticipated if treated for &gt;7-10 days. Vestibular or cochlear ototoxicity occurs in about 2-4% of treated people. Irreversible in 50% of patients showing symptoms of hearing loss.</td>
<td>Increased risk of nephrotoxicity with cyclosporine and cytotoxics. Increased risk of ototoxicity with loop diuretics.</td>
<td>Use with caution in elderly, during pregnancy and in renal impairment. Monitor ototoxicity. If renal function deteriorates, measure medicine concentration daily; adjust dose if necessary and consider an alternative antibiotic.</td>
</tr>
<tr>
<td>Neomycin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Carbapenems:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imipenem</td>
<td>Side-effects nausea, vomiting, diarrhoea abdominal pain, disturbances in liver function tests; thrombocythemia, positive Coombs' test; less commonly eosinophilia and thrombocytopenia; rarely convulsions (especially imipenem)</td>
<td>Reduces plasma concentration of valproate</td>
<td>Hypersensitivity to beta-lactam antibacterial Hepatic and renal impairment. Manufacturer advises use only if potential benefit outweighs risk in pregnancy.</td>
</tr>
<tr>
<td>Meropenem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cephalosporins:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cephalexin</td>
<td>Allergy occurs in up to 10% of people receiving penicillins; anaphylaxis occurs in 0.01%. Common adverse effects include diarrhoea, nausea and rash.</td>
<td>May enhance anticoagulant effect of warfarin.</td>
<td>In severe renal impairment, there is increased risk of neurotoxicity (seizures or coma) with high doses. Monitor renal function and complete blood picture during prolonged (&gt;10 days) and/or high dose treatment. Rapid IV administration of large doses may result in seizures.</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cefotaxime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cephazolin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chloramphenicol</strong></td>
<td>Nausea, vomiting, diarrhoea. Reversible bone marrow suppression.</td>
<td>May enhance anticoagulant effect of warfarin.</td>
<td>Avoid in pre-existing bone marrow depression and blood dyscrasias. Caution in G6PD deficiency. Reduce dose in severe hepatic impairment. Avoid in neonates and preterm infants due to risk of grey</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>Adverse Effects</td>
<td>Interactions</td>
<td>Cautions/Contraindications</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Glycopeptides:</strong></td>
<td>Vancomycin: More common with rapid IV infusion. Fever, chills and itch with IM use. Thrombophlebitis with IV use.</td>
<td>Increases risk of cardiac arrhythmias with amiodarone. May enhance anticoagulant effect of warfarin. Increases plasma concentrations of antiepileptics, theophylline and cyclosporine.</td>
<td>Risk of nephrotoxicity and ototoxicity increased when used with aminoglycosides.</td>
</tr>
<tr>
<td><strong>Macrolides:</strong></td>
<td>Erythromycin: Common ones include nausea, vomiting, diarrhoea, abdominal pain and cramps.</td>
<td>Increases risk of cardiac arrhythmias with amiodarone. May enhance anticoagulant effect of warfarin. Increases plasma concentrations of antiepileptics, theophylline and cyclosporine.</td>
<td>High degree of cross-resistance between erythromycin and other newer macrolides.</td>
</tr>
<tr>
<td><strong>Nitroimidazoles:</strong></td>
<td>Metronidazole: Thrombophlebitis (IV), nausea, vomiting, diarrhoea and metallic taste. May cause leukopenia and peripheral neuropathy at high doses and/or prolonged treatment.</td>
<td>Disulfiram like reaction with alcohol. Effect of warfarin enhanced. Increased plasma phenytoin concentration.</td>
<td>May aggravate existing neurological disease. Caution in history of blood dyscrasias. Monitor blood count. Avoid alcohol.</td>
</tr>
<tr>
<td><strong>Nitrofurantoin</strong></td>
<td>Nausea and vomiting. Anorexia, dyspepsia, allergic skin reactions, headache, dizziness and vertigo.</td>
<td></td>
<td>Use with caution in G6PD deficiency, renal impairment, breastfeeding and elderly. Avoid in neonates.</td>
</tr>
<tr>
<td><strong>Penicillins:</strong></td>
<td>Amoxicillin: Allergy occurs in up to 10% of people. Generally, well tolerated. May cause diarrhoea, nausea, rash, urticaria, pain and inflammation at site of injection.</td>
<td></td>
<td>Parenteral medicines like benzyl penicillin have high sodium content so high doses can precipitate cardiac failure. High parenteral doses and/or</td>
</tr>
<tr>
<td>Medicine</td>
<td>Adverse Effects</td>
<td>Interactions</td>
<td>Cautions/Contraindications</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Penicillin V</td>
<td></td>
<td></td>
<td>prolonged treatment may result in electrolyte disturbance and neurotoxicity. Use frequent doses for maximal antibacterial effect.</td>
</tr>
<tr>
<td>Benzylpenicillin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzathine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>benzylpenicillin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quinolones:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norfloxacin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ofloxacin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rifamycins:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rifampicin</td>
<td>Transient GI symptoms, orange-red coloration of body fluids, staining of soft contact lenses.</td>
<td>Reduces effect of oral contraceptives.</td>
<td>Avoid in severe hepatic impairment</td>
</tr>
<tr>
<td>Sulfamethoxazole +</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>trimethoprim</td>
<td>Fever, nausea (with oral use), vomiting, diarrhoea, anorexia, rash, itch, sore mouth and hyperkalaemia.</td>
<td>Increased risk of ventricular arrhythmias with amiodarone. Effect of anticoagulants, antidiabetics, antiepileptics increased. Risk of nephrotoxicity with cyclosporine. Antifolate effect increased with antimalarials.</td>
<td>Use with caution in HIV infection, SLE, G6PD deficiency, and blood dyscrasias. Monitor complete blood picture, renal function and folate status with high doses and prolonged treatment. Maintain adequate fluid intake.</td>
</tr>
<tr>
<td>Medicine</td>
<td>Adverse Effects</td>
<td>Interactions</td>
<td>Cautions/Contraindications</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tetracyclines: Doxycycline</td>
<td>Nausea, vomiting, epigastric burning; tooth discoloration, reduced born growth in children below 8 years; photosensitivity.</td>
<td>Possibly increases plasma cyclosporine concentration.</td>
<td>Use with caution in SLE, and when used concomitantly with oral retinoids and other hepatotoxic medicines. Safe in only the first 18 weeks of pregnancy. Take with plenty of water to reduce risk of oesophageal ulcers.</td>
</tr>
<tr>
<td>Azoles: Ketoconazole</td>
<td>Rash, headache, nausea, vomiting, abdominal pain, diarrhoea and elevated liver enzymes</td>
<td></td>
<td>Refer to TB guideline and Malaria guideline for details on antimalarial and anti-TB medicines</td>
</tr>
<tr>
<td>Griseofulvin</td>
<td>Headache, GI symptoms, fatigue and dizziness</td>
<td>Reduced anticoagulant effect of warfarin. Reduced effect of oral contraceptives.</td>
<td>Avoid in pregnancy and breastfeeding. Men not advised to father a child during, and for 6 months after, treatment. Use non-hormonal methods of contraception during treatment.</td>
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<td>Nystatin</td>
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<td>Refer to HIV/AIDS treatment guideline for details on Antiretroviral medicines</td>
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<td>Reduce dose in hepatic impairment during prolonged treatment. Avoid in pregnancy.</td>
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## Appendix IV

### ANTIBIOTIC SENSITIVITY PROFILE OF JDWNH (2016)

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<th>Imipenem</th>
<th>Erythromycin</th>
<th>Tetracycline</th>
<th>Nitrofurantoin</th>
<th>Norfloxacin</th>
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REFERENCES

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