Kiribati Antibiotic Guidelines

Ministry of Health and Medical Services
in conjunction with WHO and UNFPA
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Please note that detailed chapter references are only provided for longer chapters
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We acknowledge the contribution of all clinicians and pharmacists involved in the development of Kiribati Antibiotic Guidelines:

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We also wish to thank the Australian Therapeutic Guidelines, Fiji Therapeutic Guidelines and SPC HIV section for allowing us to use their guidelines as the basis for developing these Kiribati Antibiotic Guidelines.
These antibiotic treatment guidelines outline the management of communicable diseases in Kiribati. The WHO in collaboration with the UNFPA recommended that a national antibiotic guideline be developed and implemented. Improvement in the quality of management of infectious diseases has been shown within countries that have developed and used antibiotic treatment guidelines. This document is the first edition of the national Kiribati Antibiotic Guidelines and is designed for use in a referral hospital setting.

I believe that this document will benefit our health professionals by standardising the treatment practices for infectious disease and most importantly will ensure that patients receive quality treatment. Additionally, this antibiotic guideline will serve as a budgeting tool that will improve the management of the Ministry of Health’s expenditure on antibiotics and other medicines used in the treatment of communicable diseases.

Therefore, I trust that these Kiribati Antibiotic Guidelines will be welcomed, implemented, monitored and evaluated for bi-annual revision and further expansion.

I would personally like to give a big ‘thank you’ to those who have contributed to the first edition of these Kiribati Antibiotic Guidelines.

Kam bati n rabwa.

Doctor Kautu Tenaua

Minister, Ministry of Health and Medical Services

January 2013
This clinical practice guideline has been endorsed by the Minister for Health and should be followed by all prescribers in Kiribati. Antimicrobial resistance is a growing global health issue and these guidelines are designed to reduce the incidence of antimicrobial resistance in Kiribati. These guidelines are evidence based and offer the recommended first line and in some cases second and third line treatment for a patient. Antibiotic choice should always, where possible, be guided by bacterial culture and sensitivity. Sometimes these investigations will suggest an alternative antibiotic to those recommended in these guidelines, in these cases an evidence based dosing regimen should be chosen. Sometimes the recommended treatment is not available in Kiribati, we have endeavored to include an alternative in most cases. Where a drug that is not available in Kiribati is indicated a # has been used to signify this.

**ANTI-INFECTIVES CURRENTLY AVAILABLE ON THE KIRIBATI ESSENTIAL MEDICINES LIST**

**ANTIBIOTICS**

**Aminoglycosides**

Aminoglycosides cover gram-negative bacteria and are potentially ototoxic and nephrotoxic. Therapeutic drug levels must always be monitored but if this is not available patients should have their renal function and auditory function monitored. The dose of aminoglycosides must be calculated according to renal function (see page 9).

**Gentamicin** Broad gram-negative cover including *Pseudomonas aeruginosa*. This is the drug of choice for severe gram-negative infections.

**Cephalosporins**

Cephalosporins act by interfering with bacterial cell wall peptidoglycan synthesis, which leads to bacterial cell lysis and death. There are a number of drugs in the cephalosporin class and they are grouped according to when they were developed (first, second, third generation). There is some cross-sensitivity between penicillin and cephalosporins therefore patients with a severe penicillin allergy should avoid cephalosporins.

**Cefalotin** Surgical prophylaxis. Not on the Kiribati Essential Medicines List but may be brought in by visiting specialist teams.

**Cefixime** Gonorrhea single dose treatment.

**Ceftriaxone** Empirical treatment of severe infections including bacterial meningitis and pneumonia. Does not cover MRSA.

**Cephalexin** Sensitive staphylococcal and streptococcal infections and UTIs due to susceptible Gram-negative bacteria.
Macrolides

This class is bacteriostatic and act by inhibiting bacterial protein synthesis. They are a useful alternative in patients with penicillin allergy.

**Azithromycin** Chlamydia and gonorrhea single dose treatment.

**Erythromycin** Respiratory tract infections, some skin infections and other sensitive infections in patients with penicillin allergy.

Nitroimidazoles

Active against anaerobic bacteria and some protozoa.

**Metronidazole** Giardia, amoebic dysentery, aspiration pneumonia and a number of other infections due to anaerobic bacteria. Oral tablets should be taken with food to reduce stomach upset. Avoid any alcohol during treatment with metronidazole as it can cause a severe disulfiram reaction.

Penicillins

Penicillins are indicated for many bacterial infections but it must be kept in mind that there is a risk of anaphylaxis. Always monitor patients for penicillin allergy and change to a different class if needed. Penicillins are sometimes over used so they should only be prescribed where there is a clear indication.

**Amoxycillin** Currently the most mis-prescribed drug in Kiribati. Amoxycillin should not be considered as a ‘cover all’ for any illness. Specific indications include otitis media and sinusitis.

**Amoxycillin and clavulanic acid** Clavulanic acid extends coverage for beta lactamases. This drug is usually taken just twice a day with food. It may cause stomach upset.

**Ampicillin** Moderate spectrum. Given parenterally.

**Benzathine benzylpenicillin** Narrow spectrum. Must only be given intramuscularly. Provides low levels in the body for 4 weeks. 1.8 g is equivalent to 2.4 million units.

**Benzylpenicillin (penicillin G)** Narrow spectrum. Administered parenterally by slow injection. 600 mg is equivalent to 1 million units.

**Cloxacillin** Antistaphylococcal. Indicated for skin and soft tissue infections. Oral formulations should be taken on an empty stomach. Prolonged treatment may be associated with cholestatic jaundice.

**Phenoxymethylpenicillin (penicillin V)** Given orally, food impairs absorption so should be given on an empty stomach. Not for severe infections, benzylpenicillin is preferred as it is more active.

**Procaine benzylpenicillin** Narrow spectrum. Must only be given intramuscularly and provides cover for 24 hours. 1 g is equivalent to 1 million units.
Quinolones

This class of drugs should be reserved for the treatment of infections that are resistant to lower cost, more readily available drugs. There is a risk of resistance to these drugs so they must only be used where indicated. Quinolones are contraindicated in pregnancy, breastfeeding, infants and children but may be used in children if essential.

Ciprofloxacin Wide range of activity against gram-negative bacteria and some gram-positive bacteria including *Pseudomonas aeruginosa* and *Haemophilus influenzae*.

Rifamycins

Active against Gram-positive organisms and mycobacteria. Due to the risk of drug resistance developing they must always be used in combination with unrelated antimycobacterials. They induce CYP450, which may result in many drug interactions; advice should be sought from pharmacy.

Rifampicin Used as a treatment for tuberculosis in Kiribati but may be prescribed for MRSA infections.

Tetracyclines

Tetracyclines have a broad spectrum of activity including gram-positive and gram-negative bacteria. This class is contraindicated in children under the age of 8 and in pregnant and breastfeeding women.

Doxycycline Commonly used for malaria prophylaxis but may also be used for sensitive infections.

Others

Chloramphenicol A broad-spectrum antibiotic which covers gram-positive and gram negative bacteria. Oral administration gives similar bioavailability to the IV form. May cause dose-dependent bone marrow hypoplasia so patients should be monitored, especially if on long term treatment. In neonates it may cause grey baby syndrome.

Nitrofurantoin Indicated for the prophylaxis and treatment of lower urinary tract infections.

Trimethoprim Indicated for the prophylaxis and treatment of lower urinary tract infection.

Trimethoprim and sulphamethoxazole Should be restricted to infections where trimethoprim alone is not effective. The sulphamethoxazole carries a greater risk of serious adverse effects and hypersensitivity so the patient should be monitored for these.

ANTIFUNGALS

Griseofulvin Systemic treatment for fungal infections where topical treatment has failed or is inappropriate.

Miconazole Topical antifungal for the treatment of tinea, cutaneous candidiasis, and pityriasis versicolor.

Nystatin Oral drops for oropharyngeal candidiasis.
**ANTIHELMINTICS**

*Albendazole* Covers a wide range of worms but is contraindicated in pregnancy (Cat D).

*Mebendazole* Covers threadworm, roundworm, hookworm and whipworm and is safe to use after the first trimester of pregnancy.

**ANTIMYCOBACTERIALS**

*Clofazamine* Used as a component of a multidrug regimen to treat leprosy

*Dapsone* Used as a component of a multidrug regimen to treat leprosy

*Ethambutol* Used as a component of a multidrug regimen to treat tuberculosis

*Isoniazid* Used as a component of a multidrug regimen to treat tuberculosis

*Pyrazinamide* Used as a component of a multidrug regimen to treat tuberculosis

*Streptomycin* Used to treat multi drug resistant tuberculosis

**ANTIVIRALS**

*Aciclovir* Treatment and prevention of herpes simplex and varicella zoster infection

**ANTIRETROVIRALS**

*Efavirenz* NNRTI for treatment of HIV

*Lamivudine* NRTI for treatment of HIV

*Nevirapine* NNRTI for treatment of HIV

*Ritonavir* Protease inhibitor for treatment of HIV

*Stavudine* NRTI for treatment of HIV

*Zidovudine* NRTI for post exposure prophylaxis and treatment of HIV
DOSING OF GENTAMICIN

The recommended initial dose of gentamicin is usually **4-6 mg/kg/day as a single daily dose given slowly over 20 minutes.** The first dose is given irrespective of renal function as follows:

<table>
<thead>
<tr>
<th>AGE</th>
<th>INITIAL DOSE OF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonates &lt;34 weeks post conception</td>
<td>3 mg/kg</td>
</tr>
<tr>
<td>Neonates 34-44 weeks post conception</td>
<td>3.5 mg/kg</td>
</tr>
<tr>
<td>Infants and children &lt;10 years</td>
<td>7.5 mg/kg to a maximum of 320 mg</td>
</tr>
<tr>
<td>10-29 years</td>
<td>6 mg/kg to a maximum of 560 mg</td>
</tr>
<tr>
<td>30-59 years</td>
<td>5 mg/kg to a maximum of 480 mg</td>
</tr>
<tr>
<td>Greater than 60 years</td>
<td>4 mg/kg to a maximum of 400 mg</td>
</tr>
</tbody>
</table>

After the first dose, subsequent doses of the same size should be given at intervals determined by the patient’s renal function as follows:

<table>
<thead>
<tr>
<th>ESTIMATED CREATININE CLEARANCE</th>
<th>DOSING INTERVAL</th>
<th>MAXIMUM NUMBER OF DOSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 60 ml/min</td>
<td>24 hours</td>
<td>3 (at 0, 24 and 48 hours)</td>
</tr>
<tr>
<td>40-60 ml/min</td>
<td>36 hours</td>
<td>2 (at 0 and 36 hours)</td>
</tr>
<tr>
<td>30-40 ml/min</td>
<td>48 hours</td>
<td>2 (at 0 and 48 hours)</td>
</tr>
<tr>
<td>Less than 30 ml/min</td>
<td>No further doses</td>
<td>1 (at 0 hours)</td>
</tr>
</tbody>
</table>
ANTIBIOTICS IN PREGNANCY AND BREASTFEEDING (FROM ‘DRUGS AND PREGNANCY’) 

Drugs are classified into 7 different groups according to their safety in pregnancy.

**Category A** - Drugs which have been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the fetus having been observed.

**Category B1** - Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human fetus having been observed. Studies in animals have not shown evidence of an increased occurrence of fetal damage.

**Category B2** - Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effect on the human fetus having been observed. Studies in animals are inadequate or may be lacking, but available data show no evidence of an increased occurrence of fetal damage.

**Category B3** - Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human fetus having been observed. Studies in animals have shown evidence of an increased occurrence of fetal damage, the significance of which is considered uncertain in humans.

**Category C** - Drugs which, owing to their pharmacological effects, have caused or may be suspected of causing, harmful effects on the human fetus or neonate without causing malformations. These effects may be reversible. Accompanying texts should be consulted for further details.

**Category D** - Drugs which have caused, are suspected to have caused or may be expected to cause, an increased incidence of human fetal malformations or irreversible damage. These drugs may also have adverse pharmacological effects. Accompanying texts should be consulted for further details.

**Category X** - Drugs which have such a high risk of causing permanent damage to the fetus that they should not be used in pregnancy or when there is a possibility of pregnancy.

When giving drugs to breastfeeding women two important issues must be considered. Firstly, the likely exposure of the drug to the infant and secondly, the likely effect the drug may have on milk supply. The infant should be fed just before the next dose (the medication given after a feed) so that feeding when concentration of the drug in the milk is highest is avoided.
<table>
<thead>
<tr>
<th>ANTIMICROBIAL</th>
<th>USE IN PREGNANCY</th>
<th>USE IN BREASTFEEDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aciclovir</td>
<td>B3</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Albendazole</td>
<td>D, avoid in the first trimester. Should only be used if it is the drug of choice.</td>
<td>Safe to use, avoid if mother is on high dose treatment (hydatid, neurocysticercosis)</td>
</tr>
<tr>
<td>Amoxycillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Amoxycillin + clavulanic acid</td>
<td>B1</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>B1</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Benzathine penicillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Benzylpenicillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Cefalotin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Cefixime</td>
<td>B1</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>B1</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>Category</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>B3</td>
<td>Use alternatives when possible, short courses may be acceptable in some circumstances</td>
</tr>
<tr>
<td>Clofazimine</td>
<td>C, consider alternate therapy</td>
<td>Use alternatives when possible, secreted in breast milk, pigmentation of infant may occur</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Dapsone</td>
<td>B2, placental transfer has been demonstrated but has been used without adverse effect. Concern is in G6PD deficiency</td>
<td>Excreted into breast milk, neonates and G6PD deficient infants are at greater risk of dapsone haemolysis</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>D, may be used with caution during the first trimester</td>
<td>Theoretical risk but no cases reported, if necessary give short courses of 7-10 days</td>
</tr>
<tr>
<td>Efavirenz</td>
<td>D, women on antiretroviral therapy should consult a specialist</td>
<td>Breastfed infants of HIV infected mothers are at risk of postnatal transmission, consult a specialist</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel action in infant</td>
</tr>
<tr>
<td>Ethambutol</td>
<td>A</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>D, reserve for severe or life threatening infections, fetal nephrotoxicity and ototoxicity</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Antimicrobial</td>
<td>Grade</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Griseofulvin</td>
<td>B3</td>
<td>Avoid use</td>
</tr>
<tr>
<td>Isoniazid</td>
<td>A</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Lamivudine</td>
<td>B3</td>
<td>Breastfed infants of HIV infected mothers are at risk of postnatal transmission, consult a specialist</td>
</tr>
<tr>
<td>Mebendazole</td>
<td>B3</td>
<td>May be used, poorly absorbed by mother</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>B2</td>
<td>Safe to use, may cause bitterness in milk, dose preferably twice daily after breastfeeding</td>
</tr>
<tr>
<td>Miconazole (topical)</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Nevirapine</td>
<td>B3, risk of maternal hepatotoxicity, women on antiretroviral therapy should consult a specialist</td>
<td>Breastfed infants of HIV infected mothers are at risk of postnatal transmission, consult a specialist</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>A</td>
<td>Use with caution, may cause haemolysis in G6PD deficiency</td>
</tr>
<tr>
<td>Nystatin</td>
<td>A</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Phenoxydylpenicillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel actions in infant</td>
</tr>
<tr>
<td>Procaine penicillin</td>
<td>A</td>
<td>Safe to use, may cause loose bowel actions in infant</td>
</tr>
<tr>
<td>Pyrazinamide</td>
<td>B2, use as part of first-line treatment of tuberculosis during pregnancy</td>
<td>Seek specialist advice</td>
</tr>
<tr>
<td>Medicine</td>
<td>Classification</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>C</td>
<td>May be used</td>
</tr>
<tr>
<td>Ritonavir</td>
<td>B3, may be used at low doses, women on antiretroviral therapy should consult a specialist</td>
<td>Breastfed infants of HIV infected mothers are at risk of postnatal transmission, consult a specialist</td>
</tr>
<tr>
<td>Stavudine</td>
<td>B3, may be used during pregnancy, women on antiretroviral therapy should consult a specialist</td>
<td>Breastfed infants of HIV infected mothers are at risk of postnatal transmission, consult a specialist</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>D</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>B3</td>
<td>Safe to use</td>
</tr>
<tr>
<td>Trimethoprim + sulphamethoxazole</td>
<td>C, consider alternative therapy. Theoretical risk of kernicterus in the neonate if administered near term.</td>
<td>Avoid use in ill, stressed, pre-term infants or infants with hyperbilirubinaemia or G6PD deficiency</td>
</tr>
<tr>
<td>Zidovudine</td>
<td>B3</td>
<td>Breastfed infants of HIV infected mothers are at risk of postnatal transmission, consult a specialist</td>
</tr>
</tbody>
</table>
1. Infections in children

GENERAL PRINCIPLES

1. Children over 50 kg and 12 years old may receive the adult dose
2. The dose must not exceed the maximum adult dosage
3. Special care should be taken in neonates; dosage and interval may be different
4. All intravenous infusions should be given carefully according to guidelines to avoid thrombophlebitis (see the ‘Paediatric Injectable Guidelines’)
5. Gentamicin levels should be monitored whenever possible; renal function however needs to be monitored in all children receiving gentamicin (see page 9 for further details)

CARDIOVASCULAR SYSTEM INFECTIONS

BACTERIAL ENDOCARDITIS

There are 3 important principles of management:

1. Treatment must be given intravenously for at least 2 weeks
2. Treatment is prolonged – usually for 4-6 weeks
3. Drug regimens must be used in high enough concentrations

Consultation with a specialist or microbiologist should be sought in cases that are unresponsive to therapy. Surgical consultation should be considered in cases that are fulminating, complicated, or slow to respond.

Always take a blood culture before initiating therapy. S Aureus is a common cause hence cloxacillin is included in the empirical regimen. Other common causative organisms include viridans group streptococci and occasionally gram-negative bacilli.

Empirical treatment

- Benzylpenicillin 60 mg/kg/dose (max 1.8 g) IV every 4 hours for 6 weeks
- Cloxacillin 50 mg/kg/dose (max 2 g) IV every 4 hours for 6 weeks
  - PLUS
    - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily for 2 weeks
    - >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily for 2 weeks
    - Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

OR if hypersensitive to penicillin OR MRSA suspected OR hospital acquired endocarditis OR prosthetic valve in situ

- *Vancomycin
  - <12 years of age: 30 mg/kg [max 1 g] IV every 12 hours
  - >12 years of age: 25 mg/kg [max 1 g] IV every 12 hours
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PLUS

• Gentamicin
  o <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily for 2 weeks
  o >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily for 2 weeks
  Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

Drug therapy must be guided by the culture and sensitivity results. If the culture is negative, continue with empiric therapy if the patient is responding.

Prevention of infective endocarditis

All children with structural heart disease – congenital (excluding ASD) or rheumatic – require antibiotic prophylaxis.

i. LOW RISK PATIENTS (without a prosthetic valve or previous endocarditis) undergoing dental treatment, oral surgery or surgical procedures of the respiratory tract
   • Ampicillin 50 mg/kg (max 1g) IV just prior to procedure
     OR
   • Amoxycillin 50 mg/kg (max 2 g) orally 1 hour prior to procedure

ii. HIGH RISK PATIENTS (prosthetic valve or previous endocarditis) for all surgical procedures or LOW RISK PATIENTS undergoing gastrointestinal or genitourinary procedures
   • Gentamicin IV (give just before procedure) or IM (give 30 minutes before the procedure)
     o <10 years: 2.5 mg/kg
     o >10 years: 2 mg/kg
   PLUS
   • Ampicillin 50 mg/kg (max 1g) IV just prior to procedure
     OR
   • Amoxycillin 50 mg/kg (max 2g) orally 1 hour prior to procedure
   FOLLOWED BY
   • Ampicillin 25 mg/kg (max 500mg) IV 6 hours later
     OR
   • Amoxycillin 25 mg/kg (max 500mg) IV/IM/oral 6 hours later

iii. PATIENTS HYPERSENSITIVE TO PENICILLIN or on long-term penicillin therapy
   • Vancomycin IV infusion over 1 hour commenced 60 minutes prior to procedure, may be repeated after 12 hours
     o <12 years of age: 30 mg/kg (max 1 g)
     o >12 years of age: 25 mg/kg (max 1 g)
     OR
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- Erythromycin 20 mg/kg (max 800 mg) orally 1 hour prior to procedure

RHEUMATIC FEVER PROPHYLAXIS

Continuous antimicrobial prophylaxis against *Streptococcus pyogenes* infection is recommended for patients with a well documented history of rheumatic fever. Intramuscular administration is preferred, especially in remote areas, as it is more effective and usually leads to better compliance.

Treat for 5 years or up to 18 years of age

- Benzathine penicillin IM every 3 or 4 weeks
  - Child < 20 kg 600,000 units
  - Child > 20 kg 1.2 million units
  OR
- Phenoxymethylpenicillin 250 mg orally every 12 hours
  OR if hypersensitive to penicillin
- Erythromycin 250 mg orally every 12 hours

RESPIRATORY TRACT INFECTIONS

ACUTE SORE THROAT

Most are caused by viral infection and may be treated with hydration and simple analgesia.

Streptococcal sore throat is diagnosed by the presence of tender enlarged lymph nodes in the neck and white exudate in the throat or β-haemolytic streptococcus group A on throat swab culture

- Benzathine penicillin 25,000 – 50,000 units/kg (max 1.2 mega units) IM as a single dose
  OR
- Phenoxymethylpenicillin 7.5 – 15 mg/kg/dose (max 500 mg) orally every 12 hours for 10 days

The use of amoxycillin for this indication is discouraged as penicillin has a narrower spectrum and covers the organism of concern

  OR if hypersensitive to penicillin

- Erythromycin 12.5 mg/kg/dose (max 500 mg) orally every 6 hours for 10 days

ACUTE BACTERIAL OTITIS MEDIA AND SINUSITIS

Common causative organisms are *S pneumoniae, H influenzae* and *S aureus*.

Most cases of ear infection do not require antibiotic treatment and the patient should recover with supportive therapy only within 48 hours. If severe:

- Amoxycillin 10 - 25 mg/kg/dose (max 500 mg) orally every 8 hours for 5 days
Infections in children

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<2 months (<5 kg): 62.5 mg
2 months to 12 months (5 - 10 kg): 125 mg
12 months to 6 years (10 - 20 kg): 250 mg
If no improvement is seen after the course of amoxycillin consider treatment with amoxycillin + clavulanic acid

OR if hypersensitive to penicillin

- Erythromycin 12.5 mg/kg/dose (max 500 mg) orally every 6 hours for 7 days
  OR
- Trimethoprim + sulphamethoxazole (8mg + 40 mg per ml) 4 mg/kg/dose (trimethoprim component) (0.5ml/kg/dose) orally every 12 hours for 7 to 10 days

INFANTS UNDER THE AGE OF 6 WEEKS SHOULD NOT BE TREATED WITH COTRIMOXAZOLE

In infants <2 months of age consider admission and treatment with

- Ampicillin 25 mg/kg/dose IV every 6 hours (every 12 hours in week 1 of life, every 8 hours in weeks 2 and 3 of life) for 7 to 10 days

PLUS

- Gentamicin 7.5 mg/kg/dose (5 mg/kg/dose in week 1 of life) IV once daily for 5 – 7 days, monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

ACUTE EPIGLOTTITIS

This condition is considered a medical emergency. Stridor of epiglottitis is usually of lower pitch than that heard in croup and the expiratory element resembles a snore. Aphonia and drooling may also be present. The most common causative organism is H. influenza.

Do not attempt to examine the throat as this may precipitate a laryngeal spasm leading to an acute obstructive episode.

- Ceftriaxone 25 mg/kg/dose (max 1 g) IV once daily for 5 days
  OR if ceftriaxone is not available

- Chloramphenicol 40 mg/kg (max 2 g) IV as a single dose then 25 mg/kg (max 1 g) IV once daily

Transition to oral therapy when appropriate

COMMUNITY ACQUIRED PNEUMONIA

From birth to 1 week old

The pneumonia is most likely caused by a maternally acquired pathogen
Infections in children

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- Benzylpenicillin 60 mg/kg IV every 12 hours for 7 days

PLUS

- Gentamicin 3.5 mg/kg IV once daily for 7 days, adjust dosage according to gestational age and renal function (see pg 9)

From 1 week to 4 months old

*Chlamydia trachomatis* and *Bordetella pertussis* should be considered at this age. If the patient is afebrile and only mildly ill use:

- Azithromycin 10 mg/kg orally once daily for 5 days

If the patient is febrile or *C. trachomatis* has been excluded use:

- Benzylpenicillin 30 mg/kg IV every 6 hours for 7 days

From 4 months to 5 years old

The majority of cases are viral but if bacterial infection is suspected antibacterial therapy is indicated.

For mild disease:

- Amoxycillin 25 mg/kg (max 500 mg) orally every 8 hours for 7 days

For moderate disease (lobar or lobular consolidation, pleural effusion):

- Benzylpenicillin 30 mg/kg IV every 6 hours for 7 days

For severe disease (systemic toxicity and/or oxygen dependence):

- Ceftriaxone 25 mg/kg IV once daily for 7 days

PLUS

- Cloxacillin 50 mg/kg IV every 6 hours for 7 days

From 5 years to 15 years

For mild disease use:

- Amoxycillin 25 mg/kg (max 1 g) orally every 8 hours for 7 days

PLUS if *Mycoplasma pneumonia* or *Chlamydophila pneumonia* is suspected ADD:

- Erythromycin 10 mg/kg (max 500 mg) orally every 6 hours for 7 days

For more serious disease:

- Benzylpenicillin 30 mg/kg (max 1.2 g) IV every 6 hours for 7 days
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PLUS

- Erythromycin 10 mg/kg (max 500 mg) orally every 6 hours for 7 days

Staphylococcal infection

In all age groups if staphylococcal infection is suspected replace penicillin with:

- Cloxacillin 50 mg/kg IV or 25 mg/kg orally every 6 hours

ATYPICAL PNEUMONIA (NON-VIRAL)

*Mycoplasma pneumoniae* can cause pneumonia in children. The onset of the disease is gradual.

If more than 1 month old

- Erythromycin 10 mg/kg (max 500 mg) orally every 6 hours for 7 days

OR if less than 1 month old

- Azithromycin 10 mg/kg orally once daily for 5 days

PERTUSSIS

If more than 1 month old

- Erythromycin 10 mg/kg (max 250 mg) orally every 6 hours for 7 days

OR

- Trimethoprim + sulphamethoxazole (8mg + 40 mg per ml) 4 mg/kg/dose (trimethoprim component) (0.5ml/kg/dose) orally every 12 hours for 7 days

OR if less than 1 month old

- Azithromycin 10 mg/kg orally once daily for 5 days

LUNG ABSCESS AND/OR EMPYEMA

These infections are often caused by staphylococci. Other organisms including anaerobes may be involved; consider the addition of other antibiotics (e.g. metronidazole) if necessary for greater cover. Empyema must be drained adequately. Surgical drainage of lung abscess will depend on the size.

- Cloxacillin 50 mg/kg/dose (max 2 g) IV every 6 hours for 2 weeks

THEN

- Cloxacillin 25 mg/kg/dose (max 500 mg) orally every 6 hours for 10-14 days

PLUS

- Gentamicin
  - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) daily for 5-7 days
  - >10 years of age: 6 mg/kg/dose (max 240-360 mg) daily for 5-7 days

Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)
PLUS if sensitivities indicate

- Rifampicin 10-15 mg/kg (max 600 mg) orally once daily for 10-14 days may be added to the regimen (along with cloxacillin)

GASTROINTESTINAL INFECTIONS

ACUTE GASTROENTERITIS

Oral rehydration therapy (ORS) is the mainstay of treatment to correct dehydration and replace losses.

The indications for antibiotic treatment in acute gastroenteritis are cholera and bloody diarrhoea. Regimens shown below are for empiric therapy where immediate treatment is required. Antibiotic therapy should be modified if necessary according to culture and sensitivity results.

BLOODY DIARRHOEA

Rule out non-bacterial causes of bloody stools and collect stool sample for culture and sensitivity testing before commencing antibiotic therapy. Antibiotic therapy is generally not recommended in uncomplicated diarrhoea or mild cases.

- Trimethoprim + sulphamethoxazole (8 mg + 40 mg per ml) 4 mg/kg/dose (trimethoprim component) (0.5ml/kg/dose) orally every 12 hours for 5 days
  OR
- Chloramphenicol 12.5 mg/kg (max 500 mg) orally every 6 hours for 5 days

OR if seizures are present (neurotoxin)

- Ceftriaxone 50 mg/kg IV once daily for 3 days

CHOLERA

- Trimethoprim + sulphamethoxazole (8 mg + 40 mg per ml) 4 mg/kg/dose (trimethoprim component) (0.5ml/kg/dose) orally every 12 hours for 7 days
  OR
- Ciprofloxacin 25 mg/kg (max 1 g) orally as a single dose

CHRONIC DIARRHOEA

Chronic diarrhoea requires investigation for non-infective causes.

GIARDIASIS

For symptomatic patients use

- Metronidazole 10 mg/kg (max 400 mg) orally every 8 hours for 7-10 days
### AMOEBIC DYSENTRY

- Metronidazole 10 mg/kg (max 600 mg) orally every 8 hours for 7-10 days

### STRONGYLOIDOSIS

- Albendazole
  - Over 6 months and < 10 kg: 200 mg orally before food once daily for 3 days repeat after 7 days
  - > 10 kg: 400 mg orally before food once daily for 3 days repeat after 7 days
  
  OR

- Ivermectin 200 MICROgrams/kg orally with fatty food on day one, repeat dose in 7-14 days

### TYPHOID / PARATYPHOID FEVER

- Ciprofloxacin 15 mg/kg (max 500 mg) orally every 12 hours for 7 to 10 days
  
  OR

- Chloramphenicol 12.5 mg/kg (max 500 mg) orally every 6 hours for 14 days
  
  OR

- Trimethoprim + sulphamethoxazole (8 mg + 40 mg per ml) 4 mg/kg/dose (trimethoprim component) (0.5 ml/kg/dose) orally every 12 hours for 14 days

### CENTRAL NERVOUS SYSTEM INFECTIONS

### ACUTE BACTERIAL MENINGITIS

Treatment of meningitis in children involves:

1. Antibiotic therapy
2. Dexamethasone
3. Therapy to eradicate nasopharyngeal carriers of *H influenza* and meningococcus, both for the case and contacts if therapy is available (not currently available in Kiribati).

**Infants aged 2 months and above** (for younger infants see ‘Neonatal Infections’ page 28)

A patient with suspected meningitis must be referred to the hospital immediately as it is a clinical emergency. Therapy should only be initiated after consultation with a doctor. Usually blood cultures and a CSF specimen are taken for culture before antibiotics are commenced, unless there is a contraindication for lumbar puncture (e.g. a very sick child and/or raised intracranial pressure). Antibiotic therapy should be guided by cultures and sensitivities.

### EMPIRICAL THERAPY

- Benzylpenicillin 60 mg/kg/dose (max 2.4 gram) IV every 6 hours
  
  PLUS

- Chloramphenicol 25 mg/kg/dose (max 1 gram) IV every 6 hours
INFECTIONS IN CHILDREN

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OR if there is no clinical response or bacteria are resistant to the above drugs

- Ceftriaxone 50 mg/kg (max 2 g) IV once daily for 10-14 days

Duration of treatment varies from 10 to 14 days depending on causative organism and clinical state of the child.

ADD

- Dexamethasone 0.15 mg/kg/dose IV every 6 hours for 4 days (give the first dose before antibiotics are commenced)

In complicated cases where intra-cranial pressure is increased also add

- Mannitol 0.25 – 0.5 g/kg IV repeated if necessary 1 to 2 times after 4 to 8 hours

BRAIN ABSCESS

When a brain abscess is suspected treat for 6 weeks. CT scan (not currently available in Kiribati) and surgical drainage may be indicated.

- Ceftriaxone 50 mg/kg (max 2 grams) IV once daily
  PLUS
- Metronidazole 7.5 mg/kg/dose (max 500 mg) IV every 8 hours
  PLUS
- Cloxacillin 50 mg/kg/dose (max 2 grams) IV every 6 hours

In infants under the age of 2 months

- Ceftriaxone 50 mg/kg/dose IV once daily
  PLUS
- Ampicillin 50-75 mg/kg/dose IV every 6 hours

IV therapy should be given for at least 21 days then transitioned to oral treatment for a further 3 weeks

HERPES SIMPLEX ENCEPHALITIS (SUSPECTED OR PROVEN)

- Aciclovir 500 mg/m² (neonates: 20 mg/kg) IV every 8 hours for 14 days (each dose must be infused over at least one hour) adjust dosage according to renal function. If IV form is not available considering using aciclovir oral tablets 20 mg/kg 5 times per day

To calculate BSA (m²): \[
\sqrt{\frac{\text{Height (cm)} \times \text{Weight (kg)}}{3600}}
\]
In Infections in children

URINARY TRACT INFECTIONS

Appropriate collection of urine is essential before starting antibiotics. Adjust antibiotics if necessary when culture and sensitivity results are available. Treat for 7-10 days. All children with proven UTI should undergo investigations to determine whether there is an abnormality in the urinary tract.

URINARY TRACT INFECTION

- Trimethoprim 4 mg/kg (max 150 mg) orally every 12 hours for 7-10 days

Serious cases of UTI (temperature 39°C or above), if the patient is dehydrated, not tolerating oral medication, not feeding well or is less than 3 months of age admission to hospital and IV therapy is required

- Ampicillin 25-50 mg/kg (max 1 g) IV every 6 hours
  - PLUS
- Gentamicin
  - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) once daily
  - >10 years of age: 6 mg/kg/dose (max 240-360 mg) once daily

  Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

In severe resistant cases

- Ceftriaxone 50 mg/kg (max 1 g) IV once daily as a single agent

PROPHYLAXIS

Children with vesico-uretic reflux will need to be on prophylactic antibiotics:

- Trimethoprim 2 mg/kg orally once daily AT NIGHT
  - OR
- Trimethoprim + sulphamethoxazole (8mg + 40 mg per ml) 2 mg/kg/dose (trimethoprim component) (0.25ml/kg/dose) orally once daily AT NIGHT
  - OR
- Nitrofurantoin 1-2 mg/kg (max 50-100 mg) orally once daily AT NIGHT (avoid in children under 3 months old)

SKIN, MUSCLE AND BONE INFECTIONS

SKIN AND SOFT TISSUE INFECTIONS

Mild disease requires only good skin hygiene. Topical antibiotics are not required.

Impetigo
Infections in children

This may resolve with the use of topical agents such as povidone iodine. If oral antibiotics are required, they need to cover the causative agents, usually *S. aureus* and occasionally *S. pyogenes*. Pus should be collected for culture and sensitivities should guide treatment

- Cloxacillin 12.5 mg/kg (max 500 mg) orally every 6 hours for 5-7 days

OR if hypersensitive to penicillin

- Erythromycin 10 - 12.5 mg/kg (max 500 mg) orally every 6-8 hours for 5-7 days

**FOLLICULITIS, BOILS AND CARBUNCLES**

The usual causative organisms are *S. aureus* and/or *S. pyogenes*. If lesions are small and few, apply local antiseptics and hot compresses with drainage where appropriate.

If lesions are extensive or there are systemic signs of infection

- Cloxacillin 12.5 mg/kg (max 500 mg) IV or oral every 6 hours for a total of 7 days

OR if hypersensitive to penicillin

- Erythromycin 10 - 12.5 mg/kg (max 500 mg) orally every 6-8 hours for 7 days

**CELLULITIS**

The usual causative organisms are *S. pyogenes* and *S. aureus* but other organisms can be the cause. Culture and sensitivities should be done before commencing therapy.

- Cloxacillin 25 - 50 mg/kg (max 1 g) IV every 6 hours until clinical response THEN
- Cloxacillin 12.5 mg/kg (max 500 mg) orally every 6 hours for a total of 5-10 days

PLUS if the patient is not responding consider the addition of

- Benzylpenicillin 30 mg/kg IV every 6 hours until clinical response THEN
- Amoxycillin 10 - 20 mg/kg (max 500 mg) orally every 8 hours for a total of 5-10 days

OR if hypersensitive to penicillin

- Erythromycin 10 - 12.5 mg/kg (max 500 mg) orally every 6 to 8 hours for 5-7 days

**ERYSIPELAS**

- Benzylpenicillin 30 - 60 mg/kg (max 2.4 grams) IV every 6 hours until there is a clinical response THEN
- Procaine penicillin 50,000 units/kg IM once daily for a total of 7 days
Infections in children

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OR if hypersensitive to penicillin

- Erythromycin 10 - 12.5 mg/kg (max 500 mg) orally every 6-8 hours for 5-7 days

ABSCESS

Consider incision and drainage. S. Aureus is the most common cause but cultures should be done and sensitivity should guide antibiotic choice.

If abscess is mild and there are no signs of systemic infections:

- Cloxacillin 12.5 mg/kg (max 500 mg) orally every 6 hours for 7 days

In moderate to severe cases:

- Cloxacillin 25-50 mg/kg (max 1 g) IV every 6 hours until there is a clinical response
  THEN
- Cloxacillin 12.5 mg/kg (max 500 mg) orally every 6 hours for a total of 7 days

OR if hypersensitive to penicillin

- Erythromycin 10 - 12.5 mg/kg (max 500 mg) orally every 6-8 hours for 5-7 days

PLUS if sensitivities indicate or gram negative infection is suspected

- Gentamicin
  - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily
  - >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily
  Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

SUPPURATIVE WOUND INFECTIONS (SURGICAL OR TRAUMATIC)

Local measures such as surgical drainage and irrigation with normal saline usually suffice. If there is surrounding cellulitis and/or systemic symptoms are present a swab should be taken for cultures and sensitivities.

EMPIRICAL TREATMENT

- Cloxacillin 12.5 mg/kg (max 500 mg) orally every 6 hours

PLUS if gram-negative organisms are suspected add either

- Gentamicin
  - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily
  - >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily
  Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)
Infections in children

OR

- Ceftriaxone 50 mg/kg (max 2 g) IV once daily

PLUS if anaerobic organisms are suspected add

- Metronidazole 7.5 mg/kg (max 500 mg) IV or 7.5 mg/kg (max 400 mg) orally every 8 hours

Duration of treatment is determined by response to therapy but should be at least 7 days. Antibiotic choice should be guided by culture and sensitivity results.

ACUTE OSTEOMYELITIS

Advice from the surgeon should be sought in all cases of osteomyelitis.

- Cloxacillin 50 mg/kg (max 2 g) IV every 4-6 hours for 2-4 weeks
  THEN
- Cloxacillin 25 mg/kg (max 1 g) orally every 6 hours for a total of 4-6 weeks

PLUS if gram-negative organisms are suspected add either

- Gentamicin
  - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily for 5-7 days
  - >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily for 5-7 days
    Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

OR

- Ceftriaxone 50 mg/kg (max 2 g) IV once daily for 4-6 weeks

PLUS in children under 5 years of age *H. influenza* is a common causative organism. If cultured add

- Ampicillin 25-50 mg/kg (max 1 g) IV every 6 hours for 2-4 weeks
  THEN
- Amoxycillin 25-50 mg/kg (max 500 mg) orally every 8 hours for a total of 4-6 weeks

OR if hypersensitive to penicillin and cephalosporins therapy should be guided by sensitivity

SEPTIC ARTHRITIS

Aspiration and culture of synovial fluid along with surgical consultation is essential. Treatment should be guided by cultures and sensitivities.

EMPIRICAL TREATMENT

- Cloxacillin 50 mg/kg (max 2 g) IV every 6 hours for 2-4 weeks
  THEN
- Cloxacillin 25-50 mg/kg (max 1 g) orally every 6 hours for a total of 4-6 weeks
Infections in children

PLUS in neonates and infants add either

- Gentamicin
  - Week 1 of life: 5 mg/kg IV once daily
  - Week 2 of life onwards: 7.5 mg/kg IV once daily

  Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

OR

- Ceftriaxone 50 mg/kg (max 2 g) IV once daily for 4-6 weeks

ORBITAL CELLULITIS

The most common causative organisms are *streptococci*, *staphylococci* and *H. influenzae*. Gram-negative organisms may also be involved.

- Cloxacillin 50 mg/kg (max 2 g) IV every 6 hours

PLUS EITHER

- <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily for 5-7 days
- >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily for 5-7 days

  Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

OR

- Ceftriaxone 50 mg/kg (max 2 g) IV once daily

NEONATAL INFECTIONS

Ceftriaxone may cause kernicterus in jaundiced neonates and must be avoided in this patient group.

NEONATAL SEPSIS – POSSIBLE MENINGITIS

- Ceftriaxone IV once daily
  - Week 1 of life: 50 mg/kg
  - Week 2 to 4 of life: 75 mg/kg

PLUS

- Ampicillin 50 mg/kg IV
  - Week 1 of life: every 12 hours
  - Week 2 to 4 of life: every 6-8 hours

NEONATAL SEPSIS – MENINGITIS EXCLUDED

For empirical treatment of severe sepsis where meningitis has been excluded
Infections in children

- Ampicillin 50 mg/kg IV
  - Week 1 of life: every 12 hours
  - Week 2 to 4 of life: every 6-8 hours
  - PLUS
- Gentamicin IV once daily
  - Week 1 of life: 5 mg/kg
  - Week 2 to 4 of life: 7.5 mg/kg

Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)

MALNOURISHMENT

Severely malnourished children who are admitted to hospital may have a bacterial infection. Consider empiric treatment with:

Mild to moderate infection

- Trimethoprim + sulphamethoxazole (8mg + 40 mg per ml) 4 mg/kg/dose (trimethoprim component) (0.5ml/kg/dose) orally every 12 hours for 7 days

Severe infection

- Ampicillin 25 – 50 mg/kg (max 2 g) every 4 to 6 hours
  - PLUS
- Gentamicin
  - <10 years of age: 7.5 mg/kg/dose (max 240-360 mg) IV once daily
  - >10 years of age: 6 mg/kg/dose (max 240-360 mg) IV once daily

Monitor levels and renal function if possible and adjust dose accordingly (see pg 9)
## IMMUNISATION SCHEDULE

<table>
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<tr>
<th>AGE</th>
<th>VACCINE</th>
<th>DOSE AND MODE OF ADMINISTRATION</th>
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<td>BCG</td>
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<td>Hepatitis B</td>
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<td>6 weeks</td>
<td>Diptheria+Tetanus+Pertussis + Hepatitis B +</td>
<td>0.5 ml intramuscular</td>
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<tr>
<td></td>
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2. Respiratory tract infections

**ACUTE UPPER RESPIRATORY TRACT INFECTIONS**

The aetiology is usually viral. Most symptoms subside in a few days, although cough may persist longer, i.e. 14 days or more. If rhinorrhea is present topical or oral decongestants provide some relief (not currently available in Kiribati).

Paracetamol plus adequate hydration give symptomatic relief of fever and discomfort. Patients require appropriate reassurance that usually antibiotics are unhelpful and are often harmful in viral infections by causing side effects and increasing bacterial resistance.

**ACUTE SORE THROAT**

Usually caused by a viral infection and does not require antibiotic therapy. Paracetamol, aspirin (in adults) or ibuprofen provide symptomatic relief. Encourage adequate fluid intake and soft foods. Acute tonsillitis caused by *Streptococcus pyogenes* is difficult to distinguish clinically from viral aetiology, but is more likely if patients have the following features:

i. Fever $>38^\circ C$  
ii. Tender cervical lymphadenopathy  
iii. Tonsillar swelling or exudates  
iv. No cough

If bacterial infection is suspected, use

- Phenoxymethylpenicillin 500 mg orally every 12 hours for 10 days  
  OR
- Benzathine penicillin 1.2 million units IM as a single dose  
  OR if hypersensitive to penicillin

- Erythromycin 250 – 500 mg orally every 6 hours for 10 days

Although amoxycillin is widely used, phenoxymethylpenicillin has a narrow spectrum and covers *Streptococcus pyogenes* which is the organism of concern; therefore the use of amoxycillin is discouraged.

It is important to complete the course of therapy even after recovery to prevent rheumatic fever.

**ACUTE BACTERIAL OTITIS MEDIA**

May be of viral or bacterial aetiology and is usually self-limiting. Symptomatic therapy such as pain relief should be provided for the first 48 hours.

If symptoms persist or systemic signs of infection (fever, vomiting) develop then consider antibiotics.

- Amoxycillin 500 mg orally every 8 hours for 7 days  
  OR if hypersensitive to penicillin
- Doxycycline 100 mg orally every 12 hours for 7 days
**Respiratory tract infections**

**OTITIS EXTERNA**

Usual causative organisms include *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Proteus* and *Klebsiella* species.

Exudate should be removed by dry mopping with cotton wool on a thin carrier by a health professional and followed by instillation of topical steroid and antibiotic ear drops

- Dexamethasone 0.05% + framycetin 0.5% + gramicidin 0.005% 3 drops instilled into the ear 3 times per day for 3 to 7 days

PLUS if symptoms such as fever and spread of inflammation to the pinna or folliculitis are present

- Cloxacillin 500 mg orally every 6 hours for 5 to 7 days

In complex cases such as development of mastoiditis, hearing loss, refer to specialist/visiting team.

**ACUTE SINUSITIS**

Acute bacterial sinusitis may follow upper (usually viral) respiratory tract infections. Common causes are *S. pneumoniae* and *H. influenzae*.

Pain associated with sinusitis should be treated with simple analgesics such as paracetamol. Consider antibiotic therapy for patients with severe rhinosinusitis symptoms (purulent nasal discharge, nasal congestion, facial pain or pressure) for more than 5 to 7 days plus any of the following features:

i. High fever (38.4°C or more)

ii. Unilateral maxillary sinus tenderness

iii. Severe headache

iv. Worsening symptoms after initial improvement

- Amoxicillin 500 mg orally every 8 hours for 5 to 7 days

  OR if hypersensitive to penicillin

- Doxycycline 100 mg orally every 12 hours for 5 to 7 days

**ACUTE EPIGLOTTITIS**

Commonly caused by *H. influenza* this condition mostly effects children (see pg 19) but may occur in adults. Urgent hospitalisation and treatment is required.

- Ceftriaxone 2 g IV once daily for 5 days
OR if unavailable

• Chloramphenicol 1 g IV every 6 hours for 5 days

Early transfer to oral therapy is desirable.

**BRONCHITIS**

**ACUTE BRONCHITIS**

In an immune-competent adult or child acute bronchitis is most often viral and does not require antibiotic therapy. Antibiotic therapy provides no overall benefit to the patient and may cause harm.

If severe, and particularly if sputum is voluminous and purulent with associated fever, a secondary bacterial infection is assumed:

• Amoxycillin 500 mg orally every 8 hours for 5 to 7 days

OR if hypersensitive to penicillin EITHER

• Doxycycline 100 mg orally every 12 hours for 7 days

OR

• Erythromycin 500 mg orally every 6 hours for 5 to 7 days

**ACUTE EXACERBATION OF CHRONIC BRONCHITIS**

Acute exacerbation could be due to either viral or bacterial infection. Common organisms include *S. pneumoniae, H. influenzae* and *M. catarrhalis*. Antibiotic therapy is indicated if there is increased cough and dyspnoea together with increased sputum volume and/or purulence.

• Amoxycillin 500 mg orally every 8 hours for 5 to 7 days

OR if hypersensitive to penicillin EITHER

• Doxycycline 100 mg orally every 12 hours for 7 days

OR

• Erythromycin 500 mg orally every 6 hours for 5 to 7 days

**PNEUMONIA**

**COMMUNITY ACQUIRED**

In immune-competent, otherwise healthy patients pneumonia is usually caused by a single microorganism such as *S. pneumoniae, H. influenzae, M. pneumonia* or *Chlamydia pneumonia*. Poorly
controlled diabetic patients, the elderly or patients with other chronic illnesses (e.g. cancer, liver disease, heart failure or renal failure) should be treated as though they have severe disease

**Mild Disease**

- Amoxycillin 500 mg orally every 8 hours for 7 to 10 days

  OR if unable to take oral therapy

- Procaine penicillin 1.2 million units IM once daily for 7 - 10 days, transition to oral amoxycillin when able to tolerate oral therapy

  OR if hypersensitive to penicillin or mycoplasma or chlamydia is suspected EITHER

- Erythromycin 500 mg orally every 6 hours for 10 to 14 days

  OR

- Doxycycline 100 mg orally every 12 hours for 10 to 14 days

**Moderate Disease**

- Benzylpenicillin 1.2 g IV every 6 hours for 7 to 10 days

  OR if hypersensitive to penicillin

- Chloramphenicol 1 g IV every 6 hours for 7 to 10 days

If the clinical response to parenteral therapy is satisfactory the patient may be changed to high dose oral therapy

- Amoxycillin 500 mg to 1 g orally every 8 hours

  OR

- Chloramphenicol 1 g orally every 6 hours

**Severe Disease**

To assess whether pneumonia is severe the CORB parameters are used. Assessment is based on the most abnormal results obtained during the initial 24 hours of inpatient stay. If two or more of these parameters are present pneumonia is classified as severe.

C = acute confusion

O = oxygen saturation 90% or less
Respiratory tract infections

R = respiratory rate 30 breaths or more per minute

B = systolic blood pressure less than 90 mm Hg or diastolic blood pressure 60 mm Hg or less

Empirical:

- Benzylpenicillin 1.2 g IV every 6 hours
  
  PLUS

- Cloxacillin 2 g IV every 6 hours
  
  PLUS

- Gentamicin 4 to 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

PLUS if no response within 48 hours or the patient deteriorates add

- Erythromycin orally 500mg every 6 hours

OR if hypersensitive to penicillin substitute benzylpenicillin and cloxacillin for

- Chloramphenicol 1 g IV every 6 hours (oral dosage may be substituted once improved)
  
  OR

- Erythromycin 500 mg orally every 6 hours
  
  OR

- Ceftriaxone 1 g to 2 g IV once daily for 5 days

If Streptococcus anginosus is proven treat for at least 21 days

- Benzylpenicillin 1.8 to 2.4 g (3 to 4 million units) IV every 6 hours

If Pseudomonas aeruginosa is proven treat for at least 14 to 21 days

- Gentamicin 4 to 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

PLUS

- Ciprofloxacin 750 mg orally every 12 hours
Respiratory tract infections

If *Staphylococcus aureus* is proven treat for at least 21 days

- Cloxacillin 2g IV every 6 hours for at least 7 days

THEN

- Cloxacillin 500 mg orally every 6 hours for a total of 21 days

If MRSA is suspected see Chapter 16 'Special Infections' page 95 for treatment recommendations

### HOSPITAL ACQUIRED PNEUMONIA

**Mild disease**

- Amoxycillin 500mg orally every 8 hours

OR

- Amoxycillin plus clavulanic acid 500+125 mg orally every 12 hours

PLUS

- Amoxycillin 250mg orally every 12 hours

**Severe disease**

- Cloxacillin 1 g IV every 6 hours

PLUS

- Gentamicin 4 to 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

PLUS if aspiration is the likely cause ADD

- Metronidazole 500 mg IV or 400 mg orally every 12 hours

Change to oral therapy (as for mild pneumonia above) when the patient is improving and/or can take oral medications

For complex patients who are likely to have a resistant organism, seek expert advice

### ASPIRATION PNEUMONIA

For severe disease or abscess formation, prolonged high dose treatment is indicated.

*Streptococcus anginosus*, anaerobes and occasionally gram-negative bacilli and staphylococci may be causative organisms.
• Benzylpenicillin 1.2 g IV every 4 to 6 hours

OR if hypersensitive to penicillin

• Chloramphenicol 500 mg to 1 g IV or orally every 6 hours

PLUS either with

• Metronidazole 500 mg IV or 400 mg orally every 12 hours

When the patient is improving transition to oral therapy

• Amoxycillin plus clavulanic acid 500+125 mg orally every 12 hours PLUS amoxycillin 250 mg orally every 12 hours

OR if hypersensitive to penicillin

• Chloramphenicol 500 mg orally every 6 hours

PLUS either with

• Metronidazole 400 mg orally every 12 hours

For uncomplicated aspiration pneumonia total duration of therapy is usually 7 days. In extensive disease or lung abscess formation prolonged therapy is required

Additional antibiotics may be required if infection with staphylococci (cloxacillin) or gram-negative bacteria (gentamicin) is suspected or proven. If *Streptococcus anginosus* is isolated, high dose penicillin will be required for a longer duration, usually 21 days.

**LUNG ABSCESS AND EMPYEMA**

• Benzylpenicillin 1.2 g IV every 6 hours

PLUS

• Cloxacillin 2 g IV every 6 hours

PLUS

• Metronidazole 500 mg IV or 400mg orally every 12 hours

Gentamicin should be added if aspiration is the likely cause of the abscess, see page 9 for dosing. Adequate drainage of empyema is essential. The duration of therapy is usually prolonged. If the abscess is small and the patient is not unwell, oral therapy may be given.
BRONCHIECTASIS WITH INFECTION

Patients with bronchiectasis often have chronically purulent sputum which if cultured grows organisms. If the patient is clinically stable, it is NOT appropriate to treat colonising organisms as this will promote the emergence of antibiotic resistance.

Mild acute exacerbation

• Amoxicillin 500mg orally every 8 hours for 7 to 10 days

Severe acute exacerbation

• Chloramphenicol 500mg orally or IV every 6 hours for 7 to 10 days

OR

• Doxycycline 100mg orally every 12 hours for 7 to 10 days

OR

• Amoxicillin 500mg orally every 8 hours for 7 to 10 days

PLUS

• Metronidazole 400mg orally every 8 hours for 7 to 10 days

Ciprofloxacin may be used to treat severe exacerbations if an organism (e.g. pseudomonas) resistant to the above antibiotics is cultured. Resistance is likely to develop if ciprofloxacin is used repeatedly.

• Ciprofloxacin 750 mg orally every 12 hours for 7 to 14 days
CANDIDA OESOPHAGITIS

Mild oesophageal candidiasis in patients who are not immunosuppressed, use:
• Nystatin suspension 500,000 units orally every 6 hours for 10 to 14 days.

Severe oesophageal candidiasis or patients who are immunosuppressed, use:
• Fluconazole 200 to 400 mg (child 3 to 6 mg/kg) orally once daily for 14 to 21 days.

DIARRHOEAL DISEASES

Most diarrhoeal diseases are self-limiting and do not require antibiotic therapy. Oral rehydration is all that is required.

Anti-motility agents such as loperamide may be used for symptomatic relief in adults, provided that there is no evidence to suggest invasive disease or obstruction. These agents should NOT be used in children.

Antibiotic therapy is not generally required in the normal host unless there is evidence to suggest invasion with a bacterial pathogen e.g. persistent fever with bloody diarrhoea and/or rigors. Antibiotics should be considered for these infections and treatment should be modified according to the results of culture and sensitivity tests.

BACTERIAL INFECTIONS

Empiric therapy of presumed bacterial diarrhoea
• As for shigellosis (see below)

Shigellosis (moderate and severe dysentery only)
• Chloramphenicol 500mg orally or IV every 6 hours for 7 days
  OR
• Trimethoprim plus sulfamethoxazole 160 +800 mg orally every 12 hours for 7 days
  OR
• Ciprofloxacin 500mg orally every 12 hours for 7 days

Salmonella enteritis
Antibiotic therapy is not generally advisable but is indicated in immunosuppressed or elderly patients. If necessary treat as for typhoid fever (see page 41) or based on culture sensitivity for 5 days.

Campylobacter enteritis
Antibiotics are unnecessary in most cases. In severe cases:
Gastrointestinal and intra-abdominal infections

- Erythromycin 500mg orally every 6 hours for 3 days
- Ciprofloxacin 500mg every 12 hours for 3 days

**PARASITIC INFECTIONS**

**Intestinal amoebiasis**
- Metronidazole 600mg orally every 8 hours for 7 to 10 days

**Giardiasis**
- Metronidazole 400mg orally every 8 hours for 7 to 10 days.

**Strongyloidosis**
- Albendazole 400mg every 12 hours for 3 days, repeat after 2 weeks if necessary
  - OR
- Ivermectin 200 MICROgrams/kg orally with fatty food on day one, repeat dose in 7-14 days

**ANTIBIOTIC ASSOCIATED DIARRHOEA**

In most cases no pathogen is identified. For mild cases, observe patients after antibiotics are ceased. *Clostridium difficile* is responsible in a minority of cases. If *C. difficile* is proven or suspected:

**Moderate Cases:**
- Metronidazole 400mg orally every 8 hours for 10 days
  - OR if no response
- Vancomycin 125mg orally every 8 hours for 10 days

**TYPHOID/ PARATYPHOID FEVER**

- Chloramphenicol 500mg orally every 6 hours for 5 days
  - OR
- Ciprofloxacin 500mg orally 12 hourly for at least 5 days
**Gastrointestinal and intra-abdominal infections**

**INTRA-ABDOMINAL INFECTIONS**

These include cholecystitis, cholangitis, diverticulitis, peritonitis and intra-abdominal abscesses. Where possible, do culture and sensitivity tests. Surgery may be indicated in addition to antibiotics. Enterobacteriaceae, enterococci and anaerobes are usual pathogens. *Strep. anginosus/milleri* is sometimes isolated in which case high dose benzylpenicillin will be required.

**Empirical treatment**

- Ampicillin 1g IV every 6 hours for 10 to 14 days
- Gentamicin 4 - 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)
- Metronidazole 400 mg orally OR 500mg IV every 8 hours for 10 to 14 days

**For Streptococcus anginosus**

- Benzylpenicillin 1.8g every 4 hours for 21 days

**HELICOBACTER PYLORI INFECTION**

All patients with duodenal ulcer, proven *Helicobacter pylori* associated gastric ulcers or with mucosa associated lymphoma should be treated. Eradication of H pylori in non-ulcer dyspepsia or in asymptomatic patients is not of benefit.

The regimen with highest efficacy and greatest compliance, but which is expensive and not currently available in Kiribati, is:

- Omeprazole 20 mg orally every 12 hours for 7 days
- Clarithromycin 500 mg orally every 12 hours for 7 days
- Amoxycillin 1 g orally every 12 hours for 7 days
- Metronidazole 400 mg orally every 12 hours for 7 days

Because it is cheapest and readily available, the regimen recommended as first line therapy is:
Gastrointestinal and intra-abdominal infections

- Omeprazole 20 mg orally every 12 hours for 14 days
  OR
- Ranitidine 300 mg orally once daily for 14 days
  PLUS
- Amoxicillin 500mg orally every 8 hours for 14 days
  PLUS
- Metronidazole 400mg orally every 8 hours for 14 days

For patients hypersensitive to penicillin, substitute amoxicillin with doxycycline 100 mg every 12 hours

**WORMS (HELMINTHS)**

Hookworm, roundworm, threadworm & whipworm

- Mebendazole 100mg (child > 6 months and < 10 kg: 50 mg) orally every 12 hours for 3 days
  OR
- Albendazole 400mg (child > 6 months and < 10 kg: 200 mg) orally once daily for 3 days
  OR
- Praziquantel 10mg/kg (up to maximum 750mg) orally as a single dose

Repeat treatment after 7 days if heavy infection
BACTERIAL ENDOCARDITIS

There are 3 important principles of management:

1. Treatment must be given intravenously (except in rare case caused by particular organisms such as *Coxiella burnetii*)
2. Treatment is prolonged – usually 4 to 6 weeks duration
3. Drug regimen should result in high tissue concentrations

Consultation with a cardiologist and an infectious diseases physician or a microbiologist should be sought. Surgical consultation should be considered especially in cases that are fulminating, complicated or slow to respond.

If bacterial endocarditis is suspected it is recommend that at least 3 blood cultures are taken (from different venepuncture sites) before initiating therapy.

EMPIRICAL THERAPY

- Benzylpenicillin 1.8 g IV every 4 hours
  PLUS
- Cloxacillin 2 g IV every 4 hours
  PLUS
- Gentamicin 4-6 mg/kg IV once daily, calculate doses based on renal function (see pg 9)

OR if hypersensitive to penicillin OR hospital acquired endocarditis OR prosthetic valve in situ

- Vancomycin 25 mg/kg (max 1 g) IV every 12 hours, each dose to be infused over at least 1 hour
  PLUS
- Gentamicin 4-6 mg/kg once daily, calculate doses based on renal function (see pg 9)

These regimens may need to be modified when the organism and it’s sensitivity pattern is known. If culture is negative continue with the same regimen if the patient is responding.

STREPTOCOCCUS

- Benzylpenicillin 1.8 g IV every 4 hours for 4 weeks
  PLUS
- Gentamicin 1 mg/kg IV every 8 hours for 2 weeks, calculate doses based on renal function
  (see pg 9)

OR if hypersensitive to penicillin

- Ceftriaxone 2 g IV once daily for 2 weeks (consider up to 4 weeks of treatment)
  PLUS
Cardiovascular system infections

- Gentamicin 1 mg/kg IV every 8 hours for 2 weeks, calculate doses based on renal function (see pg 9)

A longer course of 4-6 weeks of both penicillin and gentamicin is advisable if relative resistance to penicillin is suspected.

**ENTEROCOCCUS**

- Gentamicin 1 mg/kg IV every 8 hours for 6 weeks, calculate doses based on renal function (see pg 9)
  
  PLUS either
  
  - Benzylpenicillin 1.8 g IV every 4 hours for 6 weeks
  
  OR
  
  - Ampicillin 2 g IV every 4 hours for 6 weeks

OR if hypersensitive to penicillin or penicillin resistance

- \(^a\)Vancomycin 25 mg/kg (max 1 g) IV every 12 hours for 4 to 6 weeks, each dose to be infused over at least 1 hour
  
  PLUS
  
  - Gentamicin 1 mg/kg IV every 8 hours for 6 weeks, calculate doses based on renal function (see pg 9)

**STAPHYLOCOCCUS**

Staphylococcus aureus that is sensitive to methicillin and cloxacillin

- Cloxacillin 2g IV every 4 hours for 4 to 6 weeks

Staphylococcus resistant to methicillin OR patient hypersensitive to penicillin

- \(^a\)Vancomycin 25 mg/kg (max 1 g) IV every 12 hours for 4 to 6 weeks, each dose to be infused over at least 1 hour

**GRAM NEGATIVE**

Gram-negative bacteria do not commonly cause endocarditis and consultation with a specialist is necessary.

**CULTURE NEGATIVE**

This may be due to previous antibiotic use or unusual microorganisms such as fastidious streptococci, legionella species or fungi including candida albicans. Unless fungal infection is strongly suspected, patients with culture negative endocarditis should be treated empirically with benzylpenicillin plus gentamicin (see STREPTOCOCCUS pg 43) for a period of at least 6 weeks.
**PROSTATIC VALVE**

There are a number of potential pathogens and these carry a risk of penicillin resistance hence treatment with vancomycin is recommended.

**Empirical Therapy**

- **Vancomycin 25 mg/kg (max 1 g) IV every 12 hours (infused over at least 1 hour) for 6 weeks**
  
  **PLUS**

- **Gentamicin 4 - 6 mg/kg once daily, calculate doses based on renal function (see pg 9)**

This regimen may need to be modified, and in particular the gentamicin dose reduced, when the organism and its sensitivity pattern is known. If culture is negative, continue with the same regimen adjusting gentamicin dose if necessary.

For specific pathogens therapy should be as for native valve endocarditis.

**MONITORING ANTIBIOTIC THERAPY**

Particular attention should be given to therapeutic drug monitoring in endocarditis. Recommended doses are for the commencement of treatment only and may need to be modified according to plasma levels attained. Therapeutic drug monitoring is not currently available in Kiribati.

**Gentamicin**

Gentamicin levels should be monitored, however the optimum method of monitoring levels in endocarditis is unknown. As doses are lower, dosing more frequently and synergy is the objective, the methods of monitoring used for gentamicin in other circumstances are inappropriate. Instead troughs should be measured only and values between 0.5 and 1mg/L will likely maximise synergy and minimise toxicity with 8 hourly dosing. Patients should be monitored for vestibular and auditory ototoxicity.

**Vancomycin**

Vancomycin peak and trough concentration should be first measured at 48 hours to 72 hours, although a steady state may not have been reached at this time. Peak vancomycin levels of 30 to 40mg/L and trough levels of 5 to 15mg/L are recommended. These levels are specific for the management of endocarditis and do not necessarily apply to other circumstances.
5. Central nervous system infections

ACUTE BACTERIAL MENINGITIS

In adults *Streptococcus pneumoniae* is the most likely causative organism; *Haemophilus influenzae* and *Neisseria meningitidis* are less common. Patients presenting with symptoms of CNS infection must be transferred to a hospital immediately.

CSF microscopy and culture should direct antibiotic therapy. A lumbar puncture and blood culture should be performed if possible before antibiotic therapy is commenced. Caution is required with lumbar puncture if the patient is in a coma, has signs of increased intracranial pressure or has focal neurological signs. A CT scan (not currently available in Kiribati) of the head is preferred over lumbar puncture if the above risk factors are present. Bacterial meningitis is a medical emergency and antibiotic therapy should not be delayed if there is difficulty obtaining a CSF sample. In such cases empirical therapy should be commenced immediately.

On outer islands or where there is a delay in transferring the patient to hospital if meningitis is suspected antibiotics must be started immediately with:

- Benzylpenicillin 1.8 g IV/IM every 6 hours
  
  OR if hypersensitive to penicillin
  
  - Ceftriaxone 2 g IV every 12 hours
    
    OR
  
  - Chloramphenicol 1 g IV every 6 hours

Dexamethasone has been found useful in children and it may have a role in the management of adults. It should be given just before the first dose of antibiotics.

- Dexamethasone 10 mg IV every 6 hours for 4 days (give the first dose just before commencing antibiotic therapy)

EMPIRICAL THERAPY

If meningitis is confirmed by CSF examination but the organism is unknown use:

- Benzylpenicillin 1.8 g IV every 4 hours for 10 days
  
  PLUS
  
  - Chloramphenicol 1 g every 6 hours for 10 days

OR if hypersensitive to penicillin

- Chloramphenicol 1 g every 6 hours for 10 days as a single agent
  
  OR
  
  - Ceftriaxone 2 g IV every 12 hours for 10 days
Once organism and sensitivity result is available use this to guide antibiotic choice. If no organism is identified continue empiric therapy for a total of 10 days.

**SPECIFIC THERAPY**

**Streptococcus pneumoniae**

If penicillin-susceptible (MIC <0.125 mg/L)

- Benzylpenicillin 1.8 g IV every 4 hours for 10-21 days

If not penicillin-susceptible use vancomycin with ceftriaxone. Rifampicin may be an alternative to vancomycin. Seek specialist advice.

**Pneumococcal/Neisseria meningitidis**

- Benzylpenicillin 1.8 g IV every 4 hours

OR if hypersensitive to penicillin

- Ceftriaxone 2 g IV every 12 hours

Pneumococcal meningitis is to be treated for 10 – 14 days although some patients may require treatment for 21 days. *Neisseria meningitidis* usually requires only 7 days treatment.

Prophylaxis is essential to clear nasal carriage. It should be given to close contacts and patients treated with benzylpenicillin

- Ceftriaxone 250 mg (child: 125 mg) IM as a single dose

OR

- Rifampicin 10 mg/kg (max 600 mg) orally every 12 hours for 4 doses

**Haemophilus influenzae type b**

- Ceftriaxone 2 g IV every 12 hours for 7 days

OR if the organism is proven to be susceptible

- Benzylpenicillin 2.4 g IV every 4 hours for 7 days

OR if hypersensitive to penicillin and cephalosporins

- Chloramphenicol 1 g IV every 6 hours for 7 days

**Gram-negative bacterial meningitis and cryptococcal meningitis**

Consultation with a specialist is advisable. For gram-negative meningitis (other than *H. influenza*) a combination of ceftriaxone and gentamicin is recommended for 21 days duration. The recommended
drugs to treat cryptococcal meningitis (amphotericin, flucytosine, fluconazole) are not currently available in Kiribati.

**BRAIN ABSCESS**

Most brain abscesses are polymicrobial and may include anaerobes, streptococci and gram-negative bacteria.

- Benzylpenicillin 2.4 g IV every 4 hours
- Ceftriaxone 2 g IV every 12 hours
- Metronidazole 500 mg IV every 8 hours

Add cloxacillin if indicated. Consider using chloramphenicol in place of benzylpenicillin in cases of penicillin hypersensitivity.

For brain abscess post neuro-surgery

- Vancomycin 1 g IV every 12 hours

+ EITHER

- Chloramphenicol 1 g IV every 6 hours
- Ceftriaxone 2 g IV every 12 hours

The duration of treatment is determined by clinical response and may be as long as 6-8 weeks. Surgical drainage may be indicated, especially if clinical response is poor.

**EPIDURAL ABSCESS**

Urgent surgery is essential. *Staphylococcus aureus* is often the causative organism but treatment should be based on gram stain and culture results of surgical samples.

For initial empiric therapy:

- Cloxacillin 2 g IV every 6 hours
- Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses according to renal function (see pg 9)

If the organism is proven to be *Staphylococcus aureus* gentamicin should be ceased. This condition is often associated with osteomyelitis or disc infections.
HERPES SIMPLEX ENCEPHALITIS – SUSPECTED OR PROVEN

- Acyclovir 10 mg/kg IV every 8 hours for at least 14 days, each dose should be infused over at least one hour and dosage adjusted according to renal function

OR if IV acyclovir is not currently available in Kiribati consider using the oral form

- Acyclovir 800 mg orally 5 times per day, adjust dosage according to renal function *(this treatment is not proven but is the highest oral dose recommended in references, Australian Medicines Handbook, 2010)*

TOXOPLASMA ENCEPHALITIS

In HIV/AIDS cerebral infection with *Toxoplasma gondii* is common. The recommended treatment for this condition (sulphadiazine and pyrimethamine) is not currently available in Kiribati. Seek specialist advice.
6. Urinary tract infections

**UNCOMPROMICATED LOWER URINARY TRACT INFECTIONS**

Urine cultures are not essential in non-pregnant women with suspected uncomplicated cystitis. Cultures should be performed if possible before the administration of antibiotics in pregnant women, men, children and patients with a history of recent antibiotic use or treatment failure of recurrent infection.

Resistance of urinary pathogens to amoxycillin is high and this is not recommended for treatment.

**EMPIRIC THERAPY**

- Nitrofurantoin 50 – 100 mg orally every 6 hours
  OR
- Trimethoprim 300 mg orally once daily

Non-pregnant women treat for 3 – 5 days.

Men treat for 10 – 14 days. All younger males with UTI should be investigated for underlying abnormality.

For details regarding UTI in pregnant women see Chapter 9 page 65. Treatment should be for 10 – 14 days and **trimethoprim should be avoided** especially in the first trimester.

Treatment failure is usually due to a resistant organism, an underlying abnormality of the urinary tract of re-infection with a similar organism. If relapse occurs pyelonephritis should be considered and treatment given for 10 – 14 days.

**UPPER URINARY TRACT (PYELONEPHRITIS) OR COMPLEX PATIENTS – SEVERE ILLNESS, DIABETES, IMMUNOCOMPROMISED**

Attempt to define or exclude underlying anatomical or functional abnormality. Treat for 14 days with antibiotics chosen on the basis of urine culture and sensitivities.

If mild infection

- Amoxycillin plus clavulanic acid 500+125 mg orally every 12 hours
  PLUS
- Amoxycillin 250 mg orally every 12 hours

OR if sufficiently ill to require parenteral therapy

- Ampicillin 2 g IV every 6 hours
  PLUS
- Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)
Urinary tract infections

OR if the prolonged use of an aminoglycoside is undesirable (elderly, significant renal failure, previous adverse reaction)

- Ceftriaxone 1 g IV once daily

OR if pseudomonas is isolated

- Ciprofloxacin 500 mg orally every 12 hours

Transition to oral therapy based on culture and sensitivity once patient is clinically well and afebrile for at least 48 hours. If hypersensitive to penicillin consider gentamicin monotherapy.

Urine should be tested at the end of therapy to check that the infection has been fully cleared.

**RECURRENT URINARY TRACT INFECTIONS - PROPHYLAXIS**

Recurrent infections should be treated for 10 – 14 days. Consider prophylaxis for women who have frequent symptomatic infections (two or more over a 6 month period, three or more over a 12 month period). Prophylactic therapy should be guided by sensitivity results.

- Nitrofurantoin 50 – 100 mg orally at night
  OR
- Trimethoprim 150 mg orally at night
  OR
- Trimethoprim plus sulphamethoxazole 80+400mg orally at night

Prophylactic antibiotic therapy should be continued for 3 – 6 months or longer if required.

**CATHETER ASSOCIATED INFECTIONS**

Treat only if symptomatic. Antimicrobial should be selected on the basis of the most recent urine culture results. Removing the catheter may be all that is required. Prophylactic antibiotics should not be routinely administered at the time of catheter placement, change or removal.

**ASYMPTOMATIC BACTERIURI A**

Decision for treatment will depend on individual circumstances. Treatment is indicated in young children, pregnant women and patients undergoing urological procedures in which mucosal bleeding is anticipated.

Antibiotic should be chosen based on sensitivity results. If asymptomatic bacteriuria recurs in a pregnant women or the organism is Group B Streptococcus seek advice from an obstetrician.
CHRONIC BACTERIAL PROSTATITIS

Most cases (90 – 95%) of ‘chronic’ prostatitis, characterised by chronic pelvic pain, are not due to infection and repeated courses of antibiotic treatment should be avoided. Chronic bacterial prostatitis is rare. Therapy should be guided by culture and sensitivity results.

- Trimethoprim plus sulphamethoxazole 160mg+800mg orally every 12 hours for 12 weeks
  OR
- Trimethoprim 300 mg orally once daily for 12 weeks

If culture is negative, chlamydia might be responsible (see pg 68)

- Azithromycin 1 g orally as a single dose

In resistant cases

- Ciprofloxacin 500 mg orally every 12 hours for 4 weeks

Treatment of this condition is difficult and over treatment with antibiotics should be avoided.

ACUTE EPIDIDYMO-ORCHITIS

NON-SEXUAL TRANSMISSION - PREPUBERTAL BOYS, OLDER MEN

Mild to moderate infection

- Trimethoprim plus sulphamethoxazole 160mg+800mg orally every 12 hours for 14 days

Severe infection

- Ampicillin 2 g IV every 6 hours
  PLUS
- Gentamicin 4 - 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

SEXUAL TRANSMISSION - ESPECIALLY IN ADULT MEN UNDER 35 YEARS OF AGE

Treat empirically as for gonorrhoea and chlamydial infection see Chapter 10 ‘Sexually transmitted infections’ page 68

CANDIDURIA

The presence of candida in urine is common, particularly in association with indwelling catheters, and does not necessarily indicate renal tract infection. Antifungal therapy is not usually indicated and should only be initiated after consultation.
7. Skin, muscle and bone infections

Mild infections require only good skin hygiene. Antiseptics such as chlorhexidine or povidone iodine may be useful. Povidone iodine 10% is available in Kiribati, it may be used as a concentrated solution or diluted with sterile water to make a 5% solution. Application of povidone iodine over a large area of broken skin is not recommend as it may be absorbed.

If MRSA infection is suspected see ‘Special infections’ Chapter 16 page 94 for treatment details.

### IMPETIGO

#### MILD

Topical antiseptics such as povidone iodine are adequate

#### MODERATE TO SEVERE

May be due to Streptococcus or Staphylococcus infection, consider

- Cloxacillin 500 mg orally every 6 hours for 10 days
  OR if *Strep. pyogenes* is confirmed or suspected, use
  - Phenoxymethylpenicillin 500 mg orally every 6 hours for 10 days
    OR
  - Procaine penicillin 1.2 million units IM once daily for 10 days
  OR if hypersensitive to penicillin
  - Erythromycin 500 mg orally every 6 hours for 10 days

### FOLLICULITIS, BOILS AND CARBUNCLES

Usually caused by *Staphylococcus aureus* and/or *Streptococcus pyogenes*

#### MILD

If the infection is mild and the patient is not diabetic or immunosuppressed, antibiotics are not usually required. If the lesions are small and few in number they may be managed by local antiseptics and hot compresses with drainage if appropriate.

#### MODERATE TO SEVERE (INCLUDING DIABETICS AND IMMUNOSUPPRESSED)

- Cloxacillin 500 mg orally every 6 hours for 7 days
  OR if hypersensitive to penicillin
  - Erythromycin 500 mg orally every 6 hours for 7 days
Skin, muscle and bone infections

If boils are persistent seek expert advice and consider cultures and sensitivities

**CELLULITIS**

Usually due to *Streptococcus pyogenes* and *Staphylococcus aureus* but can be due to other organisms. Pus and blood cultures should be done if possible before starting therapy, especially in diabetic or immunocompromised patients. Depending upon severity the duration of therapy will range from 10 – 14 days.

**MILD**

If the infection is mild and the patient is not diabetic or immunocompromised oral antibiotics are usually sufficient.

- Phenoxymethylpenicillin 500 mg orally every 6 hours for 7 days
  OR
- Procaine penicillin 1.2 million units IM once daily for 7 days

PLUS if not responding add

- Cloxacillin 500 mg orally every 6 hours for 7 days
  OR if hypersensitive to penicillin
- Erythromycin 500 mg orally every 6 hours for 7 days

**MODERATE TO SEVERE (INCLUDING DIABETICS AND IMMUNOSUPPRESSED)**

- Cloxacillin 2 g IV every 6 hours
  THEN when infection subsides transition to
- Cloxacillin 500 mg orally every 6 hours to complete a course of 10 to 14 days
  OR if hypersensitive to penicillin
- Chloramphenicol 1g IV every 6 hours
  THEN when infection subsides transition to
- Chloramphenicol 500 mg orally every 6 hours to complete a course of 10 to 14 days

If not responding change antibiotic according to culture results and consult a microbiologist

**ABSCESS**

*Staphylococcus aureus* is the single most important cause but culture and sensitivity should be done where possible.
**Skin, muscle and bone infections**

**MILD**

- Cloxacillin 500 mg orally every 6 hours for 7 to 14 days
  
  OR if hypersensitive to penicillin
  
  - Chloramphenicol 500 mg orally every 6 hours for 7 to 14 days

**MODERATE TO SEVERE**

- Cloxacillin 2 g IV every 6 hours
  
  THEN after 48 hours or when infection subsides transition to
  
  - Cloxacillin 500 mg orally every 6 hours to complete a course of 7 to 14 days
  
  OR if hypersensitive to penicillin
  
  - Chloramphenicol 1 g IV every 6 hours for 7 to 14 days
  
  THEN after 48 hours or when infection subsides transition to
  
  - Chloramphenicol 500 mg orally every 6 hours for 7 to 14 days

**BITES**

Bites can become infected with a variety of aerobic and anaerobic organisms.

Wounds require thorough cleaning, debridement and rest. The decision to use antibiotics should be determined by the severity of the bite and evidence of infection.

For small superficial wounds seen early antibiotics may not be necessary. If the wound is infected a wound swab should be taken and the wound debrided and its closure delayed. Broad-spectrum antibiotic cover is required.

Tetanus toxoid should be administered if the patient has not been immunised within the past 5 years.

If the wound is dirty or there is a higher risk or sign of infection, antibiotics should be given.

**LESS SEVERE WOUNDS**

- Procaine penicillin 1.2 million units IM once daily for 5 days
  
  OR
  
  - Procaine penicillin 1.2 million units IM as a single dose
  
  THEN EITHER
Skin, muscle and bone infections

- Amoxicillin 500mg orally every 8 hours
  OR
- Amoxicillin plus clavulanic acid 500+125 mg orally every 12 hours PLUS amoxicillin 250 mg orally every 12 hours for 5 days

SEVERE, MULTIPLE OR INFECTED WOUNDS

- Metronidazole 500 mg IV or 400 mg orally every 12 hours
  PLUS EITHER
  - Ceftriaxone 1 g IV once daily
    OR
  - Ampicillin 1 g IV every 6 hours
  PLUS
  - Gentamicin 4 – 6 mg/kg IV once daily, calculate subsequent doses based on renal function (see pg 9)

SURGICAL OR TRAUMATIC WOUND INFECTIONS – RESTRICTED TO SKIN AND SOFT TISSUE

MILD TO MODERATE
Antibiotics may not be necessary in mild infections. Where there is a collection pus should be drained. A sample should be taken for culture and sensitivity before commencing antibiotics.

- Cloxacillin 500 mg orally every 6 hours for 10 – 14 days

SEVERE

- Cloxacillin 2 g IV every 6 hours
  PLUS
- Gentamicin 4 – 6 mg/kg IV once daily, calculate subsequent doses based on renal function (see pg 9)

Antibiotics may need to be changed based on culture and sensitivity results

DIABETIC FOOT INFECTIONS

Diabetic foot infection may involve the skin and soft tissue as well as underlying muscle and bone and should always be regarded as serious. These infections are often mixed infection with aerobes and anaerobes, gram positive and gram-negative organisms. Surgical debridement is often necessary and surgical advice must be sought unless it is a very mild case.
Proper dressings and wound care are extremely important. Drug dosage must always be adjusted according to renal function, as renal impairment is common in diabetic patients. The duration of treatment depends upon response.

**MILD TO MODERATE**

- Metronidazole 400 mg orally every 12 hours
  
  PLUS
  
- Cloxacillin 500 mg orally every 6 hours

**SEVERE**

- Metronidazole 400 mg orally or 500 mg IV every 8 to 12 hours
  
  PLUS
  
- Cloxacillin 2 g IV every 6 hours
  
  PLUS
  
- Gentamicin 4 – 6 mg/kg IV once daily, calculate subsequent doses based on renal function
  
  (see pg 9)

Patient should be transitioned to oral therapy when infection is controlled. Depending on the organism isolated other antibiotics may be indicated.

**NECROTISING CELLULITIS OR FASCIITIS**

Urgent surgical debridement is required in addition to broad-spectrum antibiotics to cover enterobacteriaceae, anaerobes, streptococcus species and Staphylococcus aureus.

- Benzylpenicillin 2.4 g IV every 4 hours
  
  PLUS
  
- Gentamicin 4 – 6 mg/kg IV once daily, calculate subsequent doses based on renal function
  
  (see pg 9)
  
  PLUS
  
- Metronidazole 500mg IV every 8 hours

**MYOSITIS / MYONECROSIS**

Gas gangrene is usually caused by *C. perfringens* and is a surgical emergency

- Benzylpenicillin 2.4 g IV every 4 hours

  OR if hypersensitive to penicillin

- Metronidazole 500 mg IV every 8 hours
**Skin, muscle and bone infections**

**Burns**

**Mild**

For minor burns use sterile gauze dressing impregnated with white soft paraffin.

**Moderate to Severe or If There is Evidence of Infection**

- Silver sulfadiazine 1% cream

Sulfadiazine is active against most gram-positive and gram-negative bacteria and yeasts. It can be used either with or without a light dressing. This cream does not penetrate eschar.

Systemic antibiotic treatment should only be used to treat infections based on culture results. A single dose of an antibiotic may be given before surgical debridement and choice should be guided by microbiology results.

**Pyomyositis**

Staphylococcus aureus is the most common causative organism

- Cloxacillin 2g IV every 6 hours
  
  OR if hypersensitive to penicillin

- Chloramphenicol 1g IV every 6 hours

Transition to oral therapy when appropriate.

Duration of therapy depends on severity of infection and may range from 14 to 21 days.

Surgical drainage may be necessary. Antibiotics may need to be adjusted according to culture results.

**Mastitis**

Acute mastitis is usually associated with lactation and is frequently due to *Staphylococcus aureus*. Milk stasis is to be avoided and therefore suckling and manual expression are important. In the absence of systemic symptoms these measures are adequate.

If systemic symptoms develop commence antibiotics

- Cloxacillin 500 mg orally every 6 hours
  
  OR if hypersensitive to penicillin

- Chloramphenicol 500 mg orally every 6 hours
  
  OR if severe and IV antibiotics are required
Skin, muscle and bone infections

• Cloxacillin 1 g to 2 g IV every 6 hours
  
  OR if hypsersensitive to penicillin

• Chloramphenicol 1 g orally or IV every 6 hours

Duration of therapy will depend upon response

BREAST ABSCESS

• Cloxacillin 1 g IV every 6 hours
  
  THEN after 48 hours or when infection subsides

• Cloxacillin 500 mg orally every 6 hours for 5 days
  
  OR if hypsersensitive to penicillin

• Erythromycin 500 mg to 1 g orally every 6 hours

BONE INFECTIONS – OSTEOMYELITIS

The usual causative agent is *Staphylococcus aureus* or occasionally streptococcus.

Intravenous treatment should be given until the patient has been afebrile for several days, when appropriate the patient should be transitioned to oral therapy. The duration of treatment should be at least 4 to 6 weeks. Where possible cultures and sensitivities should guide treatment.

Empirical therapy

• Cloxacillin 2 g IV every 6 hours for at least 2 weeks
  
  THEN

• Cloxacillin 1 g orally every 6 hours for a total course of 6 weeks or longer
  
  Cloxacillin dose may be reduced to 500 mg if patient is not tolerating adverse effects such as nausea and vomiting.

  OR if hypsersensitive to penicillin

• Chloramphenicol 1 g IV for at least 2 weeks
  
  THEN

• Erythromycin 500mg orally every 6 hours for a total course of 6 weeks or longer

  PLUS if severe add

• Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

METHICILLIN RESISTANT *STAPHYLOCOCCUS AUREUS*
For further information regarding MRSA see Chapter 18 ‘Special Infections’

- Vancomycin 1 g IV every 12 hours (infused over at least 1 hour) FOLLOWED BY
- Rifampicin 600 mg orally once daily for 6 weeks

OR if the MRSA is not multi-resistant according to sensitivities consider

- Trimethoprim plus sulphamethoxazole 320+1600 mg orally every 12 hours

**SEPTIC ARTHRITIS**

Treat empirically as for osteomyelitis (see pg 59).

Urgent surgical drainage/lavage and microbiological examination of pus may be required. Antibiotic choice should be guided by culture and sensitivities.
Patients with clinical features of septicaemia require urgent blood cultures and then commencement of empiric therapy. At least 2 blood specimens from different sites should be obtained. Once the causative organisms have been identified and the sensitivities known these should guide antibiotic therapy. Duration of treatment should be at least 10 days but longer is common depending on severity, source of infection and organism involved.

**EMPIRICAL THERAPY – NO OBVIOUS SOURCE OF INFECTION**

- Cloxacillin 2 g IV every 4 hours
  PLUS
- Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

OR if hypersensitive to penicillin replace cloxacillin with

- Ceftriaxone 1 g IV every 12 hours

NB. If also allergic to cephalosporins consider #vancomycin

**NEUTROPENIC PATIENTS**

Then following regimen aimed primarily at enterobacteriaceae and *Pseudomonas aeruginosa*

- #Piperacillin 3 g IV every 4 hours
  OR
- Ciprofloxacin 500 mg orally every 12 hours

PLUS

- Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

If *Staphylococcus aureus* is suspected then ADD

- Cloxacillin 2 g IV every 4 hours

**EMPIRICAL THERAPY – SOURCE OF INFECTION CLINICALLY APPARENT**

**URINARY TRACT**

- Treat as for severe pyelonephritis see page 50

**BILIARY OR GASTROINTESTINAL TRACT**

- Treat as for intra-abdominal infection see page 41
Septicaemia and generalised infections

FEMALE GENITAL TRACT

- Treat as for severe pelvic inflammatory disease – either sexually or non-sexually acquired as appropriate see page 64

SKIN

Carbuncle and cellulitis

- Treat as for severe cellulitis see page 54

Decubitis and ischaemic ulcers, diabetic foot infection

- Treat as for severe diabetic foot infection see page 56

INTRAVENTOUS CANNULAE INCLUDING CVL

Remove infected cannula and submit for culture along with any pus

- Cloxacillin 2 g IV every 4 hours
  PLUS
- Gentamicin 4 – 6 mg/kg as a first dose, calculate subsequent doses based on renal function (see pg 9)

OR if hypersensitive to penicillin or MRSA is suspected

- Vancomycin 1 g IV (infused over at least one hour) every 12 hours can be substituted for cloxacillin

If candida infection is suspected consult a specialist for advice.

LUNG

- Treat as for severe pneumonia see page 34

SPECIFIC ORGANISMS

In blood culture positive cases with known sensitivities antibiotic use must be guided by test results. If the patient is not seriously ill monotherapy may be adequate (e.g. streptococcal or staphylococcal infections).

PSEUDOMONAS AERUGINOSA

- Piperacillin 3 g IV every 4 hours
  PLUS
Septicaemia and generalised infections

- Gentamicin 4 – 6 mg/kg IV as first dose, calculate subsequent doses based on renal function (see pg 9)

If hypersensitive to penicillin, in cases of inadequate response or when piperacillin is unavailable

- Ciprofloxacin 500 mg IV (use oral if unavailable) every 12 hours as monotherapy

Duration of therapy for *Pseudomonas aeruginosa* infections varies from 2 – 6 weeks depending on the primary site of infection.
9. Female genital tract and obstetric infections

PELVIC INFLAMMATORY DISEASE

Causative organisms include gonococci and chlamydia as well as a number of other aerobic and anaerobic organisms.

**Mild** (outpatient management)

- Doxycycline 100 mg orally every 12 hours for 10 days
- Metronidazole 400 mg orally 12 hours for 7 days
- Amoxycillin 500 mg orally every 8 hours for 7 days

**Severe** (admission required)

- Ampicillin 2 g IV every 6 hours
- Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)
- Metronidazole 500 mg IV every 12 hours

Transition to oral therapy when infection is resolving

- *Doxycycline 100 mg orally every 12 hours for 10 days*
- Metronidazole 400 mg orally every 12 hours for 7 days

Add other antibiotics if indicated. Drainage may be required.

*If the patient is pregnant or breastfeeding doxycycline must not be used and should be substituted with a safer alternative, choice should be dictated by sensitivity of causative organism.

BARTHOLIN’S ABSCESS

Surgical drainage is required

Swab and culture is recommended and sensitivity must be used to guide treatment

- Ampicillin 1 g IV as a single dose
- Amoxicillin 500 mg orally every 8 hours

SEXUAL ASSAULT

The patient should receive empirical treatment for gonorrhoea (and may cover syphilis) see page 67. This regimen may not prevent other STIs. It is important that the patient is followed up with clinical examination and serological tests. Antibiotic therapy is indicated where follow up may be difficult. **A female patient may require the emergency contraceptive pill.**

ADULT
Female genital tract and obstetric infections

- Cefixime 400 mg orally as a single dose
  PLUS
- Azithromycin 1 g orally as a single dose
  PLUS
- Metronidazole 2 g as a single dose

If azithromycin is unavailable and the patient is NOT pregnant
- Doxycycline 100 mg orally every 12 hours for 7 days.

If azithromycin is unavailable and the patient is pregnant or breastfeeding
- Amoxicillin 500 mg orally every 8 hours for 7 days
  OR if hypersensitive to penicillin
- Erythromycin 500 mg orally every 6 hours for 7 days.

If cefixime is unavailable use ceftriaxone 250 mg IM (with 2 ml lignocaine 1% injection) as a single dose.

CHILD

- Amoxicillin 20 mg/kg (max 500 mg) orally every 8 hours for 7 days
  OR
- Ceftriaxone 125 mg IM as a single dose

INFECTIONS IN OBSTETRIC PRACTICE

LOWER URINARY TRACT

If asymptomatic, delay treatment until culture and sensitivity result is known. If empirical treatment is indicated:
- Nitrofurantoin 50 to 100 mg orally every 6 to 8 hours for 10 to 14 days
  OR
- Amoxicillin 500 mg every 8 hours for 10 to 14 days

Change to appropriate antibiotic based on culture and sensitivity results

PYELONEPHRITIS

Urine and blood cultures must be taken
- Ampicillin 2 g IV every 6 hours
  PLUS
- Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal
Female genital tract and obstetric infections

function (see pg 9)

OR as a single agent

• Ceftriaxone 1 g IV once daily

Gentamicin is not recommended in pregnancy (Cat D) and may have adverse effects on the foetus. It should only be used where the benefits to the mother outweigh the risks to the foetus. It should be used for the minimum necessary duration.

Once the patient has been afebrile for 72 hours switch to oral therapy based on culture sensitivity results. The total duration of therapy should be 10 – 14 days.

PREMATURE RUPTURE OF MEMBRANES

Pre term
If the patient has no fever and normal white blood cell count give:

• Amoxycillin 500mg orally every 8 hours

If the patient is sick and has a fever or raised white blood cell count admit the patient and give:

• Ampicillin 1 g IV every 6 hours
  PLUS
• Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

FOLLOWED BY

• Erythromycin 500 mg orally every 6 hours
  PLUS
• Metronidazole 400 mg orally every 12 hours

Duration of therapy is usually for one week

At term
If the rupture occurred 18 hours prior or earlier antibiotics must be commenced:

• Ampicillin 1 g IV every 6 hours
  PLUS
• Gentamicin 4 – 6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

The patient is usually induced and antibiotic coverage includes pre-labour, during labour and post labour for a total of 72 hours.

Gentamicin is not recommended in pregnancy (cat D) and may have adverse effects on the foetus. It should only be used where the benefits to the mother outweigh the risks to the foetus. It should be used for the minimum necessary duration.
10. Sexually transmitted infections

For more detailed treatment flow charts see ‘Flow Charts for Sexually Transmitted Infection Syndromes and Specific Infections for Kiribati’

GONOCOCCAL INFECTIONS

Diagnosis should be confirmed by culture and antibiotic sensitivity tests performed if possible. All patients should also have serological testing for syphilis and HIV after confidential counseling.

*Follow up cultures should be obtained 5 days after completion of treatment for all gonococcal infections.*

CHLAMYDIA ONLY POSITIVE

- Azithromycin 1 g orally as a single dose

Observe patient take tablets, treat all sexual partners from last 3 months and encourage condom use.

GONORRHEA POSITIVE OR GONORRHOEA AND CHLAMYDIA POSITIVE

- Cefixime 400 mg orally as a single dose
  - Azithromycin 1 g orally as a single dose

Observe patients take tablets, treat all sexual partners from last 3 months with both cefixime and azithromycin and encourage condom use.

If azithromycin is unavailable and the patient is NOT pregnant

- Doxycycline 100 mg orally every 12 hours for 7 days.

If azithromycin is unavailable and the patient is pregnant or breastfeeding

- Amoxicillin 500 mg orally every 8 hours for 7 days
  - OR if hypersensitive to penicillin
  - Erythromycin 500 mg orally every 6 hours for 7 days.

If cefixime is unavailable use ceftriaxone 250 mg IM (with 2 ml lignocaine 1% injection) as a single dose.

DISSEMINATED GONOCOCCAL INFECTION

Patients should be hospitalised

- Ceftriaxone 1 g IM/IV once daily until 2 days after symptoms resolve FOLLOWED BY
  - Amoxicillin plus clavulanic acid 500+125 mg orally every 8 hours to complete 7 days

OR if infection is proved to be penicillin sensitive
Sexually transmitted infections

- Ampicillin 1 g IV every 6 hours
  FOLLOWED BY
- Amoxycillin 500 mg orally every 8 hours to complete 7 days

GONOCOCCAL IN NEONATES

Exclude disseminated gonococcal infection by careful physical examination, aspiration of joints and blood and CSF cultures where indicated.

All patients must have careful ophthalmological examination and systemic therapy is essential.

Penicillin sensitive *N. gonorrhoeae*

- Benzylpenicillin 15 mg/kg IV every 12 hours in the first week of life, 7.5 mg/kg IV every 6 hours thereafter for a total of 7 days

Penicillinase producing *N. gonorrhoeae*

- Ceftriaxone 50 mg/kg IV or IM once daily for 7 days

Irrigation of eyes with saline is a useful adjunctive therapy.

Topical antibiotics alone are insufficient and are unnecessary when appropriate systemic therapy is given.

Treat mother and sexual partner.

GONOCOCCAL OPHTHALMIA IN OLDER CHILDREN AND ADULTS

Gonococcal ophthalmia in adults and children weighing more than 20 kg with non-disseminated disease

- Ceftriaxone 25 mg/kg (max 1 g) IM or IV as a single dose

Irrigation of eyes with saline is a useful adjunctive therapy.

Topical antibiotics alone are insufficient and are unnecessary when appropriate systemic therapy is given.

INFECTIONS IN CHILDREN FOLLOWING CHILD ABUSE

- Ceftriaxone
  - < 45 kg: 125 mg IM as a single dose
  - > 45 kg: 250 mg IM as a single dose

PLUS

- < 9 years: Erythromycin 7.5 mg/kg orally every 6 hours for 7 days
Sexually transmitted infections

> 9 years: Doxycycline 100 mg orally every 12 hours for 7 days

**SYPHILIS**

Irrespective of clinical presentation anyone suspected of having a STI should have a serological test for syphilis. VDRL testing may be negative during primary syphilis therefore treatment should be given to persons presenting with clinical features of primary syphilis (e.g. genital ulcers).

All patients with syphilis should be counseled regarding the risks of HIV and encouraged to be tested for HIV.

**EARLY SYPHILIS – PRIMARY, SECONDARY OR EARLY LATENT SYPHILIS OF LESS THAN 1 YEAR DURATION**

- Benzathine penicillin 2.4 million units IM as a single dose
  - OR if hypersensitive to penicillin and non-pregnant
- Doxycycline 100 mg orally every 12 hours for 2 weeks
  - OR if hypersensitive to penicillin and pregnant
- Erythromycin 500 mg orally every 6 hours for 2 weeks

Patient should be re-examined clinically and serologically at 3 months and 6 months.

Patients should have a CSF examination and repeat treatment if either:

1. VDRL titres have not declined fourfold by 3 months in primary or secondary syphilis or by 6 months in early latent syphilis
2. Signs or symptoms persist and re-infection has been ruled out

**HIV INFECTED PATIENT WITH SYPHILIS**

Initial treatment for early syphilis as above.

Patients must be followed up with repeat VDRL testing at 1, 2, 3, 6 and 12 months. Any patient with a four-fold increase in titre at any time should have a CSF examination and treated accordingly.

**LATE LATENT SYPHILIS – MORE THAN 1 YEAR’S DURATION**

Gummas and cardiovascular syphilis

- Benzathine penicillin 2.4 million units IM as a single dose each week for 3 consecutive weeks
  - OR if hypersensitive to penicillin and non-pregnant
- Doxycycline 100 mg orally every 12 hours for 30 days
OR if hypersensitive to penicillin and pregnant

- Erythromycin 500 mg orally every 6 hours for 30 days

Follow up with repeat VDRL at 6 and 12 months. Patients should be evaluated for neurosyphilis if neurological signs or symptoms are present or if there has been treatment failure (serologically or clinically).

### NEUROSYPHILIS

- Benzylpenicillin 1.2 – 2.4 g IV every 4 hours for 10 – 14 days
  FOLLOWED BY
- Benzathine penicillin 2.4 million units IM once weekly for 3 consecutive weeks

If hypersensitive to penicillin contact a specialist for advice.

If CSF pleocytosis is present initially, repeat CSF examination (VDRL and cell count) every 6 months until the cell count is normal. Re-treat if no decrease in cell count at 6 months or if it is not normal by 2 years.

### SYPHILIS IN PREGNANCY

Pregnant women should be screened early in pregnancy at the first antenatal clinic visit. Screening should be repeated in the third trimester and again at delivery.

Patients should be treated with the penicillin regimen appropriate for the stage of syphilis EXCEPT FOR EARLY SYPHILIS that should be treated as follows

- Benzathine penicillin 2.4 million units IM given as one dose per week for 3 weeks
  OR
- Procaine penicillin 1.2 million units IM once daily for 10 – 14 days (especially after 20 weeks gestation)

OR if hypersensitive to penicillin

- Erythromycin 500 mg orally every six hours for 2 weeks

**Pregnant women should NOT be treated with doxycycline**

Following treatment monthly VDRL testing should be done for the duration of pregnancy.

A repeat course is indicated if

i. The sexual partner was not treated simultaneously
ii. The titre is not falling within 6 weeks

### INFANTS OF VDRL POSITIVE MOTHERS
Infants should be treated if any one of the following is present:

**In mothers**

1. Syphilis untreated or inadequately treated during pregnancy
2. Syphilis during pregnancy treated with non-penicillin regimen
3. Syphilis during pregnancy treated with an appropriate regimen but the expected decrease in VDRL antibody titres did not occur after therapy
4. Syphilis treated less than one month prior to delivery
5. Undocumented syphilis treatment
6. Syphilis treated before or during pregnancy but with insufficient serological follow up during pregnancy to assess the response to treatment and current infection status

**In infants**

1. Any evidence of active disease (revealed by physical or x-ray findings)
2. VDRL titres at higher levels than in the mother
3. Baby is positive in FTA-Abs-IgM test

If there is no evidence (physical or x-ray) of congenital syphilis but mother or infant has one of the above-mentioned features:

- Procaine penicillin 50,000 units/kg IM once daily for 10 – 14 days
- OR
- Benzathine penicillin 50,000 units/kg IM once a week for 3 consecutive weeks

Repeat VDRL every 3 months until VDRL is negative. Repeat treatment if it remains positive.

**CONGENITAL SYPHILIS**

When a baby has any of the following features it is considered to have congenital syphilis

1. Clinical signs of syphilis
2. X-ray changes
3. Neurological manifestations

CSF VDRL test, cell count and protein estimation should be done in such babies

If any of the following abnormalities indicating neurosyphilis exist

i. CSF VDRL is reactive
ii. Leucocyte count is >5/mm³
iii. Protein >400 mg/L

**Treat**

- Benzylpenicillin 30 mg/kg IV every 12 hours for the first 7 days of life, then 30 mg/kg IV every 8 hours for a total of 14 days
Sexually transmitted infections

If CSF findings are negative (congenital syphilis without neurosyphilis) treat as above for 10 days and repeat VDRL at 3 months. If CSF was initially positive, repeat VDRL at 3 and 6 months. If patient does not respond to treatment, re-treat or consider neurosyphilis.

OLDER INFANTS AND CHILDREN

Congenital syphilis or neurological involvement

- Benzylpenicillin 30 mg/kg (max 2.4 g/dose) IV every 4 - 6 hours for 10 - 14 days

Definite acquired syphilis and no neurological involvement

- Benzathine penicillin 50,000 units/kg (max 2.4 mega units/dose) IM as a single dose

Evaluate this patient group for sexual abuse.

SEX PARTNERS

Trace and treat contacts wherever possible as appropriate for the stage of the disease

HERPES SIMPLEX VIRUS (HSV) INFECTION

PRIMARY GENITAL HERPES

- Acyclovir 400 mg orally every 8 hours for 5 days

SEX PARTNERS

Evaluate sex partners for genital lesions and treat

Patient and partners should be counseled regarding the natural history of the disease with emphasis on the potential for recurrences.

Advise abstinence from sexual activity while lesions are present

TRICHOMONIASIS

- Metronidazole 2 g orally as a single dose

Recurrent attacks

- Metronidazole 400 mg orally every 12 hours for 5 days

TRICHOMONIASIS DURING PREGNANCY

For severe infections in the first trimester

- Clotrimazole pessary 500mg PV as a single dose or 100mg PV at night for 5 nights
**Sexually transmitted infections**

*Kiribati Antibiotic Guidelines*

*Metronidazole is contraindicated in the first trimester of pregnancy (Cat B2) and the safety in the last two trimesters of pregnancy is not proven.*

For patients with severe symptoms who are resistant to clotrimazole the following may be considered AFTER THE FIRST TRIMESTER

- Metronidazole 2 g orally as a single dose

**SEX PARTNERS**

Require evaluation and treatment

**VULVOVAGINAL CANDIDIASIS**

(NB this is not usually an STI)

- Clotrimazole 500 mg PV as a single dose or 100mg PV at night for 5 nights

Treatment of sex partners is not necessary unless candidial balantitis is present

**BACTERIAL VAGINOSIS – NON-SPECIFIC VAGINITIS, GARDNERELLA VAGINOSIS**

(NB this is not usually an STI)

- Metronidazole 400 mg orally every 12 hours for 7 days

  OR if pregnant (especially in the first trimester) metronidazole should be avoided

- Amoxycillin 500 mg orally every 8 hours for 7 days

Treatment of sex partners may be necessary if the woman has re-current infection

**GENITAL WARTS**

Genital warts are caused by human papilloma virus (HPV). The goal of treatment is removal of exophytic warts and relieving signs and symptoms rather than eradication of HPV.

**EXTERNAL GENITAL / PERIANAL WARTS**

- *Podophyllin 0.5% solution
  - Apply topically to each wart twice daily for 3 days followed by a 4 day break. If necessary repeat cycle weekly for 4 to 6 cycles until the warts disappear.

  *Contraindicated in pregnancy and breastfeeding mothers

**URETHRAL MEATUS WARTS**

Podophyllin regimen as for external genital/perianal warts
**Sexually transmitted infections**

**ANAL WARTS**

Surgical removal

**ORAL WARTS**

Surgical removal or electrocautery

**CHANCROID - *H. DUCCREYI***

Consider as a differential diagnosis of any patient with a painful genital ulcer. Nearly 50% of cases have painful inguinal adenopathy.

- Azithromycin 1 g orally as a single dose
  OR
- Erythromycin 500 mg orally every 6 hours for 7 days
  OR
- Sulphamethoxazole plus trimethoprim 800/160 mg (2 tablets of 400/80 mg) orally every 12 hours for 7 days
  OR
- Amoxicillin plus clavulanic acid 500+125 mg orally every 12 hours for 7 days

Symptomatic improvement is seen within 3 days and resolution of lesions within 7 days. Observe patients until the ulcer is completely healed.

**SEX PARTNERS**

Sex partners within the 3 weeks preceding onset of symptoms in patient, whether symptomatic or not, should be examined and treated with the above recommended regimen.

**LYMPHOGRANULOMA VENEREUM (LGV)**

Caused by LGV serovars of *C. trachomatis*. Inguinal adenopathy is the most common clinical manifestation.

- Doxycycline 100 mg orally every 12 hours for 21 days
  OR
- Erythromycin 500 mg orally every 6 hours for 21 days

**SEX PARTNERS**

Should be treated unless proven to be free from infection.
For the treatment of eye infections there is no place for local steroids unless specifically recommended by a consultant.

**ACUTE BACTERIAL CONJUNCTIVITIS**

It is important to distinguish between viral, allergic and bacterial causes. Bacterial conjunctivitis presents as irritated red eyes with pus discharging.

- Chloramphenicol 0.5% eye drops 1 - 2 drops in each eye every 2 hours for the first day then every 6 hours for a total of one week
  
- Chloramphenicol 1% eye ointment may be used as an alternative at night

Clean eyes with clean salted water before using drops, cool compresses may provide comfort. Advise patients to practice good hygiene (hand washing, washing pillow cases) to reduce the spread of infection.

**TRACHOMA**

Conjunctivitis caused by *Chlamydia trachomatis*

- Azithromycin 1 g orally as a single dose (child: 20mg/kg as a single dose)
  
  OR if azithromycin is unavailable use

- Tetracycline 1% eye ointment twice a day in both eyes for a minimum of 6 weeks. Repeat if necessary after an interval of six months for another 6 weeks.

**EYE LID INFECTIONS – STYE OR TARSAL CYSTS**

No antibiotic therapy is necessary unless there are signs of infection. Warm compresses can be helpful and should be used until the hordeolum points and spontaneously discharges.

If infected:

- Chloramphenicol 1% eye ointment every 6 to 8 hours
  
  PLUS if severely infected add

- Cloxacillin 500mg orally every 6 hours for 7 days
  
  OR if hypersensitive to penicillin

- Erythromycin 500 mg orally every 6 hours for 7 days

**CORNEAL INFECTION**

Corneal ulcer with or without pus in the anterior chamber
• Gentamicin 0.3% eye drops every half hour in affected eye with active ulceration, reduce frequency when improvement occurs

PLUS if there is active corneal ulceration

• Atropine 1% eye drops must be applied 3 times a day

Treatment may be supplemented with subconjunctival injection if pus is present in the anterior chamber, if possible an ophthalmologist should give this injection.

Review antibiotic choice when organism sensitivity is known.

If gentamicin is not available, poly-antibiotic or chloramphenicol eye drops may be used.

**DENDRITIC CORNEAL ULCERATION**

Aetiology is herpes simplex virus

• Acyclovir 3% eye ointment applied every 3 hours during waking hours and every 4 hours at night, continue for 14 days or at least 3 days after complete healing

OR

• Idoxuridine 0.1% eye drops applied every hour during waking hours and every 2 hours at night

Antibiotic eye drops have no place in the treatment of this condition

**INJURIES**

**NON-PERFORATING EYE INJURIES WHERE CORNEA IS NOT INVOLVED**

If not infected

• Chloramphenicol 0.5% eye drops at least 4 times a day during waking hours for up to 7 days

If infected (sticky discharge)

• Treat as per acute conjunctivitis

**CORNEA INVOLVED, WITHOUT INFECTION**

• Chloramphenicol 1% eye ointment as a single application and eye pad changed daily until cornea is healed. Healing should take place within days.

**CORNEA INVOLVED AND INFECTION PRESENT**

Suggested by corneal opacification around injury, redness and discharge

• Treat as per corneal ulcer, the addition of chloramphenicol ointment may be considered
**ORBITAL CELLULITIS**

This is a serious infection requiring referral to an ophthalmologist and specialised care

- Cloxacillin 2 g IV every 6 hours
  PLUS
- Gentamicin 4-6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)

PLUS if response is inadequate add

- Ampicillin 2 g IV every 6 hours

OR if hypersensitive to penicillin

- Change cloxacillin or ampicillin to chloramphenicol 1 g IV every 6 hours

**OPHTHALMIA NEONATORUM**

See page 68
12. Dental and oral infections

ACUTE DENTO-ALVEOLAR INFECTIONS – ABSCESSES AND PERIODONTAL INFECTIONS

Odontogenic infections require clinical dental management to remove the source of the infection. Antibiotics should be considered only when the infection has spread beyond the confines of the jaw and has produced facial swelling, or when there are systemic symptoms and fever.

ABCESS WITHOUT CELLULITIS

- Phenoxymethylpenicillin 500 mg orally every 6 hours for 5 days
- Amoxicillin 500 mg orally every 8 hours for 5 days
  OR if hypersensitive to penicillin
- Erythromycin 500 mg orally every 6 hours for 5 days

ABCESS WITH CELLULITIS

- Phenoxymethylpenicillin 1 g orally as a single dose, then 500 mg orally every 6 hours for 7 days
  OR
- Amoxicillin 500 mg orally every 8 hours for 7 days
  OR if hypersensitive to penicillin
- Erythromycin 500 mg orally every 6 hours for 7 days

PLUS any of the above with

- Metronidazole 400 mg orally every 12 hours for 7 days

Severe infection

- Benzylpenicillin 600 mg IV every 4-6 hours
  OR
- Ampicillin 1 g IV every 4-6 hours
  OR if hypersensitive to penicillin consider using
- Erythromycin 1 g orally every 6 hours

PLUS any of the above with

- Metronidazole 500 mg IV every 12 hours for 7 days

PERICORONITIS – INFECTION OF GUMS AROUND TEETH

- Metronidazole 400 mg orally every 12 hours for 5 days

PLUS EITHER

- Phenoxymethylpenicillin 500 mg orally every 6 hours for 5 days
Dental and oral infections

OR

• Amoxycillin 500 mg every 8 hours for 5 days

PLUS

• Chlorhexidine 0.2% aqueous solution mouthwash

If mouthwash is not available use warm salted clean water

ACUTE NECROTISING ULCERATIVE GINGIVITIS

• Metronidazole 400 mg orally every 12 hours for 7 days
  PLUS
• Peroxide or perborate mouth rinse 3 times a day – held in mouth for 2 minutes
  PLUS
• Chlorhexidine 0.2% aqueous solution mouthwash 3 times a day

If either mouthwash is not available use warm salted clean water.

Scaling, oral hygiene and appropriate pain relief are also important.

In severe cases, phenoxymethylpenicillin 500 mg orally every 6 hours for 5 days should be added to the above regimen.

ORAL ULCERS

• Antiseptic oral rinse (e.g. chlorhexidine 0.2% aqueous solution mouthwash) 3 times per day for 7-14 days
  PLUS
• Topical use of analgesic/anaesthetic gel (e.g. choline salicylate)
  PLUS
• Triamcinolone 0.1% in Orabase 2-3 times per day for 7-14 days

If none of the above are available gargle with warm salted clean water

CANDIDIASIS

• Nystatin suspension 100,000 IU/ml orally, swish and swallow 1 to 5 ml 4 times per day for 7-14 days

For severe infections requiring systemic therapy consider griseofulvin

FACIAL FRACTURES – INVOLVING MUCUS MEMBRANES

• Phenoxymethylpenicillin 500 mg orally every 6 hours for 7 days
  ○ Consider giving suspension if patient is unable to swallow tablets

OR if parenteral treatment is considered necessary

• Procaine penicillin 1.2 million units IM once daily for 5 days

OR if hypersensitive to penicillin
• Erythromycin 500 mg (up to 1 g if severe) orally every 6 hours for 7 days

Antiseptic mouthwash (e.g. chlorhexidine 0.2% aqueous solution) for 4-6 weeks and analgesics should be used as required. If mouthwash is not available use warm salted clean water.

**DENTO-ALVEOLAR SURGERY – TOOTH EXTRACTION, CYST REMOVAL ETC**

Indications for antibiotic therapy:

I. Signs of infection e.g. fever
II. Excessive trauma during surgery

• Phenoxymethylpenicillin 500 mg orally every 6 hours for 5 days

  OR if hypersensitive to penicillin

• Erythromycin 500 mg orally every 6 hours for 5 days

Analgesics, anti-inflammatory and decongestant therapy should be used as required

**PATIENTS WITH VALVULAR HEART DISEASE REQUIRING PROPHYLAXIS**

See page 84
### 13. Antibiotic prophylaxis for medical conditions

#### Kiribati

**Antibiotic Guidelines**

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**HEPATITIS B IMMUNISATION**

**PRE-EXPOSURE**

Indications for immunisation:

1. All newborns
2. Those at risk of contracting infection (e.g. health care workers)
3. Sexual partners of HBsAg positive individuals

In these cases, a full course of Hepatitis B vaccine should be administered. The vaccine is given at 0, 1 and 6 months (except for infants – refer to immunisation schedule pg 29). For dosage refer to manufacturer’s instructions.

**POST-EXPOSURE**

Following needle stick injury, mucosal or broken skin contamination by bodily fluids the following applies:

- Test the exposed person and the donor of contaminating blood (patient*) for HBsAg and Anti-HBsAg

<table>
<thead>
<tr>
<th>EXPOSED PERSON</th>
<th>STATUS</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full course of Hepatitis B vaccine with seroconversion within past 5 years</td>
<td>Protected</td>
<td>No prophylaxis needed</td>
</tr>
<tr>
<td>HBsAg positive</td>
<td>Already infected</td>
<td>No prophylaxis needed</td>
</tr>
<tr>
<td>Anti-HBsAg positive</td>
<td>Protected</td>
<td>No prophylaxis needed</td>
</tr>
<tr>
<td>HBsAg and anti-HBsAg negative</td>
<td>Susceptible</td>
<td>Vaccinate Add immunoglobulin if:</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Patient* is HBsAg positive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Status of the patient* is unknown</td>
</tr>
</tbody>
</table>

**Hepatitis B immunoglobulin is not currently available in Kiribati but if it is available:**

In cases where immunoglobulin is indicated:

- A single dose should be given intramuscularly within 7 days but preferably within 48 hours of exposure. The adult dose is 400 international units.

Neonates of mothers who are HBsAg positive:
• All such neonates should receive immunoglobulin in addition to vaccination. The immunoglobulin should be given within 48 hours of birth. Refer to manufacturer’s instructions for dose.
• A full course of Hepatitis B vaccine should be given starting at the same time as the immunoglobulin. Refer to the manufacturer’s instructions for dose.

**HIV - POST NEEDLESTICK INJURY PROPHYLAXIS**

If the source of the inoculated blood or body fluids is HIV antibody positive, post exposure prophylaxis with antiretrovirals should be commenced as soon as possible and the recipient followed up for at least 6 months. If the source patient is also at a high risk of HIV then prophylaxis is also warranted. Antiretroviral therapy should be commenced as soon as possible following the injury, preferably within 4 hours of the exposure and no more than 72 hours after exposure. For further details see pg 94.

• Zidovudine 300 mg orally every 12 hours for 4 weeks
  PLUS
• Lamivudine 150 mg orally every 12 hours for 4 weeks

**MENINGOCOCCAL AND H. INFLUENZAE MENINGITIS**

Despite prophylaxis disease can still occur.

Indications for prophylaxis:

1. Close contacts of the index case
2. In epidemics- classroom and other institutional contacts
3. Contacts who are younger than 4 years old
4. Index case before discharge from hospital to eradicate nasopharyngeal carriage

Note: For *Haemophilus influenzae* meningitis the immunisation status of the contacts should be taken into consideration.

**H. INFLUENZAE CONTACTS**

Adult

• Rifampicin 600 mg orally once daily for 4 days

Infants and children (over 4 weeks of age)

• Rifampicin 10 mg/kg (max 600 mg) orally once daily for 4 days

**MENINGOCOCCAL CONTACTS**

Adult
Antibiotic prophylaxis for medical conditions

- Rifampicin 600 mg orally every 12 hours for 2 days
  OR
- Ceftriaxone 250 mg IM as a single dose
  OR
- Ciprofloxacin 500 mg orally as a single dose

Infants and children (over 4 weeks of age)
- Rifampicin 10 mg/kg (max 600 mg) orally every 12 hours for 2 days
  OR
- Ceftriaxone 125 mg IM as a single dose

PREVENTION OF RECURRENT OF RHEUMATIC FEVER

Continuous antimicrobial prophylaxis against *Streptococcus pyogenes* infection is recommended for patients with a documented history of rheumatic fever. Intramuscular administration is preferred, especially in remote areas, as it is more effective and usually leads to better compliance.

NO CARDiac INVOLVEMENT

Treat for 5 years or up to 18 years of age

- Benzathine penicillin 1.2 million units IM every 3-4 weeks
  OR
- Phenoxymethylpenicillin 250 mg orally every 12 hours
  OR if hypersensitive to penicillin
- Erythromycin 250 mg orally every 12 hours

CARDiac INVOLVEMENT

Treat as above but until at least 40 years of age. In cases of severe carditis or moderate to severe residual valve disease (including those who have had valve surgery) prophylaxis should be given for life.

If there is evidence of initial cardiac involvement with subsequent resolution, then antibiotic prophylaxis is recommended up until 25 years of age.

PREVENTION OF INFECTIVE ENDOCARDITIS

Prophylaxis for endocarditis is an accepted but unproven practice. The recommendations listed below are based on current international practice. The need for prophylaxis depends on the cardiac condition of the patient and the likelihood of significant bacteraemia being caused by the surgery.

Prophylaxis should be considered in all patients with structural heart disease undergoing surgical procedures and should be give in addition to other antibiotics for surgical prophylaxis.
**Antibiotic prophylaxis for medical conditions**

**LOW RISK PATIENTS (WITHOUT PROSTHETIC VALVES OR PREVIOUS ENDOCARDITIS) UNDERGOING LOW RISK PROCEDURES (DENTAL, ORAL, UPPER RESPIRATORY TRACT)**

**Under local anaesthetic**

- Amoxicillin 3 g orally 1 hour prior to procedure THEN 1.5 g 6 hours after initial dose

  OR if hypersensitive to penicillin or receiving long term penicillin

- Erythromycin 1 g orally 2 hours prior to procedure THEN 500 mg 6 hours after procedure

**Under general anaesthetic**

- Ampicillin 2 g IV just prior to procedure commencing or IM 30 minutes before procedure commences
  
  THEN

- Ampicillin 500 mg IV/IM OR amoxicillin 500 mg orally 6 hours later

  OR if hypersensitive to penicillin or receiving long term penicillin

- \(^*\)Vancomycin 1 g IV infusion (slowly over at least 1 hour) finishing just prior to procedure commencing

**LOW RISK PATIENTS UNDERGOING HIGH RISK PROCEDURES (GASTROINTESTINAL, GENITOURINARY, OTHER MAJOR SURGERY) AND HIGH RISK PATIENTS (PROSTHETIC VALVES, PREVIOUS INFECTIVE ENDOCARDITIS) UNDERGOING ANY PROCEDURE**

- Ampicillin 2 g IV just prior to procedure commencing OR IM 30 minutes before procedure commences
  
  THEN

- Ampicillin 500 mg IV/IM OR amoxicillin 500 mg orally 6 hours later

  OR if hypersensitive to penicillin or receiving long term penicillin

- \(^*\)Vancomycin 1 g IV infusion (slowly over at least 1 hour) finishing just prior to procedure commencing

**POST SPLENECTOMY PROPHYLAXIS**

**IMMUNISATIONS**

\(^*\)Pneumococcal vaccine should be given every 5 years and HiB vaccine is recommended once only if the individual has not yet been immunised. For elective splenectomy vaccination should be given two weeks prior to surgery.
Antibiotic prophylaxis for medical conditions

**ANTIBIOTICS**

Prophylaxis should be assessed for each patient individually. Those at the highest risk include children, the two years following splenectomy and those associated with severe underlying immunosuppression. Prophylaxis should be given for at least the first two years but the risk of bacterial sepsis remains life long.

- Penicillin V 250 mg orally every 12 hours
  OR if hypersensitive to penicillin
- Erythromycin 250 mg orally once daily

**MALARIA**

Malaria is not currently found in Kiribati but patients travelling to other countries where malaria is endemic may require prophylaxis. Personal protection against mosquito bites is essential, even when taking chemoprophylaxis and helps prevent other mosquito borne diseases such as Dengue Fever. The use of mosquito nets, repellants and long clothing is recommended. Patients should be counseled that prophylaxis does not provide absolute protection and be educated on recognising the signs and symptoms of malaria and where to seek treatment.

The drug choice for chemoprophylaxis depends on resistance, side effects, availability and patient factors.

**Duration**

Prophylactic drugs should be commenced at least one week prior to travel to an endemic area. The drugs should be continued for the duration of stay and for a minimum of 4 weeks, preferable 6 weeks, after leaving an endemic area.

Any illness within a year of return, especially within 3 months may be malaria and should be investigated.

**PROPHYLAXIS IN AREAS OF CHLOROQUINE RESISTANT P. FALCIPARUM (PNG, SOLOMON ISLANDS, VANUATU)**

**Adults**

- 5 Mefloquine 250 mg orally once weekly
  OR
- Chloroquine 300 mg (base) orally once weekly
  PLUS
- Proguanil 200 mg orally once daily
  OR
Antibiotic prophylaxis for medical conditions

- Doxycycline 100 mg orally once daily

NB. Mefloquine may cause neuropsychiatric side effects, can have antagonistic effects on anticonvulsants and is not safe in pregnancy. It is contraindicated in patients with epilepsy, history of psychiatric disorders and must be avoided during pregnancy and 3 months prior to conception.

Doxycycline is also contraindicated in pregnancy.

Children

Prophylaxis is essential for infants and children even if breastfed. Tablets may be broken and crushed and mixed with soft food. Doses should be rounded to the nearest portion of a tablet where possible for ease of administration.

Children over 3 months or 5 kg:

- Mefloquine 5 mg/kg (max 250 mg) orally once a week

OR

From birth:

- Chloroquine 5 mg/kg (max 300 mg) orally once a week
  PLUS
- Proguanil 3 mg/kg (max 200 mg) orally once a day
14. Antibiotic prophylaxis and treatment for surgery

Surgical Antibiotic Prophylaxis - Principles

Surgical procedures that do not traverse areas with normal flora, other than the prepared skin, do not routinely require prophylaxis.

Prophylaxis should be considered where:

1. There is significant risk of infection
2. Infection although uncommon would have severe consequences

Sufficient concentration of drugs should be available in the tissues at the time of exposure. IM antibiotics should be given 30 minutes to one hour prior to exposure and IV antibiotics should be given at induction. Oral or rectal formulations should be given 2 – 4 hours preoperatively.

Antimicrobial prophylaxis should only be a single dose in most cases. Giving more than one dose is not advised except where it is specifically recommended such as:

i. When there is a delay in commencing the operation
ii. The operation is prolonged and the antibiotic has a short half life

Antibiotic choice is guided by the likely source of infection and a drug that covers these bacteria is chosen. All pre-existing infections should be treated before surgery.

In some conditions such as appendectomy surgery is performed because of an infection. In these cases the patient may have already had some doses of antibiotic and will continue to be treated with antibiotics after surgery. In these cases antibiotics given during surgery should be considered as ‘treatment’ rather than ‘prophylaxis’.

Orthopaedics

Clean Procedure

- Cephalothin 2 g IV
  OR
- Cloxacillin 2 g IV

Give at the time of induction for procedures involving the insertion of prosthetic or transplant material and internal fixation of fractures of large bones. Allow 5 minutes to elapse between administration of antibiotics and application of tourniquet.

Compound Fractures (Classified as “Dirty”)

- Cloxacillin 2 g IV every 6 hours
  PLUS
- Gentamicin 4 -6 mg/kg IV as a first dose, calculate subsequent doses based on renal function (see pg 9)
Antibiotic prophylaxis and treatment for surgery

OR use as monotherapy

- Cephalothin 2 g (child 50 mg/kg) IV every 6 hours

Duration of therapy may vary and is up to the discretion of the treating doctor. If there is no sign of infection antibiotics may only be required for 24 hours.

Consider benzylpenicillin if the wound is suspected to be contaminated with *C. perfringens*.

Add metronidazole if there is perineal involvement.

Tetanus toxoid should be given if patient’s last immunisation was not within the last 5 years.

**GENITO-URINARY SURGERY**

Patients should be shown to have sterile urine pre-operatively. If there is evidence of urinary tract infection the patient should be treated based on the culture and sensitivity results.

If an immediate operation is required and there is **bacteriuria or clinical evidence of a urinary tract infection** give a single dose of gentamicin at the time of induction

- Gentamicin 4 – 6 mg/kg IV

Single dose prophylaxis may be used before prostatectomy at the time of induction to reduce bacteraemia

- Gentamicin 2 mg/kg IV

**CAESARIAN SECTION**

All patients who have had vaginal examination(s) and/or ruptured membranes

- Ampicillin 1 – 2 g IV at induction

OR if any sign of infection is present

- Ampicillin 1 g IV every 6 hours

PLUS

- Gentamicin 4 -6 mg/kg as a first dose, calculate subsequent doses based on renal function (see pg 9)

PLUS

- Metronidazole 500 mg IV every 12 hours

OR if available consider in all patients undergoing caesarean sections

- Cephalothin 2 g IV given immediately after clamping the cord
Other antibiotics may be required as indicated by culture and sensitivity if there is no clinical response.

**ELECTIVE GYNECOLOGICAL SURGERY**

When the vaginal vault is to be opened (e.g. hysterectomy)

- Metronidazole 500 mg IV (over at least 20 minutes) to finish at the time of induction OR 400 mg orally 4 hours prior to surgery

PLUS EITHER

- Ampicillin 1 g IV at induction
  
  OR
  
  Cephalothin 2 g IV at induction

**SELECTIVE GASTRODUODENAL AND BILIARY SURGERY, APPENDICECTOMY, COLORECTAL SURGERY**

- Metronidazole 500 mg (child 12.5 mg/kg) IV (over at least 20 minutes) to finish at the time of induction

PLUS EITHER

- Cephalothin 2 g (child 50 mg/kg) IV at the time of induction
  
  OR
  
  Gentamicin 2 mg/kg IV at the time of induction

In low risk surgery metronidazole is not necessary.

In major colorectal surgery a second dose of metronidazole may be required 4 – 6 hours post-induction.

For appendectomy with gangrene, perforation or abscess, follow with a therapeutic course of ampicillin, gentamicin and metronidazole for approximately 7 days.

**NEUROLOGICAL SURGERY**

Use of prophylaxis is indicated for prolonged procedures, re-explorations and microsurgery.

- Cephalothin 2 g IV at time of induction
  
  OR
  
  Cloxacillin 2 g IV at time of induction

**OROPHARYNGEAL AND THORACIC SURGERY**

- Cephalothin 2g IV at time of induction

Add metronidazole if there is a risk of anaerobic infection
Antibiotic prophylaxis and treatment for surgery

VASCULAR SURGERY

Indicated for arterial reconstructive surgery involving the abdominal aorta and/or the lower limb particularly if a groin incision is involved or if there is implantation of prosthetic material

- Gentamicin 2 mg/kg IV at time of induction
  PLUS
- Cloxacillin 2 g IV at time of induction

OR

- Cephalothin 2 g IV at induction as a single agent

LOWER LIMP AMPUTATION – FOR ISCHAEMIA OR SEPSIS

- Benzylpenicillin 1.2 g (child 30 mg/kg) IV every 6 hours to commence at induction and continue for 48 hours
  PLUS
- Metronidazole 500mg (child 12.5 mg/kg) IV at induction FOLLOWED BY 500 mg IV or 400 mg orally every 12 hours hours for 48 hours

PLUS in amputations for diabetic sepsis add

- Gentamicin 2 mg/kg IV at induction followed by 240 mg IV daily for 48 hours, calculate subsequent doses based on renal function (see pg 9)

PROPHYLAXIS FOR PATIENTS AT RISK OF INFECTIVE ENDOCARDITIS

See page 83
All confirmed cases of tuberculosis in Kiribati are treated under the DOTS (Directly Observed Treatment Short course) program. This involves an intensive phase of in hospital treatment for 2 to 3 months then a continuation phase for approximately 4 months at home that is monitored by a supervisor. Diagnosis of tuberculosis should be based on smear examination, culture, x-ray and if indicated tissue biopsy. Treatment of tuberculosis consists of a multi-drug regimen for at least 6 months. Most tuberculosis cases present as pulmonary tuberculosis but other types do occur.

Baseline renal and liver function test should be performed prior to the commencement of treatment and visual acuity must be assessed if ethambutol is used.

For further information on tuberculosis treatment, including multi drug resistant tuberculosis consult the TB team at Tungaru Central Hospital and the WHO Tuberculosis Treatment Guidelines.

**STANDARD SHORT COURSE THERAPY**

Standard short course therapy usually renders a patient non-infectious within 2 weeks of starting therapy and produces a cure in approximately 98% of cases.

This treatment is for pulmonary tuberculosis. Patients with other forms of tuberculosis will need extended treatment and advice as to the specific regimen should come from the TB consultant.

The doses listed below are all **once daily oral doses** and are for patients weighing > 50 kg. For paediatric treatment seek advice from the TB consultant. All **medicines should be taken together as a single daily dose 30 minutes before breakfast**. These drugs are available as combination treatment packs.

**NEW PATIENT**

**Intensive phase** – 2 months duration

- Rifampicin 10 mg/kg (max 600 mg)
- Isoniazid 5 mg/kg (max 300 mg)
- Pyrizinamide 25 mg/kg (max 2 g)
- Ethambutol 15 mg/kg (max 800 mg)
- Pyridoxine 25 mg

**Continuation phase** – 4 months duration

- Rifampicin 10 mg/kg (max 600 mg)
- Isoniazid 5 mg/kg (max 300 mg)
- Pyridoxine 25 mg

**RETREATMENT – THE PATIENT HAS BEEN TREATED FOR TUBERCULOSIS IN THE PAST**
Tuberculosis

**Intensive phase** – 3 months duration

- Rifampicin 10 mg/kg (max 600mg)
- Isoniazid 5 mg/kg (max 300 mg)
- Pyrizinamide 25 mg/kg (max 2 g)
- Ethambutol 15 mg/kg (max 800 mg)
- Pyridoxine 25 mg
- Streptomycin 15 mg/kg (max 1 g) given IM for 2 months only

**Continuation phase** – 5 months duration

- Rifampicin 10 mg/kg (max 600 mg)
- Isoniazid 5 mg/kg (max 300 mg)
- Ethambutol 15 mg/kg (max 800 mg)
- Pyridoxine 25 mg

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**TREATMENT OF EXTRA-PULMONARY TUBERCULOSIS**

This is more difficult to diagnose than pulmonary disease and often requires invasive procedures to obtain diagnostic specimens. Patients with this form of the disease are not infectious unless they also have pulmonary involvement. The drug regimen is the same as for pulmonary tuberculosis but is of longer duration and surgery may also be required.

Corticosteroids are essential in the treatment of tuberculous pericarditis and may be of benefit in the first few weeks of treatment of tuberculosis meningitis.

---

**CHEMOPROPHYLAXIS**

Treatment of latent tuberculosis infection will prevent development of the disease. Consider treatment in:

i. Adults with strongly positive tuberculin reaction (> 15 mm induration or > 10 mm with blisters)
ii. Immunosuppressed contacts with evidence of previously untreated inactive tuberculosis
iii. Children exposed to or born to smear positive patients or mothers suffering infectious tuberculosis

- Isoniazid 10 mg/kg (max 300 mg) orally once daily for 6 to 9 months PLUS
- Pyridoxine 25 mg orally once daily (neonates 5 mg, infants 10 mg)

---

**TUBERCULOSIS IN CHILDREN**

When a child contracts tuberculosis it is likely there are infectious adult contacts. The BCG vaccine is given at birth to protect children from severe manifestations of the disease.
Diagnosis is dependent on history, chest x-ray and positive Mantoux test.

Standard short course therapy can be used to treat children (drug doses should be calculated according to weight). Children under the age of 6 years will not be able to report visual symptoms therefore ethambutol is usually omitted from the regimen.

**TREATMENT REGIMENS IN SPECIAL SITUATIONS**

**PREGNANCY AND BREASTFEEDING**

Most anti-tuberculosis drugs are safe for use in pregnancy. Streptomycin is pregnancy category D and may cause ototoxicity in the foetus. Rifampicin is pregnancy category C but is still recommend for use during pregnancy if precautions are taken to avoid rifampicin induced hypothrombinaemia in the newborn.

All anti-tuberculosis drugs recommended in these guidelines are safe to use during breastfeeding and mothers are encouraged to continue breastfeeding during treatment. The child should be given prophylaxis with isoniazid for at least 3 months after the time the mother is considered non-infectious. BCG vaccination of the newborn should be postponed until the completion of isoniazid prophylaxis. If the baby is receiving isoniazid prophylaxis or is being breastfed by a mother receiving isoniazid they should receive pyridoxine 5 mg once daily.

**ORAL CONTRACEPTIVES**

Rifampicin reduces the efficacy of the oral contraceptive pill and another form of contraception is advisable.

**LIVER DISORDERS**

Liver function should be assessed before commencement of therapy. In the presence of pre-existing liver disease or if AST/ALT is more than twice the normal range; regular monitoring of liver function is essential. If the patient develops jaundice or AST and ALT rise more than 5 times above the normal level, treatment should be ceased and only streptomycin and ethambutol should be continued.

**RENAL FAILURE**

Isoniazid, rifampicin and pyrazinamide are safe to use. Streptomycin and ethambutol require dose adjustment and monitoring of renal function.

**HIV INFECTION**

Standard short course therapy may be prolonged to 9 months in HIV infected individuals. Drug interactions and adverse drug reactions are common.
Infections due to methicillin resistant staphylococci aureus (MRSA) are becoming an issue in Kiribati and measures should be taken to prevent it from developing. It is important that if the infection does occur that it is fully eradicated. The drug of choice for treating serious MRSA infection is vancomycin, however, it is expensive, is not readily available, no facilities are available for measuring levels in Kiribati and it is not efficient in eradicating the organisms from carriage sites such as the pharynx, nares and gut.

For treating serious infections (septicaemia, endocarditis etc.) IV vancomycin is the therapy of choice and should be given according to the dosage regimens outlined in earlier chapters. If vancomycin is not available, and in conditions such as diabetic foot ulcers due to MRSA, a combination of rifampicin with another anti-staphylococcal drug such as fusidic acid may be used. Resistance to rifampicin develops during treatment so this drug should never be used alone. The choice of these drugs should be based on culture and sensitivity results. In all cases of MRSA consult a microbiologist for advice.

- Rifampicin 600 mg orally once daily (child: 10-20mg/kg once daily)
  PLUS
- Fusidic acid 500 mg orally every 8-12 hours for 2 weeks

Some patients may not tolerate this regimen and other combinations may have to be tried.

There is also some evidence for using:

- Trimethoprim plus sulphamethoxazole 160+800 mg orally every 12 hours
  OR
- Doxycycline 100 mg orally every 12 hours

For clearance of MRSA carriage topical application of mupirocin ointment may be useful. Consider eradication of contacts using nasal ointment where possible

**LEPTOSPIROSIS**

Less serious infections with leptospira will resolve without antibiotics. In more severe case the following is recommended:

- Benzylpenicillin 1.2 g IV every 6 hours for 7 days
  OR
- Doxycycline 100 mg orally every 12 hours for 7 days

NB. Chloramphenicol is not effective.
**FILARIASIS**

**TREATMENT OF LYMPHATIC FILARIASIS**

Adults and children > 10 years

- Diethylcarbamazine 1 mg/kg as a single dose on the first day, increase dose gradually over 3 days to 6 mg/kg daily in divided doses orally after meals for 12 days

Recommended regimen:

<table>
<thead>
<tr>
<th>Day</th>
<th>Dose</th>
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<th>Midday</th>
<th>Evening</th>
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<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>1 mg/kg</td>
<td>1 mg/kg</td>
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<tr>
<td>3</td>
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<td>4 to 12</td>
<td>2 mg/kg</td>
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<td>2 mg/kg</td>
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</tbody>
</table>

Children < 10 years give half the adult dosage

Diethylcarbamazine must not be used in pregnancy

Dosage of diethylcarbamazine is slowly increased over 3 days to avoid the danger of immunological reactions

**COMMUNITY ERADICATION**

In communities where filariasis is endemic annual administration of treatment is effective for interrupting transmission, this treatment program should continue for at least 5 years

- Albendazole 400 mg orally as a single dose

PLUS

- Diethylcarbamazine 6 mg/kg orally as a single dose
LEPROSY

All cases of leprosy should be referred to the leprosy team. For more information refer to the ‘Leprosy Manual for Health Workers – Kiribati’. Medicines for leprosy are multi drug therapy (MDT) and come in blister packs for patient compliance.

PAUCIBACILLARY (PB)

Each month for a total duration of 6 months:

<table>
<thead>
<tr>
<th></th>
<th>Children &lt; 10 years (adjust dose according to body weight)</th>
<th>10 – 14 years</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 1</strong></td>
<td>Rifampicin 300 mg</td>
<td>Rifampicin 450 mg</td>
<td>Rifampicin 600 mg</td>
</tr>
<tr>
<td></td>
<td>Dapsone 25 mg</td>
<td>Dapsone 50 mg</td>
<td>Dapsone 100 mg</td>
</tr>
<tr>
<td><strong>Day 2 to 28</strong></td>
<td>Dapsone 25 mg</td>
<td>Dapsone 50 mg</td>
<td>Dapsone 100 mg</td>
</tr>
</tbody>
</table>

MULTIBACILLARY

Each month for a total duration of 12 months:

<table>
<thead>
<tr>
<th></th>
<th>Children &lt; 10 years (adjust dose according to body weight)</th>
<th>10 – 14 years</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 1</strong></td>
<td>Rifampicin 300 mg</td>
<td>Rifampicin 450 mg</td>
<td>Rifampicin 600 mg</td>
</tr>
<tr>
<td></td>
<td>Dapsone 25 mg</td>
<td>Dapsone 50 mg</td>
<td>Dapsone 100 mg</td>
</tr>
<tr>
<td></td>
<td>Clofazimine 100 mg</td>
<td>Clofazimine 150 mg</td>
<td>Clofazimine 300 mg</td>
</tr>
<tr>
<td><strong>Day 2 to 28</strong></td>
<td>Dapsone 25 mg</td>
<td>Dapsone 50 mg</td>
<td>Dapsone 100 mg</td>
</tr>
<tr>
<td></td>
<td>Clofazimine 50 mg</td>
<td>TWICE WEEKLY ONLY</td>
<td>EVERY SECOND DAY</td>
</tr>
</tbody>
</table>

HIV / AIDS

All patients who are diagnosed with HIV must be referred immediately to the HIV clinical team for counseling and assessment.

All pregnant women with HIV must be referred to the HIV clinical and PMTCT teams to optimise treatment and care.

Any health worker who may have been exposed to HIV (e.g. needle stick injury) must be referred immediately to the HIV clinical team to assess the need for post exposure prophylaxis. See page 82.
WHEN TO START ANTIRETROVIRAL THERAPY IN ADULTS AND ADOLESCENTS

- HIV positive patient at WHO clinical stage 3 or 4
- HIV positive patient with CD4 count ≤350 cells/mm³
- HIV positive pregnant woman irrespective of the WHO clinical stage or CD4 count
- HIV/TB co-infection (treat TB first before starting ART)
- HIV/hepatitis B co-infection (hepatitis B infection that requires treatment, i.e. chronic active hepatitis)

FIRST LINE ANTIRETROVIRAL DRUG REGIMENS IN ADULTS AND ADOLESCENTS

Standard first line regimen

- Zidovudine (AZT) 300 mg orally twice daily
- Lamivudine (3TC) 150 mg orally twice daily
- *Efavirenz (EFV) 600 mg orally once daily

*Do not initiate efavirenz during the first trimester of pregnancy

Alternative first line regimen

- Zidovudine (AZT) 300 mg orally twice daily
- Lamivudine (3TC) 150 mg orally twice daily
- **Nevirapine 200 mg orally once daily for the first 14 days THEN 200 mg orally twice daily thereafter

**Be cautious of starting NVP in women with CD4 count over 250 cells/mm³ or men with CD4 count over 400 cells/mm³ due to the high incidence of serious hypersensitivity reaction and hepatotoxicity. Close monitoring is advised.

ANTIRETROVIRAL THERAPY IN InfANTS AND CHILDREN

Any HIV positive child less than 2 years of age should be initiated on ART irrespective of the WHO clinical stage or CD4 percentage. HIV positive children between 2-5 years of age should be referred to the HIV care team for assessment before ART initiation and the regimen to be prescribed to the child. Children over 5 years of age may follow adult recommendations.
References


• Drug Doses. Frank Shann, Royal Children’s Hospital, Melbourne. 2008

• Drugs and Pregnancy. Pharmacy Department, The Royal Women’s Hospital, Melbourne. 2006

• eTG Complete. Therapeutic Guidelines Limited, Melbourne. 2008

• Flow Charts for Sexually Transmitted Infections Syndromes and Specific Infections for Kiribati. Oceania Society for Sexual Health and HIV Medicine, Suva. 2010

• Gastrointestinal and Respiratory Drug Guidelines. Ministry of Health and Medical Services, Kiribati. 2007

• Obstetrics, Gynaecology, Paediatrics and Dental Drug Guidelines. Ministry of Health and Medical Services, Kiribati. 2007

• Paediatric Pharmacopoeia 13th Edition. Pharmacy Department, Royal Children’s Hospital, Melbourne. 2005

• TB Drug Treatment Guideline. Ministry of Health and Medical Services, Kiribati. 2011


• WHO Model Formulary for Children. World Health Organisation, Geneva. 2010