African Antibiotic Treatment Guidelines for Common Bacterial Infections and Syndromes

For Neonatal and Pediatric Patients

First Edition (English)

Pending final publication in 2021

Draft for external review.

Not for circulation, reprint, or clinical use.

Prepared by:

The Center for Disease Dynamics, Economics & Policy

Africa Centres for Disease Control and Prevention

Table of Contents

How to use these guidelines 3

Acronyms 4

Recommended Antibiotic Treatment for Common Bacterial Infections & Syndromes 5

Central Nervous System 5
Suspected Acute Bacterial Meningitis (Community-Acquired) 5
Eye, Ear, Nose & Throat 7
Acute Purulent Neonatal Conjunctivitis 7
Acute Otitis Media 8
Pharyngotonsillitis 9
Suspected Acute Bacterial Sinusitis 11
Dental Abscess (Including Acute Necrotising Gingivitis/Periodontitis) 13
Skin & Soft Tissue Infections (Including Impetigo, Cellulitis, Abscesses) 15
Tetanus 16
Cardiac 17
Acute Rheumatic Fever 17
Infective Endocarditis (Native Valve) 19
Bloodstream 21
Sepsis in the Newborn 21
Possible Serious Bacterial Infection in infants younger than 3 months of age (Community-Acquired) 23
Bone & Joint 25
Acute Osteomyelitis & Septic Arthritis 25
Respiratory 28
Acute Lower Respiratory Tract Infection: Mild-Moderate/Ambulatory (Community-Acquired) 28
Acute Lower Respiratory Tract Infection: Severe/Inpatient (Community-acquired) 30
Gastrointestinal 33
Typhoid/Enteric Fever 34
Complicated Intra-Abdominal Infection (Community-Acquired) 35
Urological/Genital Tract 38
Urinary Tract Infection 38
Syphilis (including congenital syphilis) 40

How to use these guidelines

Preferred antibiotic choice, dosage, and duration should be followed when possible. Only defer to alternative treatments if preferred antibiotic choice is not available or there are other compelling reasons precluding the use of the preferred antibiotic.

When step down therapies are recommended, the duration is the total treatment duration including IV therapy.

Definitions of Pediatric Age Groups

Neonate	Less than 28 days old or if born prematurely, less than 42 weeks corrected gestational age
Infant	Less than 1 year of age
Child	Less than 10 years of age
Adolescent	10 – 19 years of age

For patients 20 years and older, refer to the adult treatment recommendations.

List of Acronyms

Pathogens	
A. baumannii	*Acinetobacter baumannii*
C. trachomatis	*Chlamydia trachomatis*
C. tetani	*Clostridium tetani*
E. coli	*Escherichia coli*
H. influenzae	*Haemophilus influenzae*
K. pneumoniae	*Klebsiella pneumoniae*
L. monocytogenes	*Listeria monocytogenes*
M. catarrhalis	*Moraxella catarrhalis*
M. pneumoniae	*Mycoplasma pneumoniae*
N. gonorrhea	*Neisseria gonorrhoeae*
N. meningitidis	*Neisseria meningitidis*
S. Aureus	*Staphylococcus aureus*
S. epidermidis	*Staphylococcus epidermidis*
S. marcescens	*Serratia marcescens*
S. pneumoniae	*Streptococcus pneumoniae*
S. pyogenes	*Streptococcus pyogenes*
S. saprophyticus	*Staphylococcus saprophyticus*
T. pallidum	*Treponema pallidum*
Clinical	
AST	Antimicrobial suspectibility testing
CAP	Community-acquired pneumonia
cIAI	Complicated intrabdominal infection
CMV	Cytomegalovirus
COPD	Chronic obstructive pulmonary disease
CSF	Cerebrospinal fluid
HAP	Hospital-acquired pneumonia
HIV	Human Immunodeficiency Virus
IM	Intramuscular
IV	Intravenous
PO	Oral/by mouth
SSTI	Skin and soft tissue infection
TB	Tuberculosis
UTI	Urinary tract infection
VP	Ventriculoperitoneal
Units of Measure	
g	Gram
IU	International unit
kg	Kilogram
mg	Milligram
mL	Milliliter
MU	Million units

Central Nervous System

<table>
<tr><td colspan="4">Suspected Acute Bacterial Meningitis (Community-Acquired)</td></tr>
<tr><td colspan="4">Clinical definition: Inflammation of meninges of the brain and spinal cord. Clinical features may be non-specific in neonates and young infants (e.g. poor feeding, apathy, jaundice, apnoea, full fontanelle, fever, hypothermia) and in older infants may include irritability, drowsiness, poor feeding, high fever, and/or vomiting. Older children may present similarly to adults with headache, fever, photophobia, vomiting, neck stiffness, and/or altered level of consciousness. Common bacterial pathogens in neonates and young infants include Streptococcus agalactiae (Group B streptococcus), E. coli, Klebsiella species, L. monocytogenes, and in older infants and children: S. pneumoniae, H. influenzae, and N. meningitidis.</td></tr>
<tr><td colspan="4">Neonate</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug(s)</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="2">Combination therapy with:

Cefotaxime (IV)
PLUS
Ampicillin (IV)</td><td>Cefotaxime-
Powder for injection: 250 or 500 mg per vial (as sodium salt)</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8-20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td rowspan="2">Treat with ampicillin (for Listeria coverage) until CSF culture results confirm aetiology. If CSF culture is not available, treat with cefotaxime plus ampicillin for 14 – 21 days.</td></tr>
<tr><td>Ampicillin-
Powder for injection: 500mg, 1g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 100 mg/kg/dose 8 hourly
○ 8 days of age and older: 100 mg/kg/dose 6 hourly</td></tr>
<tr><td colspan="4">If cefotaxime is not available, use</td></tr>
<tr><td rowspan="2">Combination therapy with:

Ceftriaxone (IV)
PLUS
Ampicillin (IV)

(Except in neonates with jaundice and neonates receiving calcium-containing IV fluids)</td><td>Powder for injection: 250 mg; 1 g (as sodium salt) in vial</td><td>50 mg/kg/dose 12 hourly</td><td rowspan="2">Treat with ampicillin (for Listeria coverage) until CSF culture results confirm aetiology. If CSF culture is not available, treat with ceftriaxone plus ampicillin for 14-21 days.</td></tr>
<tr><td>Ampicillin-
Powder for injection: 500mg, 1g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 100 mg/kg/dose 8 hourly
○ 8 days of age and older: 100 mg/kg/dose 6 hourly</td></tr>
<tr><td colspan="4">Infant (Older than 28 days), Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Ceftriaxone (IV)</td><td>Powder for injection: 250 mg; 1 g (as</td><td>50 mg/kg/dose 12 hourly, maximum dose 2 g 12</td><td>10 – 14 days</td></tr>
</table>

	sodium salt) in vial	hourly	
Alternative antibiotic choice only if cefotaxime/ceftriaxone is not available			
Ampicillin (IV)	Powder for injection: 500 mg; 1 g (as sodium salt) in vial	50 mg/kg/dose 6 hourly, maximum dose: 2 g 6 hourly	10 – 14 days
Principles of Stewardship: > Acute meningitis may be caused by a range of pathogens, some of which are not bacteria. Microbiologic diagnosis, including cerebrospinal fluid gram stain/microscopy, bacterial culture, and antibiotic susceptibility testing (AST) should be obtained as soon as possible, if available, as this may allow empiric antibiotic treatment to be adjusted to target the specific pathogen identified and inform the duration of treatment. If cerebrospinal fluid (CSF) is obtained and is not consistent with meningitis, antibiotics should be stopped or adjusted depending on whether an alternative diagnosis has been reached. > Consider diagnostic tests for tuberculous and cryptococcal meningitis, particularly in high HIV-burden areas.			
Other Notes: > Complications include brain abscess which may require neurosurgical intervention in addition to treatment with the above-mentioned antimicrobial therapy. > In children and adolescents with a ventriculoperitoneal (VP) shunt presenting with meningitis, seek expert opinion and refer patient to a specialist where possible.			

Eye, Ear, Nose & Throat

Acute Purulent Neonatal Conjunctivitis			
Clinical definition: Inflammation of the conjunctivae commonly caused by *N. gonorrhoeae*.			
Neonate			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Ceftriaxone (IM)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	50mg/kg STAT as a single dose	Single dose
Principles of Stewardship: > None.			
Other Notes: > Irrigate frequently with saline and treat with topical therapy as needed.			

Acute Otitis Media			
Clinical definition: Acute infection with inflammation of the middle ear. Common symptoms include fever, ear pain,ear discharge and difficulty hearing. Common bacterial pathogens include *S. pneumoniae, H. influenzae,* and *M. catarrhalis*.			
Infant, Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Amoxicillin (PO)[A]	Powder for oral liquid: 125 mg (as trihydrate) /5 mL; 250 mg (as trihydrate) /5 mL Solid oral dosage form: 250 mg; 500 mg (as trihydrate)	40-45 mg/kg/dose 12 hourly, maximum dose 1.5 g 12 hourly	5 – 10 days
For patients who received amoxicillin in the previous 30 days or for those who are non-responsive to first-line treatment with amoxicillin after 48 – 72 hours			
Amoxicillin + clavulanic acid (PO)[A]	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL; 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL. Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).	40 – 45 mg/kg of amoxicillin component per dose 12 hourly, maximum dose of amoxicillin component: 875 mg 12 hourly. (Refer to Other Notes[B] below for guidance on dosing accurately.)	5 – 10 days
In case of confirmed drug allergy or medical contraindication			
Azithromycin[C]	Oral liquid: 200 mg/5 mL. Capsule: 250 mg; 500 mg (anhydrous).	10 mg/kg once daily, maximum daily dose 500 mg	3 – 5 days

Principles of Stewardship:

- Practice watchful waiting and withhold antibiotics except for patients with severe symptoms, those less than 2 years of age, and patients with bilateral disease
- Repeated courses of antibiotics in children with chronic otitis media and/or otorrhoea are ineffective and should be avoided. Expert advice or referral to an ENT specialist and audiologist if available should be considered.

Other Notes:

A. If a patient cannot tolerate oral antibiotics (e.g. persistent vomiting), IV or IM antibiotics may be considered:
   - Ampicillin (25 mg/kg/dose 6 hourly, Maximum dose: 500 mg 6 hourly), or
   - Ceftriaxone (50 mg/kg/dose once daily, Maximum dose: 1 g daily)

B. Current widely available oral liquid formulations contain amoxicillin + clavulanic acid in a 4:1 ratio. To achieve 40-45 mg/kg/dose of amoxicillin component, when using the 4:1 formulation, prescribe amoxicillin + clavulanic acid 10-15 mg/kg/dose of amoxicillin component 12 hourly and separately prescribe amoxicillin 30-35

mg/kg/dose 12 hourly in order not to exceed the maximum recommended dose of clavulanic acid (10 mg/kg/day) thereby reducing the risk of antibiotic-associated diarrhoea.

If oral liquid formulations with a higher dose of amoxicillin are available (7:1 ratio – 400 mg amoxicillin + 57.5 mg clavulanic acid/5 mL, or 14:1 ratio – 600 mg amoxicillin + 42.9 mg clavulanic acid/5 mL), these may be dosed at 40-45 mg/kg dose of amoxicillin component 12 hourly without a separate amoxicillin prescription (the clavulanic acid dose will not be exceeded). If the 7:1 ratio tablet formulation is available (875 mg amoxicillin + 125 mg clavulanic acid clavulanic acid) it may be prescribed 12 hourly for children weighing 25 kg or more.

C. If a patient fails macrolide therapy, consider ceftriaxone or refer to a specialist.

Pharyngotonsillitis			
Clinical definition: Acute inflammation of the pharyngeal wall and tonsils commonly caused by viral pathogens including respiratory viruses and Epstein-Barr virus. Common bacterial etiologies include group A beta-haemolytic Streptococci (*S. pyogenes*). Common symptoms include sore throat and fever.			
Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Amoxicillin (PO)[A]	Powder for oral liquid: 125 mg (as trihydrate)/5 mL; 250 mg (as trihydrate)/5 mL. Solid oral dosage form: 250 mg; 500 mg (as trihydrate).	50 mg/kg once daily, maximum dose 2 g	10 days
Alternative antibiotic choice(s)			
Benzathine benzylpenicillin (IM)[B]	Powder for injection: 900 mg benzylpenicillin (=1.2 million units) in 5 mL vial; 1.44 g benzylpenicillin (=2.4 million units) in 5 mL vial	By weight: ○ <27 kg: 600 000 units (375 mg) as a single dose ○ 27 kg and above: 1.2 million units (750 mg) as a single dose	Single dose
In case of confirmed drug allergy or medical contraindication			
Azithromycin (PO)[C]	Oral liquid: 200 mg/5 mL. Capsule: 250 mg; 500 mg (anhydrous).	10 mg/kg once daily, maximum dose 500 mg daily	5 days
Principles of Stewardship: > Viral and bacterial acute pharyngitis usually resolve without antibiotic treatment but the primary reason for considering antibiotic treatment is to prevent acute rheumatic fever (and to a lesser extent local suppurative complications) > Clinical features that suggest a viral rather than a bacterial cause of pharyngotonsillitis include runny nose, hoarse voice or cry, cough, conjunctivitis, discrete oral ulcerative			

lesions, and diarrhoea. In these cases, avoid antibiotic use.

> Children less than 3 years of age should not receive antibiotics as part of treatment for pharyngotonsillitis as they are not at significant risk for acute rheumatic fever.

Other Notes:

A. If a patient cannot tolerate oral antibiotics (e.g. persistent vomiting), IV or IM antibiotics may be considered:
    - Ampicillin (25 mg/kg/dose 6 hourly, Maximum dose: 500 mg 6 hourly), or
    - Ceftriaxone (50 mg/kg/dose once daily, Maximum dose: 1 g daily)
B. Painful IM administration of benzathine benzylpenicillin may be reduced by dissolving benzathine benzylpenicillin 1.2 million units in 3.2 mL lidocaine 1% without adrenaline (epinephrine) and bringing the preparation to room temperature before injection.
C. Significant rates of resistance of Group A Streptococcus strains to macrolides (azithromycin) and azalides (clarithromycin) have been reported in many parts of the world. If patient fails treatment with a macrolide or azalide, consider ceftriaxone or refer to a specialist.

<table>
<tr><td colspan="4">Suspected Acute Bacterial Sinusitis</td></tr>
<tr><td colspan="4">Clinical definition: Acute bacterial infection of para-nasal sinuses. Common bacterial pathogens include S. pneumoniae, H. influenzae, and M. catarrhalis. Symptoms include a preceding upper respiratory tract infection, fever, nasal congestion, nasal discharge, facial pain and tenderness. Uncommon in children, particularly in young children in whom sinuses are not fully developed.</td></tr>
<tr><td colspan="4">Infant, Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Amoxicillin (PO)[A]</td><td>Powder for oral liquid: 125 mg (as trihydrate) /5 mL; 250 mg (as trihydrate) /5 mL. Solid oral dosage form: 250 mg; 500 mg (as trihydrate)</td><td>40 – 45 mg/kg/dose 12 hourly, maximum dose 1.5 g 12 hourly</td><td>5 – 7 days</td></tr>
<tr><td colspan="4">For patients who received amoxicillin in the previous 30 days, or for those who are non-responsive to first-line treatment with amoxicillin after 48 – 72 hours.</td></tr>
<tr><td rowspan="2">Amoxicillin + clavulanic acid (PO)[A]</td><td>Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL; 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL. Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).</td><td>40 – 45 mg/kg of amoxicillin component per dose 12 hourly, maximum dose of amoxicillin component: 875 mg 12 hourly. (Refer to Other Notes[B] below for guidance on dosing accurately)</td><td rowspan="2">5 – 7 days</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="4">In case of confirmed drug allergy or medical contraindication</td></tr>
<tr><td>Azithromycin (PO)[C]</td><td>Oral liquid: 200 mg/5 mL. Capsule: 250 mg; 500 mg (anhydrous).</td><td>10 mg/kg once daily, maximum dose 500 mg daily</td><td>5 days</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> Practice watchful waiting and withhold antibiotics except for patients with severe</td></tr>
</table>

symptoms. For severe cases or poor response to initial therapy, expert advice and radiological imaging may be required to exclude intracranial extension.

Other Notes:

A. If a patient cannot tolerate oral antibiotics (e.g. persistent vomiting), IV or IM antibiotics may be considered:
   - Ampicillin (25 mg/kg/dose 6 hourly, Maximum dose: 500 mg 6 hourly), or
   - Cceftriaxone (50 mg/kg/dose once daily, Maximum dose: 1 g)

B. Current widely available oral liquid formulations contain amoxicillin + clavulanic acid in a 4:1 ratio. To achieve 40-45 mg/kg/dose of amoxicillin component, when using the 4:1 formulation, prescribe amoxicillin + clavulanic acid 10-15 mg/kg/dose of amoxicillin component 12 hourly and separately prescribe amoxicillin 30-35 mg/kg/dose 12 hourly in order not to exceed the maximum recommended dose of clavulanic acid (10 mg/kg/day) thereby reducing the risk of antibiotic-associated diarrhoea.

   If oral liquid formulations with a higher dose of amoxicillin are available (7:1 ratio – 400 mg amoxicillin + 57.5 mg clavulanic acid/5 mL, or 14:1 ratio – 600 mg amoxicillin + 42.9 mg clavulanic acid/5 mL), these may be dosed at 40-45 mg/kg dose of amoxicillin component 12 hourly without a separate amoxicillin prescription (the clavulanic acid dose will not be exceeded). If the 7:1 ratio tablet formulation is available (875 mg amoxicillin + 125 mg clavulanic acid) it may be prescribed 12 hourly for children weighing 25 kg or more.

C. If patient fails macrolide therapy, consider ceftriaxone or refer to a specialist.

Dental Abscess (Including Acute Necrotising Gingivitis/Periodontitis)			
Clinical definition: A dental abscess refers to acute or chronic suppurative infection related to the teeth. Symptoms include severe pain, tooth sensitivity, inflammation, and swelling of the gums and face. Acute necrotizing gingivitis/periodontitis refers to acute very painful infection of the gingival margin. Clinical features include foul-smelling breath, necrosis and sloughing of gum margin, loss of gingiva and supporting bone around teeth. It may be associated with underlying illness (e.g. malnutrition, HIV) and may extend to the lips and cheeks without adequate treatment. Infections are usually caused by multiple oral bacteria including anaerobic organisms.			
Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Combination therapy with: Amoxicillin (PO) PLUS Metronidazole (PO)[A]	Amoxicillin- Powder for oral liquid: 125 mg (as trihydrate)/5 mL; 250 mg (as trihydrate)/5 mL. Solid oral dosage form: 250 mg; 500 mg (as trihydrate).	40-45 mg/kg/dose 12 hourly, maximum dose: 1.5 g 12 hourly	5 – 7 days
	Metronidazole- Oral liquid: 200 mg (as benzoate)/5 mL. Tablet: 200 mg to 500 mg. Injection: 500 mg in 100-mL vial.	7.5 mg/kg/dose 8 hourly, maximum dose 300 mg 8 hourly	
Alternative antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Clindamycin (PO)	Capsule: 150 mg (as hydrochloride). Injection: 150 mg (as phosphate)/ mL. Oral liquid: 75 mg/5 mL (as palmitate).	6 mg/kg/dose 6 hourly, maximum dose 450 mg 6 hourly	5 days
In case of confirmed drug allergy or medical contraindication			
Drug	Formulation[1]	Dosage	Duration
Azithromycin (PO)	Oral liquid: 200 mg/5 mL. Capsule: 250 mg; 500 mg (anhydrous).	10 mg/kg once daily, maximum dose 500 mg	3 – 5 days
Principles of Stewardship: > Referral to a dentist is recommended in all cases > If the abscess is drained and the patient is improving, consider stopping antibiotics after 5 days of treatment. > For gingivitis alone without necrosis or abscess, do not treat with antibiotics.			
Other Notes: A. If a patient cannot tolerate oral antibiotics or for severe disease, IV/IM antibiotics may be considered. Treat with:			

- Ampicillin (25 mg/kg/dose 6 hourly IV or IM, Maximum dose: 500 mg 6 hourly) PLUS metronidazole (7.5 mg/kg/dose 8 hourly IV, Maximum dose: 400 mg 8 hourly), or
- Ceftriaxone (50 mg/kg/dose once daily IV or IM, Maximum dose: 1 g daily) PLUS metronidazole (7.5 mg/kg/dose 8 hourly IV, Maximum dose: 300 mg 8 hourly)

Skin & Soft Tissue

<table>
<tr><td colspan="4">Skin & Soft Tissue Infections (Including Impetigo, Cellulitis, Abscesses)</td></tr>
<tr><td colspan="4">Clinical definition: Bacterial infections of skin and underlying soft tissue. Common bacterial pathogens include S. aureus and Group A Streptococcus species. Anaerobes may play a role in specific regions of the body including the perineum.</td></tr>
<tr><td colspan="4">Neonate, Infant, Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="2">Cloxacillin (IV)

If Cloxacillin (IV) is not available, use Cefazolin (IV)</td><td>Cloxacillin:
Powder for injection: 500 mg (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8-28 days: 50 mg/kg/dose 8 hourly
○ Older than 28 days: 25-50 mg/kg/dose 6 hourly, maximum dose 2 g 6 hourly</td><td rowspan="2">5 – 7 days</td></tr>
<tr><td>Cefazolin: Powder for injection: 1 g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8 days & older: 50 mg/kg/dose 8 hourly, maximum dose 4 g 8 hourly</td></tr>
<tr><td colspan="4">For infants, children, and adolescents, switch to oral therapy when tolerated (Neonates should complete IV therapy):</td></tr>
<tr><td>Flucloxacillin (PO)</td><td>Capsules: 500 mg; 1 g (as sodium salt)</td><td>25 mg/kg/dose 6 hourly, maximum dose 500 mg 6 hourly</td><td>5 – 7 days (Total treatment duration including IV therapy.)</td></tr>
<tr><td colspan="4">Alternative antibiotic choice for infants and children unable to swallow Flucloxacillin capsules:</td></tr>
<tr><td>Cefalexin (PO)</td><td>Powder for reconstitution with water: 125 mg/5 mL; 250 mg/5 mL
Solid oral dosage form: 250 mg (as monohydrate)</td><td>25 mg/kg/dose 6 hourly, maximum dose 1 g 6 hourly</td><td>5 – 7 days</td></tr>
<tr><td colspan="4">In case of confirmed drug allergy or medical contraindication:</td></tr>
<tr><td>Clindamycin (IV/PO)</td><td>Oral liquid: 75 mg/5 mL (as palmitate).
Capsule: 150 mg (as hydrochloride).
Injection: 150 mg (as phosphate)/mL</td><td>6 mg/kg/dose 6 hourly, maximum dose 600 mg 8 hourly (IV) or 450 mg 6 hourly (PO)</td><td>5 – 7 days</td></tr>
<tr><td colspan="4">Principles of Stewardship:</td></tr>
</table>

- If the abscess can be incised and drained, withhold antibiotics for standard, uncomplicated abscess in an otherwise well person.
- If IV antibiotic therapy is indicated, review patient progress daily to consider switch from IV to oral therapy.

Other Notes:

- For patients with suspected animal bite, assess for rabies risk and manage accordingly, and administer a tetanus booster dose if indicated.
- If necrotizing fasciitis is suspected (especially if in perineal area), use ceftriaxone plus metronidazole plus clindamycin or, alternatively, amoxicillin/clavulanic acid plus clindamycin (clindamycin included to suppress toxin production), and obtain urgent expert advice regarding surgical management.

Tetanus			
Clinical definition: Infection caused by *C. tetani* characterized by acute onset of muscle stiffness and muscular contractions.			
Neonate, Infant, Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Metronidazole (IV)	Injection: 500 mg in 100 mL vial.	○ First week of life (7 days or less): 7.5 mg/kg/dose 12 hourly ○ 8 days of age & older: 7.5 mg/kg/dose 8 hourly, maximum dose 400 mg 8 hourly	10 days
Alternative antibiotic choice			
Benzylpenicillin (IV)	Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial.	25 000 IU/kg/dose 6 hourly, maximum dose 5 million IU/kg/dose 6 hourly	10 days
Principles of Stewardship: - None			
Other Notes: - Also administer Human Tetanus Immunoglobulin (IM): neonates 500 IU, children 2000 IU, adults 3000-6000 IU. - Wound care and debridement/umblical cord care is required. - Administer a booster dose of tetanus vaccine (not required in immunized patients who have received a booster dose within the past 5 years).			

Cardiac

Acute Rheumatic Fever			
Clinical definition: An inflammatory condition that may follow a throat infection with group A streptococci and an important cause of acquired heart disease in the acute phase of the disease and as a result of chronic valvular complications. Acute rheumatic fever is predominantly a disease of children (not infants), adolescents and young adults			
Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Amoxicillin (PO)	Powder for oral liquid: 125 mg (as trihydrate)/5 mL; 250 mg (as trihydrate)/5 mL. Solid oral dosage form: 250 mg; 500 mg (as trihydrate).	50 mg/kg once daily, maximum dose 2 g	10 days
Alternative antibiotic choice(s)			
Benzathine benzylpenicillin (IM)[A]	Powder for injection: 900 mg benzylpenicillin (=1.2 million units) in 5 mL vial; 1.44 g benzylpenicillin (=2.4 million units) in 5 mL vial	By weight: ○ <27 kg: 600 000 units (375 mg) as a single dose ○ 27 kg and above: 1.2 million units (750 mg) as a single dose	Single dose
In case of confirmed drug allergy or medical contraindication			
Azithromycin (PO)[B]	Oral liquid: 200 mg/5 mL. Capsule: 250 mg; 500 mg (anhydrous).	10 mg/kg once daily, maximum dose 500 mg daily	3 – 5 days
Principles of Stewardship: > None			
Other Notes: A. Painful intramuscular administration of benzathine benzylpenicillin may be reduced by dissolving benzathine benzylpenicillin 1.2 million units in 3.2 mL lidocaine 1% without adrenaline (epinephrine) and bringing the preparation to room temperature before injection B. Significant rates of resistance of Group A Streptococcus strains to macrolides (azithromycin) and azalides (clarithromycin) have been reported in many parts of the world. Use of these antibiotics may result in treatment failure. > Prophylaxis: administer to all patients with documented rheumatic fever. Continue prophylaxis for 10 years or until 21 years of age (whichever is longer) if no rheumatic valvular disease, and until 35 years of age in patients with rheumatic valvular disease. ○ Benzathine benzylpenicillin (IM) 600,000 IU every 21-28 days for children weighing <30 kg or 1.2 MU every 21-28 days for children weighing 30 kg or more, OR Phenoxymethylpenicillin (PO) 125 mg 12 hourly OR amoxicillin (PO) 125 mg daily for children weighing <30kg and 250 mg daily for children			

weighing 30 kg or more.

- For patients with severe penicillin allergies, give prophylaxis with:
  - For children <11 years: Macrolide e.g. azithromycin (PO) 10mg/kg/dose (maximum dose 500 mg) 3 times weekly
  - For children 11 years or older: Macrolide e.g. azithromycin (PO) 250 mg daily)

<table>
<tr><td colspan="4">Infective Endocarditis (Native Valve)</td></tr>
<tr><td colspan="4">Clinical definition: Infection of the endothelial surface of the heart. Symptoms may be variable and non-specific. Ideally, the diagnosis should be confirmed and an organism identified on blood culture before commencing treatment. However, if the patient presents with severe disease, empiric treatment should be started and directed at staphylococci and streptococci.</td></tr>
<tr><td colspan="4">Neonate, Infant, Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="3">Combination therapy with:

Benzylpenicillin (IV)
PLUS
Cloxacillin (IV)
PLUS
Gentamicin (IV)</td><td>Benzylpenicillin-
Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial</td><td>○ First week of life (7 days or less): 100 000 IU/kg/dose 8 hourly
○ 8 days of age & older: 125 000 IU/kg/dose 6 hourly, maximum dose 5 million IU 6 hourly</td><td rowspan="2">4 – 6 weeks</td></tr>
<tr><td>Cloxacillin-
Powder for injection: 500 mg (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8 – 28 days: 50 mg/kg/dose 8 hourly
○ 28 days & older: 50 mg/kg/dose 6 hourly, maximum dose 3 g 6 hourly</td></tr>
<tr><td>Gentamicin-
Injection: 10 mg, 40 mg (as sulfate) / mL in 2 mL vial</td><td>3 mg/kg/dose once daily, maximum dose 360 mg</td><td>First 2 weeks of therapy</td></tr>
<tr><td colspan="4">Alternative antibiotic choice(s)</td></tr>
<tr><td>If Benzylpenicillin is not available, substitute with:

Ampicillin (IV)

Treat in combination with Cloxacillin (IV)
PLUS
Gentamicin (IV), as above.</td><td>Ampicillin-
Powder for injection: 500 mg, 1 g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 8 hourly
○ 8 days of age & older: 50 mg/kg/dose 6 hourly, maximum dose 2 g 6 hourly</td><td>4 – 6 weeks</td></tr>
</table>

If Cloxacillin is not available, substitute with: Cefazolin (IV) Treat in combination with Benzylpenicillin (IV) (Or Ampicillin (IV) PLUS Gentamicin (IV), as above.	Cefazolin- Powder for injection: 1 g (as sodium salt) in vial	○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly ○ 8 days of age & older: 50 mg/kg/dose 8 hourly, maximum dose 4 g 8 hourly	4 – 6 weeks
In case of confirmed drug allergy or medical contraindication			
Drug	Formulation[1]	Dosage	Duration
Vancomycin (IV) PLUS Gentamicin (IV)	Vancomycin- Injection: 500 mg, 1 g vial (as hydrochloride)	15 mg/kg/dose 6 hourly	4 – 6 weeks
	Gentamicin- Injection: 10 mg, 40 mg (as sulfate) / mL in 2 mL vial	1.5 mg/kg/dose 12 hourly	First 2 weeks of therapy
Principles of Stewardship: > For suspected infective endocarditis cases, 3 blood cultures should be obtained in rapid succession from 3 anatomic sites within 6 hours before initiation of antibiotic therapy. > If a pathogen is identified in blood culture, antibiotic treatment should be tailored to that pathogen, in line with appropriate guidelines. The pathogen and anatomical site may affect the duration of therapy. > Therapeutic drug monitoring and renal function monitoring on patients treated with vancomycin and/or gentamicin.			
Other Notes: > Obtain expert advice from a cardiologist and/or infectious diseases specialist (if available) in all cases of endocarditis (native valve or prosthetic valve endocarditis)			

Bloodstream

<table>
<tr><td colspan="4">Sepsis in the Newborn</td></tr>
<tr><td colspan="4">Clinical definition: Invasion of the blood by bacteria or other microorganisms before or after birth which may spread to involve other organs / systems e.g. meninges (meningitis), lungs (pneumonia), bone (osteomyelitis) and kidneys (pyelonephritis). Symptoms may be variable and non-specific. Common bacterial pathogens include Group B streptococcus, S. aureus, Enterococcus species, Gram-negative organisms including Enterobacteriaceae (such as E. coli, K. pneumoniae, Enterobacter and Serratia species) and Acinetobacter species and Pseudomonas species. The latter two are more commonly hospital associated, and will vary depending on local hospital settings. L. monocytogenes, although a recognised neonatal pathogen, is less common.</td></tr>
<tr><td colspan="4">Early-onset (Less than 48 hours of age)</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="2">Combination therapy with:

Ampicillin (IV)
PLUS
Gentamicin (IV)[A]</td><td>Ampicillin- Powder for injection: 500 mg; 1 g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 8 hourly
○ 8 days of age & older: 50 mg/kg/dose 6 hourly</td><td rowspan="2">5 – 7 days or as determined by clinical assessment and laboratory / microbiological results</td></tr>
<tr><td>Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2-mL vial.</td><td>○ 4 mg/kg/dose once daily</td></tr>
<tr><td colspan="4">For patients not responding to therapy</td></tr>
<tr><td rowspan="2">Combination therapy with:

Cefotaxime (IV)[B]
PLUS
Ampicillin (IV)</td><td>Cefotaxime- Powder for injection: 250 or 500 mg per vial (as sodium salt)</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8-20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td rowspan="2">5 – 7 days or as determined by clinical assessment and laboratory / microbiological results</td></tr>
<tr><td>Ampicillin- Powder for injection: 500 mg, 1 g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 8 hourly
○ 8 days of age & older: 50 mg/kg/dose 6 hourly</td></tr>
<tr><td colspan="4">Late-onset (48 hours of age & older)</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Combination therapy with:</td><td>Cefotaxime- Powder for injection:</td><td>○ First week of life (7 days or less): 50</td><td>5 – 7 days or as determined by</td></tr>
</table>

<table>
<tr><td rowspan="2">Cefotaxime (IV)[B]
PLUS
Ampicillin (IV)</td><td>250 or 500 mg per vial (as sodium salt)</td><td>mg/kg/dose 12 hourly
○ 8-20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td rowspan="2">clinical assessment and laboratory / microbiological results</td></tr>
<tr><td>Ampicillin-
Powder for injection:
500 mg, 1 g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 8 hourly
○ 8 days of age & older: 50 mg/kg/dose 6 hourly</td></tr>
<tr><td colspan="4">For patients not responding to therapy or guided by laboratory/microbiological results or in health care facilities with high rates of hospital-acquired multidrug resistant gram-negative pathogens</td></tr>
<tr><td rowspan="3">If meningitis suspected or confirmed:

Meropenem (IV)

If meningitis excluded or considered unlikely:

Piperacillin/tazobactam (IV)
PLUS
Amikacin (IV)[A]</td><td>Meropenem-
Powder for injection:
500 mg (as trihydrate); 1 g (as trihydrate) in vial</td><td>40 mg/kg/dose 8 hourly</td><td>If meningitis is confirmed: 14 –21 days</td></tr>
<tr><td>Piperacillin/tazobactam-
Powder for injection: 2 g (as sodium salt) + 250 mg (as sodium salt); 4 g (as sodium salt) + 500 mg (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 100 mg/kg/dose 12 hourly
○ 8 days of age & older: 100 mg/kg/dose 8 hourly</td><td rowspan="2">7 – 10 days</td></tr>
<tr><td>Amikacin-
Powder for injection:
100 mg; 500 mg; 1 g (as sulfate) in vial.</td><td>15 mg/kg/dose once daily</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> Empirical antibiotic selection should be guided by local patterns of antibiotic susceptibility, where data is available. In the absence of local data, follow the above-described guidelines.
> If an organism is cultured and antibiotic susceptibility testing is available, switching to a narrower spectrum antibiotic should be considered in discussion with a specialist and/or clinical microbiologist.
> Therapy duration should be determined by clinical and laboratory results and clinical response.</td></tr>
<tr><td colspan="4">Other Notes:
A. When treating with gentamicin or amikacin, conduct renal function testing and therapeutic drug monitoring, where available.
B. If cefotaxime is not available, use ceftriaxone 50 mg/kg/dose 12 hourly in neonates (in combination with benzylpenicillin or ampicillin) except in neonates with jaundice and neonates receiving calcium-containing IV fluids.</td></tr>
</table>

> Consider the addition of vancomycin in patients not responding to treatment or if resistant staphylococcal infection is suspected.

Possible Serious Bacterial Infection in infants younger than 3 months of age (Community-Acquired)			
Clinical definition: An acutely unwell neonate or young infant for whom an urgent diagnostic assessment for possible serious bacterial infection including meningitis, pneumonia, urinary tract infection and bloodstream infection is required, and urgent empirical broad-spectrum antibiotic treatment is appropriate. In infants older than 3 months of age, children and adolescents, the choice of empiric antibiotic therapy should be guided by the clinical presentation and directed at the most likely organ system(s) involved and guided by the relevant section in this guideline. If the clinical presentation is non-specific, use the empiric antibiotic recommendations for the infant (28 – 90 days of age) below.			
Neonate			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration[A]
Combination therapy with: Cefotaxime (IV)[B] PLUS Ampicillin (IV)	Cefotaxime- Powder for injection: 250 or 500 mg per vial (as sodium salt)	○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly ○ 8-20 days: 50 mg/kg/dose 8 hourly ○ 21 days & older: 50 mg/kg/dose 6 hourly	7 – 10 days
	Ampicillin- Powder for injection: 500 mg, 1 g (as sodium salt) in vial	○ First week of life (7 days or less): 100 mg/kg/dose 8 hourly ○ 8 days of age & older: 100 mg/kg/dose 6 hourly	
If meningitis excluded or considered unlikely			
Combination therapy with: Ampicillin (IV) PLUS Cloxacillin (IV) PLUS Gentamicin (IV)	Ampicillin: powder for injection: 500 mg, 1 g (as sodium salt) in vial	○ First week of life (7 days or less): 100 mg/kg/dose 8 hourly ○ 8 days of age & older: 100 mg/kg/dose 6 hourly	7 – 10 days
	Cloxacillin: powder for injection: 500 mg (as sodium salt) in vial.	○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly ○ 8-28 days: 50 mg/kg/dose 8 hourly ○ Older than 28 days: 50 mg/kg/dose 6 hourly	
	Gentamicin: Injection: 10 mg; 40 mg (as sulfate)/ mL in 2-mL vial.	○ 4 mg/kg/dose once daily	

If Cloxacillin (IV) is not available, substitute with: Cefazolin (IV) Treat in combination with Ampicillin (IV) and Gentamicin (IV), as above.	Cefazolin: Powder for injection: 1 g (as sodium salt) in vial.	○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly ○ 8 days of age & older: 50 mg/kg/dose 8 hourly	
Infant			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration[A]
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	50 mg/kg/dose 12 hourly	7 – 10 days
If meningitis excluded or considered unlikely			
Combination therapy with: Ampicillin (IV) PLUS Cloxacillin (IV) PLUS Gentamicin (IV)[C]	Ampicillin: Powder for injection: 500 mg, 1 g (as sodium salt) in vial	50 mg/kg/dose 6 hourly	7 – 10 days
	Cloxacillin: powder for injection: 500 mg (as sodium salt) in vial.	50 mg/kg/dose 6 hourly	
	Gentamicin: Injection: 10 mg; 40 mg (as sulfate)/ mL in 2-mL vial.	5-7.5 mg/kg once daily	

Principles of Stewardship:

A. The duration of antibiotic therapy depends on whether a focus of bacterial infection is confirmed (e.g. meningitis, lower respiratory tract infection, UTI, osteomyelitis / septic arthritis, bloodstream infection) and clinical response to treatment. Refer to the relevant sections on specific infections in this guideline. If no focus of infection is apparent clinically or confirmed on laboratory / microbiological testing, continue IV antibiotics until there is a good clinical response and laboratory markers of infection improve (usually less than one week)

> Reconsider choice of antibiotic, aiming for monotherapy where possible, when the results of cultures and antibiotic susceptibility testing become available or if the child does not improve.

Other Notes:

B. If cefotaxime is not available, use ceftriaxone 50 mg/kg/dose 12 hourly in neonates (in combination with benzylpenicillin or ampicillin) except in neonates with jaundice and neonates receiving calcium-containing IV fluids.

C. When treating with gentamicin, conduct renal function testing and therapeutic drug monitoring, where available.

> Early administration of broad-spectrum antibiotics is critical in patients presenting with sepsis.

Bone & Joint

<table>
<tr><td colspan="4">Acute Osteomyelitis & Septic Arthritis</td></tr>
<tr><td colspan="4">Clinical definition:
Acute osteomyelitis: Bone infection that usually begins in the metaphysis of long bones as a result of haematogenous deposition of organisms following transient bacteraemia. Infection may spread via the epiphysis to the joint resulting in septic arthritis. Common causative organisms vary by age: neonates – S. aureus, Group B streptococcus, Gram negative organisms including E. coli; infants & children – S. aureus, H. influenzae, Group A streptococci, S. pneumoniae. Sickle cell anaemia is associated with bone infections caused by Salmonella species & S. pneumoniae.

Septic arthritis: May occur as a result of haematogenous deposition on the synovium during transient bacteraemia or as part of generalised septicaemia and may involve more than one joint. Common causative organisms vary by age: neonates – S. aureus, Group B streptococcus, E. coli; infants / children – S. aureus, H. influenzae, Group A streptococci, and S. pneumoniae.</td></tr>
<tr><td colspan="4">Neonate</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Cefotaxime (IV)</td><td>Powder for injection: 250 or 500 mg per vial (as sodium salt)</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8 – 20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td>4 – 6 weeks</td></tr>
<tr><td colspan="4">Alternative antibiotic choice(s)</td></tr>
<tr><td rowspan="2">Combination therapy with:

Cloxacillin (IV)
PLUS
Gentamicin (IV)</td><td>Cloxacillin- Powder for injection: 500 mg (as sodium salt) in vial.</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8-28 days: 50 mg/kg/dose 8 hourly
○ Older than 28 days: 50 mg/kg/dose 6 hourly</td><td rowspan="2">4 – 6 weeks</td></tr>
<tr><td>Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial</td><td>○ 4 mg/kg/dose once daily</td></tr>
<tr><td rowspan="2">If Cloxacillin (IV) is not available, substitute with:
Cefazolin (IV)

Combination therapy with: Cefazolin (IV)
PLUS
Gentamicin (IV)</td><td>Cefazolin- Powder for injection: 1 g (as sodium salt) in vial.</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8 days of age & older: 50 mg/kg/dose 8 hourly</td><td rowspan="2">4 – 6 weeks</td></tr>
<tr><td>Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial</td><td>○ 4 mg/kg/dose once daily</td></tr>
<tr><td colspan="4">Infant, Child & Adolescent</td></tr>
</table>

<table>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="2">Combination therapy with:

Ampicillin (IV)
PLUS
Cloxacillin (IV)</td><td>Ampicillin-
Powder for injection: 500 mg, 1 g (as sodium salt) in vial</td><td>50 mg/kg/dose 6 hourly, maximum dose 2 g 6 hourly</td><td rowspan="2">4 – 6 weeks</td></tr>
<tr><td>Cloxacillin-
Powder for injection: 500 mg (as sodium salt) in vial</td><td>50 mg/kg/dose 6 hourly, maximum dose 2 g 6 hourly</td></tr>
<tr><td>If Cloxacillin (IV) is not available, treat with:
Cefazolin (IV) (alone)</td><td>Powder for injection: 1 g (as sodium salt) in vial.</td><td>50 mg/kg/dose 8 hourly, maximum dose 4 g 8 hourly</td><td>4 – 6 weeks</td></tr>
<tr><td colspan="4">Alternative antibiotic choice(s)</td></tr>
<tr><td>Ceftriaxone (IV)</td><td>Powder for injection: 250 mg; 1 g (as sodium salt) in vial</td><td>50 mg/kg/dose 12 hourly, maximum dose 2 g 12 hourly</td><td>4 – 6 weeks</td></tr>
<tr><td colspan="4">For patients with sickle cell anemia (Empiric gram-negative cover recommended)</td></tr>
<tr><td>Ceftriaxone (IV)</td><td>Powder for injection: 250 mg; 1 g (as sodium salt) in vial</td><td>50 mg/kg/dose 12 hourly, maximum dose 2 g 12 hourly</td><td>4 – 6 weeks</td></tr>
<tr><td colspan="4">In case of confirmed drug allergy or medical contraindication</td></tr>
<tr><td>If patient has no history of immediate hypersensitivity / anaphylaxis to penicillins, treat with:

Ceftriaxone (IV)</td><td>Powder for injection: 250 mg; 1 g (as sodium salt) in vial</td><td>50 mg/kg/dose 12 hourly, maximum dose 2 g 12 hourly</td><td>4 – 6 weeks</td></tr>
<tr><td rowspan="2">If patient has a history of immediate hypersensitivity / anaphylaxis to penicillins, treat with:

Clindamycin (IV/PO)
PLUS
Ciprofloxacin (IV/PO)</td><td>Clindamycin-
Injection: 150 mg (as phosphate)/ mL.</td><td>6 mg/kg/dose 6 hourly, maximum dose 600 mg 8 hourly (IV) or 450 mg 6 hourly (PO)</td><td rowspan="2">4 – 6 weeks</td></tr>
<tr><td>Ciprofloxacin-
Solution for IV infusion: 2 mg/ mL (as hyclate); Oral liquid: 250 mg/5 mL (anhydrous)
Tablet: 250 mg (as hydrochloride)</td><td>10 mg/kg/dose 8-12 hourly, maximum dose 400 mg 8-12 hourly (IV); 15 mg/kg/dose 12 hourly, maximum dose 500 mg 12 hourly (PO)</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> Do not give empirical antibiotics for chronic bone and joint infections. Instead, conduct bone and tissue biopsies, and treat with directed therapy.
> Initiate IV antibiotic treatment immediately as the diagnosis is made and blood and pus specimens have been collected, if available.
> Adjust antibiotic therapy based on culture and AST results, if available, or if clinical response to antibiotic treatment is unsatisfactory.</td></tr>
</table>

> Continue with IV antibiotics until there is evidence of good clinical response and laboratory markers of infection improve, and then consider switching to oral antibiotic therapy if an appropriate oral option is available. If culture is not available consider empiric stepdown therapy to oral antimicrobials with amoxicillin/clavulanic acid, cefalexin, or flucloxacillin.
Other Notes: > Seek consultation with an orthopaedic specialist and consider surgical drainage > If infection is caused by *S. aureus* that is resistant to cloxacillin (MRSA), replace cloxacillin with vancomycin 15 mg/kg/dose 6 hourly IV.

Respiratory

Acute Lower Respiratory Tract Infection: Mild-Moderate/Ambulatory (Community-Acquired)			
Clinical definition: Acute lower respiratory tract infection includes acute viral bronchiolitis, and acute viral and bacterial pneumonia. Antibiotics are indicated in the empiric treatment of pneumonia and are not usually indicated for the treatment of bronchiolitis. However, the decision to prescribe or withhold antibiotics is influenced by several factors: the ability to clinically distinguish acute viral bronchiolitis from pneumonia, laboratory and radiological findings may not provide confident differentiation of viral bronchiolitis from bacterial pneumonia, the knowledge that bacterial co-infection may be present in a variable proportion of children with features of bronchiolitis, the ability of the caregiver to monitor the child and re-access health care urgently in the event of clinical deterioration. WHO recommends that antibiotics should be prescribed for young children with acute onset of cough associated with wheeze, fast breathing and chest indrawing. Antibiotic selection is based on assessment of severity and likely aetiology. Common bacterial causes of pneumonia include: neonates – Group B Streptococci, Klebsiella species, *E. coli*, *C. trachomatis*, *S. aureus*; older infants and children – *S. pneumoniae, H. influenzae, S. aureus, M. catarrhalis, M. pneumoniae.*			
Neonate			
All children younger than 1 month with mild/moderate or severe Acute Lower Respiratory Tract Infection should be admitted to hospital. See guidelines for severe Acute Lower Respiratory Infections.			
Infant, Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Amoxicillin (PO)	Powder for oral liquid: 125 mg (as trihydrate)/5 mL; 250 mg (as trihydrate)/5 mL. Solid oral dosage form: 250 mg; 500 mg (as trihydrate).	40-45 mg/kg/dose 12 hourly, maximum dose: 1.5 g 12 hourly	5 days
In case of poor response to preferred antibiotic choice			
Amoxicillin + clavulanic Acid (PO)	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL; 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL . Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).	40 – 45 mg/kg of amoxicillin component per dose 12 hourly, maximum dose of amoxicillin component: 875 mg 12 hourly. (Refer to Other Notes[A] below for guidance on dosing accurately)	5 days
In case of confirmed drug allergy or medical contraindication			
Azithromycin (PO)[B]	Capsule: 250 mg; 500 mg (anhydrous). Oral liquid: 200 mg/5 mL.	10 mg/kg once daily, maximum dose 500 mg	3 – 5 days
Principles of Stewardship: > None			
Other Notes: A. Current widely available oral liquid formulations contain amoxicillin + clavulanic acid in a 4:1 ratio. To achieve 40-45 mg/kg/dose of amoxicillin component, when using the			

4:1 formulation, prescribe amoxicillin + clavulanic acid 10-15 mg/kg/dose of amoxicillin component 12 hourly and separately prescribe amoxicillin 30-35 mg/kg/dose 12 hourly in order not to exceed the maximum recommended dose of clavulanic acid (10 mg/kg/day) thereby reducing the risk of antibiotic-associated diarrhoea.

If oral liquid formulations with a higher dose of amoxicillin are available (7:1 ratio – 400 mg amoxicillin + 57.5 mg clavulanic acid/5 mL, or 14:1 ratio – 600 mg amoxicillin + 42.9 mg clavulanic acid/5 mL), these may be dosed at 40-45 mg/kg dose of amoxicillin component 12 hourly without a separate amoxicillin prescription (the clavulanic acid dose will not be exceeded). If the 7:1 ratio tablet formulation is available (875 mg amoxicillin + 125 mg clavulanic acid) it may be prescribed 12 hourly for children weighing 25 kg or more.

B. In case of treatment failure with azithromycin, treat with clindamycin (6 mg/kg/dose 6 hourly, Maximum dose: 450 mg 6 hourly).

> *S. pneumonia* should be suspected if there is empyema, pulmonary cavitation or pneumatocoele formation, or the presence of extrapulmonary pyogenic infections. Treatment should follow Acute Lower Respiratory Tract Infection: Severe/inpatient guidelines.
> Consider screening for HIV and TB in all patients presenting with Lower Respiratory Tract Infection.

<table>
<tr><td colspan="4">Acute Lower Respiratory Tract Infection: Severe/Inpatient (Community-acquired)</td></tr>
<tr><td colspan="4">Neonate</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="2">Combination therapy with:

Cefotaxime (IV)[A]
PLUS
Ampicillin (IV)</td><td>Cefotaxime-
Powder for injection: 250 mg per vial (as sodium salt)</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8-20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td rowspan="2">5 – 7 days</td></tr>
<tr><td>Ampicillin-
Powder for injection: 500 mg, 1 g (as sodium salt) in vial</td><td>○ First week of life (7 days or less): 100 mg/kg/dose 8 hourly
○ 8 days of age & older: 100 mg/kg/dose 6 hourly</td></tr>
<tr><td colspan="4">Infant, Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Ampicillin (IV)</td><td>Powder for injection: 500 mg; 1 g (as sodium salt) in vial.</td><td>50 mg/kg/dose 6 hourly, maximum dose 2 g 6 hourly</td><td>5 – 7 days</td></tr>
<tr><td colspan="4">If poor response to treatment or Staphylococcal pneumonia is suspected (empyema, pulmonary cavitation, pneumatocoele formation or the presence of extrapulmonary pyogenic infections), escalate to:</td></tr>
<tr><td rowspan="2">Amoxicillin + clavulanic acid (IV)
OR
Ceftriaxone (IV)</td><td>Amoxicillin + clavulanic acid-
Powder for injection: 500 mg (as sodium) + 100 mg (as potassium salt); 1000 mg (as sodium) + 200 mg (as potassium salt) in vial.</td><td>30 mg/kg/dose of amoxicillin component 8 hourly, maximum dose 1.2 g 8 hourly</td><td>10 –14 days</td></tr>
<tr><td>Ceftriaxone-
Powder for injection: 250 mg; 1 g (as sodium salt) in vial.</td><td>50 mg/kg once daily, maximum dose 1 g</td><td>10 – 14 days</td></tr>
<tr><td colspan="4">Step down therapy to:</td></tr>
<tr><td>Amoxicillin (PO)
OR,
if treated with Amoxicillin + clavulanic acid (IV) or Ceftriaxone (IV),
then Amoxicillin + clavulanic acid (PO)[B]</td><td>Amoxicillin-
Powder for oral liquid: 125 mg (as trihydrate)/5 mL; 250 mg (as trihydrate)/5 mL.
Solid oral dosage form: 250 mg; 500 mg (as trihydrate).</td><td>40-45 mg/kg/dose 12 hourly, 1.5 g 12 hourly</td><td>10 – 14 days

(Total treatment duration including IV therapy.)</td></tr>
</table>

	Amoxicillin + clavulanic acid- Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL; 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL . Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).	40 – 45 mg/kg of amoxicillin component per dose 12 hourly, maximum dose of amoxicillin component: 875 mg 12 hourly. (Refer to Other Notes[B] below for guidance on dosing accurately)	
In case of confirmed drug allergy or medical contraindication			
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial.	50 mg/kg/dose once daily, maximum dose 1 g	10 – 14 days

Principles of Stewardship:

> Continue with IV antibiotics until there is evidence of good clinical response and/or laboratory markers of infection improve, and then consider switching to oral antibiotic therapy.

> For suspected or confirmed Staphylococcal pneumonia or empyema with or without microbiological confirmation, adequate drainage of pus and prolonged treatment duration is recommended (minimum 10 – 14 days).

Other Notes:

A. If cefotaxime is not available, use ceftriaxone (50 mg/kg/dose 12 hourly in neonates) in combination with benzylpenicillin or ampicillin except in neonates with jaundice and neonates receiving calcium-containing IV fluids.

B. Current widely available oral liquid formulations contain amoxicillin + clavulanic acid in a 4:1 ratio. To achieve 40-45 mg/kg/dose of amoxicillin component, when using the 4:1 formulation, prescribe amoxicillin + clavulanic acid 10-15 mg/kg/dose of amoxicillin component 12 hourly and separately prescribe amoxicillin 30-35 mg/kg/dose 12 hourly in order not to exceed the maximum recommended dose of clavulanic acid (10 mg/kg/day) thereby reducing the risk of antibiotic-associated diarrhoea.

   If oral liquid formulations with a higher dose of amoxicillin are available (7:1 ratio – 400 mg amoxicillin + 57.5 mg clavulanic acid/5 mL, or 14:1 ratio – 600 mg amoxicillin + 42.9 mg clavulanic acid/5 mL), these may be dosed at 40-45 mg/kg dose of amoxicillin component 12 hourly without a separate amoxicillin prescription (the clavulanic acid dose will not be exceeded). If the 7:1 ratio tablet formulation is available (875 mg amoxicillin + 125 mg clavulanic acid) it may be prescribed 12 hourly for children weighing 25 kg or more.

> If pertussis is suspected, add treatment with a macrolide e.g. azithromycin 10 mg/kg once daily for 3 – 5 days, maximum dose 500 mg.

> Screen all patients for HIV and TB.

> Add empiric treatment for pneumocystis pneumonia (PCP) in HIV-exposed or HIV-infected infants and children:

- Trimethoprim + sulfamethoxazole (1:5) dosed according to trimethoprim component (Loading dose: 10 mg/kg IV followed by 5 mg/kg/dose IV or PO 6 hourly for 21 days.)

- The addition of corticosteroids, usually prednisone 1 – 2 mg/kg once daily PO for 7 days, tapered over the next 7 days may be beneficial.

Gastrointestinal

<table>
<tr><td colspan="4">Acute Diarrhoeal Disease: Viral Gastroenteritis, Dysentery</td></tr>
<tr><td colspan="4">Clinical definition: Acute diarrhoea is a serious common childhood illness evidenced by the passing of frequent profuse loose watery stools. Vomiting may or may not be present. Often caused by viral infection but may be due to bacterial infection, dietary or other causes. Antibiotics should not be routinely used for diarrhoeal disease other than when dysentery is present. Features include fever, blood and mucous in stool, leucocytes on stool microscopy, culture of Shigella, Salmonella, pathogenic E. coli or Campylobacter species.</td></tr>
<tr><td colspan="4">Neonate</td></tr>
<tr><td colspan="4">Diarrhoeal disease is uncommon in neonates. See section on Possible Serious Bacterial Infection for treatment guidance.</td></tr>
<tr><td colspan="4">Infant, Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice for suspected or confirmed dysentery</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>For mild/moderate illness & ambulatory therapy:

Ciprofloxacin (PO)</td><td>Oral liquid: 250 mg/5 mL (anhydrous)
Tablet: 250 mg (as hydrochloride)</td><td>15 mg/kg/dose 12 hourly, maximum dose 500 mg 12 hourly</td><td rowspan="2">3 – 5 days</td></tr>
<tr><td>For moderate/severe illness requiring hospital admission:

Ceftriaxone (IV)</td><td>Powder for injection: 250 mg, 1 g (as sodium slat) in vial</td><td>50 mg/kg/dose once daily, maximum dose 1 g</td></tr>
<tr><td colspan="4">Alternative antibiotic choice(s) for suspected or confirmed dysentery</td></tr>
<tr><td>Azithromycin (PO)</td><td>Oral liquid: 200 mg/5 mL. Capsule: 250 mg. 500 mg (anhydrous)</td><td>10 mg/kg/dose daily, maximum dose 500 mg</td><td>3 – 5 days</td></tr>
<tr><td colspan="4">In regions where amoebiasis is common</td></tr>
<tr><td>Metronidazole (PO)</td><td>Oral liquid: 200 mg (as benzoate) / 5 mL
Tablet: 200 mg to 500 mg</td><td>15 mg/kg/dose 8 hourly, maximum dose 800 mg 8 hourly</td><td>7 – 10 days</td></tr>
<tr><td colspan="4">In regions where cholera is endemic or where outbreaks are occurring</td></tr>
<tr><td>Azithromycin (PO)</td><td>Oral liquid: 200 mg/5 mL. Capsule: 250 mg. 500 mg (anhydrous)</td><td>10 mg/kg/dose daily, maximum dose 500 mg</td><td>3 – 5 days</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> In an epidemic context and where stool culture and AST is available, adjust treatment according to current susceptibility of the organism.</td></tr>
<tr><td colspan="4">Other Notes:
▪ For immunocompromised patients with Salmonella infections (e.g. patients with sickle cell disease), increase duration of therapy to 14 days.
▪ Prevention and treatment of dehydration and/or hypovolaemic shock with careful fluid management is essential.</td></tr>
</table>

Typhoid/Enteric Fever			
Clinical definition: A systemic disease caused by Salmonella species. Clinical features include fever, anorexia, headache, vomiting, constipation or diarrhoea, abdominal pain or tenderness, cough, delirium / altered level of consciousness, hepatomegaly or splenomegaly. Where available, the organism may be cultured from blood (first week of illness) or stool (after first week), urine or bone marrow. A chronic carrier state may occur with ongoing shedding of the organism in stool which may result in transmission to others via contaminated food or water.			
Infant, Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
For patients with severe disease: Ceftriaxone (IV)	Powder for injection: 250 mg, 1 g (as sodium slat) in vial	50 mg/kg/dose 12 hourly, maximum dose 2 g 12 hourly	10 – 14 days
For mild/moderate disease or as step down therapy for severe disease based on clinical response and antibiotic susceptibility results, if available: Ciprofloxacin (PO)	Oral liquid: 250 mg/5 mL (anhydrous) Tablet: 250 mg (as hydrochloride)	15 mg/kg/dose 12 hourly, maximum dose 500 mg 12 hourly	10 – 14 days *(Total treatment duration including IV therapy, if applicable.)*
Alternative antibiotic choice(s) or for confirmed drug allergy or medical contraindication			
Drug	Formulation[1]	Dosage	Duration
Ciprofloxacin (IV)	Solution for IV infusion: 2 mg/ mL (as hyclate)	10 mg/kg/dose 8-12 hourly, maximum dose 400 mg 8-12 hourly	10 – 14 days
Azithromycin (PO)	Capsule: 250 mg; 500 mg (anhydrous). Oral liquid: 200 mg/5 mL	10 mg/kg/dose daily, maximum dose 500 mg	5 days
Principles of Stewardship: > The patient should ideally be isolated with contact precautions maintained until eradication of the organism from the stool is confirmed on 3 stool samples taken 1 week after completion of antibiotic treatment and every 48 hours thereafter to detect chronic carriage and excretion of the organism.			
Other Notes: ▪ Prolonged therapy (4-6 weeks) is recommended in invasive disease, including bone infections, and in immunocompromised patients (including HIV infection)			

<table>
<tr><td colspan="4">Complicated Intra-Abdominal Infection (Community-Acquired)</td></tr>
<tr><td colspan="4">Clinical definition: Suspected or confirmed peritonitis including perforation or leakage of intestinal contents into peritoneum</td></tr>
<tr><td colspan="4">Neonate</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage[2]</td><td>Duration</td></tr>
<tr><td rowspan="2">Combination therapy with:

Cefotaxime (IV)
PLUS
Metronidazole (IV)</td><td>Cefotaxime-
Powder for injection: 250 mg per vial (as sodium salt)</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8-20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td rowspan="2">5 – 10 days depending on response to clinical and surgical treatment</td></tr>
<tr><td>Metronidazole-
Injection: 500 mg in 100- mL vial.</td><td>○ First week of life (7 days or less): 7.5 mg/kg/dose 12 hourly
○ 8 days of age & older: 7.5 mg/kg/dose 8 hourly, maximum dose 400 mg 8 hourly</td></tr>
<tr><td colspan="4">Alternative antibiotic choice(s)</td></tr>
<tr><td rowspan="3">Combination therapy with:

Benzylpenicillin (IV)
PLUS
Gentamicin (IV)
PLUS
Metronidazole (IV)</td><td>Benzylpenicillin-
Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial.</td><td>○ First week of life (7 days or less): 100 000 IU/kg/dose 8 hourly
○ 8 days of age & older: 125 000 IU/kg/dose 6 hourly, maximum dose 5 million IU 6 hourly</td><td rowspan="3">5 – 10 days depending on response to clinical and surgical treatment</td></tr>
<tr><td>Gentamicin-
Injection: 10 mg; 40 mg (as sulfate)/ mL in 2-mL vial.</td><td>○ 4 mg/kg/dose once daily</td></tr>
<tr><td>Metronidazole-
Injection: 500 mg in 100- mL vial.</td><td>○ First week of life (7 days or less): 7.5 mg/kg/dose 12 hourly
○ 8 days of age & older: 7.5 mg/kg/dose 8 hourly, maximum</td></tr>
</table>

		dose 400 mg 8 hourly	
If Benzylpenicillin (IV) unavailable, substitute with: Ampicillin (IV) Treat with Gentamicin (IV) PLUS Metronidazole (IV), as above.	Ampicillin: Powder for injection: 500 mg; 1 g (as sodium salt) in vial.	○ First week of life (7 days or less): 50 mg/kg/dose 8 hourly ○ 8 days of age & older: 50 mg/kg/dose 6 hourly	
Infant, Child & Adolescent			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Combination therapy with: Ceftriaxone (IV) PLUS Metronidazole (IV)	Ceftriaxone- Powder for injection: 250 mg, 1 g (as sodium slat) in vial	50 mg/kg/dose 12 hourly, maximum dose 2 g 12 hourly	5 days if source control has been achieved (e.g. laparotomy, washout, repair). Longer durations may be required if source control is delayed
	Metronidazole- Injection: 500 mg in 100- mL vial.	7.5 mg/kg/dose 8 hourly, maximum dose 400 mg 8 hourly	
Alternative antibiotic choice(s)			
Amoxicillin + clavulanic acid (IV)	Powder for injection: 500 mg (as sodium) + 100 mg (as potassium salt); 1000 mg (as sodium) + 200 mg (as potassium salt) in vial.	30 mg/kg/dose of amoxicillin component 8 hourly, maximum dose 1.2 g 8 hourly	5 days if source control has been achieved (e.g. laparotomy, washout, repair). Longer durations may be required if source control is delayed
If poor response to treatment			
Combination therapy with: Piperacillin/tazobactam (IV) PLUS Amikacin (IV)	Piperacillin/tazobactam- Powder for injection: 2 g (as sodium salt) + 250 mg (as sodium salt); 4 g (as sodium salt) + 500 mg (as sodium salt) in vial	100 mg/kg of piperacillin component/dose 8 hourly, maximum dose 4 g of piperacillin component 8 hourly	5 days if source control has been achieved (e.g. laparotomy, washout, repair). Longer durations may be required if source control is delayed
	Amikacin- Injection: 250 mg (as sulfate)/mL in 2- mL vial	15 mg/kg/dose once daily, maximum dose 1.5 g	
If piperacillin-tazobactam (IV) is not available or in case of confirmed drug allergy or medical			

<table>
<tr><td colspan="4">contraindication</td></tr>
<tr><td rowspan="3">Ciprofloxacin (IV)
PLUS
Metronidazole (IV)
PLUS
Amikacin (IV)</td><td>Ciprofloxacin- Solution for IV infusion: 2 mg/ mL (as hyclate)</td><td>10 mg/kg/dose 8-12 hourly, maximum dose 400 mg 8-12 hourly</td><td rowspan="3">5 days if source control has been achieved (e.g. laparotomy, washout, repair). Longer durations may be required if source control is delayed</td></tr>
<tr><td>Metronidazole- Injection: 500 mg in 100- mL vial.</td><td>7.5 mg/kg/dose 8 hourly, maximum dose 400 mg 8 hourly</td></tr>
<tr><td>Amikacin- Injection: 250 mg (as sulfate)/mL in 2- mL vial</td><td>15 mg/kg/dose once daily, maximum dose 1.5 g</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> Obtain a blood culture prior to starting antibiotic therapy.
> Investigate TB as a cause in endemic areas.</td></tr>
<tr><td colspan="4">Other Notes:
B. Once the patient is improving clinically and tolerating oral feeds, consider switching to an oral antibiotic such as amoxicillin + clavulanic acid.</td></tr>
</table>

Urological/Genital Tract

<table>
<tr><td colspan="4">Urinary Tract Infection</td></tr>
<tr><td colspan="4">Clinical definition: Uncomplicated urinary tract infection (UTI) is an infection limited to the lower urinary tract with no associated urological anomalies. It is seen most commonly in girls older than 2 years of age. Complicated UTI is an infection involving the renal parenchyma (acute pyelonephritis) or which is associated with underlying congenital anomalies of the kidneys and urinary tract. Differentiating uncomplicated from complicated UTI is often not feasible in neonates and infants and they should be treated as for complicated UTI. UTI may result in significant short-term morbidity, including septic shock and acute renal failure, especially in infants. Permanent renal damage may occur in children who have recurrent episodes of pyelonephritis. Common aetiologies include Enterobacteriaceae (E. coli, Klebsiella species, Proteus species, Enterobacter species) and Enterococcus species. For UTI in pregnant adolescents, refer to adult guidelines.</td></tr>
<tr><td colspan="4">Neonate (Treat all UTIs in neonates as complicated UTIs)</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Cefotaxime (IV)</td><td>Powder for injection: 250 mg per vial (as sodium salt)</td><td>○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly
○ 8 – 20 days: 50 mg/kg/dose 8 hourly
○ 21 days & older: 50 mg/kg/dose 6 hourly</td><td>10 – 14 days[A]</td></tr>
<tr><td colspan="4">Infant, Child & Adolescent</td></tr>
<tr><td colspan="4">Preferred antibiotic choice</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td rowspan="2">If oral route suitable:

Amoxicillin + clavulanic acid (PO)
OR
Nitrofurantoin (PO)</td><td>Amoxicillin + clavulanic acid-
Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL; 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL. Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).</td><td>10-15 mg/kg of amoxicillin component/dose 8 hourly, maximum dose 250 mg of amoxicillin component 8 hourly

If the formulation containing 875 mg amoxicillin + 125 mg clavulanic acid is available, this may be prescribed twice a day for children weighing 25 kg or more</td><td rowspan="4">Uncomplicated UTI:
5 –7 days

Complicated UTI:
10 days</td></tr>
<tr><td>Nitrofurantoin-
Oral liquid: 25 mg/5 mL. Tablet: 100 mg.</td><td>1 – 2 mg/kg/dose 6 hourly, maximum dose 100 mg 6 hourly</td></tr>
<tr><td rowspan="2">If oral route not suitable or for complicated UTI, treat with:

Ceftriaxone (IV)
OR
Gentamicin (IV)</td><td>Ceftriaxone-
Powder for injection: 250 mg; 1 g (as sodium salt) in vial.</td><td>50 mg/kg/dose once daily, maximum dose 1 g</td></tr>
<tr><td>Gentamicin-
Injection: 10 mg; 40 mg (as sulfate)/ mL in</td><td>5 – 7.5 mg/kg/dose once daily, maximum dose 360 mg</td></tr>
</table>

	2- mL vial.		
Alternative antibiotic choice, guided by culture results, or in case of poor response to preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
Ciprofloxacin (PO for uncomplicated, IV for complicated UTI)	Oral liquid: 250 mg/5 mL (anhydrous). Tablet: 250 mg (as hydrochloride). Solution for IV infusion: 2 mg/ mL (as hyclate).	Oral therapy: 10-15 mg/kg/dose 12 hourly, maximum dose 500 mg 12 hourly IV therapy: 10 mg/kg/dose 8-12 hourly, maximum dose 400 mg 8-12 hourly	Uncomplicated UTI: 5 – 7 days Complicated UTI: 7 days
Principles of Stewardship: A. After 5-7 days, or sooner if there is a good clinical response to treatment, consider switching to an oral antibiotic to complete a total treatment duration of 10 days. Oral antibiotic selection should be guided by urine culture and antibiotic susceptibility results or use amoxicillin/clavulanic acid if urine culture is not available. > Avoid the use of fluoroquinolones whenever possible. > Do not treat asymptomatic patients outside of pregnancy. > The choice of route of therapy should be determined by the ability to tolerate oral therapy and/or the presence of significant systemic illness.			
Other Notes: > Children younger than 5 years of age with a confirmed UTI and children with recurrent or persistent UTIs should have an ultrasound scan of the kidneys, ureter and bladder to screen for abnormalities of the urinary tract and/or be referred to a specialist for further investigations.			

Syphilis (including congenital syphilis)			
Clinical definition: Multi-organ infection caused by *T. pallidum*. Congenital infection is acquired by vertical transmission via the transplacental route during pregnancy. Signs that may be present at birth or within the first 3 months of life include jaundice, pallor, oedema, generalised erythematous maculopapular rash that may desquamate, hepatosplenomegaly, lymphadenopathy, rhinitis, pseudoparalysis of one or more limbs. Acquired syphilis is transmitted via sexual contact including sexual abuse. For treatment of syphilis in pregnant adolescents, refer to separate guidelines.			
Neonate			
Preferred antibiotic choice			
Drug	Formulation[1]	Dosage	Duration
For patients with symptomatic infection: Benzylpenicillin (IV)[A]	Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial.	○ First week of life (7 days or less): 50 000 units/kg/dose 12 hourly ○ 8 – 28 days: 50 000 units/kg/dose 8 hourly	10 days
For patients with asymptomatic infection & mother seropositive or result unknown & mother has not been treated or was only partially treated during pregnancy: Benzathine benzylpenicillin (IM)[A]	Powder for injection: 900 mg benzylpenicillin (= 1.2 million IU) in 5- mL vial; 1.44 g benzylpenicillin (= 2.4 million IU) in 5- mL vial.	50,000 units/kg	Single dose
Alternative antibiotic choice(s)			
Cefotaxime (IV)	Powder for injection: 250 or 500 mg per vial (as sodium salt)	○ First week of life (7 days or less): 50 mg/kg/dose 12 hourly ○ 8-20 days: 50 mg/kg/dose 8 hourly ○ 21 days & older: 50 mg/kg/dose 6 hourly	10 days
Infant, Child & Adolescent			
Preferred antibiotic choice for delayed diagnosis of congenital syphilis			
Drug	Formulation[1]	Dosage	Duration
Benzylpenicillin (IV)[A]	Powder for injection: 600 mg (= 1 million IU); 3 g (= 5 million IU) (sodium or potassium salt) in vial.	50,000 units/kg/dose 6 hourly, maximum dose 5 million IU/kg/dose 6 hourly	10 days
Alternative antibiotic choice(s)			
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	50 mg/kg/dose 12 hourly, maximum dose 2 g 12 hourly	10 days

<table>
<tr><td colspan="4">For acquired, primary, or secondary syphilis infection (not congenital syphilis)</td></tr>
<tr><td>Benzathine benzylpenicillin (IM)[A]</td><td>Powder for injection: 900 mg benzylpenicillin (= 1.2 million IU) in 5- mL vial; 1.44 g benzylpenicillin (= 2.4 million IU) in 5- mL vial.</td><td>50,000 units/kg/dose, maximum dose 2.4 million units</td><td>3 doses at 1-week intervals</td></tr>
<tr><td colspan="4">Alternative antibiotic choice(s) or for confirmed penicillin allergy</td></tr>
<tr><td rowspan="2">Children/adolescents <12 years of age:

Amoxicillin (PO)
PLUS
Probenecid (PO)</td><td>Amoxicillin- Powder for oral liquid: 125 mg (as trihydrate)/5 mL, 250 mg (as trihydrate)/5 mL; solid oral dosage form: 250 mg, 500 mg (as trihydrate)</td><td>1 g 8 hourly</td><td rowspan="2">Early syphilis: 14 days

Late/latent syphilis: 28 days</td></tr>
<tr><td>Probenicid- Tablets: 500 mg (not included in WHO MLEM)</td><td>250 mg 8 hourly</td></tr>
<tr><td>Adolescents 12 years & older:

Doxycycline (PO)</td><td>Oral liquid: 25 mg/5 mL, 50 mg/5ml (anhydrous); solid oral dosage form: 50 mg, 100 mg (as hyclate)</td><td>100 mg 12 hourly</td><td>Early syphilis: 14 days

Late/latent syphilis: 28 days</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> For congenital syphilis, a complete 10-day course is required. If treatment is interrupted by 1 day (or longer), restart the full 10-day course of treatment.
> Infants treated for congenital syphilis should be followed-up 3-monthly after initial treatment to repeat non-treponemal serological testing until the test becomes non-reactive. If the decrease in serological titre is less than 4-fold, the course of treatment should be repeated.</td></tr>
<tr><td colspan="4">Other Notes:
A. If benzylpenicillin (IV) or benzathine benzylpenicillin (IM) is not available, seek expert opinion on alternative therapies (The efficacy of cefotaxime/ceftriaxone is uncertain.).

> Acquired syphilis in a child (not sexually active) requires investigation for child abuse.
> Investigate and treat both parents, if necessary and if not already diagnosed and treated.</td></tr>
</table>

References

1. World Health Organization. Model List of Essential Medicines for Children, 7th List. Geneva: World Health Organization. 2019. Available from: https://apps.who.int/iris/bitstream/handle/10665/325772/WHO-MVP-EMP-IAU-2019.07-eng.pdf?ua=1
2. Neonatal Guidelines and Drug Doses Fifth Edition. Cape Town Neonatal Consultancy Ltd. Available from: https://play.google.com/store/apps/details?id=com.neonatalguide