African Antibiotic Treatment Guidelines for Common Bacterial Infections and Syndromes

For Adult Patients

First Edition (English)

Pending final publication in 2021

Draft for external review.

Not for circulation, reprint, or clinical use.

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Table of Contents

List of Acronyms

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

Recommended Antibiotic Treatment for Common Bacterial Infections & Syndromes

Central Nervous System

Acute Bacterial Meningitis (Community-Acquired)			
Clinical definition: Inflammation of meninges and subarachnoid space. Common symptoms include headache, fever, stiff neck, reduced consciousness. Major causes of bacterial meningitis include *N. meningitidis, S. pneumoniae, L. monocytogenes*.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	2 g 12 hourly	If culture negative: 10 days. In case of proven *S. pneumoniae* infection: 14 days
Cefotaxime (IV)	Powder for injection: 250 mg per vial (as sodium salt	2 g 6 hourly	
Alternative antibiotic choice(s)			
Ampicillin (IV)	Powder for injection: 500 mg; 1 g (as sodium salt) in vial	3 g 6 hourly	10 days, or if confirmed *L. monocytogenes:* 3 weeks
Benzylpenicillin (IV)	Powder for injection: 600 mg; 3 g (sodium or potassium salt) in vial	4 MU 4 hourly	10 days
Chloramphenicol (IV)[A]	Powder for injection: 1 g (sodium succinate) in vial	1 g 6 hourly	10 days
In case of non-severe penicillin allergy			
Ceftriaxone	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	2 g 12 hourly	If culture negative: 10 days. In case of proven *S. pneumoniae* infection: 14 days
Cefotaxime (IV)	Powder for injection: 250 mg per vial (as sodium salt	2 g 6 hourly	
In case of severe Penicillin allergy			
Moxifloxacin (IV, PO)	Tablet: 400 mg or 100 mg (dispersible); Injectable solution: 400mg/250 mL[3]	400 mg once daily	If culture negative: 10 days. In case of proven *S. pneumoniae* infection: 14 days
Principles of Stewardship: A. Chloramphenicol is not preferred and should only be used if other listed antibiotics are not available. > Acute meningitis may be caused by a range of pathogens, some of which are not bacteria. Microbiologic diagnosis, including bacterial culture from CSF, should be obtained as soon as possible to confirm etiology. > In presentations of subacute or chronic nature, consider diagnostic tests for TB meningitis, particularly in HIV-endemic areas.			
Other Notes:			

- Add ampicillin in situations of confirmed Listeria outbreaks and for patients at high risk for Listeria including:
  - Patients over 50 years of age
  - Immunosuppressed patients – cancer, transplantation etc.
  - Patients with alcoholism, cirrhosis, etc.
  - Pregnant women

Head, Eyes, Ear, Nose & Throat

Acute Otitis Media			
Clinical definition: Acute infection and inflammation of the middle ear. Common symptoms include ear pain and difficulty hearing. Common bacterial etiologies include *S. pneumoniae, H. influenzae, M. catarrhalis, S. aureus, Group A Streptococcus* sp.			
Preferred antibiotic choice(s)			
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)	500 mg 8 hourly	5 days
Alternative antibiotic choice(s)			
Amoxicillin + clavulanic acid (PO)	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL; Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt)	500 mg of amoxicillin component 12 hourly	5 days
In case of confirmed drug allergy or medical contraindication			
Azithromycin (PO)	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
Principles of Stewardship: > If patient has received antibiotics in the past month, use amoxicillin-clavulanic acid in preference to amoxicillin.			
Other Notes: > None			

<table>
<tr><th colspan="4">Dental Abscess including Gingivitis</th></tr>
<tr><td colspan="4">Clinical definition: Tooth infections from cavities, gingivitis, and periodontitis. Common symptoms include severe pain, tooth sensitivity, and inflammation of the face and gums. Most infections are polymicrobial and include anaerobic bacteria.</td></tr>
<tr><td colspan="4">Preferred antibiotic choice(s)</td></tr>
<tr><td>Drug</td><td>Formulation[1]</td><td>Dosage</td><td>Duration</td></tr>
<tr><td>Amoxicillin-clavulanic acid (PO)</td><td>Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL; Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt)</td><td>500 mg component of amoxicillin 8 hourly</td><td>3 days if adequate source control, or 5 days if not</td></tr>
<tr><td>Phenoxymethyl-penicillin (penicillin V) (PO)</td><td>Powder for oral liquid: 250 mg (as potassium salt)/5 mL; Tablet: 250 mg (as potassium salt)</td><td>500 mg 6 hourly</td><td>3 days if adequate source control, or 5 days if not</td></tr>
<tr><td colspan="4">In case of confirmed drug allergy or medical contraindication</td></tr>
<tr><td rowspan="2">Combination therapy with:

Azithromycin (PO)

PLUS

Metronidazole (PO)</td><td>Azithromycin- Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL</td><td>500 mg 6 hourly</td><td rowspan="2">5 days</td></tr>
<tr><td>Metronidazole- Oral liquid: 200 mg (as benzoate)/ 5 mL; Tablet: 200 mg to 500 mg</td><td>400 mg 8 hourly</td></tr>
<tr><td colspan="4">Principles of Stewardship:
> Dental abscess requires surgical drainage, not just antibiotics.
> If the abscess is drained and the patient is improving, consider stopping antibiotics after 3 days of treatment.
> Although gingivitis is a risk factor for dental abscess, only acute necrotizing gingivitis should be treated with antibiotics
> For gingivitis without necrosis or abscess, do not treat with antibiotics.</td></tr>
<tr><td colspan="4">Other Notes:
> For acute necrotizing gingivitis:
▪ Treat with clindamycin [Dosage: Capsule: 150 mg (as hydrochloride); Injection: 150 mg (as phosphate)/ mL; Oral liquid: 75 mg/5 mL (as palmitate)] for 3 days
▪ For cases of acute necrotizing gingivitis associated with malnutrition, treat with vitamins.</td></tr>
</table>

Bacterial Pharyngotonsillitis, including Streptococcal & Diphtheria			
Clinical definition: Infection causing acute inflammation of the pharyngeal wall and tonsils caused by various classes of *S. pyogenes* or *C. diphtheriae* (diphtheria). Common symptoms include sore throat, low-grade fever, and inflammation of the tonsils, uvula, lymph nodes, submandibular region, and neck.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration[2]
Phenoxymethyl-penicillin (penicillin V) (PO)	Powder for oral liquid: 250 mg (as potassium salt)/5 mL; Tablet: 250 mg (as potassium salt)	500 mg 6 hourly	5 days
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)	500 mg 8 hourly	5 days
In case of confirmed severe penicillin allergy or medical contraindication			
Azithromycin (PO)	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
Principles of Stewardship: > 85% or more of pharyngotonsillitis is viral. Most cases of pharyngotonsillitis in adults should be managed with watchful waiting & symptomatic relief. Antibiotics should not be considered unless there is a confirmed diagnosis of group A *Streptococcus*.			
Other Notes: > If clinical findings or epidemiologic context suggest diphtheria, treat with diphtheria antitoxin in addition to penicillin or macrolide.			

Cardiac

Infective Endocarditis - Native valve endocarditis			
Native valve endocarditis			
Clinical definition: Symptoms may be variable and non-specific. Common etiologies include *S. aureus*[A] and streptococcal and enterococcal species.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Combination thereapy with: Benzylpenicillin (penicillin G, IV) PLUS Gentamicin (IV)	Powder for injection: 600 mg; 3 g (sodium or potassium salt) in vial	5 MU 6 hourly	28 days
	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/mL in 2- mL vial	3 mg/kg daily	14 days
Alternative antibiotic choice(s)			

Combination therapy with: Ampicillin (IV) PLUS Gentamicin (IV)	Ampicillin- Powder for injection: 500 mg; 1 g (as sodium salt) in vial	2 g 4 hourly	28 days
	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/mL in 2mL vial	3 mg/kg daily	14 days
In case of confirmed drug allergy or medical contraindication			
Vancomycin (IV)	Powder for injection: 250 mg (as hydrochloride) in vial	20 mg/kg 12 hourly	6 weeks
Prosthetic valve or pacemaker infection			
Clinical definition: Infection associated with insertion or presence of prosthetic valve, pacemaker, or implanted defibrillator. Common etiologies include *S. aureus, S. epidermidis,* and other staphylococcal species.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Combination therapy with: Vancomycin (IV)	Vancomycin- Powder for injection: 250 mg (as hydrochloride) in vial	Loading dose: 25-30 mg/kg followed by maintenance dose: 10-15 mg/kg	6 weeks
PLUS Gentamicin (IV)	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial	3 mg/kg daily	2 weeks
PLUS Rifampicin (PO)	Rifampicin- Oral liquid: 20 mg/mL; Solid oral dosage form: 150 mg; 300 mg	7.5 mg/kg 12 hourly	6 weeks
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 administration of antibiotic therapy. > Approximately 10% of endocarditis cases are culture-negative. The most common reason for which is receipt of antibiotics prior to the blood cultures. True, culture-negative endocarditis suggests infection by a fastidious organism, and includes *Bartonella* sp., *Coxiella burnetti* (Q Fever), and *Brucella sp*, each of which associate with specific risk factors. Discuss investigation and treatment options with your local pathology laboratory.			
Other Notes: A. If there are risk factors for *S. aureus* (e.g. patient is an IV drug user, if vegetation is very large, or patient has rapidly accelerating symptoms), add cloxacillin.			

Acute Bronchitis
Clinical definition: Inflammation of the upper airways due to viral infection or irritants.
Acute bronchitis is a viral infection and should **NOT** be treated with antibiotics.

Acute Exacerbation of Chronic Obstructive Pulmonary Diseases (COPD)			
Clinical definition: Acute or subacute worsening of dyspnea (greater than or equal to 5 on a visual analogue scale that ranges from 0 to 10) sometimes but not necessarily accompanied by increased cough, sputum volume, and/or sputum purulence.			
Preferred antibiotic choice(s) – Mild-moderate disease			
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)	500 mg 8 hourly	5 days
Doxycycline (PO)	Oral liquid: 25 mg/5 mL; 50 mg/5 mL (anhydrous); Solid oral dosage form: 50 mg; 100 mg (as hyclate)	200 mg STAT then 100 mg 12 hourly	5 days
Preferred antibiotic choice(s) – Severe disease			
Amoxicillin + clavulanic acid (PO)	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL; Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt)	500 mg of amoxicillin component 8 hourly	5 days
In case of confirmed drug allergy or medical contraindication in severe disease			
Azithromycin	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
Principles of Stewardship: > Up to 50% of infection-related acute exacerbations are viral. Biomarkers such as C-reactive protein (CRP) and procalcitonin (PCT) may play a role in differentiating, when available.			

Other Notes:

- Exacerbations of COPD are commonly non-infectious and require optimization of non-antimicrobial therapeutic management.

Mild to Moderate Community-Acquired Pneumonia (CAP) in Ambulatory Outpatients			
Clinical definition: Pneumonia with onset in patients not admitted to the hospital. Mild to moderate disease severity is treated in the outpatient setting. (For severe CAP (CURB score >2), see below)			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Amoxicillin (PO)	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)	1 g 8 hourly	5 days
Alternative antibiotic choice(s)			
Doxycycline (PO)	Oral liquid: 25 mg/5 mL; 50 mg/5 mL (anhydrous); Solid oral dosage form: 50 mg;100 mg (as hyclate)	100 mg 12 hourly	5 days
In patients with severe comorbidities – Alcoholism, chronic obstructive pulmonary disease, witnessed aspiration which is progressing after 24-48 hours, etc.			
Amoxicillin + clavulanic acid (PO)	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL; Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt)	500 mg component of amoxicillin 8 hourly	5 days
In case of confirmed drug allergy or medical contraindication			
Azithromycin (PO)[A]	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
Principles of Stewardship: A. Macrolides should be avoided in countries with high macrolide resistance rates in *S. pneumoniae*, and should rather be reserved for treatment of patients with penicillin allergy. > Fluoroquinolones should be avoided, particularly in TB-endemic countries.			
Other Notes: > A blood culture is preferred to sputum culture if the patient is admitted to hospital. > If azithromycin or another macrolide is not available, treat with a quinolone such as moxifloxacin or levofloxacin.			

Severe Community-Acquired Pneumonia for Hospitalized Patients			
Clinical definition: Severe disease is defined as CURB-65 score greater than two[4] and requires hospitalization.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Combination therapy with: Ceftriaxone (IV/IM) OR Cefotaxime (IV/IM) PLUS Clarithromycin OR Azithromycin (PO)	Ceftriaxone- Powder for injection: 250 mg; 1 g (as sodium salt) in vial	2 g daily	5 days
	Cefotaxime - Powder for injection: 250 mg per vial (as sodium salt	2 g 8 hourly	5 days
	Clarithromycin- Solid oral dosage form: 500 mg; Powder for oral liquid: 125 mg/5 mL; 250 mg/5 mL; Powder for injection: 500 mg in vial	500 mg by mouth 12 hourly	5 days
	Azithromycin- Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	5 days
In case of confirmed drug allergy or medical contraindication			
Moxifloxacin (IV/PO)	Tablet: 400 mg; Tablet (dispersible): 100 mg; Injectable solution: 400mg/250 mL[3]	400 mg daily	5 days
Principles of Stewardship: > Obtain a blood culture prior to starting antibiotic therapy. > If available, perform a legionella urinary antigen test – a positive result will allow stopping of the b-lactam and extension of azithromycin to a minimum of 7 days to treat *L. pneumophilia* > In high TB-endemic areas, assess patients presenting with fever and cough ± constitutional symptoms (anorexia, weight loss, night sweats) for active TB disease. > Doxycylcine may be used in place of a macrolide if unavailable.			
Other Notes: > None			

Hospital-Acquired (Nosocomial) Pneumonia (HAP)			
Clinical definition: Pneumonia with onset at least 48 hours following hospital admission excluding ventilator-acquired pneumonia. Early onset HAP is defined as onset within 5 days of admission. Common etiologies of early onset HAP include *S. Pneumoniae, S. aureus, H. influenzae*, and enteric gram-negative bacilli. Late onset HAP is defined as onset after 5 days following admission; common etiologies include *E. coli, S. marcescens, K. pneumoniae, A. baumannii, P. aeruginosa,* and *Enterobacter* species.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration

For facilities with low-level antibiotic resistance or where resistance is unknown and/or for patients not transferred from facilities with high resistance:			
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	2 g daily	8 days
Cefotaxime (IV)	Powder for injection: 250 mg per vial (as sodium salt	2 g 8 hourly	8 days
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.	1 g of amoxicillin component 8 hourly	8 days
For facilities with high Gram-negative resistance and/or for patients with risk factors for resistance:			
Piperacillin-tazobactam (IV)	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	4.5 g 8 hourly	7 – 14 day
Alternative antibiotic choice(s)			
Ertapenem	Powder for injection: 1g/vial[3]	1 g daily	7 – 14 days
In case of confirmed drug allergy or medical contraindication			
Moxifloxacin (PO)	Tablet: 400 mg; Tablet (dispersible): 100 mg	400 mg daily	7 – 14 days
Principles of Stewardship: > Empiric choice of antibiotics for HAP should be informed by the local resistance profiles in your hospital/unit. > It is recommended to obtain both blood and sputum cultures prior to starting antibiotics. > Switching from IV antibiotics to oral when patient can tolerate oral medication and as soon as signs and symptoms of infection are improving (e.g. clinical and laboratory white blood cell count improvement).			
Other Notes: > If risk factors for Pseudomonas infection exist, increase dosing frequency of piperacillin-tazolbactam to 6-hourly, and use a 2nd generation carbapenem (e.g., meropenem or imipenem) in place of ertapenem.			

Gastrointestinal

Acute Invasive Diarrheal Disease (Dysentery)			
Clinical definition: Acute infection commonly caused by bacteria resulting in bloody diarrhea, often with associated fever and abdominal pain. Bacterial etiologies include *Shigella flexneri, Campylobacter jejuni,* enteroinvasive and enterohaemorrhagic *E. coli,* and non-typhoidal *Salmonella* species. Dysentery may also be caused by the protozoan pathogen, *Entamoeba histolytica*.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Ciprofloxacin (PO)	Oral liquid: 250 mg/5 mL (anhydrous); Tablet: 250 mg (as hydrochloride)	500 mg 12 hourly	3 days
Alternative antibiotic choice(s)			
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	1 g 12 hourly	5 days
Azithromycin (PO)	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
For severe cases or those progressing despite ciprofloxacin, add Entamoeba cover:			
Metronidazole (PO)	Injection: 500 mg in 100-mL vial; Oral liquid: 200 mg (as benzoate)/5 mL; Suppository: 500 mg; 1 g; Tablet: 200 mg to 500 mg	800 mg stat followed by 400 mg 8 hourly	7 days
Principles of Stewardship: > Non-bloody infectious diarrhea is generally caused by viruses and should not be treated empirically with antibiotics, but rather with supportive care and rehydration. > Send stool sample for culture and sensitivity prior to starting antibiotics.			
Other Notes: > In patients with advanced HIV and CD4 count <100 cells/mm3, consider cytomegalovirus (CMV) colitis			

Complicated Intra-Abdominal Infections (cIAI)			
Clinical definition: Intramural inflammation of the gastrointestinal tract extending into the peritoneal space			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration[5]
If mild to moderate:			4 days if source control has been achieved and clinical condition is improving. If not, duration will depend on clinical and radiological progress, jointly managed with surgeons.
Amoxicillin + clavulanic acid (IV/PO)	Powder for injection: 500 mg (as sodium) + 100 mg (as potassium salt); 1000 mg (as sodium) + 200 mg (as potassium salt) in vial	875 mg of amoxicillin component 8 hourly	
If severe:			
Combination therapy with: Cefotaxime (IV)	Cefotaxime- Powder for injection: 250 mg per vial (as sodium salt	2 g 8 hourly	
PLUS Metronidazole (IV)	Metronidazole- Injection: 500 mg in 100- mL vial	500 mg 6 hourly	
Combination therapy with: Ampicillin (IV)	Ampicillin- Powder for injection: 500 mg; 1 g (as sodium salt) in vial	200 mg/kg 4 hourly	
PLUS Gentamicin (IV)	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial.	1 mg/kg 8 hourly	
PLUS Metronidazole (IV)	Metronidazole- Injection: 500 mg in 100- mL vial	500 mg 6 hourly	
If hospital-acquired in a facility where resistance has been documented, consider:			
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	4.5 g 6 hourly	4 days if source control has been achieved and clinical condition is improving. If not, duration will depend on clinical and radiological progress, jointly managed with surgeons.
Alternative antibiotic choice			
Meropenem	Powder for injection: 500 mg (as trihydrate); 1 g (as trihydrate) in vial	1 g 8 hourly	4 days if source control has been achieved and clinical condition is

			improving. If not, duration will depend on clinical and radiological progress, jointly managed with surgeons.
In case of confirmed penicillin allergy or medical contraindication			
Combination therapy with: Clindamycin (IV) PLUS Gentamicin (IV) OR Ciprofloxacin (IV)	Clindamycin- Injection: 150 mg (as phosphate)/mL	20 mg/kg/day divided every 6 to 8 hours	4 days if source control has been achieved and clinical condition is improving. If not, duration will depend on clinical and radiological progress, jointly managed with surgeons.
	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial.	1 mg/kg 8 hourly	
	Ciprofloxacin- Solution for IV infusion: 2 mg/ mL (as hyclate)	500 mg 12 hourly	
Principles of Stewardship: > Obtain a blood culture prior to starting any new antibiotic therapy. > Breach of the gastrointestinal tract mucosa is a risk factor for candida infection, which should be considered if source control and antibiotic treatment are not inducing a response. > Investigate for TB in endemic areas.			
Other Notes: > cIAI is often a difficult infection to treat and requires close collaboration with surgical colleagues to manage, as source control is a key aspect of management.			

Typhoid (Enteric) Fever			
Clinical definition: Systemic illness due to *S. enterica* serotype Typhi or Paratyphi, commonly acquired from ingestion of contaminated food or water. High fever and diarrhea or constipation are common presenting symptoms.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
For uncomplicated cases from outside of South Asia or Pakistan (low levels quinolone resistance):			
Ciprofloxacin (PO)	Oral liquid: 250 mg/5 mL (anhydrous); Tablet: 250 mg (as hydrochloride)	500 mg 12 hourly	For mild cases: 7 days For severe cases: 10 days
For uncomplicated cases from South Asia or Pakistan (high levels quinolone resistance):			
Azithromycin (PO)	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
For complicated cases, if patient is unable to take oral medication, or in case of confirmed			

drug allergy or medical contraindication:			
Ceftriaxone (IV, with de-escalation to ciprofloxacin or azithromycin depending on fluoroquinolone resistance)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	2 g daily	For mild cases: 7 days For severe cases: 10 days
Alternative antibiotic choice(s)			
Cefixime (PO)	Capsule or tablet: 200 mg; 400 mg (as trihydrate); Powder for oral liquid: 100 mg /5 mL	100 mg 12 hourly	For mild cases: 7 days For severe cases: 10 days
Principles of Stewardship: > Obtain a blood culture prior to starting antibiotic therapy.			
Other Notes: > Patients who aquire S. Typhi from Pakistan who have complicated, severe infection should be considered for empirical meropenem due to ongoing outbreak of XDR-*S. Typhi*. > Median time to fever reduction is 5 days.			

Genitourinary

Mild to Moderate Acute Uncomplicated Prostatitis			
Clinical definition: Common symptoms include fever, chills, malaise, myalgia, pelvic pain, dysuria, and cloudy urine. In younger patients, common etiologies include *N. gonorrhea and C. trachomatis*. In older patients, common etiologies include *Enterobacteriaceae* species.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Ciprofloxacin (PO)	Oral liquid: 250 mg/5 mL (anhydrous); Tablet: 250 mg (as hydrochloride)	500 mg 12 hourly	10 – 14 days
Alternative antibiotic choice(s)			
Azithromycin	Capsule: 250 mg; 500 mg (anhydrous); Oral liquid: 200 mg/5 mL	500 mg daily	3 days
Principles of Stewardship: > None			
Other Notes: > In sexually active men, syndromic treatment for gonorrhoea and chlamydia should be added, as per national protocol.			

Uncomplicated Urinary Tract Infection (UTI)			
Clinical definition: Infection of the bladder and lower urinary tract. Symptoms include urgency, dysuria, and frequency of micturition. UTIs are more common in women than men. Commonly caused by the enterobacteriales, *E. coli* and *K. pneumoniae*			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Nitrofurantoin (PO)	Oral liquid: 25 mg/5 mL; Tablet: 100 mg.	50 mg 6 hourly	5 days
Amoxicillin + clavulanic acid (PO)	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL; Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).	500 mg of amoxicillin component 12 hourly	5 days
Principles of Stewardship: > Treatment with quinolones should be avoided. > Do not treat patients with asymptomatic bacteriuria except in pregnancy, and consider in those persons undergoing genitourinary tract biopsy.			
Other Notes: > None			

Acute Pyelonephritis			
Clinical definition: Bacterial infection of the kidney commonly presenting in women ages 18-40 years. Common symptoms include high fever, chills or rigors, costovertebral tenderness and flank pain. Common etiologies include the enterobacteriales *E. coli*, *K. pneumoniae,* and *P. mirabilis*. *P. aeruginosa* and *Enterococci* are less common causes.			
Preferred antibiotic choice(s)for mild-moderate cases			
Drug	Formulation[1]	Dosage	Duration
Ciprofloxacin (PO)	Oral liquid: 250 mg/5 mL (anhydrous); Tablet: 250 mg (as hydrochloride)	500 mg 12 hourly	7 days
For severe cases consider:			
Gentamicin (IV)	Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial	5 mg/kg daily	7 days
Amikacin (IV)	Injection: 250 mg (as sulfate)/mL in 2- mL vial	15 mg/kg daily	7 days
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	1 g daily	7 days
Cefotaxime (IV)	Cefotaxime- Powder for injection: 250 mg per vial (as sodium salt	1 g 8 hourly	7 days
Principles of Stewardship: > Obtain urine and blood cultures for bacterial identification and condct antimicrobial suspectibility testing (AST) prior to starting antibiotic therapy. > If treating *Pseudomonas* infection with ciprofloxacin, increase dose to 750 mg and treat 12 hourly.			
Other Notes: > Avoid treatment with aminoglycosides in patients with renal impairment.			

Skin & Soft Tissue Infections (SSTI)			
Clinical definition: Bacterial infections of skin and underlying soft tissue including cellulitis and abscess.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
Cloxacillin (PO)	Capsule: 500 mg; 1 g (as sodium salt); Powder for oral liquid: 125 mg (as sodium salt)/5 mL.	250 mg 6 hourly	5 days
Alternative antibiotic choices:			
Amoxicillin + clavulanic acid (PO) Used in animal bites[A]	Oral liquid: 125 mg amoxicillin + 31.25 mg clavulanic acid/5 mL AND 250 mg amoxicillin + 62.5 mg clavulanic acid/5 mL; Tablet: 500 mg (as trihydrate) + 125 mg (as potassium salt).	500 mg of amoxicillin component 8 hourly	5 days
Cefalexin (PO)	Powder for reconstitution with water: 125 mg/5 mL; 250 mg/5 mL (anhydrous); Solid oral dosage form: 250 mg (as monohydrate)	500 mg 6 hourly	5 days
In case of confirmed drug allergy or medical contraindication			
Clindamycin (PO)	Capsule: 150 mg (as hydrochloride); Oral liquid: 75 mg/5 mL (as palmitate)	300 mg 8 hourly	5 days
Principles of Stewardship: > Withhold antibiotics for standard, uncomplicated abscess in an otherwise well person if the abscess can be incised and drained. > If IV antibiotic therapy is clinically indicated, review patient progress at day 3 of treatment to consider switch from IV to oral therapy.			
Other Notes: A. For patients with suspected animal bite, assess for rabies risk and consider administering a tetanus booster.			

Acute Osteomyelitis & Septic Arthritis			
Clinical definition: Acute osteomyelitis is an infection of bone infection with symptoms lasting days or a few weeks, commonly caused by methicillin-susceptible or resistant *S. aureus*. Common etiologies of septic arthritis include *N. gonorrhea, S. aureus, Streptococcus* species, and Gram-negative bacilli.			
Preferred antibiotic choice(s)			
Drug	Formulation[1]	Dosage	Duration
For the empiric treatment of acute osteomyelitis or septic arthritis:			
Cloxacillin (IV)	Powder for injection: 500 mg (as sodium salt) in vial.	2 g 6 hourly	4 – 6 weeks
Alternative antibiotic choice(s)			
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	1 g daily	4 – 6 weeks
Cefotaxime (IV)	Powder for injection: 250 mg per vial (as sodium salt	2 g 8 hourly	
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	1 g Amoxicillin componenent 8 hourly	
For the treatment of monoarticular septic arthritis with STD risk			
Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	1 g daily	2 weeks
In case of confirmed drug allergy or medical contraindication			
Clindamycin (IV)	Clindamycin- Injection: 150 mg (as phosphate)/mL; Oral liquid: 75 mg/5 mL (as palmitate)	600 mg 8 hourly	2 weeks
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. > For septic arthritis, conduct a joint culture before administering antibiotic therapy and refer to an orthopedic surgeon for assessment. > If patient cannot take oral antibiotics, start with IV antibiotics and switch to oral therapy as soon as patient is able to take antibiotics orally.			
Other Notes: > Adequate drainage of purulent joint fluid is needed in addition to antibiotic therapy for septic arthritis.			

Bloodstream

Sepsis (Septicemia) & Septic Shock			
Clinical definition: Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection. Septic shock is sepsis that requires vasopressor therapy to maintain blood pressure. **The choice of empiric antibiotic(s) will depend on the likely source of infection (see individual infections).** The guidance given here, relates to sepsis/septic shock where no infection source is immediately identifiable.			
Preferred antibiotic choice(s) when no source is identified and/or is community-acquired with low risk of drug-resistant bacteria			
Drug	Formulation[1]	Dosage	Duration
Combination therapy with: Ampicillin (IV) OR Amoxicillin-clavulanic acid (IV)	Ampicillin- Powder for injection: 500 mg; 1 g (as sodium salt) in vial	200 mg/kg 4 hourly	10 days
	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	1 g amoxicillin component 8 hourly	10 days
PLUS Gentamicin (IV)	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/ mL in 2- mL vial.	2 mg/kg 12 hourly	5 days
Alternative antibiotic choice(s)			
Combination therapy with; Ceftriaxone (IV)	Powder for injection: 250 mg; 1 g (as sodium salt) in vial	2 g daily	10 days
PLUS Gentamicin (IV)	Gentamicin- Injection: 10 mg; 40 mg (as sulfate)/mL in 2-mL vial.	2 mg/kg 12 hourly	5 days
Preferred antibiotic choice(s) when no source is identified and hospital acquired with high risk of drug-resistant bacteria			
Drug	Formulation[1]	Dosage	Duration
Combination therapy with Piperacillin-tazobactam (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	4.5 g 6 hourly	10 days
PLUS Amikacin (IV)	Amikacin - Injection: 250 mg (as sulfate)/mL in 2- mL vial	15 mg/kg daily	5 days

Principles of Stewardship: > If the primary source of sepsis is defined, amend treatment duration according to the suggested duration for individual infections.
Other Notes: > Early administration of broad-spectrum antibiotics is critical in patients presenting with sepsis. > Amikacin has better coverage for extended-spectrum betalactamases than gentamicin.

References

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