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ANTIBIOTIC POLICY

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Contents

a. General guidelines

STEPS TO FOLLOW THE PROTOCOLS

1. Identify the type of infection viz. bloodstream, respiratory, intra-abdominal or urinary tract
2. Define the location — OPD, ICU or In- patient
3. Wait for at least 48hrs of antimicrobial therapy before labeling the patient as non-responding to the therapy and to switch to the next higher line of therapy. Also consider escalation if patient's condition deteriorates.
4. Send samples for cultures and or primary set of investigations before starting antibiotic therapy
5. Once culture / sensitivity report is available initiate specific antimicrobial therapy. Antimicrobial may require being changed/de-escalated.

b. Principles of Judicious Antimicrobial Prescribing

The appropriate use of antimicrobials is mandatory for the effective delivery of care for patients and is a key factor in the management of antimicrobial resistance.

Antimicrobial stewardship is defined as processes to assist and support clinicians with decisions regarding the optimal selection, dose and duration of an antimicrobial agent.

The objective of AMS is to ensure the best clinical outcome for the treatment or prevention of infection, with minimal toxicity to the patient and minimal impact on subsequent development of resistance.

1. Send the appropriate investigations for all the infections as recommended. These are the minimum required for diagnosis, prognosis and follow up of these infections.
2. All antibiotic initiations should be done after sending appropriate specimens for culture and sensitivity test.
3. Change in antibiotic should be done after receiving the culture and sensitivity report.
4. Follow the Hospital policy when choosing antimicrobial therapy whenever possible. If alternatives are chosen, document the reason in the case records.
5. Check for factors which will affect drug choice & dose, eg, renal function, drug interactions and allergy.
6. Ensure that the appropriate dose is prescribed.
7. The need for antimicrobial therapy should be reviewed on a daily basis. For most infections 5-7 days of antimicrobial therapy is sufficient (simple UTIs can be adequately treated with 3 days of antibiotic).
8. All IV antibiotics may only be given for 48 – 72 hours without review and then consideration of oral alternatives. New microbiological or other information (eg. fever defervescence for at least 24h, marked clinical improvement; low CRP) should at this stage often permit a switch to oral antibiotic(s), or switch to a narrow spectrum antibiotic, or cessation of antibiotics (no infection present).
9. Once culture reports are available, the physician shall deescalate to the narrowest spectrum, most efficacious and most cost effective option. If there is no step down availed, the reason shall be documented and is subjected to clinical audit.
10. Empirical Therapy - Where delay in initiating therapy pending microbiological results would be life threatening or caries risk of serious morbidity. Antimicrobial therapy based

on a clinically defined infection is justified. Where empiric therapy is used the accuracy of diagnosis should be reviewed regularly and treatment altered/stopped when microbiological results become available.

11. Microbiological samples must always be sent prior to initiating antimicrobial therapy. Rapid tests, such as Gram smears, can help determine therapeutic choices when empiric therapy is required.
12. Prescribing antibiotics just in case an infection is present is rarely justified. Where patients are in hospital close observation is usually a better option.

Surgical prophylaxis

Prophylaxis should only be considered in the following scenarios, when either there is a significant risk of infection or when the consequences of infection would be disastrous (e.g. joint replacement surgery):

1. **Contaminated surgery** – Surgical antimicrobial prophylaxis is strongly recommended when there is a risk of macroscopic soiling of the operative field. Examples include: large bowel resection, biliary or genitourinary tract surgery with infective bile or urine.

2. **Clean-contaminated surgery** – surgical antimicrobial prophylaxis is recommended where the mucosa is penetrated under controlled conditions without unusual contamination. Examples include laryngectomy, uncomplicated appendicectomy, cholecystectomy, transurethral resection of prostate gland.

3. **Clean surgery** – surgical antimicrobial prophylaxis is only recommended for insertion of a prosthesis or artificial device or for high risk areas such as the central nervous system, eye, aorta or sternum.

- Antimicrobial prophylaxis cannot be relied upon to overcome poor surgical technique (e.g. inadequate haemostasis, excessive damage to tissues, inadequate debridement).
- The first dose(s) of surgical prophylaxis should be given at a time that ensures adequate plasma and tissue drug levels are achieved at the start of the procedure (i.e. administration of prophylaxis one hour prior to commencement of the operation).
- Repeat intra-operative doses are recommended for prolonged procedures of more than three hours or if there is excessive blood loss. “Prophylaxis” continuing for

more than twenty four hours postoperatively is unnecessary and potentially dangerous.

c. CATEGORIZATION OF ANTIBIOTICS

Restricted use antibiotics:

A written documentation to be maintained which captures the request along with justification for use by the clinician and also captures the approval for use by the authority in charge

Limited access antibiotics:

Unrestricted use of these antibiotics may be allowed for empirical use for first 48-72hrs but after that a clinical justification by clinician and approval from authority in charge needs to be documented as to why these antibiotics cannot be de-escalated and need to be continued further.

Under Surveillance antibiotics:

A close monitoring to check their usage (indication, quantity and pattern) in OPD /
Type 1 Patients/ Surgical prophylaxis. Audits to be done at regular intervals to assess their consumption

RESTRICTED USE ANTIBIOTICS

1. **Colistin:** It is the last resort for managing multidrug resistant (MDR) gram negative organisms and its use, dose and duration need to be rationalised. Use should be restricted
2. **Doripenem:** It is the last carbapenem (at least in near future). If Imipenem and Meropenem are effective, we need to conserve the use of Doripenem
3. **Rifampicin:** (For Non-TB use) This is a valuable drug for TB. The use of rifampicin in MDR Pseudomonas, Acinetobacter or MRSA should be restricted
4. **Linezolid:** Alternatives available eg. Vancomycin/Teicoplanin.
5. **Daptomycin:** Alternatives are available for MRSA eg. Vancomycin, Teicoplanin.
6. **Tigecycline:** Bacteriostatic, one of the most Broad spectrum drug, has limited role in MDR infections like SSTI, IAI where ESBL/MRSA and or Acinetobacter are feared.
7. **Sulbactam:** Recently introduced in market. Reserved for pan drug resistant (PDR) Acinetobacter. Dose has to be correct (4-12gm/day for PDR Acinetobacter)

LIMITED ACCESS ANTIBIOTICS

1. **Imipenem/Meropenem :** Use as an empirical drug in sick patients is allowed looking at the antibiograms in most hospitals showing better sensitivity of these antibiotics over other classes, however after culture and sensitivity report is available, if the pathogen is susceptible to other classes of antibiotics or if patient's condition improves – then de-escalation should be advised.
2. **Piperacillin-Tazobactam/Cefoperazone-Sulbactam:** These are as broad spectrum as carbapenems (this fact is not appreciated generally). Use as empirical in sick patients is allowed looking at the antibiograms in most hospitals showing good sensitivity of these antibiotics over other classes, however after culture and sensitivity report is available, if the pathogen is susceptible to other classes of antibiotics or if patient's condition improves - then de-escalation should be advised.
3. **Vancomycin/Teicoplanin:** Use as empirical in sick patients may be allowed specially in BSI, SSTI where MRSA is suspected but if after 48-72hrs culture and sensitivity report shows no staph aureus or MSSA then Vancomycin/Teicoplanin have absolutely no role and should be discontinued.

UNDER SURVEILLANCE ANTIBIOTICS: WHAT AND WHY?

- 3rd generation cephalosporins (both oral and IV) and Flouroquinolones:

One of the main reasons for widespread Extended Spectrum Beta- Lactamase producing organisma (ESBLs) in India in the community is due to overuse of 3rd generation cephalosporins and flouroquinolones at OPD level-Type 1 patients, pediatric patients and surgical prophylaxis.

It is must to remind the clinicians about these antibiotics and the collateral damage they cause. Also it is imperative to exercise control on liberal usage of these antibiotics in a phased manner and perform regular audits on the rate of consumption of these antibiotics. This could be the single most valuable intervention to curb resistance in community in India.

d. D1. Dosage guide for commonly used antimicrobial agents

ANTIBIOTICS	ROUTE	PAEDIATRIC DOSE	ADULT DOSE
Amikacin	Intravenous	15-22.5 mg/Kg/day in 2-3 doses	15mg/Kg/day q 8-12 h, max doses 1.5mg / kg
Amoxycillin	Oral	20-50mg/Kg/day, 3-4 doses	250-500mg q 8 hourly
Amoxycillin- clavunate (co-amoxyclav)	Oral Intravenous	40mg/kg/day (amoxicillin) in 2 doses 90mg/kg/day if penicillin resistant S.pneumonia suspected 100mg/kg/day in otitis media	375mg q 8 hourly 625 – 1000mg 12 hrly
Ampicillin	Intravenous or Oral	100-400 mg/kg/day in 4 doses (IV)	500mg- 1gm q 6 hrly
Azithromycin	Oral	10mg/kg/day once daily Enteric fever 20 mg/kg once daily	500mg daily
Azetronam	Intravenous	30-120 mg/kg/day q 6-8hrly In Cystic fibrosis max dose 200mg / kg/day	1- 2gm q 8 hrly, max dose 8gm in 24 hours
Benzathine penicillin	Intramuscular	1,200,000 units(>30 kg) 600,000 units(<30 kg)	1.2 – 2.4 million units / dose
Cefadroxil	Oral	30 mg/kg/day in 2 doses	500 mg bid or 1 gm bid
Cefazolin	Intravenous	100 mg/kg/day in 3-4 divided doses	0.52 gm q 6-8 hourly
Cefepime	Intravenous		1-4gm/day in 2-3 doses
Cefixime	Oral	15 mg/kg/day in 2 divided doses, 20 mg/kg/day in 2 divided doses for enteric fever	400 gm /day in 1-2 divided doses
Cefotaxime	Intravenous	100 mg/kg/day in 3-4 divided doses, 200 mg/kg/day in 4 divided doses for meningitis	1 -2 gm 6-8 hourly
Ceftazidime	Intravenous Intramuscular	100mg/kg/day in meningitis (IV) 75-100mg/kg/day in 3 divided doses	1 -2 gm q 12-24 hourly (IV)
Ceftriaxone	Intravenous	50-100mg/kg/day in 2 divided doses Meningitis 100mg/kg/day in 2 divided doses	1 -2 gm q 12-24 hourly
Cefuroxime	Intravenous	75-100mg/kg/day in 3 divided doses	750mg -1.5gm q 8 hrly

	Oral	20-30mg/kg/day in 2 divide doses	250-500mg bid
Cephalexin	Oral	30-40mg/kg/day in 3 divided doses	250-500mg q 8 hourly
Chloramphenicol	Oral Intravenous	75-100mg/kg/day in 4 divided doses **Avoid in infants less than 3 months**	50 mg/kg/day in 4 divided doses
Ciprofloxacin	Oral Intravenous	20-30mg/kg/day in 2 divided doses	250-750mg q 12 hourly
Clarithromycin	Oral Intravenous	15mg/kg/day in 2 divided doses	250-500mg bid
Clindamycin	Oral Intravenous	40-60mg/kg/day in 3-4 divided doses	150-300mg q 6-8 hourly (oral, iv) severe infections 300-600mg 8 hrly IV
Cloxacillin	Oral Intravenous	50-100mg/kg/day in 3-4 divided doses 100- 200mg / kg/day divides q 6 hourly	250-500mg /kg/day in 3-4 divided doses 1-2 gram q 6 hourly
Cotrimoxazole	Oral	5-10mg/kg/day in 2 divided doses (5mg trimethoprim) 20mg/kg/day in 4 divided doses in *Pneumocystis jirovecii* pneumonia	160mg bid
Ertapenem	Intravenous Intramuscular	3 -12 years 15mg/kg/day twice daily (not to exceed 1gm/day)	13 years and above 1gm IV infusion / IM once daily in 3-5ml lidocaine **CI if hypersensitivity to lidocaine/β lactum**
Erythromycin	Oral		250-500mg q 6 hourly
Furazolidine	Oral	5mg /kg in 3-4 divided doses (not below 1 year)	100mg 3-4 times a day
Gentamicin	Intravenous Intramuscular	5-7.5mg/kg/day in 2-3 divided doses	1.3-6 mg/kg/day in 3 divided doses
Imipenem cilastin	Oral / Intravenous		500mg once daily
Linezolid	Oral Intravenous	10mg/kg/dose in 6-8 hourly (oral, IV)	400-600mg q 12 hourly
Meropenem	Oral Intravenous	7.5mg/kg/day /dose in meningitis	1.5 – 3 gm/day in 3 divided doses 6gm/day in meningitis
Metronidazole	Intravenous	7.5mg/kg/day in 3	500 -700mg q 8 hourly

	Oral	divided doses 30-50mg/kg/day in 3 divided doses for liver abscess	
Nalidixic acid	Oral	8 mg/kg/day in 2 divided doses	1gm 4 times/day
Nitofurantoin	Oral	8 mg/kg/day in 2 divided doses	50 - 100mg/kg/day q 6 hourly (5-7mg/kg/day in 4 divided doses max dose 400mg)
Norfloxacin	Oral	20-30 mg/kg/day in 2 divided doses	200 -400mg twice daily
Ofloxacin	Oral Intravenous	20 mg/kg/day in 2 divided doses	200 -400mg q 12 hourly
Penicillin G	Oral Intravenous	50,000units /kg /dose 6 hourly 200,000 – 400,000units /kg /day in 4 divided doses	 2- 24 million units /day in divided doses q 4-6 hours (IV)
Penicillin V	Oral	20-50 mg/kg/day in 4 divided doses	250 -500mg every 6-8 hourly
Piperacillin – Tazobactum	Intravenous	200-400 mg/kg/day in 3-4 divided doses	4.5gm q 8 hourly
	Intravenous Intramuscular	10 mg/kg/day/dose every 12 hours for 3 doses 10 mg/kg/day once daily	400mg once daily (6-30 mg /kg/day)
Tigecycline	Intravenous	**Above 10 years**	100mg followed by 50mg every 12 hrly infusion over 30-60 minutes.
Vancomycin	Intravenous	40-60 mg/kg/day in 3-4 divided doses	0.5gm q 6 hrly or 1 gm q 12 hrly

D2 . Drug doses in Pediatric Age group

Drug name	Dose	Frequency	Maximum dose	Comments
Cefepime Infants >14 days of age and Children >40 kg in weight	50 mg/kg	q 12 h		
Ceftazidime Infants and children <12 years	100–15 mg/kg/d	Divided q 8 h	6 g	
Cefotaxime Infants and children a) < 50 kg b) >12 years and >50 kg	100–200 mg/kg/d 1–2 g	Divided q6-8 h q 8 h	2 g	
Ceftriaxone Infants and children	50-75 mg/kg/d	Divided q 12 h	2 g	
Vancomycin Infants and children	40 mg/kg/d	Divided q 6-8h	2 g	
Linezolid Infants and children <12 years Children >12 years of age and adolescents	10 mg/kg 10 mg/kg	q 8 h q 12 h		
Piperacillin	100-300 mg/kg/day	q 8 h	4 g	
Ciprofloxacin	20–30 mg/kg/d	divided every 12 h	800 mg	
Levofloxacin Children 6 months to 5 years of age Children >5 years of age	10 mg/kg 10 mg/kg	q12 h q24 h	500mg	
Amikacin Infants andchildren	15–22.5 mg/kg/d	q 24 h		
Gentamicin	5-7.5 mg/kg/d	q 24 h		If normal renal function
Meropenem Infants ≥3 months of age and children	20 mg/kg	q 8 h	1 g	
Imepenem-cilastin Infants < 3 months of age Infants > 3 months of age and children	100 mg/kg/d 60-100 mg/kg/d	Divided q 6 h Divided q 6 h	4 g	

Fluconazole	12 mg/kg/d	q 24 h		
Anidulafungin Children 2– 17 years of age	1.5 mg/kg/day			Limited experience
Micafungin	1–4 mg/kg/day		150mg	Limited experience
Caspofungin Children 3months-17 years	Loading dose of 70 mg / m2 /day on day 1 followed by 50 mg/m2/day thereafter		70 mg; may increase to 70mg/m2/day if clinical response is inadequate	
Clindamycin	10 mg/kg/dose	q 6-8 h	900 mg Q 8	

5.a. Surgical antimicrobial prophylaxis

- To be administered within 1 hr before the surgical incision.
- Single dose is recommended. Consider for second intra-operative dose in prolonged surgery based on the choice of antibiotic used for prophylaxis.
- Prophylaxis should **not** be given beyond the duration of surgery (except for cardiothoracic surgery, up to 48 hours permissible)

SURGERY	MEDICATION
Breast	Inj.Cefazolin 2gm or Inj.Cefuroxime 1.5gm IV stat
Gastroduodenal & biliary	Inj.Cefaperazone- Sulbactam 2gm IV stat & BD for 24hrs(maximum)
ERCP	Inj.Piperacillin-Tazobactum 4.5gm or Inj.Cefaperazone- Sulbactam 2gm IV stat
Cardiothoracic	Inj.Cefuroxime 1.5gm IV stat & BD for 48hrs
Colonic surgery	Inj.Cefaperazone- Sulbactam 2gm IV stat & BD for 24hrs(maximum)
Abdominal surgery (hernia)	Inj.Cefazolin 2gm or Inj.Cefuroxime 1.5gm IV stat
Head & Neck/ ENT	Inj.Cefazolin 2gm IV stat
Neurosurgery	Inj.Cefazolin 2gm or Inj.Cefuroxime 1.5gm IV stat
Obstetrics& Gynecology	Inj.Cefuroxime 1.5gm IV stat
Orthopaedic	Inj.Cefuroxime 1.5gm IV stat & BD for 24 hrs(maximum) or Inj.Cefazolin 2gm IV stat Open reduction of closed fracture with internal fixation- Inj.Cefuroxime 1.5gm IV stat and q 12h or Inj.Cefazolin 2gm IV stat and q 12h for 24 hrs
Trauma	Inj.Cefuroxime 1.5gm IV stat and q 12h (for 24 hrs) or Inj.Ceftriaxone 2gm IV OD
Urologic procedures	Antibiotics only to patients with documented bacteriuria
Trans- rectal prostatic surgery	Inj.Cefaperazone- Sulbactam 2gm IV stat

*Reference:

National Treatment Guidelines for Antimicrobial use in Infectious diseases. Ministry of Health & Family Welfare, Govt of India.Ver 1.0 (2016)

6. Treatment of Muti-Drug Resistant Bacterial Pathogens

1. Methicillin- Resistant *S. aureus* (MRSA)

a. These organisms are considered resistant to all penicillins, cephalosporins and macrolides.

b. Though MRSA strains may be reported as susceptible to Fluoroquinolones, aminogycogides, chloramphenicol and doxycycline in-vitro, these drugs are **NOT** to be used alone or as initial treatment for serious MRSA infections.

c. Rifampicin use should be avoided in diseases other than Mycobacterial diseases.

d. The drug of choice for treatment of infections due to MRSA is the glycopeptides i.e Vancomycin and Teicoplanin.

e. Linezolid can be used to treat skin and soft tissue infections caused by MRSA.

f. Mupirocin local application (intranasally bid x 5 days) for eradicating nasal carriage.

g. Daptomycin: Daptomycin is an intravenous antibiotic approved to be used for the treatment of complicated skin infections and *Staphylococcus aureus* bacteraemia. Daptomycin should NOT be used for treatment of pneumonia due to its inactivation by surfactant.

***The marker used in our laboratory to assess potential MRSA is the resistance of S.aureus to Cefoxitin.**

2. Vancomycin Resistant Enterococcus (VRE)

The treatment for VRE should be based on infection severity and in-vitro susceptibility of the strain to other antibiotics.

- **Linezolid**: Linezolid is the only drug specifically approved for the treatment of VRE-blood stream infections.
- **Ampicillin:** Isolates that remain relatively susceptible to penicillin or ampicillin may be treated with high doses of these agents.
- **Daptomycin**: Not approved for treatment of VRE infection.
- **Doxycycline:** Not a first line therapy. For susceptible isolates, not for bacteremia or endocarditis. It should not be used as monotherapy.
- **Nitrofurantoin:** Uncomplicated UTIs have been treated successfully with nitrofurantoin.
- **Fosfomycin**: For urinary tract infections (cystitis) with isolates susceptible to fosfomycin.

- **Chloramphenicol:** For chloramphenicol-susceptible isolates of *E faecium* and *E. faecalis*. Not a first-line therapy and it should not be used as monotherapy.
- **Gentamicin or streptomycin**: To be used in combination with ampicillin for the treatment of enterococcal endocarditis caused by organisms susceptible in vitro to either agent; streptomycin is used when gentamicin cannot be used because of resistance.

3. Extended Spectrum β-Lactamases (ESBL) Producing Enterobacteriaceae.

- CLSI (Clinical and Laboratory Standards Institute) recommends that **laboratories should report ESBL producing isolates as resistant to all penicillins, cephalosporins (including cefepime and cefpirome), and azetreonam irrespective of *in-vitro* test results.**
- The carbapenems (Ertapenem, Meropenem and Imipenem) are currently considered the drug of choice for serious infections caused by these pathogens.
- Piperacillin–Tazobactam and Cefoperazone- Sulbactam may be considered options in mild infections and when ESBL producers are demonstrably susceptible *in -vitro*.

***The marker used in our laboratory to assess potential ESBL production among Enterobactericeae is the resistance to Cefotaxime and Ceftazidime.**

4. Carbapenem- Resistant Enterobacteriaceae (CRE)

- Most carbapenemase producers are extremely drug resistant: being resistant to β-lactam antibiotics, aminogycosides, and β-lactam–βlactam inhibitor combinations.
- **Polymyxins, tigecycline & fosfomycin** are the agents with most frequent *in vitro activity*, but all have limitations. Dosage will vary with the patient and infection site.
- **Colistin -** Case reports of successful use in a range of infections due to carbapenemase producers**.**
- **Tigecycline:** Licensed for complicated skin and soft-tissue Infections and complicated intra-abdominal infections.
- **Others:** a few isolates are susceptible to other antibiotics including e.g. chloramphenicol, ciprofloxacin and cotrimoxazole. Most producers, however, are resistant to these drugs.

Recommended measures to control spread of Multi-drug resistant organisms (MDRO)

- Improved laboratory detection and reporting of MDRO
- Enhanced infection surveillance and control in ICUs
- Prevent spread by barrier precautions : Gowns and gloves
- Hand Washing
- Restricted use of 3rd generation cephalosporins

3.a Upper Respiratory Tract Infections

Conditions	Most likely organisms	Drug	Dose	Duration
Acute bacterial rhinosinusitis	Streptococcus pneumonia H.influenzae M.catarrhalis	Amoxycillin-Clavulanate	875/125 mg PO q 12 hourly	7 days
		In case of Penicillin allergy : Azythromycin	500mg PO q 12 h	3 days
Acute pharyngitis	Streptococcus pyogenes Viruses (Antibiotic administration only for bacterial infection)	Penicillin V	500 mg PO q 12 h	10 days
		Amoxycillin	500 mg PO q 8 h	10 days
		In case of Penicillin allergy : Azythromycin	500 mg PO OD	5 days
Acute epiglottis	**Children**: H.influenzae Streptococcus pyogenes Streptococcus pneumonia Staph.aureus **Adult**: H.influenzae Streptococcus pyogenes	Ceftriaxone (or)	50 mg /kg IV 24 hr	
		Cefotaxime (or)	50 mg /kg IV 8 hr	
		Levofloxacin (and)	10 mg / kg IV24 hr	
		Clindamycin	7.5 mg /kg IV 6 hr	
Malignant otitis externa	Pseudomonas aeruginosa in > 90% cases	For early disease: Ciprofloxacin	750 mg PO q 12 hr	Up to **5 days** after signs of inflammation resolve. **6 weeks** in case of bone involvement
		For advanced disease: Ceftazidime (or)	2 gm IV q 8 hr	
		Piperacillin-Tazobactum	4.5 gm IV 6 hr	
Acute Otitis Media	Streptococcus pneumonia H.influenzae M.catarrhalis	Amoxycillin-Clavulanate	90 / 6.4 mg / kg/ day PO q 12 hr	< 2 years :10days >2 years:5-7 days
		If treated in past 1 month: Cefuroxime -Axetil	250 PO q 12hr	

3.b Lower Respiratory Tract Infections

Conditions	Most likely organisms	Drug	Dose	Duration
Acute exacerbation of chronic bronchitis	Streptococcus pneumonia H.influenzae M.catarrhalis Viruses Chlamydophilia pneumoniae	**OPD Patient:** Amoxicillin (or)	500 – 1000 mg TID	5-7 days
		Azythromycin	500 mg OD	3 days
		IP Patient: Amoxycillin-Clavulanate (or)	625 mg TID	5-7 days
		Cefuroxime (or)	500 mg BD	5-7 days
		Cefixime	200 mg BD	5-7 days
Bronchiectasis, acute exacerbation	H.influenzae Pseudomonas aeruginosa	Amoxycillin-Clavulanic acid	625 mg TID	5-7 days
		Long term (repeated) Azythromycin	500 mg thrice a week	1-2 months
Community acquired pneumonia (CAP)	Non-hospitalized M.pneumoniae Streptococcus pneumonia Viruses	Azythromycin (or)	500 mg OD	3 days
		Amoxycillin	500 – 1000 mg TDS	5 days
	Hospitalized (non ICU or with comorbidities) M.pneumoniae Streptococcus pneumonia Viruses	Amoxycillin-Clavulanic acid (or)	1.2 gm IV TDS	5-8 days
		Cefotaxime (or)	2 – 4 IV OD	7-10 days
		Ceftroaxone (and)	2 gm IV OD	5-8 days
		Azythromycin	500 mg IV OD	7-10 days
	Hospitalized (ICU) Streptococcus pneumonia H.influenzae M.catarrhalis Legionella spp	Amoxycillin-Clavulanic acid (or)	1.2 gm IV TDS	5-8 days
		Cefotaxime (or)	2 – 4 IV OD	7-10 days
		Ceftroaxone (and)	2 gm IV OD	5-8 days
		Azythromycin	500 mg IV OD	7-10 days

3.c CNS Infections

Condition	Situation / Severity	Most likely organisms	Drug	Dose	Duration
Meningitis	Immunocompetent	S.pneumoniae N.meningitidis H.influenzae	Ceftriaxone (or)	2 gm IVq 12 hrly	10 – 14 days
			Cefotaxime	2 gm IVq 4-6 hrly	10 – 14 days
			Chloramphenicol (in case of Penicillin allergy)		
	Immunocompromised	S.pneumoniae N.meningitidis H.influenzae GNR	Ceftriaxone (and)	2 gm IVq 12 hrly	10 – 14 days
			Meropenem	2 gm IVq 8 hrly	10 – 14 days
	Post neurosurgery Penetrating head trauma	Staph.epidermidis Staph.aureus Propionibacterium acnes Pseudomonas aeruginosa Acinetobacter baumanii	Vancomycin (and)	1.5gm IV loading 1 gm IV q 12 hrly	10 – 14 days
			Meropenem	2 gm IVq 8 hrly	10 – 14 days
	Infected shunt	Staph.aureus GNR (rare)	Vancomycin (and)	1 gm IV q 12 hrly	10 – 14 days
			Meropenem	2 gm IVq 8 hrly	10 – 14 days
	Meningitis with basilar skull fractures	S.pneumoniae H.influenzae	Ceftriaxone	2 gm IVq 12 hrly	14 days
		Dexamethsone 0.15 mg / kg q6h for 2-4 days (1st dose with or before first antibiotic dose)			
	Organism specific therapy	S.pneumoniae	Ceftriaxone	2 gm IVq 12 hrly	10 -14 days
		N.meningitidis	Ceftriaxone	2 gm IVq 12 hrly	7days
		H.influenzae	Ceftriaxone	2 gm IVq 12 hrly	7 days
		E.coli	Ceftriaxone	2 gm IVq 12 hrly	21 days
		S.aureus –MRSA	Vancomycin	1 gm IV q 12 hrly	10 – 14 days
		S.aureus –MSSA	Vancomycin	1 gm IV q 12 hrly	10 – 14 days
		Enterococcus	Ampicillin (and)	2 gm IV q 4 hrly	
			Gentamicin	5mg / kg IV q 24 hrly	
		Candida spp	Amphotericin B	1 mg / kg IVq 24 hrly	
		Cryptococcus	Amphotericin B	1 mg / kg IVq 24 hrly	
			Flucytocine	25 mg / kg PO q 6hrly	
Encephalitis		HSV / VZV	Acyclovir	10 mg /kg IVq 8 h	14 – 21 days

Condition	Situation / Severity	Most likely organisms	Drug	Dose	Duration
Brain abscess	Source unknown	Streptococci Bacteroides Enterobacteriaceae S.aureus	Vancomycin (and)	1 gm IV q 12 hrly	Duration guided by response
			Ceftriaxone (and)	2 gm IVq 12 hrly	
			Metronidazole	500mg IV q 6 hrly	
	Source : Sinusitis	S.pneumoniae Anaerobes	Ceftriaxone (and)	2 gm IVq 12 hrly	
			Metronidazole	500mg IV q 6 hrly	
	Source : Chronic otitis	S.pneumoniae	Ceftriaxone	2 gm IVq 12 hrly	
		Anaerobes	Metronidazole	500mg IV q 6 hrly	
	Source : Post neurosurgery	S.aureus GNR	Vancomycin (and)	1 gm IV q 12 hrly	
			Meropenem	2 gm IVq 8 hrly	
	Source : Cyanotic heart disease	Streptococci	Ceftriaxone	2 gm IVq 12 hrly	

Note:

1. Antibiotic therapy must be started within 30 minutes of suspecting a CNS infection
2. Please give Dexamethasone to all patients with suspected meningitis in the dose of 0.15 mg / kg IV q 6 hours for 2 – 4 days, ideally first dose 10 – 20 minutes before an antibiotic.
3. **STOP** antibiotic treatment if LP culture obtained prior to antibiotic therapy is negative at 48 hours or **NO** PMNs on CSF cell count.

3.d Skin and Soft tissue Infections

Condition	Situation / Severity	Most likely organisms	Drug	Dose	Duration
Cellulitis See note 1 below	Non – suppurative	Streptococci	Amoxicillin-clavulanic acid (or)	625 mg PO q 8 h	5-7 days
			Amoxicillin-clavulanic acid (or)	1.2 gm IV q 8 h	5-7 days
			Ceftriaxone (or)	2 gm IV q 24 h	5-7 days
			Clindamycin	600-900mg IV q 8 h	5-7 days
	Suppurative cellulitis or cutaneous abscess	Staph.aureus	Doxycyciln (or)	100mg PO q 12 h	5-7 days
			Clindamycin (or)	300mg PO q 8 h	5-7 days
			Clindamycin (or)	600mg IV q 8 h	5-7 days
			Vancomycin	1gm IV q 12 h	5-7 days
	Cat / dog bite	P.multocida	Amoxicillin-clavulanic acid (or)	625 mg PO q 8 h	5-7 days
Diabetic foot See notes 2, 3, 4, 5, 6 as below	Mild infection	Staph.aureus	Amoxicillin-clavulanic acid (or)	875 mg PO q 8 h	7- 10 days
			Cephalexin (or)	500mg PO q 12 h	7- 10 days
			Clindamycin	300mg PO q 8 h	7- 10 days
	Moderate infection	Staph.aureus Streptococci Pseudomonas Enterobacteriaceae	Etrapenem (or)	1gm IV q 24 h	7- 10 days
			Ciprofloxacin (and)	500mg PO q 12 h	7- 10 days
			Metronidazole (or)	400mg PO q 8 h	7- 10 days
			Clindamycin	300mg PO q 8 h	7- 10 days
	Severe infection	Staph.aureus Streptococci Pseudomonas Enterobacteriaceae Anaerobes	Piperacillin –Tazobactum (or)	4.5gm IV q 6 h	7- 10 days
			Ciprofloxacin (or)	500mg IV q 12 h	7- 10 days
			Aztreonam (and)	1gm IV q 8 h	7- 10 days
			Clindamycin	600mg IV q 8 h	7- 10 days
			Piperacillin –Tazobactum (and)	4.5gm IV q 6 h	7- 10 days
			Vancomycin	1gm IV q 12 h	7- 10 days

Condition	Situation / Severity	Most likely organisms	Drug	Dose	Duration
Necrotizing fasciitis See note 7 as below		Staph.aureus Clostridia Anaerobes Streptococci	Piperacillin –Tazobactum (and)	4.5gm IV q 6 h	Duration depends on process
			Clindamycin	600-900mg IV q 8 h	
			(OR)		
			Imipenem (or)	1gm IV q 8 h	
			Meropenem (and)	1gm IV q 8 h	
			Clindamycin (or)	600-900mg IV q 8 h	
			linezolid	600 mg IV BD	

Note :

1. Incision and drainage is preferred therapy in case of cutaneous abscess. Antibiotics are indicated if infection is severe, associated with extensive cellulitis, septic phlebitis, diabetes, advanced age or no response to I & D
2. Uninfected diabetic foot infection: no purulence or inflammation (erythema, pain, warmth, induration)
3. Mild diabetic foot infection: presence of purulence and one sign of inflammation.
4. Moderate diabetic foot infection: mild inflammation and >2 cm cellulitis, lymphangitic streaking, deep tissue abscess, gangrene, involvement of muscle, tendon, joint or bone.
5. Ulcer floor should be probed carefully. If bone can be touched with a metal probe then patient should be treated for osteomyelitis with antibiotics in addition to surgical debridement.
6. Duration of treatment depends on response. Usually 7-10 days after surgical debridement. Treatment is prolonged with osteomyelitis.
7. In necrotizing fasciitis, antibiotics are only an adjunct to surgical debridement.

3.e Genital tract Infection

Condition	Most likely organisms	Drug	Dose	Duration
PID	N.gonorrhoea Chlamydia Bacteroides Streptococci Gardenella vaginalis Staph.aureus	**Outpatient regimen option 1:**		
		Doxycycline (and)	100 mg PO BD	14 days
		Ceftriaxone (can add)	250 mg IM / IV	Single dose
		Metronidazole	400 mg PO BD	14 days
		Outpatient regimen option 2:		
		Cefoxitin (and)	2 gm IM	Single dose
		Probenecid (and)	1 gm PO	Single dose
		Doxycycline (and)	100 mg PO BD	14 days
		Metronidazole	400 mg PO BD	14 days
		Inpatient regimen:		
		Ceftriaxone (and)	250 mg IM single dose	For inpatient regimens, continue treatment until satisfactory response for ≥ 24 hours before switching to outpatient regimen
		Clindamycin (can add)	900 mg IV q 8 h	
		Gentamicin	2 mg / kg loading dose	
		Then switch to outpatient regimen	Then 1.5 mg / kg q 8 h	
Vaginal candidiasis	Candida albicans 80-90% C.glabrata } C.tropicalis } Less susceptible to azoles	**Oral azoles:** Fluconazole	150 mg PO	Single dose
		Intravaginal azoles:		
		Clotrimazole (or)	200mg vag tab at bed time	3 days
			1%cream(5gm)at bed time	7-14 days
			100 mg vaginal tab	7 days
			500 mg vaginal tab	Single dose
		Miconazole	200 mg vaginal suppository at bed time	3 days
			100 mg vaginal suppository q 24 hours	7 days
			2%cream(5gm)at bed time	7 days
	Recurrent candidiasis 4 or more episodes /year	Fluconazole	150 mg PO q week	6 months
		Clotrimazole	Vaginal suppositories 500 mg q week	6 months

3.f Urinary tract Infections

Condition	Most likely organisms	Drug	Dose	Duration
Balanitis	Candida 40% Group B streptococci Gardnerella vaginalis	Oral & topical azoles as of vaginitis		
Bacterial vaginosis	Etiology unclear Gardnerella vaginalis Mobiluncus Mycoplasma hominis Prevotella spp Atopobium vaginae etc.	Metronidazole (or)	400 mg PO BD	7 days
			Vaginal gel 1 applicator intravaginally at bed time	5 days
		Tinidazole (or)	2 gm PO OD	2 days
			1 gm PO OD	5 days
		Clindamycin	300 mg PO BD	7 days
			2% vaginal cream 5 gm at bed time	7 days
Vaginal Trichomoniasis	Trichomonas vaginalis	Metronidazole (or)	2 gm PO OD	Single dose
			400 mg PO BD	7 days
		Tinidazole	2 gm PO single dose **For treatment failure**: Metronidazole 400 mg PO BD	7 days
			2nd failure: Metronidazole 2 gm PO q 24 hours	3-5 days
Urethritis, cervicitis, proctitis (uncomplicated)	N. gonorrhoeae (50% with urethritis, cervisitis have concomitant C.trachomatis) Empirical t/t to cover both pathogen	Ceftriaxone (and)	250 mg IM	Single dose
		Azithromycin (or)	1 gm PO	Single dose
		Doxycycline	100 mg PO q 12 h	7 days
Epididymo-orchitis	N. gonorrhoeae Chlamydia trachomatis	Ceftriaxone (and)	250 mg IM	Single dose
		Azithromycin (or)	1 gm PO	Single dose
		Doxycycline	100 mg PO BD	10 days
	Enterobacteriaceae (coliforms)	Levofloxacin (or)	500-750 mg IV / PO OD	10 -14 days
		Ciprofloxacin	500 mg PO BD (or) 400 mg IV BD	10 -14 days

3.g Obstetrics related Infections

Condition	Most likely organisms	Drug	Dose	Duration
Chorioamnionitis	Group B streptococci, Gram negative bacilli, Chlamydiae, Ureaplasma and anaerobes Usually polymicrobial	Clindamycin (or) Vancomycin (or) Teicoplanin (and)		
		Cefoperazone -Sulbactum		
		If patient is not in sepsis then IV Ampicillin		
Septic abortion & Endomyometritis	Bacteroides, Pervotella bivius, Group B Streptococcus, Enterobacteriaceae, Chlamydia trachomatis, Clostridium perfringens	If patient has not taken any prior antibiotic (Start after sending cultures)		
		Ampicillin (and)	500 mg qid	Till the sensitivity report is available
		Metronidazole	500 mg IV tds	
		If patient has been partially treated with antibiotics, send blood culture and start		
		Piperacillin –Tazobactum (or)		Till the sensitivity report is available and modify as per report.
		Cefoperazone - sulbactum		
Obstetric sepsis	Group A beta-hemolytic streptococcus, E.coli Anaerobes. <u>Source of sepsis outside genital tract</u> S.pyogenes E.coli Staph.aureus (MRSA, MSSA) S.pneumoniae C.septicum Morganella morganii	If patient is in shock and blood culture reports are pending start		
		Piperacillin –Tazobactum (or)		Till the sensitivity report is available and modify as per report.
		Cefoperazone - sulbactum		
		If patient has only fever, with or no features of severe sepsis start		
		Amoxicillin-Clavulanate (or)	625mg PO TDS / 1.2gm IV TDS	
		Ceftriaxone (and)	2 gm IV OD	
		Metronidazole (can add)	500 mg IV TDS	
		Gentamicin	7 mg / kg / day OD	
		If admission needed MRSA cover may be required if suspected or colonized. (Vancomycin / Teicoplanin)		

3.h Infective Endocarditis				
Condition	**Most likely organisms**	**Drug**	**Dose**	**Duration**
Infective Endocarditis:	Native valve (Indolent) Viridans Streptococci, Other streptococci, Enterococci.	Penicillin G (or)	20 MU IV divided doses every 4 hours	4 – 6 weeks
		Ampicillin (and)	2 gm IV q 4 h	4 – 6 weeks
		Gentamicin	1 mg /kg IM / IV q 8h	4 – 6 weeks
	Native valve (sepsis) Staph.aureus (MSSA or MRSA) Risk for GNB	Vancomycin (and)	25 – 30 mg/kg loading followed by 15-20 mg /kg IV q 12 h (max 1gm / 12h)	4 – 6 weeks
		Meropenem	1gm IV q 8 h	4 – 6 weeks
	Prosthetic valve (< 2 months) Staphylococcus Gram Negative Rods Diptheroids	Vancomycin (and)	25 – 30 mg/kg loading followed by 15-20 mg /kg IV q 12 h (max 1gm / 12h)	4 – 6 weeks
		Meropenem	1gm IV q 8 h	4 – 6 weeks
		Imipenem	500 mg IV q 6 h	
	Prosthetic valve (>2 months) CONS Enterococcus Staph.aureus	Vancomycin (and)	25 – 30 mg/kg loading followed by 15-20 mg /kg IV q 12 h (max 1gm / 12h)	
		Gentamicin	1 mg /kg IV q 8 h Modify according to renal function.	

3.i – Gastrointestinal Infections

Condition	Most likely organisms	Drug	Dose	Duration
Acute gastroenteritis	Viral Entero-toxigenic & Entero-pathogenic E.coli	None	None	None
Food poisoning	Staph.aureus B.cereus C.botulinum	None	None	None
Cholera	V.cholerae	Doxycycline (or)	300 mg PO	Single dose
		Azythromyycin (or)	1 gm PO	3 days
		Ciprofloxacin	500 mg PO BD	3 days
Bacterial dysentery	Shigella spp, Campylobacter, Non-typhoidal salmonellosis	Ceftriaxone (or)	2 gm IV OD	5 days
		Cefixime (or)	10-15 mg /kg /day	5 days
		Azythromyycin (drug of choice for campylobacter)	1 gm PO OD	3 days
Amoebic dysentery	E.histolytica	Metronidazole (or)	400 mg PO TDS	7-10 days
		Tinidazole	2 gm PO OD	3 days
Giardiasis	Giardia lamblia	Metronidazole (or)	250 – 500mg PO TDS	7-10 days
		Tinidazole	2 gm PO OD	Single dose
Hospital acquired diarrhea	C.difficle	Metronidazole (or)	400 mg PO TDS	10 days
		Vancomycin	250 mg PO	10 days
Enteric fever (outpatient)	S.Typhi, S.Paratyphi A, B	Cefixime (or)	20 mg /kg / day	14 days
		Azythromyycin	500 mg PO BD	7 days
Enteric fever (inpatient)	S.Typhi, S.Paratyphi A, B	Ceftriaxone (to be changed to oral cefixime when patient is afebrile to finish total duration of 14 days) or	2 gm IV BD	2 weeks
		Azythromyycin	500 mg PO BD	7 days
Biliary tract infections	Enterobacteriaceae (E.coli, Klebsiella.sp)	Amikacin (or)	1 gm IM / IV OD	7 -10 days
		Piperacillin - Tazobactum	4.5 gm IV q 8 h	7-10 days
	Enterobacteriaceae (E.coli, Klebsiella.sp)	Imipenem (or)	500 mg IV q 6 h	7-10 days

	ESBL producers	Meropenem	1 gm IV q 8 h	7-10 days
3. j Intra-abdominal Infections				
Condition	**Most likely organisms**	**Drug**	**Dose**	**Duration**
Spontaneous bacterial peritonitis	Enterobacteriaceae (E.coli, Klebsiella.sp)	Amikacin (or)	1 gm IM / IV OD	Duration of treatment is based on source control and clinical improvement
		Piperacillin - Tazobactum	4.5 gm IV q 8 h	
	Enterobacteriaceae (E.coli, Klebsiella.sp) ESBL producers.	Imipenem (or)	500 mg IV q 6 h	
		Meropenem	1 gm IV q 8 h	
Secondary peritonitis, Intra-abdominal abscess / GI perforation	Enterobacteriaceae (E.coli, Klebsiella.sp) Bacteroides (colonic perforation) Anaerobes	Amikacin (or)	1 gm IM / IV OD	Duration of treatment is based on source control and clinical improvement
		Piperacillin - Tazobactum	4.5 gm IV q 8 h	
		Imipenem (or)	500 mg IV q 6 h	
		Meropenem	1 gm IV q 8 h	
		In very sick patients, if required, additional cover for yeast (Fluconazole IV 800mg loading dose day 1, followed by 400 mg 2nd day onwards) & for MRSA (Vancomycin or Teicoplanin) may be contemplated		
Pancreatitis	**Mild - Moderate**	No antibiotics		
	Severe Enterobacteriaceae Staph.aureus Staph.epidermidis Anaerobes Candida spp	Amikacin (or)	1 gm IM / IV OD	Duration of treatment is based on source control and clinical improvement
		Piperacillin - Tazobactum	4.5 gm IV q 8 h	
		Imipenem (or)	500 mg IV q 6 h	
		Meropenem	1 gm IV q 8 h	
		In very sick patients, if required, additional cover for yeast (Fluconazole IV 800mg loading dose day 1, followed by 400 mg 2nd day onwards) & for MRSA, Enterococcus (Vancomycin or Teicoplanin) may be contemplated		
Diverticulitis	**Mild** : Gram Negative Rods anaerobes	Amoxicillin-Clavulanate acid	625 mg PO TDS	7 days
	Moderate : Gram Negative Rods anaerobes	Metronidazole	500mg IV TDS	Duration of treatment is based on source control and clinical improvement
		Piperacillin – Tazobactum (and)	4.5 gm IV q 8 h	
		Amikacin	1 gm IM / IV OD	
	Severe	Imipenem (or)	500 mg IV q 6 h	Duration of treatment is

	Gram Negative Rods anaerobes	Meropenem	1 gm IV q 8 h	based on source control and clinical improvement
Liver abscess	Polymicrobial	Metronidazole	500mg IV / 800mg PO TDS	2 weeks USG- guided drainage indicated in large abscesses, signs of imminent rupture and no response to medical treatment.
		Piperacillin – Tazobactum (and)	4.5 gm IV q 8 h	
		Amikacin	1 gm IM / IV OD	

3.k – Sepsis:

The choice of antibiotics depends on the source

1. **Lungs** : follow pneumonia guidelines

2. **SSTI**:
   a. **Extensive inflammation + Systemic toxicity**:
   Organism: GNB, Staph.aureus
   Drug: BL + BLI (Piperacillin-Tazobactum 4.5 gm IV q 8 h) or
   Carbapenem (Meropenem 1 gm IV q 8 h / Imipenem 500 mg IV q 6 h) + Vancomycin 1gm IV BD
   b. **Necrotizing fasciitis**:
   Organism: Streptococci, Anaerobes, GNB, Staph.aureus
   Drug: BL + BLI (Piperacillin-Tazobactum 4.5 gm IV q 8 h) or
   Carbapenem (Meropenem 1 gm IV q 8 h / Imipenem 500 mg IV q 6 h) + Clindamycin 600mg IV q 8 h
3. **Secondary peritonitis**:
   Organism: Enterobacteriaceae, Bacteroides, Enterococci, Pseudomonas
   Drug: BL + BLI (Piperacillin-Tazobactum 4.5 gm IV q 8 h)

4. **Primary peritonitis**:
   Organism: S.pneumoniae, GNB
   Drug: Ceftriaxone / Cefotaxime 1 gm IV BD

5. **Uncomplicated pyelonephritis**:
   Organism: GNB
   Drug: BL + BLI (Piperacillin-Tazobactum 4.5 gm IV q 8 h)

6. **Pyelonephritis**:
   Organism: GNB (E.coli, Pseudomonas)
   Drug: Carbapenem (Meropenem 1 gm IV q 8 h / Imipenem 500 mg IV q 6 h)

7. **Severe Pyelonephritis, Phrenic abscess, Emphysematous pyelonephritis**:
   Organism: GNB (E.coli, Pseudomonas)
   Drug: Carbapenem (Meropenem 1 gm IV q 8 h / Imipenem 500 mg IV q 6 h)

8. **Unknown origin**:
   Drug: Carbapenem (Meropenem 1 gm IV q 8 h / Imipenem 500 mg IV q 6 h) + Vancomycin / Teicoplanin
   (Vancomycin 1 gm IV BD / Teicoplanin 400mg IV BD for one day, there after 400mg IV OD for 2 days thereafter as per CrCl)

4– Pediatric Infections

4.a. Respiratory Tract Infections

Condition	Most likely organisms	Drug	Dose	Duration
Pharyngotonsillitis	Viruses – Mostly Bacterial 30% Group A Streptococci Group C Streptococci Arcanobacterium haemolyticum	Viral – No antibiotics needed		
		If bacterial: Inflammed enlarged tonsils with pus points		
		Amoxicillin	50-75mg/ kg/day PO BD/ TID	10 days
		Penicillin	50-75mg/ kg/day PO BD/ TID	10 days
		Benzathine Penicillin	< 27 kg : 6,00,000 units IM >27 kg : 1.2 million units IM	Single dose
		If Penicillin Allergy Erythromycin	20-40mg/ kg/day PO BD/ QID	10 days
		Azithromycin	12 mg / kg/day	5 days
Diphtheria	Corynebacterium diptheriae	Erythromycin (or)	20-40mg/ kg/day PO BD/ QID	14 days
		Azithromycin	12 mg / kg/day	5 days
Acute Otitis Media	S.pneumoniae H.influenzae M.catarrhalis	Amoxicillin	40-50mg/ kg/day PO BD	7-10 days
		Coamoxyclav	40-50mg/ kg/day BD	7-10 days
		Cefuroxime	20-30mg/ kg/day BD	7-10 days
		I.V. Ceftriaxone	75mg/ kg/day BD	3-5 days
Acute Sinusitis	S.pneumoniae H.influenzae M.catarrhalis	Amoxicillin	40-50mg/ kg/day PO BD	7-10 days
		Coamoxyclav	40-50mg/ kg/day BD	7-10 days
		Cefuroxime	20-30mg/ kg/day BD	7-10 days
		I.V. Ceftriaxone	75mg/ kg/day BD	3-5 days
Ludwig's Angina	S.pyogenes	Penicillin G (and)	200000 – 250000 U / kg / day IV q6h	
	Staph.aureus	Clindamycin	40 mg/ kg/day IV q 8 h	
Pertussis	Bordetella pertussis	Azithromycin	10 mg / kg/day PO OD	5 days
		Clarithromycin	15 mg / kg/day PO BD	7 days
		Erythromycin	40 mg / kg/day PO QID	14 days

Condition	Most likely organisms	Drug	Dose	Duration
Acute laryngotracheobronchitis	Parainfluenza virus	Antibiotics not needed		
Acute Epiglottitis	H.influenzae S.pneumoniae	IV Ceftriaxone	50 mg/ kg/day IV OD	7-10 days
Bronchiolitis	Respiratory syncytial virus, Metapneumovirus	Antibiotics not needed		
Pneumonia				
Community Acquired Pneumonia	**3 month – 4 years** S.pneumoniae Staph.aureus S.pyogenes **≥ 5 years** Chlamydophila pneumonia Mycoplasma			
Mild-Moderate: Bronchopneumonia	Mostly viral Lobar pneumonia	No antibiotic required		
		Amoxycillin	80-90 mg/ kg/day QID	7-10 days
Moderate- Severe		Ampicillin	200 mg/ kg/day QID	7-14 days
		Ceftriaxone	50 – 75 mg/ kg/day IV OD	10-14 days
		Cefotaxime	150 mg/ kg/day	10-14 days
	MRSA	Vancomycin	60 mg/ kg/day	10-14 days
	Mycoplasma	Azithromycin	10 mg/ kg/day OD	5 days
Hospital Acquired pneumonia	Staph.aureus P.areuginosa S.pneumoniae H.influenzae	Meropenem (or)	60 mg/ kg/day TDS	10-14 days
		Piperacillin-Tazobactum (or)	240 – 300 mg/ kg/day TDS	10-14 days
		Cefipime (or)	150 mg/ kg/day TDS	10-14 days
		(Plus) Gentamicin	6 – 7.5 mg/ kg/day	10-14 days
	MRSA	(Add) Vancomycin	60 mg/ kg/day	10-14 days
With pleura effusion / empyema	Staph.aureus Klebsiella S.pneumoniae	Ceftriaxone	50 – 75 mg/ kg/day	2 – 3 weeks
		Cefotaxime	150 mg/ kg/day	2 – 3 weeks
		Vancomycin	60 mg/ kg/day	2 – 3 weeks

4. b. CNS Infections

Condition	Most likely organisms	Drug	Dose	Duration
Meningitis	H.influenzae N.meningitidis S.pneumoniae	Ceftriaxone	200-300 mg/ kg/day QID	14 – 21 days
		Cefotaxime	100 mg/ kg/day BD	14 – 21 days
		Vancomycin	60 mg/ kg/day	14 – 21 days
	<u>Community acquired</u> GBS E.coli L.monocytogenes S.pneumoniae	Cefotaxime IV (plus)	150-200 mg/ kg/day TID	21 days for Gram negative, 14- 21 days for GBS and other Gram positive bacilli.
		Gentamicin	5 – 8 mg / kg/day OD	
	<u>Hospital acquired</u> Staphylococcus, CONS, Gram negative bacilli	Cefotaxime IV (plus)	150-200 mg/ kg/day TID	
		Amikacin IV	15 – 20 mg / kg/day OD/BD	
	<u>Hospital acquired (Resistant org)</u> Gram negative bacilli Pseudomonas Staphylococcus (MRSA)	Cefotaxime IV (or)	150-200 mg/ kg/day TID	
		Meropenem IV (Plus)	120 mg/ kg/day TID	
		Amikacin IV	15-20 mg/ kg/day OD/ BD	
		Ceftazidime IV	100-150mg/kg/day BD/ TID	
		Vancomycin IV	40-60 mg/ kg/day TID/QID	
		Clindamycin IV	20-30 mg/ kg/day TID/QID	
		Linezolid IV	30 mg/ kg/day TID	

4.c. Gastrointestinal Infections

Condition	Most likely organisms	Drug	Dose	Duration
Dysentery	Shigella Campylobacter	Ceftriaxone. IV	100 mg/ kg/day BD	7 days
		Cefixime	20 mg/ kg/day BD	7 days
Cholera	Vibrio cholera	Azithromycin	20 mg/ kg/day OD	5 days
		Doxycline	4 mg/ kg/day BD	7 -10 days
Enteric fever	Salmonella Typhi Salmonella Paratyphi	Cefixime	20 mg/ kg/day BD	14 days
		Azithromycin	20 mg/ kg/day OD	5 days
		Ceftriaxone. IV	100 mg/ kg/day BD	14 days
		Cefotaxime. IV	100 mg/ kg/day TDS	14 days
		2nd line drugs		
		Chloramphenicol	50-75 mg/ kg/day BD	14 days
		Amoxicillin	75-100 mg/ kg/day BD/ TID	14 days
		Cotrimoxazole	TMP: 8 mg/ kg/day SMX: 40 mg/ kg/day BD	14 days
Peritonitis	E.coli S.pneumoniae S.viridans	Ampicillin. IV	100 mg/ kg/day	7-10 days
		Cefotaxime. IV	100 mg/ kg/day	7 -10 days
		(Plus) Gentamicin	5 -6 mg/ kg/day	7 – 10 days
Liver abscess	**<u>Pyogenic</u>** E.coli Klebsiella pneumonia Streptococcal spp Bacteroids spp	Ampicillin. IV	100 mg/ kg/day	2-6 weeks
		Cefotaxime. IV (Plus)	100 mg/ kg/day	2-6 weeks
		Gentamicin	5 -6 mg/ kg/day	2-6 weeks
		Amikacin IV	15-20 mg/ kg/day	2-6 weeks
	<u>Amoebic</u> E.histolytica	Metronidazole IV	30-50 mg/ kg/day	10 – 14 days
		Tinidazole IV (Plus)	50 mg/ kg/day	5 days
		Paromomycin	30 mg/ kg/day	7 days
		Iodoquinol	30 mg/ kg/day	7 days

4. d. Urinary Tract Infections

Condition	Most likely organisms	Drug	Dose	Duration
Urinary Tract Infection	E.coli Klebsiella Proteus Staph.saprophyticus Enterococcus	**Parenteral drugs (If pyelonephritis)**		
		Ceftriaxone	75-100 mg/ kg/day BD	Switch to oral following clinical response (7-10 days total)
		Cefotaxime	100-150 mg/ kg/day TDS	
		Amikacin	10-15 mg/ kg/day OD	
		Gentamicin	5-6 mg/ kg/day OD	
	If mild cystitis (3-5 days)	**Oral drugs:**		
		Cefixime	8 10 mg/ kg/day BD	7-10 days
		Ciprofloxacin	10-20 mg/ kg/day BD	7-10 days
		Coamoxiclav	30-35 mg/ kg/day BD	7-10 days
		Ofloxacin	15-20 mg/ kg/day BD	7-10 days

4. e. Febrile Neutropenia

Condition	Most likely organisms	Drug	Dose	Duration
Febrile Neutropenia	Staph.aureus Pseudo.aeruginosa Candida Enterococcus	Ceftazidime. IV (and)	150 mg/ kg/day TDS	
		Amikacin. IV	15-20 mg/ kg/day BD	
		Piperacillin-Tazobactum IV (and)	300 mg/ kg/day TDS	
		Vancomycin. IV	40 mg/ kg/day QID	

4. f. Bone & Joint Infections

Condition	Most likely organisms	Drug	Dose	Duration
Osteomyelitis / Septic arthritis	Staph.aureus Group B Streptococcus Gram negative bacilli Pseudo.aeruginosa	Coamoxyclav IV	100 mg/ kg/day BD	4-6 weeks
		Gentamicin IV	7.5 mg/ kg/day OD/ BD	4-6 weeks
		2nd line drugs		
		Ceftriaxone IV	100 mg/ kg/day BD	4-6 weeks
		Cefotaxime IV	100 mg/ kg/day TDS	4-6 weeks
		Vancomycin IV	60 mg/ kg/day TDS	4-6 weeks

4. g. Tetanus

Condition	Most likely organisms	Drug	Dose	Duration
Tetanus	C.tetani	Crystalline Penicillin	1-2 lac units/ kg/day QID	10 days
		Metronidazole IV	30 mg/ kg/day TDS	10 days

4. h. Acute Infective Endocarditis

Condition	Most likely organisms	Drug	Dose	Duration
Acute Infective Endocarditis	Streptococcus viridans Staph.aureus Group D streptococcus Serratia marsecens Pseudomonas aeruginosa	Crystalline Penicillin	2 lac units/ kg/day	
		Ampicillin IV (and)	200 mg/ kg/day QID	4-6 weeks
		Gentamicin (or)	7.5 - 15 mg/ kg/day BD	4-6 weeks
		Amikacin	7.5 - 15 mg/ kg/day BD	4-6 weeks
		2nd line drugs		
		Ceftriaxone IV	100 mg/ kg/day BD	
		Vancomycin IV	40-60 mg/ kg/day TDS	
		Meropenem IV	60-120 mg/ kg/day TDS	

		Amikacin	7.5 - 15 mg/ kg/day BD	
		Gentamicin	7.5 - 15 mg/ kg/day BD	
Secondary prophylaxis	Group A streptococcus	Benzathine Penicillin IM	1.2 million units	Single dose
		Penicillin V Oral	250 mg QID	10 days
		Erythromycin Oral	250 mg QID	10 days
		Benzathine Penicillin IM	>30 kg : 1.2 million units <30 kg : 0.6 million units	Every 3 weeks
		Penicillin V Oral	250 mg QID	Every 3 weeks
		Erythromycin Oral	250 mg QID	Every 3 weeks

4. i. Cellulitis

Condition	Most likely organisms	Drug	Dose	Duration
Cellulitis	Staphylococcus aureus Streptococcus spp	Cloxacillin IV	50-100 mg/ kg/day QID	7-10 days
		Cefazolin IV	100 mg/ kg/day TDS	7-10 days
		Clindamycin IV	30 mg/ kg/day TDS	7-10 days

4. j. Neonatal Sepsis

Condition	Most likely organisms	Drug	Dose	Duration
Community Acquired	GBS Staph.aureus GNB (E.coli, Klebsiella)	Ampicillin IV	100 mg/ kg/day	10-14 days
		Gentamicin IV	5-8 mg/ kg/day	10 -14 days
Hospital acquired (low probability of resistant strain)	Staphylococcus CONS	Ampicillin IV	100 mg/ kg/day	
		Cloxacillin IV (and)	50 mg/ kg/day	
		Amikacin IV	15-20 mg/ kg/day	
Hospital acquired (high probability of resistant strain)	Staphylococcus Gram negative bacilli Pseudomonas	Cefotaxim IV	100 mg/ kg/day	
		Meropenem IV	100 mg/ kg/day	
		Amikacin IV	15-20 mg/ kg/day	

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5.

ANTIMICROBIAL STEWARDSHIP

Surgical prophylaxis algorithm

Clean surgery

Involving placement of a prosthesis or implant

Clean contaminated surgery

Contaminated surgery

Surgical Prophylaxis
ONE DOSE
Within 60 minutes before surgical incision.

Redose for long surgical procedures

Intra-operative redosing is needed to ensure adequate serum and tissue concentrations of the antimicrobial if the duration of the procedure exceeds two half-lives of the antimicrobial or there is excessive blood loss (i.e., >1500ml in adults or > 25ml/kg in children). A treatment course of antibiotics may also need to be given (in addition to prophylaxis) in cases of dirty surgery or infected wounds. The appropriate use and choice of antibiotics should be discussed with specialists for each case.

DOCUMENT ALL DECISIONS