

# **ANTIBIOTIC POLICY**



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## Introduction

### AIMS OF ANTIMICROBIAL THERAPY

1. To provide a simple, best empirical/specific treatment of common infections
2. To promote the safe, effective, economic and rational use of antibiotics
3. To minimise the emergence of bacterial resistance in the community

### PRINCIPLES OF TREATMENT

1. These guidelines are based on the best available evidence.
2. A dose and duration of treatment is suggested but can be modified by consultants based on clinical scenarios
3. Prescribe an antibiotic only when there is likely to be a clear clinical benefit.
4. Do not prescribe an antibiotic for viral sore throat, simple coughs and colds and viral diarrhoea.
5. Use simple generic antibiotics first whenever possible. Avoid broad spectrum antibiotics (e.g. Amoxycillin+Clavulanate, quinolones and cephalosporins) when standard and less expensive antibiotics remain effective, as they increase risk of *Clostridium difficile*, MRSA and resistant UTIs.
6. Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations).
7. Clarithromycin is an acceptable alternative in those who are unable to tolerate erythromycin because of side effects.
8. Test dose to be given for beta-lactam antibiotics.

### STEPS TO FOLLOW THE PROTOCOLS

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

## **GASTROINTESTINAL & INTRA-ABDOMINAL INFECTIONS**

Condition	Likely Causative Organisms	Empiric (presumptive) antibiotics/ FirstLine	Alternative antibiotics/ Second Line	Comments
<b>Acute Gastroenteritis</b>  <b>Food poisoning</b>	Viral, Entero-toxigenic & Entero-pathogenic <i>E.coli</i>  <i>S.aureus</i> , <i>B. cereus</i> , <i>C. botulinum</i>	None	None	Rehydration(oral/ IV)essential
<b>Cholera</b>	<i>V. cholerae</i>	Doxycycline300mgO ralstat  Azithromycin Oral in children(20mg/kg) and pregnant women (1g)	Azithromycin 1gm Oral stat or Ciprofloxacin 500mg BD for 3days	Rehydration( oral/IV) Is essential  Antibiotics are adjunctive therapy.
<b>Bacterial dysentery</b>	<i>Shigella sp.</i> , Campylobacter, Non-typhoidal salmonellosis	Ceftriaxone 2gm IV OD for 5days or oral cefixime 8 mg/kg/day x 5days	Azithromycin 1g OD x3days	For Campylobacter the drug of choice is azithromycin.
	Shiga toxin Producing <i>E.coli</i>	Antibiotic Treatment Not recommended.		Antibiotic Use associated with development of hemolytic uremic syndrome.
<b>Amoebic dysentery</b>	<i>E.histolytica</i>	Metronidazole 400mg Oral TDS for7- 10days	Tinidazole 2gm Oral OD for 3days	Add diloxanide furoate 500mg TDS for 10d
<b>Giardiasis</b>	<i>Giardia lamblia</i>	Metronidazole 200- 400mg oral TIDx 7-10d	Tinidazole 2gm oral x1dose	
<b>Enteric fever</b>	<i>S.Typhi</i> , <i>S.</i> <i>ParatyphiA</i>	<u>Outpatients:</u> Cefixime 20mg/kg/day for 14 days or Azithromycin 500 mg BD for 7days. <u>Inpatients:</u> Ceftriaxone 2g IV BD for 2 weeks +/-Azithromycin 500mg BD for 7days	Cotrimoxazole 960mg BD for 2 weeks	Majority of strains are nalidixic acid resistant.  Ceftriaxone to be changed to oral cefixime when patient is afebrile to finish total duration of 14 days.

<b>Biliary tract infections (cholangitis, cholecystitis)</b>	Enterobacteriaceae ( <i>E.coli</i> , <i>Klebsiella</i> sp.)	Ceftriaxone 2gm IV OD or Piperacillin-Tazobactam 4.5gm IV 8 hourly Or Cefoperazone-Sulbactam 3gm IV 12 hourly  For 7-10days	Imipenem 500 mg IV 6 hourly or Meropenem 1 gm IV 8hourly  For 7-10days	Surgical or endoscopic intervention to be considered if there is biliary obstruction. High prevalence of ESBL producing <i>E.coli</i> , <i>Klebsiella</i> sp. strains. De-escalate therapy once antibiotic susceptibility is known.
<b>Hospital acquired diarrhea</b>	<i>C. difficile</i>	Metronidazole 400 mg oral TDS for 10 days	Severe disease: start Vancomycin 250 mg oral 6 h empirically.	
<b>Spontaneous bacterial Peritonitis</b>	S pneumoniae E coli Klebsiella Enterococcus	Cefotaxime 1-2gm IV TDS Or Piperacillin-Tazobactam 4.5gm IV 8 hourly Or Cefoperazone-Sulbactam 3 gm IV 12h	Imipenem 500mg IV 6 hourly or Meropenem 1gm IV 8 hourly	Descalate to Ertapenem 1gm IV OD for 5-7 days once the patient improves
<b>Secondary peritonitis, Intra-abdominal abscess/ GI perforation</b>	Enterobacteriaceae ( <i>E.coli</i> , <i>Klebsiella</i> sp.), Bacteroides (colonic perforation), Anaerobes	Piperacillin-Tazobactam 4.5gm IV 8 hourly Or Cefoperazone-Sulbactam 3gm IV 12 hourly in severe infections  In very sick patients, if required, addition of cover for yeast (fluconazole iv 800mg loading dose day 1, followed by 400mg 2 <sup>nd</sup> day onwards) & And for Enterococcus (vancomycin / teicoplanin) may be contemplated	Imipenem 1g IV 8hourly Or Meropenem 1gm IV 8hourly or Ertapenem 1gm IV OD	Source control is important to reduce bacterial load. If excellent source control – for 5-7 days; otherwise 2-3 weeks suggested.
<b>Pancreatitis Mild-moderate</b>		No antibiotics		



<b>Post necrotizing pancreatitis: infected pseudocyst; pancreatic abscess</b>	<i>Enterobacteriaceae, Enterococci, S. aureus, S. epidermidis, anaerobes, Candida sp.</i>	Piperacillin-Tazobactam 4.5gm IV 8 hourly empirically or Cefoperazone-Sulbactam 3gm IV 8 hourly <b>in severe infections</b>  <b>In very sick patients, if required, addition of cover for yeast</b> (fluconazole iv 800mg loading dose day 1, followed by 400mg 2 <sup>nd</sup> day onwards) & and for Enterococcus (vancomycin /teicoplanin) may be contemplated For 7-10 days	Imipenem-Cilastatin 500mg IV 6 hourly or Meropenem 1gm IV 8 hourly	Duration of treatment is based on source control and clinical improvement
<b>Diverticulitis Mild- OPD treatment</b>	<i>Gram-Negative Bacteria Anaerobes</i>	Co-trimoxazole DS 800/160mg BD for 7-10 days	Ciprofloxacin+ Metronidazole for 7 days	
<b>Diverticulitis moderate</b>	<i>Gram-Negative Bacteria Anaerobes</i>	Ceftriaxone 2 gm IV OD + metronidazole 500 mg IV TDS or Piperacillin-Tazobactam 4.5 gm IV 8 hourly empirically or Cefoperazone-Sulbactam 3 gm IV 8 hourly		BL-BLI agents have very good anaerobic cover, so no need to add metronidazole.
<b>Diverticulitis Severe</b>	<i>Gram-Negative Bacteria Anaerobes</i>	Meropenem 1gm IV 8hrly or Imipenem Cilastatin 500 mg IV 6 hourly		Duration based on improvement
<b>Liver Abscess</b>	<i>Polymicrobial</i>	Amoxycillin-clavulanate/ 3rd generation cephalosporin + Metronidazole 500mg I.V. TID/ 800 mg oral TID for 2	Piperacillin- Tazobactam 4.5gm IV 8 hourly	Ultrasound guided drainage indicated in large abscesses, signs of imminent rupture and no response to medical treatment.

## CENTRAL NERVOUS SYSTEM INFECTIONS

Condition	Likely Causative Organisms	Empiric antibiotics (presumptive antibiotics)	Alternative antibiotics	Comments
Acute bacterial Meningitis	<i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Neisseria meningitidis</i>	Ceftriaxone 2g IV 12hourly 10-14days treatment	Meropenem 1gm 8 hourly 7-14 days + Vancomycin 1gm BD x 14 days	Antibiotics should be started as soon as the possibility of bacterial meningitis becomes evident, ideally within 30 minutes. Do not wait for CT scan or LP results. No need to add vancomycin as primary agent, as ceftriaxone resistant <i>Pneumococcus</i> is not common in India. <i>Listeria</i> is also rare in India and so ampicillin is also not indicated Adjust therapy once pathogen and susceptibilities are known.
Acute bacterial Meningitis in Elderly (>55 yrs), alcoholics, Immune compromised	<i>Listeria monocytogenes</i>	Inj. Ampicillin 2gm IV 4 hrly  Duration 2 weeks		
Meningitis-Post-neurosurgery or Penetrating head trauma	<i>S. epidermidis</i> , <i>S. aureus</i> , <i>P. acnes</i> , <i>P. aeruginosa</i> , <i>A. baumannii</i>	Meropenem 2gm IV 8hourly And Vancomycin 15mg/kg IV 8hourly  For 14days.		May need intraventricular therapy in severe cases
Meningitis with basilar skull fractures	<i>S. pneumoniae</i> , <i>H. influenzae</i>	Ceftriaxone 2gm IV 12hourly For 14 days		Dexamethasone 0.15mg/kg IV 6hourly for 2-4days (1 <sup>st</sup> dose with or before first antibiotic dose)

Brain abscess, Sub dural empyema	Streptococci, Bacteroides, Enterobacteriaceae, <i>S.aureus</i>	Ceftriaxone 2gm IV 12 hourly or Cefotaxime 2 gm IV 4-6hourly  AND  Metronidazole 800mg IV 8hourly  Duration of treatment to be decided by clinical & radiological response, minimum two months required.	2 <sup>nd</sup> line Meropenem 2gm IV 8hourly  Add Vancomycin 2gm/ day IV , 12 hrly if MRSA suspected	Exclude TB, Nocardia, Aspergillus, Mucor  (If fungal etiology confirmed, Add Amphotericin B/ Voriconazole)  If abscess <2.5cm & patient neurologically stable, await response to antibiotics. Otherwise, consider aspiration/surgical drainage and modify antibiotics as per sensitivity of aspirated/ drained secretions.
Neurocysticercosis	<i>Taenia solium</i>	Albendazole 400mg/Kg PO BD + Prednisolone 1mg/Kg PO OD  Duration 15 days		Consider antiepileptic therapy for seizures

### **SKIN & SOFT TISSUE INFECTIONS**

Condition	Likely Causative Organisms	Empiric antibiotics (presumptive antibiotics)	Alternative antibiotics	Comments
<b>Cellulitis</b>	<i>Streptococcus pyogenes</i> (common), <i>S.aureus</i>	Amoxicillin-Clavulanate 1.2gm IV TDS/625mg oral TDS or Ceftriaxone 2gm IV OD	Clindamycin 600-900mg IV TDS	Treat for 5-7 days.
<b>Furunculosis</b>	<i>S.aureus</i>	Amoxicillin-Clavulanate 1.2gm IV/Oral 625 TDS or Ceftriaxone 2gm IV OD Duration—5-7 days	Clindamycin 600-900mg IV TDS	Get pus cultures before starting antibiotics



<b>Necrotizing fasciitis</b>	<i>Streptococcus pyogenes</i> , <i>S. aureus</i> , anaerobes, Enterobacteriaceae (polymicrobial)	Piperacillin-Tazobactam 4.5gm IV 6 hourly Or Cefoperazone-Sulbactam 3gm IV 12 hourly  &  Clindamycin 600-900mg IV 8 hourly  Duration depends on the progress	Imipenem 1g IV 8 hourly or Meropenem 1gm IV 8 hourly AND Clindamycin 600-900mg IV TDS /linezolid 600 mg IV BD/daptomycin 6mg/kg/day	Early surgical intervention crucial
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## **RESPIRATORY TRACT INFECTIONS**

Condition	Likely Causative Organisms	Empiric antibiotics (presumptive antibiotics)	2nd line antibiotics	Comments
<b>Community acquired Pneumonia</b>	<i>S. pneumoniae</i> , <i>H. influenzae</i> , Legionella, <i>E. coli</i> , <i>Klebsiella</i> sp., <i>S. aureus</i>	<u>Mild cases:</u> Amoxycillin-clavulanic acid  <u>Moderate to severe cases</u> If IV indicated, amoxycillin-clavulanate 1.2g IV TDS or Ceftriaxone 1g IV BD + Levofloxacin 500mg OD x5-7 days	Piperacillin-Tazobactam 4.5gm IV 6hourly or Imipenem 1g IV 6hourly Or Cefoperazone-Sulbactam 3gm IV 12hourly	Reserve drugs: Linezolid + Vancomycin  If MRSA is a concern, add Vancomycin  If atypical pneumonia suspected, Azithromycin 500 mg oral/IV OD Or Doxycycline 100mg BD
<b>Lung abscess, Empyema</b>	<i>S. pneumoniae</i> , <i>E. coli</i> , <i>Klebsiella</i> sp., <i>Pseudomonas aeruginosa</i> , <i>S. aureus</i> , anaerobes	Piperacillin-Tazobactam 4.5gm IV 6hourly Or Cefoperazone-Sulbactam 3gm IV 12hourly	Add Clindamycin 600-900mg IV 8hourly	3-4 weeks treatment required
<b>Acute pharyngitis</b>	Viral	None required		As most cases are viral no antimicrobial therapy required

	Group A $\beta$ -hemolytic <i>Streptococci</i> (GABHS), Group C, G <i>Streptococcus</i> ,	Oral Penicillin v 500mg BD or Amoxicillin 500mg Oral TDS for 10days	In case of penicillin allergy: Azithromycin 500mg OD for 5 days Or Benzathine Penicillin 12 lac units IM	Antibiotics are recommended to reduce transmission rates and prevention of long term sequelae such as rheumatic fever
<b>Ludwig's angina</b> <b>Vincent's angina</b>	Polymicrobial (Cover oral anaerobes)	Clindamycin 600mg IV 8hourly or Amoxicillin-Clavulanate 1.2 gm IV	Piperacillin-Tazobactam 4.5gm IV 6hourly	Duration based on improvement
<b>Acute bacterial Rhino sinusitis</b>	Viral, <i>S. pneumoniae</i> , <i>H. influenzae</i> , <i>M. catarrhalis</i>	Amoxicillin-Clavulanate 1gm Oral BD for 7days	Moxifloxacin 400mg OD for 5-7days	
<b>Acute bronchitis</b>	Viral	Antibiotics not required	-	-
<b>Acute bacterial exacerbation of COPD</b>	<i>S. pneumoniae</i> , <i>H. influenzae</i> , <i>M. catarrhalis</i>	Amoxicillin-clavulanate 1gm oral BD for 7 days	Azithromycin 500mg oral OD $\times$ 3days	Treated as community acquired pneumonia
<b>Ventilator associated pneumonia</b>		Piperacillin + Tazobactam 4.5gm 6 hourly	Meropenem 1gm 8 hourly + colistin 3miu	Check for Multiple organ failure Nephrotoxic

## URINARY TRACT INFECTIONS

Asymptomatic bacteriuria NOT to be treated except pregnant women and immunocompromised patients. All cases of dysuria may not be UTI. Refer to Obstetrics and gynaecology infections for treatment of asymptomatic bacteriuria in pregnant women.

Condition	Likely Causative Organisms	Empiric antibiotics (presumptive antibiotics)	Alternative antibiotics	Comments
<b>Acute uncomplicated Cystitis</b>	<i>E.coli</i> , <i>Staphylococcus saprophyticus</i> (in sexually active young women), <i>Klebsiella pneumoniae</i>	Nitrofurantoin 100mg BD for 7 days or Cotrimoxazole 960mg BD $\times$ 3-5 days or Ciprofloxacin 500mg BD for 3-5	Cefuroxime 250mg BD for 3-5days	Get urine cultures before antibiotics & modify therapy based on sensitivities.

<b>Acute uncomplicated Pyelonephritis</b>	<i>E.coli</i> , <i>Staphylococcus saprophyticus</i> (in sexually active young women), <i>Klebsiella pneumoniae</i> , <i>Proteus mirabilis</i>	Amikacin 1g OD I/M/IV Or Gentamicin 5-7 mg/kg/day OD  (Monitor renal function closely and rationalise according to culture report) Complete total	Piperacillin-Tazobactam 4.5g IV 6 hourly Or Cefoperazone-Sulbactam 3g IV 12 hourly or Ertapenem 1g IV OD	Urine culture and susceptibilities need to be collected before starting antimicrobial treatment to guide treatment.
<b>Complicated Pyelonephritis</b>	<i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , <i>Proteus mirabilis</i> , <i>Pseudomonas aeruginosa</i> , <i>Enterococcus</i> sp.  Frequently multi-drug resistant organisms are present	Piperacillin-Tazobactam 4.5 gm IV 6 hourly or Amikacin 1g OD IV Or Cefoperazone-Sulbactam 3gm IV 12 hourly	Imipenem 1g IV 8 hourly or Meropenem 1gm IV 8 hourly	Get urine cultures before antibiotics & switch to a narrow spectrum agent based on sensitivities. Treat for 10-14 days.  De-escalate to Ertapenem 1gm IV OD, if Imipenem/meropenem initiated. Monitor renal function if aminoglycoside is used.
<b>Acute prostatitis</b>	Enterobacteriaceae ( <i>E.coli</i> , <i>Klebsiella</i> sp.)	Doxycycline 100mg BD or Co-trimoxazole 960mg BD.	In severe cases, Piperacillin-Tazobactam 4.5gm IV 6 hourly or Cefoperazone-sulbactam 3gm IV 12 hourly or Ertapenem 1gm IV OD or Imipenem 1g IV 8 hourly or Meropenem 1gm IV 8 hourly	Get urine and prostatic massage cultures before antibiotics & switch to narrow spectrum agent based on sensitivities and then treat total for 3-4 weeks. Use Ciprofloxacin (if sensitive)

## **OBSTETRICS AND GYNAECOLOGICAL INFECTIONS**

- Fluoroquinolones are contraindicated in 1<sup>st</sup> trimester.
- Cotrimoxazole is contraindicated in 1<sup>st</sup> trimester.
- Doxycycline is not recommended in nursing mothers. If need to administer doxycycline discontinuation of nursing may be contemplated.

<b>Infections</b>	<b>Likely organism</b>	<b>Primary treatment (presumptive antibiotics)</b>	<b>Alternate treatment</b>	<b>Remarks</b>
Asymptomatic Bacteriuria >1,00,000cfu/ml of bacteria of same species in 2 urine cultures obtained 2-7 days apart. Treat as per sensitivity result for 7 days.		Nitrofurantoin 100mg Oral, BD for 7days Or Amoxicillin 500mg Oral BD x 7-10days.	Oral cephalosporins, TMP-SMX or TMP alone	Screen in 1 <sup>st</sup> trimester. Can cause pyelonephritis in upto 25% of all pregnant women. 30% Chance of recurrence after empirical therapy <sup>1</sup> . Few direct effects, uterine hypoperfusion due to maternal anemia dehydration, may cause fetal cerebral hypoperfusion. 2. LBW,
<b>Group B streptococcal Disease, Prophylaxis and Treatment</b>	GroupB Streptococci	IV Penicillin G 5 million units. (Loading dose) then 2.5-3 million units IV QID until delivery. or Ampicillin 2gm IV (Loading dose) then 1gm QID until delivery	Cefazolin 2 gm IV (Loading Dose) and then 1gm TID  Clindamycin 900mg IV TID or vancomycin IV or teicoplanin for penicillin allergy	Prevalance very low so the prophylaxis may be required only on culture documented report Associated with high risk of pre-term labour, stillbirth, neonatal sepsis
<b>Chorioamnionitis</b>	Group B streptococcus, Gram negative bacilli, chlamydiae, ureaplasma and anaerobes, usually Polymicrobial		Clindamycin/ vancomycin/ teicoplanin and cefoperazone-sulbactam  If patient is not in sepsis then IV Ampicillin	Preterm Birth, 9-11% death rate in preterm infant's unfavourable neurologic outcome, lesser risk to

<b>Septic abortion</b>	Bacteroides, <i>Prevotella bivia</i> , Group B, Group A Streptococcus, Enterobacteriaceae, <i>C. trachomatis</i> , <i>Clostridium perfringens</i> .	Ampicillin 500mg QID+ Metronidazole 500mg IV TDS if patient has not taken any prior antibiotic (start antibiotic after sending cultures) If patient has been	Ceftriaxone 2g IV OD	
		Partially treated with antibiotics, send blood cultures and start Piperacillin-Tazobactam or Cefoperazone-sulbactam till the sensitivity report is available.		
<b>Endomyometritis and Septic Pelvic Vein Phlebitis</b>	Bacteroides, <i>Prevotella bivia</i> , Group B, Group A Streptococcus, Enterobacteriaceae, <i>C. trachomatis</i> , <i>Clostridium perfringens</i>		Same as above.	
<b>Obstetric Sepsis during pregnancy</b>	Group A beta-haemolytic Streptococcus, <i>E. coli</i> , anaerobes.	If patient is in shock and blood culture reports are pending, then start Piperacillin-Tazobactam or Cefoperazone-sulbactam till the sensitivity report is available and modify as per the report. If patient has only fever, with no features of severe sepsis start amoxicillin clavulanate oral 625 TDS/ IV 1.2gm TDS or Ceftriaxone 2gm IV OD + Metronidazole 500mg IV TDS +/- gentamicin 7mg/kg/day OD if admission needed. MRSA cover may be required if suspected or colonized (Vancomycin/ Teicoplanin)		



<b>Obstetric Sepsis following pregnancy</b>	<i>S.pyogenes</i> , <i>E.coli</i> , <i>S.aureus</i> <i>S.pneumoniae</i> , Meticillin-resistant <i>S. aureus</i> (MRSA), <i>C. septicum</i> & <i>Morganella morganii</i> .	Same as above		Sources of sepsis outside Genital tract Mastitis UTI Pneumonia Skin and soft tissue (IV site, surgical site, drain site etc.)
<b>Syphilis</b>				Refer to STD program guidelines
<b>Tuberculosis in pregnancy</b>	<b>Similar to NON PREGNANT Population with</b>	Please refer RNTCP guideline  WHO has advocated that, all the first line drugs are		Very small chance of transmission of infection to fetus.
	<b>Some exceptions (see comment and chapter 8)</b>	Safe in pregnancy and can be used except streptomycin. SM causes significant ototoxicity to the fetus (Pyrazinamide not recommended by USFDA)  1. Mother and baby should stay together and the baby should continue to breastfeed. 2. Pyridoxine supplementation is recommended for all pregnant or breast feeding women taking isoniazid as well as to neonate who are being breastfed by mothers taking INH.		Late diagnosis can predispose to LBW, prematurity.

VIRAL INFECTIONS (NO ANTIBIOTICS TO BE GIVEN)				
<b>Influenza In pregnancy (seasonal And H1N1)</b>	<p>1. Tendency for severe including premature labor &amp; delivery.</p> <p>2. Treatment should begin within 48 hrs of onset of symptoms.</p> <p>3. Higher doses commonly used in non pregnant population (150mg) are not recommended in pregnancy due to safety concerns.</p> <p>4. Chemoprophylaxis can be used in significant exposures.</p> <p>5. Live (nasal Vaccine) is contraindicated in pregnancy.</p>	<p>Oseltamivir 75 mg Oral BD for 5 days</p>	<p><b>Nebulization with Zanamvir respules</b> (2) 5mg each, BD For 5 days</p>	<p>Direct fetal infection rare</p> <p>Preterm delivery and pregnancy loss.</p> <p>The best preventive strategy is administration of single dose of killed vaccine.</p>
<b>Varicella</b>	<p>&gt;20 wks of gestation, presenting within 24 hours of the onset of the rash,</p> <p>&gt;24hrs from the onset of rash, antivirals are not found to be useful.</p>	<p><b>Aciclovir 800mg Oral 5 times a day IV acyclovir recommended for the treatment of severe complications,</b></p> <p><b>VZIG</b> should be offered to susceptible women &lt;10days of the exposure.</p> <p>VZIG has no role in treatment once the rash appears.</p> <p>The dose of VZIG is 125units/10kg not exceeding 625 units, IM.</p>		<p>Chickenpox during pregnancy does not justify termination without prior prenatal diagnosis as only.</p> <p>a minority of fetuses infected develop fetal varicella syndrome.</p>

PARASITIC INFECTIONS			
Acute Toxoplasmosis in pregnancy	<18 weeks gestation at diagnosis	Spiramycin 1gm Oral qid until 16-18weeks/ Pyrimathamine+ sulphadizine. Alternate every two weeks–	
	>18weeks gestation and documented fetal infection by positive amniotic fluid PCR.	If PCR Positive -  Pyremethamine 50 mg Oral BDx 2days then 50 mg OD + Sulphadiazine75 mg/kg Oral x 1dose then 50mg/kg bd + Folinic Acid (10-20 mg Oral daily) for minimum of 4 weeks or for duration of pregnancy.	
Malaria In pregnancy	As per national program		
GENITAL TRACT INFECTIONS			
Candidiasis	Candida species	Fluconazole oral 150 mg single dose For milder cases- Intravaginal agents as creams or suppositories clotrimazole, miconazole, nystatin. Intravaginal azoles, single dose to 7-14days.	Non-pregnant-If recurrent candidiasis, (4 or more episodes/year) 6 months suppressive treatment with fluconazole 150mg oral once a week or clotrimazole vaginal suppositories 500mg once a week.
Bacterial vaginosis	Polymicrobial	Metronidazole 500mg Oral BD x 7days Or metronidazole vaginal gel 1HS x 5days Or Tinidazole 2g orally ODx 3days Or 2% Clindamycin Vaginal cream 5gm HS x5 days	Treatthepartner.
Trichimoniasis	Trichomonas vaginalis	Metronidazole 2gm single dose or 500mg Oral BD x 7days or  Tinidazole 2gm Oral single dose For treatment failure –retreat with Metronidazole 500mg Oral BD x7Days, if 2 <sup>nd</sup> failure Metronidazole 2gm Oral OD x3-5days	Treat sexual partner with metronidazole 2gm single dose
Cervicitis /Urethritis Mucopurulent gonococcal	Polymicrobial	Ceftriaxone 250mg IM Single dose + Azithromycin 1gm single dose OR Doxycycline 100mg BD x7day	
Pelvic Inflammatory Disease (Salpingitis & tubo-ovarian abscess)	S.aureus, Enterobacteriaceae, gonococci, Gardenella	Out patient treatment Ceftriaxone 250mg IM/IV single dose plus+/- Metronidazole 500mg BD x14days Plus Doxycycline 100mg BD x 14Days InpatientTreatment Clindamycin + ceftriaxone till patient admitted then change to OPD treatment	Drainage of tubo-ovarian abscess wherever indicated Evaluate and treat sex partner

<b>Mastitis without abscess</b>	<i>S. aureus</i>	Amoxycillin clavulunate/ Cephalexin 500mg QID/ OR Ceftriaxone 2gm OD OR MRSA- based on sensitivities Add Clindamycin 300QID or Vancomycin 1gm IV 12hourly /teicoplanin 12mg/kg IV 12hourly x3 doses followed by 6 mg once daily IV	
<b>Mastitis with abscess</b>		Drainage with antibiotic cover for MRSA Clindamycin 300 QID or Vancomycin 15mg/kg IV 12hourly (maximum 1gm 12hourly)/ teicoplanin 12mg/kg IV 12hourly x 3doses followed by 6 mg once daily IV	

## **BONES AND JOINT INFECTIONS**

Condition	Likely causative Organisms	Empiric antibiotics	Alternative antibiotics	Comments
<b>Acute osteomyelitis OR Septic arthritis</b>	<i>S. aureus</i> , <i>Streptococcus pyogenes</i> Enterobacteriaceae	Ceftriaxone 2g IV OD  Followed by Oral therapy by Cl oxacillin 500mg q8h Or Cephalexin 500mg q6h	Piperacillin-tazobactam 4.5g m IV q6h or Cefoperazone- sulbactam 3gm IV q12h AND Clindamycin 600- 900mg IV TDS	Treat based on culture of blood/ synovial fluid/ bone biopsy  Orthopedic Consultation is essential for surgical debridement  Duration: 4-6 weeks (From initiation or last major debridement)
<b>Chronic Osteomyelitis OR Chronic synovitis</b>		No empiric therapy		Definitive treatment guided by bone/ synovial biopsy culture. <b>Treat for 6 weeks minimum</b> Investigate for TB, Nocardia, fungi. Extensive surgical debridement. Total duration of treatment depends on the joint and the organism. Choose antibiotic based on sensitivity.
<b>Prosthetic joint infection</b>	Coagulase negative staphylococci, <i>Staphylococcus aureus</i> , <i>Streptococci</i> Gram-negative bacilli, <i>Enterococcus</i> , Anaerobes	Ceftriaxone 2g IV OD. Add Vancomycin 1gm IV BD or Teicoplanin 800mg x3 doses followed by 400mg Once daily		4 weeks

## OPHTHALMIC INFECTIONS

Eye lid infections	Likely organisms	First line/ Suggested Regimen	Alternate regimen	Remarks		
External Hordeolum (Stye)	S. aureus	Hot pack Topical and oral antibiotic e/d and e/o in some cases incision and drainage of the stye.	Amoxicillin 500 mg PO QDS x 5 days Or Ampiclox (250 mg each) PO TDS x 5 days	if associated conjunctivitis Gatiflox 0.3% / Moxifloxacin 0.5% e/d QDS x 1 week		
Internal Hordeolum						
Blephritis	MSSA/ S. epidermidis	Oral Cloxacillin 250-500mg QID or Oral Cephalexin 500mg QID	Lid margin care with baby shampoo & warm compresses 24hourly. Artificial tears if associated with dry eye.			
	MRSA	Oral Trimethoprim Sulphamethoxazole 960 mgBD or Linezolid 600mg BD				
Conjunctival infections	S.aureus, S.pneumoniae, H.influenzae	No antibiotics required treat for symptoms			Highly contagious. If pain & photophobia suggestive of keratitis.	
Viral conjunctivitis (pinkeye)						
Bacterial conjunctivitis			Ophthalmologic solution: Gatifloxacin 0.3%, Levofloxacin 0.5%, Moxifloxacin 0.5% 1-2 drops q2h while awake during 1st2days, then q4-8h up to 7days			Uncommon causes- Chlamydia trachomatis N. gonorrhoeae
Corneal infections						
Herpes Simplex keratitis			H. simplex type 1& 2			Trifluridine ophthalmic soln 1drop 2hourly, upto 9times/day until re-epithilised. Then 1 drop 4hourly upto 5times/ day for total duration of 21days
	Varicella–zostervirus	Famciclovir 500mg BD Or TID OR Valacyclovir 1gm oral TID x10 days	Acyclovir800mg5time s/dx10days	.		
Varicella Zoster ophthalmicus	S.aureus, S.pneumoniae, S.pyogenes, Haemophilus spp	Moxifloxacin topical (0.5%): 1drop 1hourly for first 48hr, then reduce as per response	Gatifloxacin 0.3% ophthalmic Solution 1drop 1hourly for 1st 48hrs then reduceas per response	Moxifloxacin. Preferable. Treatment may fail against MRSA.		
Acute bacterial keratitis (No comorbidities)	P. aeruginosa	Tobramycin or Gentamicin 14mg/ml+ Piperacilin or Ticarcillin eye drops (6-12mg/mL) q15-60 min around	Ciprofloxacin ophthalmic 0.3% or Levofloxacin Ophthalmic 0.5%			
Acute Bacterial (Contact lens users)						



<b>Fungal keratitis</b>	Aspergillus, Fusarium, Candida and others	Natamycin (5%) 1 drop 1-2 hourly for several days, then 3- 4 hourly for several days depending on response	Amphotericin B (0.15%) 1 drop q1-2 hourly for several days depending on the response	Empirical therapy  is not recommended.
<b>Protozoan (soft contact lens users)</b>	Acanthamoeba spp.	Optimal regimen uncertain Suggested– (Chlorhexidine 0.02% or Polyhexamethylene biguanide 0.02%)+ (Propamidine isethionate 0.1% or Hexamidine 0.1%) eye drops 1 drop every 1 hourly during daytime, Taper according to clinical Response	-	Uncommon. & soft contact Lenses are risk factors
<b>Orbital infections</b>				
<b>Orbital cellulitis</b>	<i>S.pneumoniae</i> , <i>H.influenzae</i> , <i>M.catarrhalis</i> , <i>S.aureus</i> , Anaerobes, Group A Streptococcus, Occasionally Gram Negative bacilli post trauma.	Cloxacillin 2gm IV q4h+ Ceftriaxone 2gm IV q24 hourly+ Metronidazole 1gm IV 12h	If Pencillin /Cephalosporin allergy: Vancomycin 1gm iv q12h+ levofloxacin 750mg IV once daily+ Metronidazole iv 1gm 24h	If MRSA is suspected substitute Cloxacillin with Vancomycin
<b>Endophthalmitis Bacterial</b>  Post- ocular surgery	<i>S.epidermidis</i> <i>S.aureus</i> , Streptococci, enterococci, Gram- bacilli	Immediate ophthalmological consultation. Immediate vitrectomy+ Intravitreal antibiotics (Inj Vancomycin+ Inj ceftazidime)	Adjuvant systemic antibiotics (doubtful value in post cataract surgery endophthalmitis) Inj Vancomycin+ Inj Meropenem	.
Hematogenous	<i>S.pneumoniae</i> , <i>S.aureus</i> , Group B streptococcus, <i>K. pneumoniae</i> <i>N meningitidis</i>	Intra vitreal antibiotics Inj Vancomycin+ Inj Ceftazidime + Systemic antibiotics Inj Meropenem 1 gm iv q8h/Inj Ceftriaxone 2gm iv q24h+ Inj Vancomycin 1g iv q12h		

<b>Endophthalmitis Mycotic (Fungal)</b>	Candida sp, Aspergillus sp.	Intavitreal amphotericinB 0.005-0.01mg in 0.1 ml Systemic therapy: AmphotericinB 0.7-1mg/kg+ Flucytosine 25mg/kg qid	Liposomal AmphotericinB 3- 5mg/kg Or Voriconazole	Duration of treatment 4-6 week sor longer depending upon clinical response. Patients with chorioretinitis and ocular involvement other than endophthalmitis often respond to systemically administered
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### **EAR NOSE & THROAT INFECTIONS**

<b>Ear infection</b>	<b>Likely Etiology/</b>	<b>Suggested Regimen</b>	<b>Alternate</b>	<b>Remarks</b>
<b>Malignant otitis externa</b>	<i>P. aeruginosa</i> (in >90% cases)	Piperacilin+Tazobactam 4.5gm IV 6h Or Imipenem/Meropenem Ciprofloxacin	Ceftazidime	Debridement usually required. Rule out osteomyelitis; Do CT or MRI. If bone involved, treat for 4-6 wks.
<b>Acute otitis media</b>	<i>S. pneumoniae</i> <i>H. influenzae</i> <i>Moraxella</i> <i>catarrhalis</i>	Amoxicillin+clavulanate 90/6.4mg/kg/ day bid or cefprozoxim/ cefuroxime Axetil 250mg BD	Ceftriaxone 50mg/kg I/M for 3 days	Treat children <2 years If >2 years, a febrile and No ear pain-consider analgesics and defer antibiotics Duration of treatment If age <2 years: 10 days If age >2 years: 5-7 days
<b>Mastoiditis</b>				
<b>Acute</b>	<i>S. pneumoniae</i> <i>S. aureus</i> <i>H. influenzae</i> <i>P. aeruginosa</i>	Cefotaxime 1-2gm iv 4-8 Hourly Ceftriaxone 2gm iv OD		Modify as per culture Unusual causes- Nocardia, TB, Actinomyces.
<b>Chronic</b>	Polymicrobial	Piperacillin-tazobactam 4.5g IV 8h Meropenem 1gm iv 8h		
<b>Acute Pharyngitis/ tonsillitis</b>				
<b>Exudative/ Diffuse Erythema</b>	Mostly viral Group A, C, G Streptococcus, Infectious mononucleosis,	Penicillin V oral x 10 days or Benzathine Penicillin 1.2 MU IM x 1 dose or Cefdinir or cefprozoxime x 5 days		Penicillin allergic, Clindamycin 300-450 mg orally 6-8 hourly x 5 days. Azithromycin or clarithromycin are alternatives.

<b>Membranous pharyngitis</b>	<i>C.diphtheriae</i> ,	Erythromycin 500mg IV QID DorPenicillin G 50,000 units/kg IV 12 hourly. Diphtheria antitoxin: Horses serum. <48hrs: 20,000-40,000 units, Nasopharyngeal membranes: 40,000-60,000 units >3 days & bull neck: 80,000-1,20,000 units		
<b>Epiglottitis (Supraglottis)</b>	Children: <i>H.influenzae</i> , <i>S.pyogenes</i> , <i>S.pneumoniae</i> , <i>S.aureus</i> .	Cefotaxime 50mg/kg IV 8 hourly or ceftriaxone 50mg/kg IV 24 hourly	Levofloxacin 10mg/kg IV 24 hourly + clindamycin 7.5mg/kg IV 6 hourly.	
<b>Laryngitis (hoarseness)</b>	Viral (90%)	No antibiotic indicated		



## **FUNGAL INFECTIONS**

Routine antifungal prophylactic therapy in critically ill patients is NOT recommended. Fungal therapy is usually started based on positive cultures or systemic evidence of fungal infection. It is advised to take paired cultures if fungal infection is suspected. Evidence includes persistent sepsis / SIRS despite broad spectrum antibiotic (exclude sepsis, abscess, drug fever, DVT etc). Treat according to identification and antifungal sensitivity of Candida isolate.

Fluconazole IV/oral 800 mg OD first day (12mg/kg) and then 400 mg OD (6mg/kg from second day) if fluconazole naïve or sensitive

Or

2nd line Liposomal Amphotericin B (for Candida krusei and C.glabrata as inherently resistant to Fluconazole.) or Caspofungin (As Caspofungin is inherently inactive against Zygomycetes, Cryptococcus, Fusarium and Trichosporon Spp) Liposomal Amphotericin B IV 3mg/kg OD or Caspofungin dose: IV 70mg on Day 1 (loading), 50mg OD (<80kg) or 70mg OD (if >80kg) thereafter. Moderate to severe hepatic dysfunction: reduce the subsequent daily dose to 35mg OD. Check for drug interactions.

To be decided by Microbiologist/ID physician based on patient's hepatic / renal functions/Severity of infection /drug interactions e.g. rifampicin, carbamazepine, phenytoin, efavirenz, nevirapine, cyclosporin, dexamethasone, tacrolimus etc.

## **POST-CARDIOVASCULAR SURGERY INFECTIONS**

Surveillance regarding the Infections following CTVS should be done in each institute

1. Antibiotic Prophylaxis to be guided by the institutional prevalence of MRSA infection and in patients at increased risk for MRSA colonization
2. Nasal screening before CTV surgery is recommended to rule out MRSA colonization

S. no.	Surgery	Antibiotic Prophylaxis			Comments
		1st line	2nd line	Special Antibiotic/Combination	
1.	CABG	Cefazolin	Cefuroxime	-	<p>Vancomycin /Teicoplanin to be used in case of high prevalence of MRSA infections only</p> <p>Using only Vancomycin/Teicoplanin is NOT recommended due to lack of coverage of GNB</p> <p>Vancomycin infusion to be given over 1 hour &amp; to be started 2 hrs before the surgical incision</p> <p>Teicoplanin dosing to start with 800 mg x 3 doses and then 6 mg/kg to complete prophylaxis</p> <p>Duration of Prophylaxis: Continued till 48 hours after the surgery</p>

## Empirical Treatment after appropriate specimen for stain & cultures have been collected

S. no.	Infection/ Syndrome	Likely Causative agents	Antibiotics			Comments
			1st line	2nd line	Special Antibiotic/ Combination	
1	Sternotomy site infection	Not known	BL-BLI (Piperacillin-tazobactam, Cefoperazone-sulbactam, cefipime-tazobactam) with or without amikacin. With Vancomycin/ teicoplanin	Daptomycin/ Linezolid with carbapenem	Consider de-escalation to TMP/SMX , doxy/minocycline, cloxacillin, cefazolin, If these are sensitive	1) Removal of the foreign body (steel wires) should be considered
2	Infection of vascular catheters	Not known	BL-BLI (Piperacillin-tazobactam, Cefoperazone-sulbactam, cefipime-tazobactam) with or without amikacin with Vancomycin/ teicoplanin	Carbapenem  (Empirical anti-MRSA drug if the incidence of MRSA CRBSI is high)		Consider de-escalation as per the isolate, susceptibility, MICs, adverse effects, drug allergy
3	Pneumonia	Not known	BL-BLI (Piperacillin-tazobactam, Cefoperazone-sulbactam) with or without amikacin	Carbapenem		Consider de-escalation as per the isolate, susceptibility, MICs, adverse effects, drug allergy
4	Mediastinitis	Not known	BL-BLI (Piperacillin-tazobactam,	Carbapenem with or without		Consider de-escalation as per the isolate,



			Cefoperazone-sulbactam) with or without amikacin With Vancomycin/teicoplanin	Amikacin		susceptibility, MICs, adverse effects, drug allergy
5	Urinary tract infection	Not known	BL-BLI (Piperacillin-tazobactam, Cefoperazone-sulbactam with or without amikacin	Carbapenem with or without Amikacin		Consider de-escalation as per the isolate, susceptibility, MICs, adverse effects, drug allergy

Definitive Treatment after appropriate specimen for stain & cultures have been collected

S. No.	Infection/ Syndrome	Likely Causative agents	Antibiotics			Comments
			1st line	2nd line	Special Antibiotic/ Combination	

1	Sternotomy site infection	Coagulase Negative Staphylococci	Vancomycin, Teicoplanin	Daptomycin Linezolid	Consider de-escalation to Cotrimoxazole or Cloxacillin or Cefazolin	1) Consider MICs, risk of nephrotoxicity, bone penetration for choosing the antibiotic
		MRSA	Vancomycin, Teicoplanin,	Daptomycin Linezolid	Consider de-escalation to TMP/SMX or doxy/minocycline If these are sensitive	2) Removal of the foreign body (steel wires) should be considered
		Enterococcus	Vancomycin, Teicoplanin,		Consider de-escalation to Ampicillin/ Ampi-sulbactam	3) Longer duration of duration – 6-12 months may be required
		GNB (Enterobacteriaceae, Pseudomonas, Acinetobacter)	BL-BLI (Piperacillin-tazobactam, Cefoperazone-sulbactam, with or without amikacin	Carbapenem (Meropenem, Imipenem)	Consider de-escalation to oral agent if possible after 2-6 weeks of antibiotic therapy	
		Candida	L-AmB/AmB-d for 3 weeks followed by Fluconazole (If susceptible)		De-escalation to Fluconazole 800 mg loading followed by 200 mg BD	For Candida osteomyelitis, longer duration of treatment (12 months) is recommended

## **FEBRILE NEUTROPENIA**

### **Febrile Neutropenia-definition**

- Neutropenia-ANC<500/mm<sup>3</sup> and expected to fall below 500/mm<sup>3</sup> in 48hrs
- Fever-single oral temperature of 38.3°C(101°F) on one occasion or 38°C (100.4°F) on at least 2 occasions (1 hour apart)
- Neutropenic patients may not have usual signs of infection. Redness, tenderness and fever may be the only signs.

### **Protocol:**

- Critical examination of areas usually harboring infections, including but not limited to, oral cavity, axillary region, scalp, groin, perineal region.
- Send blood Cultures 2 sets (each bottle 10ml x 4 bottles)
- Other relevant investigations: urea, creatinine, ALT, urine culture ,Chest Xray, separate culture from central line, etc.

### **Patient-Haemodynamically stable**

- Blood culture 2 sets
- Start IV Ceftazidime 1gm IV 8 hourly
- No need to add glycopeptides in the initial regimen (except in specific situations, given below)

### **Patient-Haemodynamically unstable**

- Start BL-BLI agent(Cefoperazone-Sulbactam 1.2gm IV 8 hourly/ piperacillin- tazobactam 4.5gm IV 8 hourly) OR Carbapenem (meropenem 1gm IV 8 hourly/imipenem 500mg IV 6 hourly/doripenem 500mg IV 6 hourly)
- No need to add glycopeptides in the initial regimen (except in specific situations, given below)

### **Reassess after 48 hours:**

If blood cultures are negative, haemodynamically stable but still febrile

- Reculture blood
- Add amikacin 500mg IV BD for 3days
- Add colistin (instead of amikacin) if indicated (see below)

If blood cultures are negative, haemodynamically unstable but still febrile

- Inj Colistin (+/-Carbapenem) + glycopeptides + Echinocandin/ L-AmphoB

### **Blood culture growing Gram negative bacilli**

- Patient afebrile- continue the empirical antibiotic till antibiotic sensitivity is available.
- Rationalise as per susceptibility profiles

### **When to add glycopeptides?**

1. Haemodynamic instability, or other evidence of severe sepsis, septic shock or pneumonia
2. Colonisation with MRSA or penicillin-resistant *S. pneumonia*
3. Suspicion of serious catheter-related infection e.g. *chills or rigours within fusion through catheter and cellulitis around the catheter exit site*
4. Skin or soft-tissue infection at any site
5. Positive blood culture for gram-positive bacteria, before final identification and susceptibility testing

- is available
6. Severe mucositis

#### **When to add empirical colistin in febrile neutropenic patients?**

1. Hemodynamic instability.
2. Colonisation with carbapenem resistant gram-negative bacteria.
3. Previous infection with carbapenem resistant gram-negative bacteria.
4. GNB in blood, sensitivity pending, persistent fever with haemodynamic instability.

#### **Empirical Antifungal Therapy**

- No response to broad spectrum antibiotics (3-5days)- add L-AmphoB/echinocandin
- When a patient is located at a remote area and may not have access to emergency healthcare services, febrile neutropenia can be life threatening. Under such circumstances, availability of broad-spectrum oral antibiotics with the patient can help them gain time to reach emergency healthcare service.

#### **Useful tips**

- Febrile after 72hrs- CT chest and consider empirical antifungal.
- If fever persists on empirical antibiotics, send two sets blood cultures/day for 2 days
- Send further cultures if clinical deterioration
- Unexplained persistent fever in otherwise stable patient doesn't require change in empirical antibiotic regimen.

Continue the regimen till ANC is  $>500\text{cells/mm}^3$

- If glycopeptides started as a part of empirical regimen, STOP after 48hrs, if no evidence of Gram positive infection
- Antibiotic treatment should be given for at least seven days with an apparently effective antibiotic, with at least four days without fever.
- Once Neutrophil count has recovered, with no culture positivity and hemodynamically stable; antibiotics can be stopped and patient observed, even if remains febrile. Evaluate for fungal infection, if at risk.

#### **Antibiotic Prophylaxis**

Though quinolone prophylaxis is recommended by International guidelines, it is not useful in Indian scenario due to high resistance.

#### **Antiviral prophylaxis**

- For HSV IgG positive patients undergoing allo-HSCT or leukemia induction needs acyclovir prophylaxis
- All patients being treated for cancer need to receive annual influenza vaccination with an inactivated vaccine.
- Neutropenic patients presenting with influenza like illness should receive empirical treatment with neuraminidase inhibitor.

### **Antifungal prophylaxis**

a) Induction chemotherapy of Acute Leukemia: Posaconazole

b) Post allo BMT

Pre engraftment:

Voriconazole/ echinocandin

Post engraftment:

Posaconazole

### **SURGICAL ANTIMICROBIAL PROPHYLAXIS**

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

<b>SURGERY</b>	<b>MEDICATION</b>
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-Tazobactam 4.5 gm or Inj. Cefaperazone-Sulbactam 2 gm IV stat
Cardiothoracic	Inj. Cefuroxime 1.5gm IV stat & BD for 48 hrs
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 24hrs (maximum) or Inj. Cefazolin 2gm IV stat Open reduction of closed fracture with internal fixation-Inj. Cefuroxime 1.5 gm IV stat and q12 h or Inj. Cefazolin 2gm IV stat and q12 h for 24hrs
Trauma	Inj. Cefuroxime 1.5gm IV stat and q 12h (for 24hrs) or Inj. Ceftriaxone 2gm IV OD
Urologic procedures	Antibiotics only to patients with documented bacteriuria
Trans-rectal prostatic surgery	Inj. Cefaperazone-Sulbactam 2 gm IV stat



## Pediatric Infections

Diseases /Conditions	1 <sup>st</sup> line Antibiotics (Who did not received antibiotic for the present condition)	1 <sup>st</sup> line antibiotics (Received oral antibiotics for < 5 days)	2 <sup>nd</sup> line Antibiotics (Received multiple or prolonged antibiotics)
<b>Central Nervous System Infection</b>			
Acute Bacterial Meningitis	Ceftriaxone ± Vancomycin (in Shock)	Ceftriaxone ± Vancomycin (in Shock)	Meropenem/Cefepime + Vancomycin/Teicoplanin
Brain abscess	Ceftriaxone + Vancomycin + Metronidazole	Ceftriaxone + Vancomycin + Metronidazole	Cefepime or Meropenem + Vancomycin
Shunt infection	Ceftriaxone + Vancomycin	Ceftriaxone + Vancomycin	Cefepime or Meropenem + Vancomycin
Acute encephalitis syndrome	Ceftriaxone ± Vancomycin + Acyclovir	Ceftriaxone ± Vancomycin + Acyclovir	Meropenem/Cefepime + Vancomycin/Teicoplanin ( add Azithromycin if atypical organisms suspected)
<b>Respiratory Tract Infections</b>			
Community acquired pneumonia	Ceftriaxone + Amoxicillin-clavulanate	Ceftriaxone+ Amoxicillin-clavulanate	Piperacillin-tazobactam + Vancomycin
Evidence of staph infection (± Shock)	Ceftriaxone + Vancomycin	Ceftriaxone + Vancomycin	
Atypical Pneumonia	Azithromycin	Azithromycin	Fluoroquinolones
Empyema	Amoxicillin-clavulanate	Amoxicillin-clavulanate (if already received in IV dose) then start Vancomycin + Ceftriaxone	Vancomycin + Cefoperazone-sulbactam
Cystic Fibrosis (CF)-pulmonary exacerbation	Cefoperazone-sulbactam/ Piperacillin-tazobactam+ Amikacin	Cefoperazone-sulbactam/ Piperacillin-tazobactam + Amikacin	Meropenem OR Ofloxacin OR Colistin + Vancomycin OR Linezolid
Suppurative lung disease	Cefoperazone-sulbactam+ Amikacin	Cefoperazone-sulbactam+ Amikacin	Piperacillin-tazobactam + Vancomycin
Immunodeficiency condition + LRTI	Cefoperazone-sulbactam+ Amikacin	Cefoperazone-sulbactam+ Amikacin	Piperacillin-tazobactam + Vancomycin
<b>Infection related to Kidney and Urinary Tract</b>			
Nephrotic syndrome with peritonitis	Ceftriaxone ± Vancomycin (in Shock)	Ceftriaxone ± Vancomycin (in Shock)	Teicoplanin + Piperacillin-tazobactam
Nephrotic syndrome with cellulitis	Amoxicillin-clavulanic acid OR Cloxacillin + Cefotaxime	Amoxicillin-clavulanic acid OR Cloxacillin + Cefotaxime	Teicoplanin + Piperacillin-tazobactam
Nephrotic syndrome with	Ceftriaxone ± Vancomycin (in Shock)	Ceftriaxone ± Vancomycin (in Shock)	Teicoplanin + Piperacillin-

pneumonia			tazobactam
Haemodialysis with suspected catheter related bloodstream infection	Ceftazidime + Vancomycin	Ceftazidime + Vancomycin	Remove line (place another after 48 hr; preferred) Piperacillin-tazobactam + Vancomycin
UTI (complicated)	Ceftriaxone	Ceftriaxone	Culture and sensitivity guided
<b>Infection of Bone and Joints</b>			
Acute Bacterial Osteomyelitis (Empirical)	Ceftriaxone + Vancomycin		Ceftazidime/Piperacillin-tazobactam + Vancomycin
MSSA	Cefazolin/Cloxacillin/Nafcillin		
MRSA	Vancomycin or Clindamycin (If no Bacteremia and child is no severely ill)		
Septic Arthritis (Empirical)	Ceftriaxone + Vancomycin		Ceftazidime/Piperacillin-tazobactam + Vancomycin
MSSA	Cefazolin/Cloxacillin/Nafcillin		
MRSA	Vancomycin or Clindamycin		
<b>Infections of Skin and Soft Tissues</b>			
Cellulitis	Oral Amoxicillin-Clavulanate/Cephalosporin/Clindamycin	Ceftriaxone/Cefazolin/Amoxicillin-Clavulanate/Clindamycin (IV)	Vancomycin + Piperacillin – tazobactam
<b>Infection of Gastrointestinal System</b>			
Liver abscess	Cefazolin + Ceftriaxone	Vancomycin + Ceftriaxone	Teicoplanin + Meropenem
Acute Cholangitis	Piperacillin – tazobactam	Piperacillin – tazobactam	Meropenem
Infected pancreatic collection	Piperacillin – tazobactam	Piperacillin – tazobactam	Meropenem
<b>Infection in Pediatric Intensive Care Unit (PICU)</b>			
Sepsis without focus (community acquired)	Ceftriaxone	Ceftriaxone	Piperacillin-tazobactam + Vancomycin
Nosocomial Sepsis (Without focus)	Piperacillin-tazobactam + vancomycin	NA	Colistin + Vancomycin
Septic shock	Ceftriaxone + Vancomycin	Piperacillin-tazobactam + Vancomycin	Piperacillin-tazobactam /Cefoperazone-sulbactam +Vancomycin
Ventilator Associated Pneumonia	Piperacillin-tazobactam + Vancomycin	NA	Colistin ±/ Vancomycin

Suspected fungal pneumonia			Add fluconazole or amphotericin B
DKA with suspected sepsis	Ceftriaxone	Ceftriaxone	Piperacillin-Tazobactam+ Vancomycin
Meningococcal sepsis	Ceftriaxone	Ceftriaxone	Piperacillin-Tazobactam+ Vancomycin
Central line associated Blood stream Infection	Vancomycin	Meropenem	Colistin±vancomycin
<b>Infection in Immunocompromised Children</b>			
Febrile Neutropenia (No focus)	Cefoperazone-sulbactam/ Piperacillin-tazobactam + Amikacin	NA	Add/increase gram positive cover (Vancomycin/Linezolid)
FN-Pneumonia	Amoxicillin-clavulanate + Amikacin	Cefoperazone-sulbactam + Amikacin ± Vancomycin/Linezolid	Meropenem + Vancomycin/Linezolid  Add antifungals if fever persists > 5-7 days
FB-GIT	Cefoperazone-sulbactam + Ofloxacin/ Metronidazole	Add gram positive cover (Vancomycin/Linezolid)	Meropenem + Vancomycin/Linezolid  Add antifungals if fever persists > 5-7 days
Febrile neutropenia with shock	Cefoperazone-sulbactam/ Piperacillin-tazobactam+ Vancomycin	NA	Meropenem + Vancomycin  Add Amphotericin B (if fever persists >5-7 days)
FN-meningitis	Ceftriaxone + Vancomycin	NA	Meropenem + Vancomycin
Sepsis	Piperacillin-tazobactam + vancomycin Add Amphotericin- B in case of strong suspicion of fungal infection.	Piperacillin-tazobactam + vancomycin Add Amphotericin-B in case of strong suspicion of fungal infection	Colistin + Vancomycin Add Amphotericin-B
PCP Pneumonitis	Cotrimoxazole	Cotrimoxazole	
<b>Infection in Neonatal Intensive Care Unit (NICU)</b>			
Early-onset sepsis	Ciprofloxacin + Amikacin	NA	Piperacillin-tazobactam + Amikacin
Late-onset sepsis	Ciprofloxacin + Amikacin	NA	Piperacillin-tazobactam + Amikacin
Meningitis	Piperacillin-tazobactam+ Amikacin	NA	Meropenem + Amikacin
Sepsis	Cefotaxime + Amikacin	NA	Piperacillin-

(Community Acquired)			tazobactam + Amikacin
Osteomyelitis	Cefotaxime + Cloxacillin  In MRSA replace Cloxacillin with Vancomycin		
Septic Arthritis	Cefotaxime + Cloxacillin  In MRSA replace Cloxacillin with Vancomycin		

