

ANTIBIOTIC POLICY

SINHGAD TECHNICAL EDUCATION SOCIETY'S

SMT. KASHIBAI NAVALE MEDICAL COLLEGE AND GENERAL HOSPITAL





**SMT. KASHIBAI NAVALE MEDICAL COLLEGE
&
GENERAL HOSPITAL
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FOREWORD



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MBBS MD (Microbiology)

Director

Smt. Kashibai Navale Medical College &
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I am glad that the Department of Microbiology & Department of Pharmacology have taken efforts to formulate Antibiotic Policy, a venture which was overdue for long.

Antibiotic resistance, a global concern, is particularly pressing in developing nations, including India, where the burden of infectious disease is high and healthcare spending is low. This document will definitely help to restrict inappropriate use of antimicrobial agents, optimize selection, dose, route & duration of treatment for best outcomes.

I congratulate all members of Hospital Infection Control Committee for taking efforts to prepare this document

FOREWORD



Dr. Rajendra S Bangal

MBBS MD (FMT), D.N.B., LL.B

DEAN

Smt. Kashibai Navale Medical College &
General Hospital

It gives me immense pleasure to note that our institute has formulated an “Antibiotic policy”, which is based on the prevalent institutional antibiogram and the National treatment guidelines for antimicrobial use in infectious diseases.

It is well known fact that the rational use of available antibiotics is one of the best methods to tackle the rising prevalence of antimicrobial resistance. I feel that this policy will help all residents and faculty of our institute in making an appropriate choice of antimicrobial for the treatment of various infectious diseases.

I congratulate all the members of antibiotic policy formulating team for preparing this document and wish that the policy will be implemented successfully by all the doctors in SKNMC & GH, Pune.

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INTRODUCTION

Antimicrobial resistance (AMR) has emerged as a major public health problem all over the world. The emergence of resistant strains of organisms leads to outbreaks of infections which are difficult to treat. Despite a plethora of antibiotics, infections are rearing their ugly heads and increasing the morbidity and mortality in patients. The rampant overuse and misuse of antibiotics, the lack of information of infection epidemiology contribute in so small measure, to the development of resistant organisms and treatment failures. The increasing use of higher antibiotics is also a cause of concern. A pragmatic, well laid out policy for antimicrobial use and its proper implementation will ensure cost effective safe antibiotic treatment regimens which match the susceptibility pattern of prevalent organisms in various infections. This coupled with proper hospital hygiene and other measures to tackle infection control, will ensure that antibiotics continue to remain as useful drugs in our armamentarium in our fight against disease. Clinical judgment, pharmacological knowledge backed with microbiological data on prevalent organisms and their sensitivity patterns, needs to be translated into an ANTIBIOTIC POLICY for our hospital.

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POLICY FRAMEWORK

1. **Categorization** of antibiotics into these for **free use, monitored use and restricted use**.
2. **Segregation** of antibiotics for **outpatient** and **inpatient** use. Only few cost effective antibiotics will be available for outpatients. The choice will be based on the cost effectiveness and appropriateness on the basis of antimicrobial susceptibility. The Microbiology Dept. will survey the microbial pattern of commonly encountered infections treated on an OPD basis e.g. Resp. tract. Infections, urinary tract infections, wound and skin infections etc. along with the susceptibility spectrum, so that the most appropriate antibiotic/ chemotherapeutic agent can be made available for the respective infections. Rotation of antibiotics on a periodic basis will be also carried out, when such periodic reporting of prevalence of bacterial (organism) and their susceptibility is made available.
3. **Antibiotic prophylaxis** should be kept to a minimum and only for specified indications. Surgical prophylaxis should not exceed beyond 48 hrs. An **automatic stop** should be introduced in such cases to prevent antibiotic usage for prophylaxis beyond 48 hrs. In indoor patients, switch over from parenteral to oral antibiotics will be made, whenever possible. On similar lines, use of antibiotics for more than 7 days in outpatients should be referred to and endorsed by the Head of the Unit.

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4. Use of **multiple antibiotics (>3) prolonged antibiotic therapy beyond 15 days**, treatment of complicated infections in inpatients, should be monitored by a subcommittee of the Institutional Infection Control Committee (HOD: Medicine, Pharmacology, and Microbiology).
5. **Auditing of antibiotic use** and periodic review is necessary to curb misuse of antibiotics.
6. Proper sterilization of instruments, aseptic procedures and correct use of disinfectants by the nursing staff should be implemented strictly to minimize the incidence of hospital acquired infections esp. in the high areas – ICUs & OTs. A monitoring system should be introduced to check these aspects.
7. Formation of **standard treatment guidelines** for infections, by the respective disciplines, through consensus opinions of various subject experts is mandatory for uniform, standardized treatment. These will be made available in the form of a handbook to every prescriber (including residents).

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PLAN OF ACTION

1. The Microbiology department will conduct short term study on predominant prevalent organisms of the various infections encountered in the various outpatient departments e.g. urinary tract infections, skin, wound infections etc. from the appropriate clinical specimens over a specified period of time for each speciality. The data on prevalence of organisms and their susceptibility pattern both of OPD (previous + current data) and indoor clinical specimens to be made available to the clinical departments.
2. A study of the sensitivity pattern of microorganisms to various antibiotics supplied by the Medical store will be carried out by the Microbiology department at the earliest.
3. On the basis of the above, standard treatment guidelines for the commonly encountered infections will be drawn up by the clinicians for their respective disciplines. These will be submitted in June 2017.
4. The existing lists of antibiotics for OPD use and indoor use and the list of free, monitored, restricted (reserve) antibiotics drawn up by the Pharmacology Department, will be revised if necessary on the basis of the information obtained from the Microbiology Dept. and the standard treatment guidelines.

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RECOMMENDATIONS

- It is recommended that all antimicrobials that form a part of standard treatment protocol for infection control, be made available.
- To curb infections any policy for antimicrobial use will not work well, if potential sources of infections are not minimized. Hence adequate budgetary allocation and proper distribution is necessary for sufficient linen. E.g. operation theatre paraphernalia, gloves, gowns, caps, masks, slippers, antiseptic soap, adequate sterilization measures, pre sterilized instruments etc.

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CURRENT POLICY

At present twenty antibiotics are freely available for general use in all outpatient departments. These are co-trimoxazole, amoxycillin, amoxyclav, erythromycin, doxycycline, nitrofurantoin, ciprofloxacin, norfloxacin, ofloxacin, levofloxacin, cefixime, cefdinir, cefpodoxime, cephalexin, cloxacillin, penicillin V, benzathine penicillin, clindamycin, metronidazole and tinidazole. Three antibiotics namely azithromycin, amikacin and gentamicin are available for specific indications in outpatients demand. Piperacillin-tazobactam, imipenem, meropenem, teicoplanin, vancomycin, colestin, linezolid, daptomycin, polymyxin B, tigecycline will be available for restricted use for the treatment of specific conditions, subject to antimicrobial testing and will be dispensed only against the signature of the Head of the Unit. In addition speciality specific formulations e.g. antibiotic syrups in paediatrics, ointments for Dermatology and eye/ear drops for Ophthalmology and ENT are available in the Out Patient Department. Antibiotic use for more than 7 days in the OPD case will be reviewed by the Head of the Unit.

In addition to these, twelve other antibiotics (barring antifungal agents, specific chemotherapeutic agents for tuberculosis, leprosy, malaria, helminthiasis etc.) are available for use in inpatients. Reserve antibiotics are made available only against antimicrobial indications in individual patients or on the basis of culture sensitivity reports. Antibiotics for prophylaxis will be kept to a minimum and in case of antibiotics given by the intravenous route change to the oral route will be made as early as possible in clinically stable patients. Hospital Infection

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control committee members will take decision on training and monitoring of disinfectant use in wards and operation theatres.

An antibiotic usage review is taken on an annual basis. Drug audit will be carried out periodically.

Standard treatment guidelines have been drawn up for commonly encountered infections by the various specialities (list attached). Most of the first line drugs for systemic use are available. These specific treatment guidelines will be made available in the form of hand-book to every department and specific treatment guideline relevant to the clinical speciality will be dispensed in the wards.

The antimicrobial sensitivity testing will be carried out against clinically relevant antibiotics specified for different types of infections (list attached), both for first-line and alternate drugs. This data will be reviewed at the end of 6 months, for changes if necessary in the antibiotic policy laid down for the treatment of various infections and for the rotation of antibiotics.

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LIST OF ANTIBIOTICS TO BE USED FOR ANTIMICROBIAL TESTING:

OPD infections:

Urinary tract infections (UTI) (Urine sample):

Amoxycillin, Norfloxacin, Co-trimoxazole, Nitrofurantoin

Upper respiratory tract infections (URTI) (Throat swab)

Amoxicillin, doxycycline, co-trimoxazole, erythromycin, ciprofloxacin, cephalexin

Minor wound infections (Pus sample)

Amoxicillin, cloxacillin, co-trimoxazole

Gynaecological infections (Vaginal swabs)

Co-trimoxazole, amoxicillin, doxycycline, norfloxacin, metronidazole (for anaerobes)

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Indoor infections:

Urinary tract infections:

Norfloxacin, co-trimoxazole, amoxicillin, gentamycin, amikacin, ceftriaxone (reserve), vancomycin (reserve), Imipenem (reserve), piperacillin- tazobactam (reserve)

Lower respiratory tract infections: Chronic obstructive pulmonary disease with secondary infections, pneumonia

Amikacin, gentamicin, erythromycin, ciprofloxacin, cefotaxime, ceftazidime, Imipenem (reserve), piperacillin- tazobactam (reserve)

CNS infections: e.g. meningitis

Penicillin, amoxicillin, chloramphenicol, cefotaxime, cefoperazone, ceftazidime, ceftriaxone, vancomycin (reserve)

Post-operative and severe wound infections:

Amoxicillin, cloxacillin, ciprofloxacin, amikacin, gentamicin, cefoperazone, ceftazidime, cefotaxime, vancomycin (reserve-eye), roxithromycin

Septicemia:

Cefotaxime, amikacin, ciprofloxacin, piperacillin, carbenicillin, cloxacillin, ceftazidime, vancomycin (reserve), imipenem (reserve),

In addition for infective endocarditis, benzyl penicillin and gentamicin.

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Gastro intestinal infections:

Amoxicillin, norfloxacin, co-trimoxazole, furazolidine, gentamicin, tetracycline, chloramphenicol, cefotaxime

Enteric fever:

Ciprofloxacin, chloramphenicol, gentamicin, amikacin, ceftriaxone, amoxicillin, imipenem (reserve)

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1) MEDICINE

Clinical condition		Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1.	Urinary tract infection (UTI)	Nitrofurantoin 100mg orally BD for 7 days Cotrimoxazole 960mg 12 hourly for 3-5 days Amikacin 1g OD IM/IV Gentamicin 7mg/kg/d OD IM or IV Norfloxacin 400mg BD for 7 days	Piperacillin-Tazobactam 4.5g IV 6 hourly OR Imipenem 1g IV 8 hourly OR Ofloxacin 200-400mg 12 hourly OR Vancomycin 15 mg/kg IV 12 hourly	Get urine cultures before antibiotics & modify therapy based on sensitivities. Monitor renal function if aminoglycoside is used
2.	Upper respiratory tract infections	Azithromycin 500mg od for 3 days OR Roxithromycin 300mg od for 5 days Ciprofloxacin 500mg orally 12 hourly for 3-5 days Cefazolin 2gm IV stat Cotrimoxazole 960mg 12 hourly	Amoxyclav 625mg 1-1-1 for 7 days Cefixime CV 200mg 1-0-1 for 7 days OR Teicoplanin 6-30 mg/kg/day IV OR Cefotaxime 1-2gm 6-8 hourly	

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		for 3-5 days		
3.	Lower respiratory tract infection	Amikacin 15mg/Kg/day q 8-12 hours IV Gentamicin 7.5mg/kg/day OD i.m or i.v for 10 days Inj. Amoxyclav 1gm 1-0-1 for 7 days Cefotaxime 500mg 1-1-1 for 7 days Roxithromycin 300mg I.V. 1-0-1 Cefazoline 0.52 gm 6-8 hourly IV Ciprofloxacin 500mg 12 hourly Doxycycline 100mg 12 hourly orally	Imipenem 1g IV 8hourly OR Meropenem 1g IV 8hourly Piperacillin - Tazobactam 4.5gm IV 8 hourly for 7-10 days. Ofloxacin 200-400mg orally 12 hourly Vancomycin 15mg/kg IV 12 hourly	Amikacin max doses 1.5mg/Kg If atypical pneumonia suspected, Doxycycline 100mg bd
4.	Enteric fever	Ceftriaxone 1gm IV 8 hours Till afebrile then 1gm 1-0-1 for 7 days Chloramphenicol 500mg qid orally Ciprofloxacin 750mg 12 hourly	Ofloxacin 15mg/kg/d in two divided doses. Meropenem 1gm IV 8 hourly till afebrile then 12 hourly for 7 days.	Change empiric regimen based on susceptibility testing. Duration of treatment: 10-14 days. Antibiotic therapy should be continued till one week post-fever defervescence

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5.	Septicemia	Amikacin 15mg/Kg/day q 8-12 hours IV Gentamicin 1mg/kg IM or IV 8 hourly Ceftriaxone 1gm 8 hourly Ciprofloxacin 400 mg IV 12 hourly	Imipenem 1g IV 8hourly OR Meropenem 1g IV 8hourly Piperacillin - Tazobactam 4.5gm IV 8 hourly for 7-10 days. Ofloxacin 15mg/kg/d in two divided doses Vancomycin 15mg/kg IV 12 hourly Teicoplanin 6-30 mg/kg/day IV	
6.	Pyrexia of unknown origin (PUO)	Ceftriaxone 2gm IV orally 24 hourly OR Cefotaxime 50mg/kg/dose 6 hourly IV Amikacin 15mg/Kg/day 8-12 hourly IV		

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7.	VAP (Ventilator Associated Pneumonia)	Piperacillin-tazobactam 4.5g IV 6 hourly Amikacin 20mg/Kg/day 8-12 hourly IV Gentamicin 7mg/kg/d IM or IV 8 hourly Tobramycin 7mg/kg/d Ciprofloxacin 400 mg 8 hourly Levofloxacin 750 mg daily Vancomycin 15 mg/kg 12 hourly Imipenem 1g IV 8hourly	Meropenem 1g IV 8hourly OR Teicoplanin 6-30 mg/kg/day IV	
8.	Meningitis	Ceftriaxone 1-2 gm 12-24 hourly IV Cefotaxime 1-2 gm 6-8 hourly IV Amikacin 20mg/Kg/day 8-12 hourly IV Gentamicin	Vancomycin 15 mg/kg 12 hourly Meropenem 2gm IV 8 hourly	

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		7mg/kg/d IM or IV 8 hourly for 10-14 days		
9.	Diarrhoea / Dysentery	Doxycycline 300 mg oral stat only for Cholera Norfloxacin 200-400mg 12 hourly orally Gentamicin 1mg/kg IM or IV 8 hourly Rifaximin 200mg 1-0-1 for 5 days Amikacin 15mg/Kg/day q 8-12 hours IV	Ceftriaxone 2 gm IV OD for 5 days Ofloxacin 200-400mg 12 hourly	
10	Empiric therapy of suspected Gram positive infections	Cefazolin 2 g IV q8h Or Cloxacillin 2 g IV q6h	Amoxicilin-clavulanate 1.2 g IV q8h or Penicillin G 20 laks IV q4h (if <i>S.aureus</i> excluded) or Vancomycin (if anaphylactic penicillin allergy or MRSA)	Adjust regimen after receipt of culture and susceptibility data. Duration of treatment will depend on final diagnosis.

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			clinically possible)	
11	Empiric therapy for suspected Gram negative infections (eg pyelonephritis or intra-abdominal infections)	Piperacillin-tazobactam 4.5 g IV q6h or Cefoperazone-sulbactam 3 g IV q12h	Imipenem 1 g IV q8h or Meropenem 1 g IV q8h or Ertapenem 1 g IV od (carbapenems preferred for more seriously ill patients)	Separate anaerobic coverage unnecessary for IAI, when using BL-BLIs or carbapenems. De-escalate to ciprofloxacin, co-trimoxazole or third generation cephalosporin if isolate is sensitive. Duration of treatment: 10-14 days for pyelonephritis, 4-7 days for IAI.
12	Rickettsial infections	Doxycycline 100 mg po or IV bd	Azithromycin 500 mg po or IV od, chloramphenicol 500mg qid	Duration of treatment: 7 days
13	Leptospirosis	Penicillin G 20 laks IV q4h or Doxycycline 100 mg po or IV bd	Ceftriaxone 2 g IV od	Duration of treatment: 7 days
14	Vivax malaria	Chloroquine 25 mg/kg body weight divided	Artemether-lumefantrine (1 tab bd for 3	Followed by primaquine (0.25 mg/kg daily for 14

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		over three days i.e. 10 mg/kg on day 1, 10 mg/kg on day 2 and 5 mg/kg on day 3.	days)	days)
15	Falciparum malaria	Artesunate 4 mg/kg body weight daily for 3 days Plus Sulfadoxine (25 mg/kg body weight) and Pyrimethamine (1.25 mg/kg body weight) on first day.	Artemether- lumefantrine (1 tab bd for 3 days)	Followed by primaquine single dose (0.75 mg/kg). All mixed infections should be treated with full course of ACT and primaquine 0.25 mg per kg daily for 14 days.
16	<i>C. difficile</i> Colitis Mild disease	Metronidazole 400 mg orally three times daily for 10 to 14 days	Vancomycin 125 mg orally four times daily	Stop any ongoing antibiotic, if possible. Substitute with low- risk antibiotic if possible. Correction of fluid and electrolyte imbalance
17	<i>C. difficile</i> Colitis Severe disease	Vancomycin 125 mg orally four times daily for 10 to 14 days, can be increased to 500 mg 4 times daily	If not able to tolerate oral vancomycin, vancomycin retention enema (500 mg in 100 ml normal saline given six hourly	Monitor organ function closely; Consider surgery for severe persistent symptoms, toxic megacolon, severe ileus, or peritonitis.

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) with intravenous metronidazole 500 mg 8 hourly.	
18	Cholera	Doxycycline 300 mg PO stat	Azithromycin 1 gm PO stat or Ciprofloxacin 500 mg BD for 3 days	Rehydration (oral/IV) essential Antibiotics are adjuvant therapy
19	Bacterial dysentery	Ceftriaxone 2 gm IV OD for 5 days	Azithromycin 1 gm od x 3d	
20	Amoebic dysentery	Metronidazole 500 to 750 mg IV q8h for 7-10 days	Tinidazole 2 gm PO OD for 3 days	Add diloxanide furoate 500 mg tds for 10d
21	Febrile Neutropenia	Ceftazidime (150 mg/kg/day in 3div doses) + Amikacin (15-20mg/kg/day in 2 or 3 div doses)	Piperacillin + Tazobactam (200-300 mg/kg/day IV in 3-4 div doses)+ Vancomycin (40 mg/kg/day IV in 4 divided doses)	if fever persists or ANC remains <200 parenteral therapy should be continued with 2nd line antibiotics

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2. PEDIATRICS

Sr. No.	Clinical condition	Empiric antibiotics/1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Urinary Tract Infection	<p>Parenteral (for pyelonephritis)</p> <p>Inj. Amikacin 15mg/kg/d q24h X 10-14 days</p> <p>OR</p> <p>Inj. Ceftriaxone 75mg/kg/day in divided doses 10-14 days</p> <p>Oral for Uncomplicated UTI</p> <p>Amoxyclav (30-50mg of Amoxicillin) for 7-10 days</p> <p>OR</p> <p>Co-trimoxazole (8-10mg/kg/d of TMP component) orally 12 hourly</p> <p>OR</p> <p>Nitrofurantoin 8mg/kg/d orally</p>	<p>Meropenem 120mg/kg/day 8 hourly</p> <p>Vancomycin 60mg/kg/day 6 hourly for 10-14 days</p> <p>Piperacillin-Tazobactam 300mg/kg/d hourly for 10-14 days</p> <p>Teicoplanin 10mg/kg/day /dose every 12 hours for 3 doses then 10mg/kg/day once daily</p> <p>Ofloxacin 20mg/kg/d 12 hourly</p>	Get urine cultures before antibiotics & modify therapy based on sensitivities

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		6 hourly for 5-7 days		
2	Upper Respiratory Tract Infections	Amoxycillin 40mg/kg/d orally 6-8 hourly for 10 days OR Amoxy-clav (30-50 mg of Amoxicillin) for 7-10 days		
3	Lower respiratory tract infection	Amoxy-clav (30-50 mg of Amoxicillin) for 7-10 days OR Cefotaxime 100mg/kg/d IV 8 hourly for 10-14 days OR Ceftriaxone 100mg/kg/d IV 12 hourly for 10-14 days	Meropenem 120mg/kg/day 8 hourly Vancomycin 60mg /kg/day 6 hourly for 10-14 days Piperacillin-Tazobactam 300mg/kg/d 8 hourly for 10-14 days	
4	Enteric fever	Ceftriaxone 100mg/kg/d IV 12 hourly for 10-14 days OR Cefixime 20mg/kg/d for	Ofloxacin 15mg/kg/d 12 hourly for 10-14 days Azithromycin 20mg/kg/d for 7 days	Antibiotic therapy should be continued till one week post-fever defervescence shift to oral cefixime once fever resolves

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		14 days		
5	Septicemia bacteremia	/ Ampicillin 100- 400mg/kg/d IV 6 hourly OR Ceftriaxone 100mg/kg/d IV 12 hourly for 7- 10 days OR Cefotaxime 150mg/kg/d IV 6-8 hourly for 10- 14 days + Gentamicin 5-7.5mg/kg/d IM or IV 24 hourly for 7-10 days OR Amikacin 15-20mg/kg/d 24 hourly	Meropenem 120 mg/kg/day 8 hourly Vancomycin 60mg /kg/day 6 hourly Piperacillin- Tazobactam 300mg/kg/d 8 hourly Ofloxacin 20mg/kg/d 12 hourly Teicoplanin 10mg/kg/day /dose every 12 hours for 3 doses then 10mg/kg/day once daily	
6	Pyrexia of unknown origin (PUO)	Ceftriaxone 100mg/kg/d IV 12 hourly for 7- 10 days	Piperacillin- Tazobactam 300mg/kg/d 8 hourly	
7	VAP (Ventilator Associated Pneumonia)	Piperacillin- Tazobactam 300mg/kg/d 8		Modify based on culture of lower respiratory tract

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		hourly OR Vancomycin 40-60mg /kg/day 6-8 hourly OR Meropenem 120 mg/kg/day 8 hourly		secretions. Stop antibiotics after 5 days of clinical response
8	Meningitis	Ceftriaxone 100mg/kg/d IV 12 hourly for 10-14 days	Vancomycin 60mg /kg/day 6 hourly for 10-14 days if Staph/ resistant pneumococcal disease suspected.	Discontinue Vancomycin if rapid latex agglutination negative for S. pneumoniae or positive for N. meningitidis, or H. influenza
9	Diarrhoea / Dysentery	Co-trimoxazole (8-10mg/kg/d of TMP component) orally 12 hourly OR Cefixime 8-10 mg/kg/day in divided doses for 5 days Parenteral Ceftriaxone 100mg/kg/d IV		

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		12 hourly for 5-7 days		
10	Infective Endocarditis	Cefotaxime 150mg/kg/d IV 6-8 hourly + Gentamicin 5-7.5mg/kg/d IM or IV 24 hourly	Vancomycin 60mg /kg/day 6 hourly + Gentamicin 5-7.5mg/kg/d IM or IV 24 hourly	
11	Shunt Infection	Vancomycin 60mg /kg/day 6 hourly + Gentamicin 5-7.5mg/kg/d IM or IV 24 hourly		

Clinical condition	Empiric antibiotics/1 st line antibiotics	Alternative antibiotics	Remarks/Comments
EOS including meningitis	Ampicillin 70-100mg/kg/day Gentamicin 5mg/kg/day Duration : 14 days (culture positive sepsis) 21 days (Meningitis)	Piperacillin Tazobactam 100mg/kg/day Amikacin 15mg/kg/day	- Always send Blood for culture and sensitivity testing before starting antibiotics -Modify therapy based on sensitivity -Step antibiotics if blood culture

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			negative in suspected sepsis & baby stable clinically
LOS including meningitis	Piperacillin - Tazobactam Gentamicin 5mg/kg/day Duration - 14 days (culture positive sepsis) 21 days (Meningitis)	Piperacillin - Tazobactam 100mg/kg/day Amikacin 15mg/kg/day	Always send Blood for culture and sensitivity testing before starting antibiotics -Modify therapy based on sensitivity -Step antibiotics if blood culture negative in suspected sepsis & baby stable clinically
Gram Positive	Cloxacillin 50mg/kg/day Gentamicin 5mg/kg/day Duration - 14 days (culture positive sepsis) 21 days (Meningitis)	Meropenem 20mg/kg/dose Vancomycin 10-15 mg/kg/dose	Always send Blood for culture and sensitivity testing before starting antibiotics -Modify therapy based on sensitivity -Step antibiotics if blood culture negative in suspected sepsis & baby stable clinically
Acinetobacter	Meropenem 20mg/kg/dose Gentamicin 5mg/kg/day Duration - 14	Meropenem 20mg/kg/dose	Always send Blood for culture and sensitivity testing before starting antibiotics

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	days (culture positive sepsis) 21 days (Meningitis)		-Modify therapy based on sensitivity -Step antibiotics if blood culture negative in suspected sepsis & baby stable clinically
Pan Resistant	Colistin 25000 units/kg/dose Duration - 14 days (culture positive sepsis) 21 days (Meningitis)		Always send Blood for culture and sensitivity testing before starting antibiotics -Modify therapy based on sensitivity -Step antibiotics if blood culture negative in suspected sepsis & baby stable clinically

MDR organisms (Paediatrics)

Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
MRSA infection	Vancomycin 25-30 mg IV loading followed by 15-20 mg/kg 8-12 Hourly OR Teicoplanin 12 mg/kg x3	Linezolid 600 mg IV/Oral 12 hourly Daptomycin 6mg/kg IV once a day	MRSA strains may be reported as susceptible to Fluoroquinolones, aminoglycosides, chloramphenicol and doxycycline in-vitro, these drugs are NOT

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	<p>doses followed by 6 mg/kg once a day OR Piperacillin – Tazobactam 4.5gm IV 8 hourly</p>		to be used alone or as initial treatment for serious MRSA infections
MDR infections Enterobactericea & non-fermenting GNB	<p>Meropenem 120mg/kg/day divided 8 hourly OR Piperacillin – Tazobactam 4.5gm IV 8 hourly for 7-10 days Ofloxacin 200-400mg orally/IV hourly 12</p>	<p>Colistin base 2.5 – 5 mg/kg/day I/V every 6 – 12 hourly (1mg= 30000 IU) Polymyxin B 15,000-25,000 units/kg/day divided q12hr; not to exceed 25000 units/kg/day Tigecycline 100mg followed by 50mg every 12 hourly infusion over 30-60 minutes</p>	

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3. SURGERY

Sr No	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	UTI	Tab. Nitrofurantoin 100mg 12 hrly OR Tab. Cotriamoxazole DS 12 hrly OR Tab Doxycycline 100 mg 12 hrly OR Inj Amikacin 250 mg IV/IM 12 hrly OR Inj. Gentamicin 5mg/kg IV OD	Inj. Piperacillin with Tazobactam 3.375 IV 6 hourly OR Tab. Ofloxacin 300 mg 12 hourly OR Inj. Imipenam 500 mg IV 6hourly Meropenam 1 gm IV 24 hourly	Can Be Changed According To Urine Culture Sensitivity
2	Skin soft tissue Cellulitis	Tab Cotrimoxazole 12 hrly + Tab Amoxycillin 500 mg Tab Doxycycline 100 mg 12 hrly OR Inj. Clindamycin 600 mg 6 hrly IV	Inj. Vancomycin 15 mg/kg IV 12 hrly	Can Be Changed According To Pus Culture Sensitivity
3	Cutaneous Abcess	Tab Doxycycline 100 mg 12 hrly, Tab Cotrimoxazole DS 12 hrly + Tab Cloxacillin	Inj. Vancomycin 15 mg/kg IV 12 hrly	Can Be Changed According To Pus Culture Sensitivity

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		500 mg 6hrly		
4	Diabetic Foot	Inj. Vancomycin 15 mg/kg IV 12 hrly + Inj. Piperacillin with Tazobactam 3.375 IV 6 hrly + Inj. Metronidazole 500 mg 8 hrly IV		Can Be Changed According To Pus Culture Sensitivity
5	Cholecystitis, cholangitis	Inj. Ceftriaxone 1 gm 12 hrly IV Inj. Piperacillin with Tazobactam 3.375 IV 6 hourly	Severe cases Inj. Imipenam 500 mg IV 6hrly OR Meropenam 1 gm IV 24 hrly + Inj. Metronidazole 500 mg 8 hrly IV	Surgical or endoscopic intervention to be considered if there is biliary obstruction. De-escalate to narrow spectrum agent on receipt of sensitivities.
6	Septicemia/bacteremia	Inj. Ceftriaxone 1 gm 12 hourly IV + Inj. Metronidazole 500 mg 8 hrly IV Inj. Cefotaxim 500 mg IV 6 hrly Inj. Amoxycillin +Clavulanic acid 1.2 gm BD Tab Doxycycline 100 mg 12 hrly,	Inj. Meropenem 2 gm 8 hrly + Inj Vancomycin 1 gm 12 hrly IV, Inj. Piperacillin with Tazobactam 3.375 IV 6 hrly Inj. Teicoplanin 6 mg/kg 12 hrly IV or IM	
7	SSI (Surgical site infection) G.U.T.	Inj Amoxycillin +Clavulanic acid 1.2 gm BD , Inj. Cefotaxim 500 mg IV 6 hrly Inj. Ceftriaxone 1 gm 24 hrly,	Inj. Meropenem 2 gm 8 hrly + Inj Vancomycin 1 gm 12 hrly IV Inj. Piperacillin with Tazobactam	

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		Inj. Pipercillin +Tazobactam 3.375gm every 6 hrly OR 4.5 gm every 8 hrly IV, Tab Doxycycline 100 mg 12 hrly Tab Metronidazole 500 mg 8 hrly IV	3.375 IV 6 hrly Inj. Teicoplanin 6 mg/kg 12 hrly IV or IM	
8	Wound infection	Inj. Amoxycillin +Clavulanic acid 1.2 gm BD Inj. Cetriaxone 1 gm 24 hrly	Inj. Meropenem 2 gm 8 hrly + Inj Vancomycin 1 gm 12 hrly IV Inj.Piperacillin with Tazobactam 3.375 iv 6 hrly Inj. Teicoplanin 6 mg/kg 12 hrly IV or IM	
9	Acute prostatitis Chronic bacterial prostatitis	Piperacillin-tazobactam 4.5 gm IV q 6h or Cefoperazone-sulbactam 3 gm IV q 12h or Ertapenem 1 gm IV OD or Ciprofloxacin 750 mg po bid	TMP/SMX DS PO q12h	Obtain urine and blood cultures before antibiotics & switch to narrow spectrum agent based on sensitivities. Treat for 4 weeks. Therapy based on urine and prostatic massage cultures obtained before antibiotics. Treat for 4-6 weeks

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4. OBSTETRICS AND GYNAECOLOGY

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Vaginal delivery: in the following situations: <ul style="list-style-type: none">• Preterm labour (<37 wks)• Prolonged rupture of membranes (>18hrs)• Fever during labour or chorioamnionitis• History of previous baby with GBS infection• Bladder or kidney infection due to GBS	Inj. Cefotaxime 2gm IV followed by 1 gm IV 4 to 6 hourly till delivery	Inj. Cefazolin 2 gm iv followed by 1 gm 8 hourly till delivery. If allergic then Vancomycin 1 gm iv till delivery	Not recommend routinely for normal vaginal delivery. Delivery is considered akin to drainage of an abscess as the fetus and placenta is removed which are the nidus of infection
2	3rd or 4th degree Perineal tear	Single dose Cefotaxime OR Ceftriaxone 1 gm IV	Single dose : Inj. Cefazoline 1 gm IV + Inj. Metronidazole 500 mg IV OR	Prophylaxis is considered to prevent adverse outcomes arising from infection e.g.

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			Single dose of Inj.Cefuroxime 1.5gm+ Inj. Metronidazole 500 mg IV OR Inj.Amox+ Clavulanic acid 1.2 gm IV If allergic, single dose IV clindamycin 600- 900mg	fistulas
3	Preterm pre-labour rupture of membranes	IV Cefotaxime 2gm followed by 1gm 4-6 hourly for 48 hours followed by cefixime 200mg 8 hourly for 5 days + oral Erythromycin 333mg 8 hourly for 7 days	If Erythromycin 333 mg not available, use Erythromycin stearate 250 mg 6 hourly for 7days	
4	Caesarean delivery	Single dose Inj. Cefotaxime 2 gm IV Dose is 3 gm if patient is >100kg	If allergic, single dose clindamycin 600-900mg IV + Gentamicin 1.5 mg/kg IV	Puerperal endometritis is polymicrobial, (aerobic-anaerobic). These organisms are part of vaginal flora and are introduced into the upper genital tract coincident with vaginal examinations

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				during labor and/or instrumentation during surgery Tita et al showed the addition of 500mg azithromycin to cefazolin for (in labour or with membranes ruptured) reduced Endometritis & wound infection significantly (6.1% vs. 12%, p<0.001), endometritis (3.8% vs 6.1%, p=0.02) wound infection (2.4% vs. 6.6% , p<0.001)
5	Rescue cervical encerclage	Inj. Ampicillin 2 gm single dose		To prevent ascending infection from vaginal flora to exposed membranes

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6	Puerperal sepsis/ Septic abortion/ chorioamnionitis	Inj. Piperacillin + Tazobactam 4.5 gm IV 8 hourly for 7 - 14 days	Clindamycin 600-900mg IV 8 hourly + Gentamicin 60 mg IV 8 hourly + Metronidazole 500 mg IV8 hourly OR Ampicillin – Sulbactam 3gm IV 6 hourly	
7	Hysterectomy (AH,VH, Laparoscopic) and surgeries for pelvic organ prolapsed and/or stress urinary incontinence	Inj. Cefotaxime 2gm IV single dose Dose is 3 gm if patient is >100kg	Cefuroxime 1.5gm IV single dose OR if allergic to cephalosporin, Clindamycin 600 -900 mg IV + Gentamicin 1.5 mg/kg IV	
8	Laparoscopy (uterus and/or vagina not entered)/ Hysteroscopy/ ectopic pregnancy	Inj. Cefazolin 1 gm single dose IV	Cefuroxime 1.5 gm single dose IV If allergic use clindamycin 600 mg	
9	Abortions (medical and	Tab. Azithromycin 1gm orally+	Doxycycline 100mg orally	No prophylaxis for missed/

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	surgical)	Tab Metronidazole 800 mg orally at time of abortion	twice daily for 7 days, starting on day of abortion + Metronidazole 800mg orally at time of abortion	incomplete abortion
10	Postoperative Surgical site infection Obstetrics	Inj Amoxycillin + Clavulanic acid 1.2 gm BD + Inj Metronidazole 500mg TDS OR Gentamicin 5mg/kg IV OD + Inj. Metronidazole 500 mg 8 hrly.		
11	HSG	Tab Doxycycline 100 mg orally before procedure		Doxycycline continued for twice daily for 5 days if there is history of PID or fallopian tubes are dilated at procedure

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12	Pelvic Inflammatory disease (mild to moderate)	NACO: Tab. Cefixime 400mg orally stat + Tab. Metronidazole 400mg BD for 14 days + Cap. Doxycycline 100mg BD for 14 days	CDC: Levofloxacin 500mg OD x 14 days OR Ofloxacin 400 mg OD for 14 days with or without Metronidazole 500 mg BD for 14 days OR Ceftriaxone 250 mg IM single dose + Doxycycline 100mg orally BD for 14 days with or without Metronidazole 500mg BD for 14 days	
13	Pelvic Inflammatory disease (severe) eg tubo-ovarian abscess, pelvic abscess,	Inj Cefotetan 2 gm IV BD + Doxycycline 100mg orally or IV BD	Cefoxitin 2gm IV 6 hourly + Doxycycline 100mg orally or IV 12 hourly OR Clindamycin 900mg IV 8 hourly + Gentamicin	An attempt should be made to obtain cultures and deescalate based on that. Duration is two weeks, but can be extended depending upon clinical situation. Antibiotics may

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			loading dose 2gm/kg IV or IM followed by maintaince dose 1.5 mg/kg every 8 hours. Single daily dosing (3- 5mg/kg) can be substituted	be altered after obtaining culture reports of pus/or blood
14	Vaginal candidiasis	Tab Fluconazole 150 mg orally single dose OR local Clotrimazole 500mg vaginal tablet once only	Miconazole, Nystatin, vaginal tablets/creams	Treat for 7 days in pregnancy, diabetes, Recurrent infections: 150 mg Fluconazole on day 1,4,7 then weekly for 6 months
15	Vaginal trichomoniasis	Tab Secnidazole 2gm oral single dose OR Tab Tinidazole 500mg orally BD for 5 days OR Tab.Metronidazole 400 mg BD for 7 days		Alcohol avoided during treatment and 24 hours after metronidazole or 72 hours after completion of tinidazole to reduce possibility of disulfiram-like reaction. Partner treatment essential
16	Bacterial vaginosis	Metronidazole 400 mg BD for 7 days OR	Secnidazole 2gm orally OD for one day OR	Refrain from sexual activity OR use condoms during the

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		Metronidazole gel 0.75% one applicator(5g) intra-vaginal for 5 days OR Clindamycin cream 2% one applicator(5 gm) intra-vaginal for 7 days	Tinidazole 2 gm orally OD for 2 days OR Tinidazole 1 gm orally OD for 5 days OR Clindamycin Orally 300 mg BD for 7 days OR Clindamycin ovules 100mg intravaginally OD HS for 3 days.	treatment. Clindamycin cream is oil-based and might weaken latex condoms
17	UTI Uncomplicated	Tab Nitrofurantoin 50-100 mg for 4 times Tab Ciprofloxacin 500 mg BD for 14 days OR Tab Norfloxacin 400 mg BD for 14 days		
18	Pyelonephritis	Piperacillin with Tazobactam 3.375 IV 6 hourly for 14 days		
19	Asymptomatic bacteruria in pregnancy	Tab Nitrofurantoin 50-100 mg for 4 times		

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20	Cystitis	Tab Nitrofurantoin 50-100 mg for 4 times Tab Ciprofloxacin 500 mg BD for 14 days OR Tab Norfloxacin 400 mg BD for 14 days		
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5. ORTHOPEDICS

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Acute osteomyelitis/ Septic arthritis	MRSA: Inj. Vancomycin 1 gm IV 12 hourly for 21 days Inj. Ceftriaxone IV 12 hourly OR Inj. Amoxiclav 1.2 gm 8 hourly with or without Gentamicin 3 to 5 mg 24 hrly for 21 days.	Inj.Piperacillin with Tazobactam 3.375 IV 6 hourly	If DM then Inj. Ciprofloxacin IV 400mg 12 hrly OR Inj. Gentamicin 5mg/kg IV OD OR Inj. Ceftriaxone 1to 2 gm per day + Inj. Metronidazole 500 mg IV8 hrly
2	Prosthetic implant associated infection	/ Inj. Ceftriaxone + Inj. Vancomycin 1gm 12hrly OR Inj. Teicoplanin 400mg 12 hrly IV OR Inj Clindamycin 600-900 mg 8 hrly		
3	Preop– prophylaxis a) Laminectomy	Inj. Ceftriaxone / Cefotaxime 1to 2gm / day IV or IM+ Inj Gentamicin 5mg/kg IV OD for 3 days		
4	b) THR/TKR	Inj. Vancomycin 15 mg/kg IV 12 hrly Inj. Ceftriaxone / Inj. Cefotaxime 1 to 2 gm/ day IV or IM		

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6. OPHTHALMOLOGY

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Blepharitis Anterior	e/d Chloramphenicol BD for 7 days Tab Azithromycin 500 mg for 3 days		Lid margin care with baby shampoo and warm compress 24 hrly.
	Posterior	Topical e/d Tobramycin 0.5% OR e/d Gentamicin 0.3% Refractory cases Tab Doxycycline 100 mg BD for 1 week then daily for 6 to 12 weeks		Artificial tears if associated with dry eye
2	External Hordeolum (Stye)	Tab Levofloxacin 500 mg/day for 5 days. Tab. Cloxacillin 250-500 mg QID Tab Cephalexin 500 mg QID		Hot fomentation Pus evacuation by epilation.
3	Bacterial conjunctivitis	e/d Gatifloxacin 0.3% e/d Levofloxacin 0.5% e/d Moxifloxacin 0.5% 2 hrly for 1 st 2 days then 4-8 hourly upto 7 days		

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4	Acute bacterial keratitis	e/d Moxifloxacin 0.5% 1 hourly for 48 hrs then as per response	e/d Gatifloxacin 0.3% 1 drop 1 hourly for 48 hrs then reduce as per response	Moxifloxacin t/t may fail against MRSA
5	Acute bacterial infection complicateds (pseudomonas)	e/d Tobramycin 0.5% OR Gentamicin 0.3 % e/d + e/d Piperacillin Or Ticarcillin (6-12 mg/ml) 15-60 min around clock 24-72 hr , then slowly reduce frequency	e/d Ciprofloxacin 0.3% or e/d Levofloxacin 0.5%	
6	Orbital Cellulitis	Inj.Cloxacillin 2gm IV 4 hrly + Inj. Ceftriaxone 2 gm IV 24 hrly + Inj. Metronidazole 1 gm IV 12hrly	If allergic to Penicillin then Vancomycin 1 gm IV 12 hrly + Levofloxacin 750 mg IV od + Metronidazole 1 gm 24 hrly	If MRSA is suspected substitute Cloxacillin with Vancomycin
7	Endophthalmitis Bacterial	Immediate ophthalmology consultation. Immediate vitrectomy + intravitreal antibiotics (Inj vancomycin + Inj Ceftazidime)	Adjuvant systemic (doubtful value in post cataract surgery endophthalmitis)	

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		<p>Intravitreal antibiotics . Inj. Vancomycin+ Inj Ceftazidime + systemic antibiotics Inj. Meropenam 1 gm IV 8 hrly OR Inj. Ceftriaxone 2gm IV 24 hrly + Inj. Vancomycin 1 gm IV 12 hrly</p>	<p>Inj Vancomycin + Inj Meropenam</p>	
8	Cataract Sx	<p>Tab. Ciplox 500mg BD for 5 days e/d Ciprofloxacin 0.3% OR e/d Moxifloxacin 0.5% QID</p>		
9	Acute Dacryocystitis	<p>Tab. Amoxicillin and Clavulinic acid 625 mg 12 hourly e/d Moxifloxacin 0.5% 8 hourly</p>		

ANTI - VIRAL AND ANTI - FUNGAL

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Herpes simplex keratitis	<p>Trifluridine ophthalmic solution 1 drop 2 hour, upto 9 times/ day until re – epithelized then 1 drop 4 hourly upto 5 times / day for duration of 21 days</p>	Ganciclovir 0.15% ophthalmic gel for acute herpetic keratitis	Fluorescein staining shows topical dendritic figures 30 – 50 % re-cure within 2 years

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2	Varicella Zoster ophthalmicus	Famciclovir 500 mg BD Or TID OR Valacyclovir 1 gm oral TID for 10 days	Acyclovir 800 mg 5 times/ day for 10 days	
3	Fungal keratitis	Natamycin5% 1 drop 1- 2 hrly for several days , then 3 – 4 hourly for several days depending on response	Amphotericin B (0.15%) 1 drop , 1- 2 hourly for several days depending on the response	Empirical therapy is not recommended
4	Endophthalmitis Mycotic (Fungal)	Intravitreal Amphotericin B 0.005-0.01 mg in 0.1 ml Systemic therapy : Amphotericin B 0.7 – 1mg / kg + Flucytosine 25 mg/kg QID	Liposomal Amphotericin B 3- 5 mg /kg OR Voriconazole	Duration of treatment 4-6 weeks or longer depending upon clinical response. Patients with Chorioretinitis and ocular involvement other than endophthalmitis often respond to systemically administered antifungal.

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7. ENT

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Acute otitis media	Amoxycillin + Clavulanic Acid (Amoxicillin 45mg/kg/day TDS/50-60mg/kg/day in two divided doses) for 7-10 days Cotrimoxazole 8mg/kg/d 12 hourly		
2	Acute mastoiditis	Cefotaxime 1–2 g i.m./i.v. 6–12 hourly, children 50–100mg/kg/day. Inj.Ceftriaxone 75 mg/kg/day OD		
3	Acute epiglottitis	Cefotaxime 50 mg/kg IV 8 hourly Ceftriaxone 50 mg/kg IV 24 hourly	Levofloxacin 10 mg/kg IV 24 hourly	
4	Acute tonsillitis/ Pharyngitis	Penicillin V oral x10 days OR	Penicillin allergic, Clindamycin	

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		Benzathine Penicillin 1.2 MU IM x 1 dose OR Cefdinir or cefpodoxime x 5 days	300-450 mg orally 6-8 hourly x 5 days. Azithromycin clarithromycin are alternatives.	
5	Head and neck space infections	Clindamycin 600 mg IV q8h or Amox-clav 1.2 gm IV/PO q8h	Piperacillin-tazobactam 4.5 gm IV q 6h	Duration: At least 1 week
6	Acute sinusitis	Amox-clav 1.2 gm IV/PO q8h for 7 days	Piperacillin-tazobactam 4.5 gm IV q 6h	Exclude fungi (Aspergillus, Mucor)
7	Acute bronchitis (Viral)			Antibiotics not required
8	Ludwig's angina Vincent's Angina	Clindamycin 600mg IV 8 hourly or Amoxicillin clavulanate 1.2 gm IV	Piperacillin tazobactam 4.5 gm IV 6 hourly	10-14 days and then can be prolonged based on response.

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8. SKIN

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Cellulitis	Amoxicillin-Clavulanate 1.2gm IV TDS/625 mg oral TDS OR Ceftriaxone 2gm IV OD	Clindamycin 600-900mg IV TDS	Treat for 5-7 days.
2	Furunculosis	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
3	Necrotizing fasciitis	Piperacillin-Tazobactam 4.5gm IV 6hourly AND Clindamycin 600-900mg IV 8 hourly Duration depends on the progress	Imipenem 1g IV8hourly OR Meropenem 1gm IV 8hourly AND Clindamycin 600-900mg IV TDS	Early surgical intervention crucial
4	Impetigo and skin soft-tissue infections	Clindamycin 300-400 mg qid PO	Amoxicillin-clavulanate 875/125 mg bid po	Local: Mupirocin ointment Apply to lesions bid

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9. RESPIRATORY MEDICINE

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	Lower respiratory tract infection	Amoxicillin clavulanate 1.2 g IV TDS OR Ceftriaxone 2g IV OD Cotrimoxazole 960mg 12 hourly Azithromycin 500 mg once daily orally/ IV for 3-5 days Doxycycline 100mg 12 hourly orally Gentamicin 7.5mg/kg/day OD i.m or i.v for 10 days Amikacin 15mg/Kg/day q 8-12 hours IV	- Piperacillin – Tazobactam 4.5gm IV 8 hourly for 7-10 days. Imipenem 1g IV 8hourly OR Meropenem 1g IV 8hourly Vancomycin 15mg/kg IV 12 hourly Teicoplanin 6-30 mg/kg/day IV 3 doses 12 hourly then 24h	Amikacin max doses 1.5mg/Kg If atypical pneumonia suspected, Doxycycline 100mg bd
2	VAP (Ventilator Associated Pneumonia)	Ceftriaxone 2g IV once daily for 5-7 days Amikacin 15mg/Kg/day q 8-12 hours IV Gentamicin		Modify based on culture of lower respiratory tract secretions. Stop antibiotics after 5 days of clinical

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		<p>7.5mg/kg/day OD i.m or i.v for 10 days</p> <p>Piperacillin – Tazobactam 4.5gm IV 8 hourly for 7-10 days</p> <p>Imipenem 1g IV 8hourly or</p> <p>Meropenem 1g IV 8hourly</p> <p>Vancomycin 15mg/kg IV 12 hourly</p>		response
3	Lung abscess	<p>Piperacillin-Tazobactam 4.5gm IV 6 hourly</p>	ADD Clindamycin 600-900mg IV 8 hourly	3-4 weeks treatment required
4	Acute bacterial exacerbation of COPD	<p>Amoxicillin-clavulanate 1gm oral BD for 7 days</p>	Azithromycin 500 mg oral OD × 3 days	

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10.MDR organisms

Sr no	Clinical condition	Empiric antibiotics/ line antibiotics	Alternative antibiotics	Remarks/Comments
1	MRSA infection	Vancomycin 25-30 mg IV loading followed by 15-20 mg/kg 8-12 Hourly Teicoplanin 12 mg/kg x3 doses followed by 6 mg/kg once a day Piperacillin – Tazobactam 4.5gm IV 8 hourly	Linezolid 600 mg IV/Oral 12 hourly Daptomycin 6mg/kg IV once a day	MRSA strains may be reported as susceptible to Fluoroquinolones, aminoglycosides, chloramphenicol and doxycycline in vitro, these drugs are NOT to be used alone or as initial treatment for serious MRSA infections
2	MDR infections Enterobactericea & non-fermenting GNB	Imipenem 1g IV 8hourly or Meropenem 1g IV 8hourly Piperacillin – Tazobactam 4.5gm IV 8 hourly for 7-10 days Ofloxacin 200-400mg orally/IV 12 hourly	Colistin base 2.5– 5mg/kg /day I/V every 6 – 12 hourly(1mg= 30000 IU) Polymyxin B 15,000-25,000 units/kg/day divided q12hr; not to exceed 25,000 units/kg/day Tigecycline 100mg followed by 50mg every 12 hourly infusion over 30-60 minutes	

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ANTIMICROBIAL AGENTS THAT REQUIRE DOSAGE ADJUSTMENT OR ARE CONTRAINDICATED IN PATIENTS WITH RENAL OR HEPATIC IMPAIRMENT

Dosage Adjustment Needed in Renal Impairment	Acyclovir, amantadine, aminoglycosides, aztreonam, carbapenems, cephalosporins (except ceftriaxone), clarithromycin, colistin, cycloserine, daptomycin, didanosine, emtricitabine, ethambutol, ethionamide, famciclovir, fluconazole, flucytosine, foscarnet, ganciclovir, lamivudine, penicillins (except nafcillin & dicloxacillin), pyrazinamide, quinolones (except moxifloxacin), rimantadine, stavudine, telavancin, telbivudine, telithromycin, tenofovir, terbinafine, trimethoprim-sulfamethoxazole, valacyclovir, vancomycin, zidovudine
Contraindicated in Renal Impairment	Cidofovir, methenamine, nalidixic acid, nitrofurantoin, sulfonamides (long-acting), tetracyclines (except doxycycline & possibly minocycline)
Dosage Adjustment Needed in Hepatic Impairment	Amprenavir, atazanavir, chloramphenicol, clindamycin, erythromycin, fosamprenavir, indinavir, metronidazole, rimantadine, tigecycline, isoniazid, rifampin
Contraindicated in Hepatic Impairment	Erythromycin estolate, tetracyclines, pyrazinamide, nalidixic acid, talampicillin, pefloxacin

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CHOICE OF DRUGS FOR COMMON PROBLEMS DURING PREGNANCY

Drug class	Unsafe/ safety uncertain	Safer alternative
Antibacterials (systemic bacterial infections)	Cotrimoxazole, Fluoroquinolones, Tetracycline , Doxycycline, Chloramphenicol , Gentamicin, Streptomycin, Kanamycin , Tobramycin, Clarithromycin, Azithromycin, Clindamycin, Vancomycin, Nitrofurantoin	Penicillin G, Ampicillin Amoxicillin-clavulanate Cloxacillin, Piperacillin Cephalosporins Erythromycin
Antitubercular	Pyrazinamide, Streptomycin	Isoniazid, Rifampicin, Ethambutol
Antiamoebic	Metronidazole, Tinidazole Quiniodochlor	Diloxanide furoate, Paromomycin
Antimalarial	Artemether, Artesunate Primaquine	Chloroquine, Mefloquine, Proguanil Quinine (only in 1st trimester), Pyrimethamine + Sulfadoxine (only single dose)
Anthelmintic	Albendazole, Mebendazole, Ivermectin, Pyrantel pamoate, Diethylcarbamazine	Piperazine Niclosamide Praziquantel

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Antifungal (superficial and deep mycosis)	Amphotericin B, Fluconazole Itraconazole , Ketoconazole, Griseofulvin, Terbinafine	Clotrimazole Nystatin Topical Tolnaftate
Antiretroviral (HIV-AIDS)	Didanosine, Abacavir, Indinavir Ritonavir, Efavirenz	Zidovudine, Lamivudine, Nevirapine, Nelfinavir, Saquinavir
Antiviral (other than HIV)	Acyclovir, Ganciclovir Foscarnet, Amantadine Vidarabine , α -interferon	

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ANTIMICROBIAL AGENTS THAT ARE SAFE OR ARE CONTRAINDICATED IN BREASTFEEDING WOMEN

Safe in ordinary doses	Albendazole, Antifungal drugs (topical), Cephalosporins, Cloxacillin, Erythromycin, Ethambutol, Gentamicin, Mebendazole, Niclosamide, Piperacillin, Piperazine, Praziquantel, Pyrantel, Pyrazinamide
Used with special precaution	Acyclovir, Aminoglycosides, Ampicillin/Ampoxicillin, Chloroquine, Clindamycin, Clofazimine, Cotrimoxazole, Dapsone, Isoniazid, Mefloquine, Metronidazole, Nalidixic acid, Nitrofurantoin, Penicillins, Pyrimethamine-sulfadoxine, Quinidine, Rifampin, Streptomycin, Sulfonamides, Tinidazole, Vancomycin
Drugs contraindicated	Azithromycin, Chloramphenicol, Ciprofloxacin, Cyclosporine, Fluconazole, Itraconazole, Ketoconazole, Methotrexate, Norfloxacin, Tetracyclines

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RECOMMENDED ANTIMICROBIALS IN GERIATRIC PATIENTS

Drugs to be Avoided	Reasons	Safer alternatives
Antibiotics Penicillins Cephalosporins Fluoroquinolones Nitrofurantoin	Because of the decline in renal functions in elderly, half-life of these antibiotics is prolonged. Elderly are very sensitive to peripheral neuritis and pulmonary reaction caused by nitrofurantoin. Gatifloxacin may cause episodes of hypo- as well as hyperglycaemia (caution- diabetes)	Use of ceftriaxone cefoperazone, which are excreted through bile, could be alternatives. Some trials indicate that half life of tobramycin is not prolonged in elderly. This could be other alternative. Otherwise dose adjustment of these drugs is needed.

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DRUG INTERACTIONS IN DIABETES MELLITUS

Sulfonamides	Enhance sulfonylureas action (may precipitate hypoglycaemia) by displacing protein bound drug
Ketoconazole,	Enhance sulfonylureas & pioglitazones action (may precipitate hypoglycaemia) by inhibiting metabolism
Sulfonamides,	Enhance sulfonylurea action (may precipitate hypoglycaemia) by inhibiting metabolism
Chloramphenicol	Enhance sulfonylurea action (may precipitate hypoglycaemia) by inhibiting metabolism
Rifampicin	Induce metabolism, decrease action of sulfonylurea & pioglitazones (vitiate diabetes control)

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EMPIRIC ANTIMICROBIAL THERAPY BASED ON MICROBIOLOGICAL ETIOLOGY

Suspected or Proven Disease or Pathogen	Drugs of First Choice	Alternative Drugs
Gram-negative cocci (aerobic)		
Moraxella (Branhamella) catarrhalis	TMP-SMZ, cephalosporin (second- or third-generation)	Quinolone, 3 macrolide4
Neisseria gonorrhoeae	Ceftriaxone, cefixime	Spectinomycin, azithromycin
Neisseria meningitidis	Penicillin G	Chloramphenicol, ceftriaxone, cefotaxime
Gram-negative rods (aerobic)		
E coli, Klebsiella, Proteus	Cephalosporin (first- or secondgeneration), TMP-SMZ	Quinolone, aminoglycoside
Enterobacter, Citrobacter, Serratia	TMP-SMZ, quinolone, Carbapenem	Antipseudomonal penicillin, aminoglycoside, cefepime
Shigella	Quinolone	TMP-SMZ, ampicillin, azithromycin, ceftriaxone
Salmonella	Quinolone, ceftriaxone	Chloramphenicol, ampicillin, TMP-SMZ
Campylobacter jejuni	Erythromycin or azithromycin	Tetracycline, quinolone
Brucella species	Doxycycline + rifampin or Aminoglycoside	Chloramphenicol + aminoglycoside or TMP-SMZ
Helicobacter pylori	Proton pump inhibitor + amoxicillin + clarithromycin	Bismuth + metronidazole + tetracycline + proton pump Inhibitor
Vibrio species	Tetracycline	Quinolone, TMP-SMZ

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Pseudomonas aeruginosa	Antipseudomonal penicillin ± Aminoglycoside	Antipseudomonal penicillin ± quinolone, cefepime, ceftazidime, antipseudomonal carbapenem, or aztreonam ± aminoglycoside
Burkholderia cepacia (formerly Pseudomonas cepacia)	TMP-SMZ	Ceftazidime, chloramphenicol
Stenotrophomonas maltophilia (formerly Xanthomonas maltophilia)	TMP-SMZ	Minocycline, ticarcillin-clavulanate, tigecycline, ceftazidime, quinolone
Legionella species	Azithromycin or quinolone	Clarithromycin, erythromycin
Gram-positive cocci (aerobic)		
Streptococcus pneumoniae	Penicillin	Doxycycline, ceftriaxone, antipneumococcal quinolone, macrolide, linezolid
Streptococcus pyogenes (group A)	Penicillin, clindamycin	Erythromycin, cephalosporin (first-generation)
Streptococcus agalactiae (group B)	Penicillin (± aminoglycoside)	Vancomycin
Viridans streptococci	Penicillin	Cephalosporin (first- or third-generation), vancomycin
Staphylococcus aureus		
B-Lactamase negative	Penicillin	Cephalosporin (first-generation), vancomycin
B-Lactamase positive	Penicillinase-resistant penicillin	As above

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Methicillin-resistant	Vancomycin	TMP-SMZ, minocycline, linezolid, daptomycin, tigecycline
Enterococcus species	Penicillin ± aminoglycoside	Vancomycin ± aminoglycoside
Gram-positive rods (aerobic)		
Bacillus species (non-anthracis)	Vancomycin	Imipenem, quinolone, clindamycin
Listeria species	Ampicillin (± aminoglycoside)	TMP-SMZ
Nocardia species	Sulfadiazine, TMP-SMZ	Minocycline, imipenem, amikacin, linezolid
Anaerobic bacteria		
Gram-positive (clostridia, Peptococcus, Actinomyces, Peptostreptococcus)	Penicillin, clindamycin	Vancomycin, carbapenem, chloramphenicol
Clostridium difficile	Metronidazole	Vancomycin, bacitracin
Bacteroides fragilis	Metronidazole	Chloramphenicol, carbapenem, β -lactam– β -lactamase inhibitor combinations, clindamycin
Fusobacterium, Prevotella, Porphyromonas	Metronidazole, clindamycin, penicillin	As for B fragilis
Mycobacteria		
Mycobacterium tuberculosis	Isoniazid + rifampin + ethambutol + pyrazinamide	Streptomycin, moxifloxacin, amikacin, ethionamide, cycloserine, PAS, linezolid
Mycobacterium leprae		
Multibacillary	Dapsone + rifampin + clofazimine	
Paucibacillary	Dapsone + rifampin	

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Mycoplasma pneumoniae	Tetracycline, erythromycin	Azithromycin, clarithromycin, quinolone
Chlamydia		
C trachomatis	Tetracycline, azithromycin	Clindamycin, ofloxacin
C pneumoniae	Tetracycline, erythromycin	Clarithromycin, azithromycin
C psittaci	Tetracycline	Chloramphenicol
Spirochetes		
Borrelia recurrentis	Doxycycline	Erythromycin, chloramphenicol, penicillin
Borrelia burgdorferi		
Early	Doxycycline, amoxicillin	Cefuroxime axetil, penicillin
Late	Ceftriaxone	
Leptospira species	Penicillin	Tetracycline
Treponema species	Penicillin	Tetracycline, azithromycin, ceftriaxone
Fungi		
Aspergillus species	Voriconazole	Amphotericin B, itraconazole, caspofungin
Blastomyces species	Amphotericin B	Itraconazole, fluconazole
Candida species	Amphotericin B, echinocandin	Fluconazole, itraconazole, voriconazole
Cryptococcus	Amphotericin B ± flucytosine (5-FC)	Fluconazole, voriconazole
Coccidioides immitis	Amphotericin B	Fluconazole, itraconazole, voriconazole, osaconazole
Histoplasma capsulatum	Amphotericin B	Itraconazole
Mucoraceae (Rhizopus, Absidia)	Amphotericin B	Posaconazole
Sporothrix schenckii	Amphotericin B	Itraconazole

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