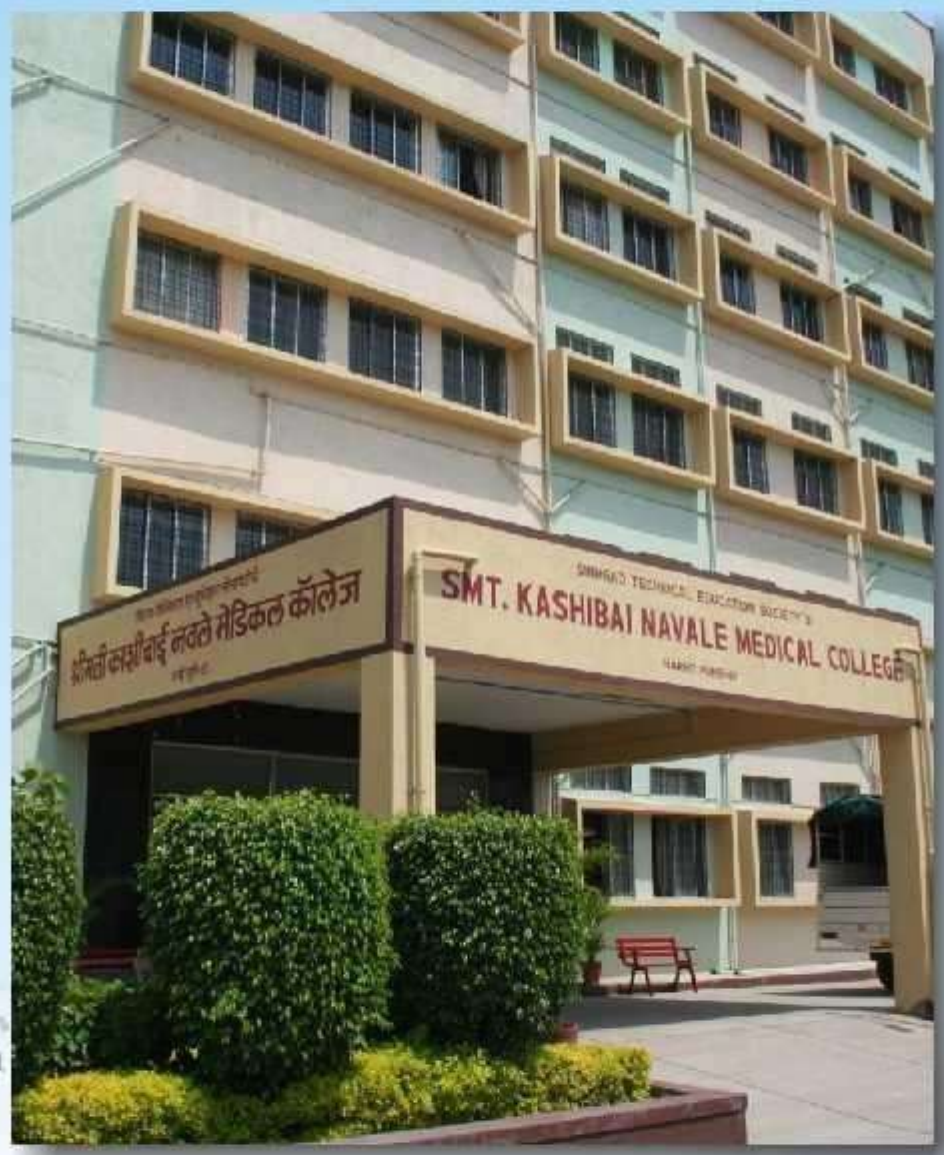
Smt. Kashibai Navale Medical College & General Hospital, Narhe, Pune.

ANTIBIOTIC POLICY



WHO : Seven Steps of Hand Washing

Rub palms together.

Rub the back of both hands.

Interface fingers and rub hands together.

Interlock fingers and rub the back of Fingers of both hands.

Rub thumb in a rotating manner Followed by the area between Index finger and thumb for both hands.

Rub fingertips on palm for both hands

Rub both wrists in a rotating manner.
Rinse and dry thoroughly.

SMT. KASHIBAI NAVALE MEDICAL COLLEGE & GH
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FOREWORD

Dr. Arvind V. Bhore
MBBS MD (Microbiology)
Director
Smt. Kashibai Navale Medical College
& General Hospital

Antimicrobial resistance has become a matter of great concern, globally as well as in our country. This document will definitely help to restrict inappropriate use of antimicrobial agents, optimize selection, dose,route& duration of treatment for best outcomes.

The Reviewed Antibiotic Policy prepared by the Department of Microbiology & Department of Pharmacology will help to cater better services to the IPD & OPD patients of SKNMC&GH.

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I wish that the policy will be implemented successfully by using antibiotics judiciously.

FOREWORD

Dr.Krishnakant Patil
MBBS MD(Physiology)
DEAN
Smt. Kashibai Navale Medical College &
General Hospital

I am happy to know that SKNMC&GH has formulated and Reviewed an "Antibiotic policy", which is based on the National treatment guidelines for antimicrobial use in infectious diseases and data of susceptibility patterns of common pathogens causing infections in hospital.

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 Dept. of Pharmacology & Microbiology for Reviewing the Antibiotic Policy.

ANTIMICROBIAL PRESCRIBING: GOOD PRACTICES

1. Send for the appropriate investigations in all these infections as recommended. These are the minimum required for diagnosis, prognosis and followup of these infections.
2. All antibiotic initiations would be done after sending appropriate cultures
3. Change in antibiotic would be done after sending fresh cultures
4. Follow the Hospital policy when choosing antimicrobial therapy whenever possible.If alternatives as chosen,document the reason in the case records.
5. Check for factors which will affect drug choice & dose, e.g. renal function, interactions, allergy.
6. Check that the appropriate dose is prescribed. If uncertain, contact Infectious disease physician, Pharmacy,or check in the hospital formulary.
7. The need for antimicrobial therapy should be reviewed on a daily basis. For most infections 5-7 days of antimicrobial therapy is sufficient (simple UTIs can be adequately treated with 3 days of antibiotic).
8. All IV antibiotics may only be given for 48–72 hours without review and consideration of oral alternatives. New microbiological or other information (eg fever, defervescence for at least 24h, marked clinical improvement; low CRP) should at this stage often permit a switch to oral antibiotic(s), or switch to an IV narrow spectrum alternative, or cessation of antibiotics (no infection present).
9. Once culture reports are available, the physician shall step down to the narrowest spectrum, most efficacious and most cost effective option. If there is no step down availed, the reason shall be documented and is subjected to clinical audit.
10. Empiric Therapy: Where delay in initiating therapy to await microbiological results would be life threatening or risk serious morbidity, antimicrobial therapy based on a clinically defined infection is justified. Where empiric therapy is used the accuracy of diagnosis should be reviewed regularly and treatment altered/stopped when microbiological results become available.
11. Microbiological samples must always be sent prior to initiating antimicrobial therapy. Rapid tests, such as Gram smears, can help determine therapeutic choices when empiric therapy is required.
12. Prescribing antibiotics just in case an infection is present is rarely justified. Where patients are in hospital close observation is usually a better option.

MONITORING TREATMENT

The continued need for antimicrobial therapy should be reviewed at least daily. For most types of infection treatment should continue until the clinical signs and symptoms of infection have resolved - exceptions to this are indicated in the relevant sections. Parenteral therapy is normally used in seriously ill patients and those with gastrointestinal upset. Oral therapy can often be substituted as the patient improves.

Where treatment is apparently failing, advise from the microbiologist and ID Physician should normally be sought rather than blindly changing to an alternative choice of antimicrobial agent.

THE IMPORTANCE OF INFECTION CONTROL (IC) TO CONTROL ANTIMICROBIAL RESISTANCE

The use of antimicrobial agents inevitably leads to the emergence of resistant micro-organisms. It also destroys the normal flora of the body and renders patients far more susceptible to colonization with micro-organisms introduced from elsewhere in the hospital through the process of cross infection.

Hospitals may be considered as reservoirs and breeding grounds within the world of antibiotic resistance.Prevention of cross infection and good quality antimicrobial prescribing contribute to the prevention of antimicrobial resistance. Infection Control and Clinical Microbiology are inextricably linked. The importance of hand washing in preventing hospital acquired infection and the spread of antibiotic resistant micro-organisms is clear. High standards of hospital cleanliness may be important in controlling the spread of resistant organism in the environment e.g. MRSA, Acinetobacter baumannii. Surveillance is a crucial part of the control of antimicrobial resistance

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ANTIBIOTIC POLICY

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.

POLICY FRAME WORK

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,switchover 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.

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).

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.

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.

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.

ANTIBIOGRAM

Blood Stream Infections(BSI)-IPD Antibiogram(2024)

MICROBIOLOGY DATA (n=1853)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=719)		Linezolid (88.3%), Vancomycin (94.1%), Erythromycin(31.9%), Clindamycin (44.1%), Cotrimoxazole (65.2%), Chloramphenicol (90.2%), Ampicillin(66.7%), Gentamicin(87%), Ciprofloxacin (17.9%), Tetracycline(86.7%), Doxycycline(60%), Penicillin-G (6.2%), Teicoplanin(93.8%), Levofloxacin (28.6%), Daptomycin (72.7%), Gentamicin-High(87.5%)
Enterococcus faecalis	7	
Staphylococcus aureus ss. aureus	68	
Staphylococcus, coagulase negative	9	
Staphylococcus epidermidis	5	
Streptococcus pneumoniae	6	
Streptococcus sp.	5	
Gram Negative Bacteria (n=1052)		Imipenem (51.9%), Meropenem (59.4%), Piperacillin Tazobactam (50%), Ampicillin (48.6%), Amikacin (55.6%), Cefotaxime (43.8%), Ceftriaxone (30.2%), Gentamicin (53.3%), Ceftazidime (60%),Ciprofloxacin (41.1%), Amoxicillin /clavulanic acid (28%), Chloramphinecol (86.2%), Trimethoprim + Sulfamethoxazole (54%), Cefepime (33.3%), Cefuroxime (0%) Colistin (69.4%),
Acinetobacter baumannii	8	
Acinetobacter calcoaceticus-baumannii complex	5	
Bordetella bronchiseptica	1	
Citrobacter koseri	8	
Citrobacter freundii	6	
Enterobacter cloacae	2	
Escherichia coli	14	
Klebsiella pneumoniae ss. pneumoniae	20	

Burkholderia cepacia	2	Ertapenem(37.5%), Tigecycline(81%), Azetronam(33.3%), Levofloxacin (57.1%), Minocycline(88.2%), Cefuroximeaxetil (0%), Ofloxacin(42.9%)
Stenotrophomonas maltophilia	4	
Proteus mirabilis	1	
Salmonella Paratyphi A	4	
Salmonella sp.	10	
Pseudomonas aeruginosa/Sp	15	
Pseudomonas (n=82)		Gentamicin (100%), PolymyxinB/Amikacin (100%), Imipenem (80%), Piperacillin/Tazobactam (94.1%), Sulbactam/Ciprofloxacin (100%), Pipracillin (82.4%), Ceftazidime (76.5%), Meropenem (100%)

Blood Stream Infections(BSI)-ICU Antibiogram(2024)

MICROBIOLOGYDATA (n=440)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=83)		Linezolid (76.5%),Vancomycin (85.7%), Erythromycin (25%), Cotrimoxazole (64.3%), Gentamicin (81.8%), Ciprofloxacin (28.6%), Tetracycline (55.6%), Penicillin-G (11.8%), Teicoplanin (84.2%), Levofloxacin (0%), Gentamicin-High (25%)
Enterococcus sp	15	
Staphylococcus aureus ss. aureus	54	
Staphylococcus, coagulase negative	8	
Staphylococcus haemolyticus	15	
Streptococcus pneumoniae	8	
Gram Negative Bacteria (n=332)		

Acinetobacter sp	5	Imipenem (55%), Meropenem(55%), Piperacillin /Tazobactam (46%), Ampicillin (11%), Amikacin (46%), Cefotaxime (50%), Ceftriaxone (23%), Ciprofloxacin (37%), Amoxicillin/clavulanic acid (23.0) Chloramphinecol (40%), Ofloxacin (57%), Trimethoprim + Sulfamethoxazole (42%), Cefepime (40%), Cefuroxime (60%), Ertapenem (100%), Levofloxacin (0%),
Citrobacter koseri	8	
Citrobacter freundii	5	
Enterobacter cloacae	5	
Escherichia coli	13	
Klebsiella pneumoniae ss. pneumoniae	22	
Burkholderia cepacia complex	8	
Salmonella Typhi	5	
Pseudomonas aeruginosa/Sp	29	
Pseudomonas (n=25)		Imipenem (50%), Piperacillin/Tazobactam (100%), Ciprofloxacin (100%), Pipracillin (75%), Ceftazidime (83%), Meropenem (100%)

Urinary Tract Infections (UTI)-OPD Antibiogram(2024)

MICROBIOLOGYDATA (n=2046)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=336)		Ampicillin (100%), Linezolid (77.8%), Vancomycin (88.1%), Tetracycline (70.6%), Doxycycline (44%), Penicillin-G (2.7%), Teicoplanin(90.0%), Trimethoprim + Sulfamethoxazole (65.7%), Cefoxitin (13.8%), Norfloxacin (23.7%), Nitrofurantoin (92.7%)
Enterococcus sp	19	
Staphylococcus aureus ss. aureus	24	
Staphylococcus, coagulase negative	57	
Gram Negative Bacteria (n=1606)		Gentamycin (77.6%), Ciprofloxacin (46.9%), Tetracycline (63%), Doxycycline (50.8%), Imipenem

Acinetobacter sp.	2	(45.5%), Meropenem (90.2%), Piperacillin /Tazobactam (61.4%), Ampicillin (15.2%), Amikacin(78.9%), Cefotaxime (23.3%), Ceftriaxone(38.9%), Ciprofloxacin (46.9%), Amoxicillin/clavulanic acid (60.7%), Ertapenem (60%), Cefazolin (64.1%), Norfloxacin (59.8%), Nitrofurantoin (71.4%), Ofloxacin (58.4%), Pipracillin (35.3%), Trimethoprim + Sulfamethoxazole (62.3%), Ceftazidime (64.1%), Fosfomycin (92.3%), Cefoxitin (50%), Nalidixic acid (23.1%), Ticarcillin (40%)
Citrobacter koseri	9	
Citrobacter freundii	5	
Escherichia coli	57	
Klebsiella pneumoniae ss. pneumoniae	11	
Proteus vulgaris	2	
Proteus mirabilis	2	
Pseudomonas aeruginosa	12	
Pseudomonas (n=104)		Amikacin(84.6%), Gentamycin (0.0%), Imipenem(0.0%), Piperacillin/Tazobactam(66.7%), Ciprofloxacin(50%), Norfloxacin (61.1%), Pipracillin(35.3%), Ceftazidime(70.6%), Meropenem (73.3%), Colistin (100%)

Urinary Tract Infections (UTI)-IPD Antibiogram(2024)

MICROBIOLOGYDATA (n=4617)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=541)		Amikacin(100%), Ampicillin (52.1%), Amoxycillin/Clavulanic acid (0%), Cefotaxime (100%), Gentamicin(100%), Ciprofloxacin(25%), Tetracycline(30.4%), Doxycycline (46%), Trimethoprim + Sulfamethoxazole (46.7%), Penicillin-G (6.9%), Vancomycin (94.8%), Teicoplanin (95.8%), Linezolid (92.7%), Norfloxacin (20.3%), Nitrofurantoin (84.9%)
Enterococcus sp	62	
Staphylococcus aureus ss. Aureus	17	
Staphylococcus, coagulase negative	21	

Gram Negative Bacteria (n=3856)		Amikacin(62.8%), Gentamicin(60.4%), Tetracycline (63.6%), Doxycycline (27.4%), Imipenem (33.3%), Nitrofurantoin (45.9%), Cefoxitin (42.2%), Meropenem (57.1%), Colistin (80%), Ceftazidime (29.0%), Piperacillin/Tazobactam (40.8%), Ampicillin(5.8%), Ertapenem (54%), Fosfomycin (67.1%), Cefotaxime (10.3%), Cefazolin (15.3%), Ticarcillin (7.3%) Norfloxacin (39.2%), Pipracillin(43.2%), Cefixime (6.7%), Ceftriaxone(16.4%),Ciprofloxacin(21.2%), Amoxicillin/clavulanic acid (31%), Nalidixic acid (12.4%), Ofloxacin(31.1%), Trimethoprim + Sulfamethoxazole (45.8%),
Acinetobacter baumannii	3	
Citrobacter koseri	6	
Citrobacter freundii	5	
Enterobacter cloacae	6	
Escherichia coli	39	
Klebsiella pneumoniae ss. pneumoniae	23	
Proteus mirabilis	4	
Proteus vulgaris	2	
Salmonella typhi	1	
Pseudomonas aeruginosa	11	
Pseudomonas (n=220)		Amikacin(48%), Gentamicin(100%), Ciprofloxacin(28.6%), Imipenem(0%), Meropenem (54.3%), Piperacillin/Tazobactam(56.4%), Norfloxacin (55.9%), Pipracillin(43.2%),Ceftazidime(47.4%), Colistin (100%)

Urinary Tract Infections (UTI)-ICU Antibiogram(2024)

MICROBIOLOGYDATA (n=1242)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=69)		Ampicillin (33.3%), Tetracycline(33.3%), Doxycycline (42.9%), Trimethoprim + Sulfamethoxazole (80%), Cefoxitin (0%), Penicillin-G (0%), Erythromycin(0%), Vancomycin (83.3%), Teicoplanin (90.9%), Linezolid (100%), Clindamycin (100%), Norfloxacin (11.1%), Nitrofurantoin (63.6%), Oxacillin (0%), Ciprofloxacin
Enterococcus sp	80	
Staphylococcus aureus ss. aureus	20	

		(0%), Tigecycline (100%), Levofloxacin (0%)
Gram Negative Bacteria (n=1099)		Amikacin (60%), Ampicillin (1.5%), Amoxycillin /Clavulanic acid (31.3%), Cefotaxime (21.4%), Ceftriaxone (22.9%), Gentamicin(30.6%), Ciprofloxacin (18.2%), Tetracycline (40%), Doxycycline (20%), Trimethoprim + Sulfamethoxazole (38.2%), Imipenem (14.3%), Meropenem (48.3%), Ofloxacin (32.9%), Piperacillin/Tazobactam(40.2%), Ertapenem(39.2%), Cefazolin (11.8%), Norfloxacin (32.9%), Nitrofurantoin (28.6%), Pipracillin (42.9%), Ceftazidime(22.7%), Colistin (14.3%), Fosfomycin (66%), Cefoxitin (23.5%), Ticarcillin (17.1%) , Nalidixic acid (20%)
Acinetobacter sp.	2	
Citrobacter koseri	7	
Citrobacter freundii	7	
Escherichia coli	47	
Klebsiella pneumoniae ss. pneumoniae	21	
Proteus vulgaris	2	
Pseudomonas aeruginosa	14	
Pseudomonas (n=74)		Amikacin (58%), Ciprofloxacin (0%), Imipenem (0%), Meropenem (56%), Piperacillin /Tazobactam (46%), Norfloxacin (36%), Pipracillin (46%), Ceftazidime(42%),

Respiratory-OPD Antibiogram(2024)

MICROBIOLOGYDATA (n=280)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=56)	Nil	Ciprofloxacin (0%), Doxycycline (100%), Trimethoprim + Sulfamethoxazole (100%), Penicillin-G (0%), Erythromycin (0%), Vancomycin (0%), Teicoplanin (0%)
Gram Negative Bacteria (n=215)		Amikacin (94.4%), Ampicillin (20%), Amoxycillin /Clavulanic acid (66.7%), Cefotaxime (33.3%), Ceftriaxone (60%), Gentamicin (82.4%), Ciprofloxacin (83.3%), Doxycycline (72.7%), Trimethoprim +
Escherichia coli	8	
Klebsiella pneumoniae ss.	50	

pneumoniae		Sulfamethoxazole (93.8%), Imipenem (87.5%), Meropenem (95.7%), Ofloxacin (77.8%), Piperacillin/ Tazobactam (68%), Pipracillin (50%), Ceftazidime (63.6%), Colistin (66.7%), Levofloxacin (100%),
Pseudomonas aeruginosa	42	
Pseudomonas (n=9)		Amikacin (100%), Gentamicin(100%), Ciprofloxacin (45.5%), Imipenem (100%), Meropenem (100%), Piperacillin/ Tazobactam (81.8%), Ceftazidime (70%), Pipracillin (50%),

Respiratory-IPD Antibiogram(2024)

MICROBIOLOGYDATA (n=3275)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=93)		Ciprofloxacin (10%), Doxycycline (40%), Trimethoprim + Sulfamethoxazole (54.5%), Ofloxacin (0%), Penicillin-G (44.4%), Erythromycin(40%), Vancomycin(90.9%), Teicoplanin(100%), Linezolid(90%), Clindamycin (0%), Gentamicin(50%), Tetracycline(75%)
Staphylococcus aureus ss. aureus	71	
Streptococcus pneumoniae	29	
Gram Negative Bacteria (n=2767)		Amikacin (41.5%), Ampicillin (1.2%), Amoxycillin /Clavulanic acid (25.7%), Cefotaxime (16.4%), Ceftriaxone (14.9%), Gentamicin (38.3%), Ciprofloxacin (32.7%), Doxycycline (37.8%), Trimethoprim + Sulfamethoxazole (31.1%), Imipenem (32.8%), Meropenem (43.3%), Ofloxacin (30.6%), Piperacillin/ Tazobactam (36.7%), Pipracillin (63.5%), Ceftazidime (54.9%), Colistin (79.4%), Cefepime(14.8%), Ertapenem(33.3%), Tigecycline (80%), Levofloxacin (12.5%), Minocycline (46.2%), Cefuroxime axetil (0%)
Acinetobacter baumannii	2	
Acinetobacter calcoaceticus-baumannii complex	4	
Citrobacter koseri	6	
Citrobacter freundii	6	
Escherichia coli	9	
Klebsiella pneumoniae ss. pneumoniae	43	

Burkholderia sp.	1	
Stenotrophomonas maltophilia	1	
Pseudomonas aeruginosa/Sp	28	
Pseudomonas (n=415)		Amikacin (75%), Gentamicin(78.3%), Ciprofloxacin (79.6%), Imipenem (77.1%), Meropenem (83.6%), Piperacillin/ Tazobactam (86%), Ceftazidime (78.8%), Pipracillin (63.5%), Colistin (100%), Trimethoprim + Sulfamethoxazole (0%),

Respiratory-ICU Antibiogram(2024)

MICROBIOLOGYDATA (n=374)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=23)		Erythromycin(0%), Clindamycin (0%), Ciprofloxacin (0%), Trimethoprim + Sulfamethoxazole (100%), Doxycycline (100%), Penicillin-G (0%), Vancomycin (100%), Teicoplanin (100%), Tetracycline (100%), Linezolid (100%)
Staphylococcus aureus ss. aureus	100	
Gram Negative Bacteria (n=320)		Amikacin (44%), Ampicillin (0%), Amoxycillin /Clavulanic acid (5.9%), Cefotaxime (0%), Gentamicin (37.5%), Ciprofloxacin (36.8%), Doxycycline (0%), Trimethoprim + Sulfamethoxazole (37.5%), Imipenem (31%), Meropenem (36.8%), Ofloxacin (25%), Piperacillin/ Tazobactam (37.5%), Pipracillin (44.4%), Ceftazidime (36.4%), Cefepime(16.7%), Ceftriaxone (11.1%), Cefuroxime (14.3%), Cefuroxime axetil (0%), Colistin (40%), Ertapenem(14.3%), Tigecycline (88.9%),
Acinetobacter baumannii	2	
Acinetobacter sp.	10	
Citrobacter koseri	5	
Citrobacter freundii	7	
Klebsiella pneumoniae ss. pneumoniae	50	
Pseudomonas	26	

aeruginosa		Aztreonam (0%), Levofloxacin (0%), Minocycline (75%)
Pseudomonas (n=31)		Ciprofloxacin (100%), Meropenem (100%), Piperacillin/Tazobtam(67%), Pipracillin (44%), Ceftazidime(44%)

Skin Soft Tissue infections-OPD Antibiogram(2024)

MICROBIOLOGYDATA (n=1294)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=574)		Cefotaxime (0%), Ampicillin (80%), Ceftriaxone (100%), Gentamicin(77.8%), Ciprofloxacin(28.6%), Tetracycline(72.2%), Doxycycline (65.2%), Trimethoprim+Sulfamethoxazole(54.2%), Penicillin-G (3.3%), Erythromycin(10.6%), Vancomycin(19.4%), Teicoplanin(16.1%), Linezolid(93%), Clindamycin (47.2%), Gentamicin-High(50%)
Enterococcus sp	4	
Staphylococcus aureus ss. Aureus	63	
Staphylococcus, coagulase negative	33	
Gram Negative Bacteria (n=575)		Amikacin (79.5%), Ampicillin (5.6%), Amoxycillin /Clavulanic acid (47.4%), Cefotaxime (30.8%), Ceftriaxone (27.3%), Gentamicin(72.1%), Ciprofloxacin(54.3%), Tetracycline(58.3%), Doxycycline (41.7%), Trimethoprim+Sulfamethoxazole(62.8%), Imipenem(66.7%), Meropenem(80.3%), Ofloxacin(62.8%), Piperacillin/Tazobactam(59.7%), Pipracillin(55.1%), Ceftazidime(73.3%), Colistin (83.3%)
Citrobacter koseri	10	
Citrobacter freundii	3	
Escherichia coli	22	
Klebsiella pneumoniae ss. pneumoniae	15	
Proteus vulgaris	5	
Proteus mirabilis	3	
Pseudomonas aeruginosa	42	

Pseudomonas (n=145)		Amikacin (100%), Ciprofloxacin(75%), Meropenem(82.8%), Piperacillin/Tazobactam(79.3%), Ceftazidime(75.9%), Pipracillin(55.2%)

Skin Soft Tissue infections-IPD Antibiogram(2024)

MICROBIOLOGYDATA (n=6679)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=1750)		Ampicillin (72%), Amoxycillin /Clavulanic acid (0%), Cefotaxime (66.7%), Ceftriaxone (100%), Gentamicin(71.4%), Ciprofloxacin(23.2%), Tetracycline(83.3%), Doxycycline (76%), Trimethoprim+Sulfamethoxazole(65.1%), Imipenem(0%), Ofloxacin(50%), Piperacillin/Tazobactam(0%), Penicillin-G (6.4%), Erythromycin(27.8%), Vancomycin(93.7%), Teicoplanin(94.3%), Linezolid(94.4%), Clindamycin (47.3%), Levofloxacin (28.6%), Daptomycin (50%), Gentamicin-High(63.6%)
Enterococcus sp	13	
Staphylococcus aureus ss. Aureus	60	
Staphylococcus, coagulase negative	22	
Streptococcus pyogenes	5	
Gram Negative Bacteria (n=4486)		Amikacin (61.9%), Ampicillin (3%), Amoxycillin /Clavulanic acid (29.6%), Cefotaxime (11.4%), Ceftriaxone (22.3%), Gentamicin(57.3%), Ciprofloxacin(34.8%), Tetracycline(57.1%), Doxycycline (32.5%), Trimethoprim+Sulfamethoxazole(42.8%), Imipenem(35.7%), Meropenem(64.3%), Ofloxacin(37.1%), Piperacillin/Tazobactam(48.7%), Pipracillin(53.8%), Ceftazidime(55.8%), Colistin (69.9%), Cefepime(38.6%), Cefuroxime(16.7%),
Acinetobacter baumannii	3	
Acinetobacter calcoaceticus-baumannii complex	2	
Citrobacter koseri	10	
Citrobacter freundii	5	
Enterobacter cloacae	5	
Escherichia coli	23	

Klebsiella pneumoniae ss. pneumoniae	22	Ertapenem(59.7%), Tigecycline (71.3%), Aztreonam (44.4%), Levofloxacin (22.7%), Minocycline (50%) Cefoperazone/Sulbactum (41.3%), Cefuroxime axetil (5%),
Proteus mirabilis	4	
Proteus vulgaris	3	
Pseudomonas aeruginosa/Sp	23	
Pseudomonas (n=443)		Amikacin (100%), Cefotaxime (0%), Gentamicin(80%), Ciprofloxacin(74.2%), Doxycycline (0%), Trimethoprim+Sulfamethoxazole(0%), Imipenem(53.3%), Meropenem (88.3%)Piperacillin/Tazobactam(77.4%), Pipracillin(54.8%), Ceftazidime(68.2%), Colistin (100%),

Skin Soft Tissue infections-ICU Antibiogram(2024)

MICROBIOLOGYDATA (n=765)

Most Common Pathogens	Prevalance %	Antibiotic-sensitivity(%)
Gram Positive Cocci (n=188)		Ampicillin (100%), Erythromycin(26.9%), Cefotaxime (100%), Clindamycin (53.3%), Ciprofloxacin(21.2%), Trimethoprim+Sulfamethoxazole(76.5%), Doxycycline (58.8%), Penicillin-G (5.6%), Vancomycin(96%), Teicoplanin(95.2%), Linezolid(100%) , Gentamicin(100%), Gentamicin-High(100%)
Enterococcus sp	20	
Staphylococcus aureus ss. aureus	55	
Staphylococcus, coagulase negative	5	
Streptococcus pneumoniae	5	
Streptococcus pyogenes	15	
Gram Negative Bacteria (n=517)		Amikacin (36.4%), Ampicillin (6.3%), Amoxycillin

Acinetobacter sp	5	/Clavulanic acid (16.7%), Cefotaxime (33.3%), Ceftriaxone (4.6%), Gentamicin(52.3%), Ciprofloxacin(28.6%), Doxycycline (21.4%), Trimethoprim + Sulfamethoxazole (31.1%), Imipenem (40%), Meropenem (47.1%), Ofloxacin(35.7%), Piperacillin/Tazobactam (34.6%), Pipracillin (22.2%), Ceftazidime (58.3%), Colistin (75%), Cefepime (0%), Cefuroxime (0%), Ertapenem (42.9%), Tigecycline (70%), Levofloxacin (0%), Minocycline (40%)
Citrobacter koseri	9	
Citrobacter freundii	5	
Enterobacter cloacae	3	
Escherichia coli	23	
Klebsiella pneumoniae ss. pneumoniae	31	
Proteus mirabilis	3	
Proteus vulgaris	3	
Pseudomonas aeruginosa/Sp	18	
Pseudomonas (n=60)		Ciprofloxacin(60%), Meropenem (54.5%), Piperacillin/ Tazobactam (77.8%), Pipracillin(22.2%), Ceftazidime(63.6%), Amikacin (0%), Amoxycillin /Clavulanic acid (0%), Colistin (50%), Gentamicin (0%), Trimethoprim + Sulfamethoxazole (0%),

CURRENT POLICY

At present twenty antibiotics are freely available for general use in all out patient departments. These are co-trimoxazole, amoxycyllin, 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 Opthalmology 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 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 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 1 year, for changes if necessary in the antibiotic policy laid down for the treatment of various infections and for the rotation of antibiotics.

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)(Throatswab)

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

Minor wound infections (Pus sample)

Amoxicillin, cloxacillin, co-trimoxazole

Gynaecologica linfections (Vaginal swabs)

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

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,benzylpenicillin and gentamicin.

Gastrointestinal infections:

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

Enteric fever:

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

1) MEDICINE

Clinicalcondition		Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comments
1	Urinary tract infection (UTI)	**Nitrofurantoin** 100 mg orally BD for7days **Cotrimoxazole** 960 mg 12 hourly for 3-5days **Amikacin** 1g OD IM/IV **Gentamicin** 7mg/kg/d OD IM or IV **Norfloxacin** 400 mg BD for 7 days	Piperacillin-Tazobactam 4.5g IV 6 hourly OR Imipenem 1gIV 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** 960 mg 12 hourly for 3-5days	Amoxyclav 625mg 1-1-1for7 days Cefixime CV 200mg 1-0-1 for 7days OR Teicoplanin 6- 30 mg/kg/dayIV OR Cefotaxime 1-2gm 6-8 hourly	
3	Lower respiratory tract infection	**Amikacin** 15mg/Kg/dayq 8- 12 hours IV **Gentamicin** 7.5mg/kg/dayOD i.m or i.v for 10days **Inj.Amoxyclav** 1gm 1-0-1 for 7 days **Cefotaxime** 500mg 1-1-1for 7 days	Imipenem 1g IV 8 hourly OR Meropenem 1g IV 8 hourly Piperacillin -Tazobactam 4.5gm IV 8 hourly for 7-10 days. Ofloxacin 200-400mg orally 12	Amikacin maxdoses 1.5mg/Kg If atypical pneumonia suspected, Doxycycline 100mg bd

			hourly	
		Roxythromycin 300mgI.V.1-0-1 **Cefazoline** 0.52 gm 6-8 hourlyIV **Ciprofloxacin** 500mg12hourly **Doxycycline** 100mg12hourly orally	Vancomycin 15mg/kg IV 12 hourly	
4	Enteric fever	**Ceftriaxone** 1gm IV 8 hours Till afebrile then 1gm 1-0-1for 7 days **Chloramphenicol** 500mg qid orally **Ciprofloxacin** 750mg12hourly	**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
5	Septicemia	**Amikacin** 15mg/Kg/day q 8- 12 hours IV **Gentamicin** 1mg/kg IM or IV 8hourly **Ceftriaxone** 1gm 8 hourly **Ciprofloxacin** 400 mg IV 12 hourly	Imipenem 1g IV 8 hourly OR Meropenem 1g IV 8 hourly 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 8-12hourly IV		
7	VAP (Ventilator Associated Pneumonia)	**Piperacillin-tazobactam** 4.5g IV 6 hourly **Amikacin** 20mg/Kg/day 8-12 hourly IV **Gentamicin** 7mg/kg/d Imor IV 8 hourly **Tobramycin** 7mg/kg/d **Ciprofloxacin** 400mg 8 hourly **Levofloxacin** 750mg daily **Vancomycin** 15 mg/kg 12 hourly **Imipenem** 1g IV 8 hourly	Meropenem 1g IV 8 hourly OR Teicoplanin 6-30mg/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** 7mg/kg/d IM or IV 8 hourly for 10-14 days	Vancomycin 15 mg/kg 12 hourly Meropenem 2gm IV 8 hourly	

9	Diarrhoea Dysentry	**Doxycycline** 300mg oral stat only for Cholera **Norfloxacin** 200-400mg 12hourly orally **Gentamicin** 1mg/kgIMorIV 8 hourly **Rifaximin** 200mg 1-0-1 for 5days **Amikacin** 15mg/Kg/day q8- 12 hours IV	Ceftriaxone 2gm IV OD for 5 days Ofloxacin 200-400mg 12 hourly	
10	Empiric therapy suspected of Gram positive infections	**Cefazolin** 2g IV q8 h **Or Cloxacillin** 2g IV q 6h	Amoxicilin- clavulanate 1.2g IV q 8h or Penicillin G 20laks IV q 4h (if S.aureus excluded) or Vancomycin (if anaphylactic penicillin allergy or MRSA clinically possible)	Adjust regimen after receipt of culture and susceptibility data. Duration of treatment will depend on final diagnosis.
11	Empiric therapy for suspected Gram negative infections (eg pyelonephritis or intra-abdominal infections)	**Piperacillin-tazobactam** 4.5g IV q 6 hor **Cefoperazone-sulbactam** 3g IV q 12h	Imipenem 1g IV q 8 h or Meropenem 1 g IV q8h or Ertapenem 1 g IV od (carbapenems preferred for more seriously ill patients)	Separate anaerobic coverageunnecessary for IAI, when using BL-BLIs or carbapenems. De-escalate to ciprofloxacin, co-trimoxazole or third generation cephalosporin if isolate is sensitive. Durationof treatment:10-14days forpyelonephritis,4- 7 days for IAI.

12	Rickettsial infections	**Doxycycline** 100mg poor IV bd	Azithromycin 500mg poor IV od, chloramphenicol 500mg qid	Durationof treatment:7days
13	Leptospirosis	**Penicillin G** 20laks IV q 4 h or **Doxycycline** 100mg poor IV bd	Ceftriaxone 2 g IV od	Duration of treatment:7days
14	Vivaxmalaria	**Chloroquine** 25 mg/kg body weight divided over three days i.e. 10 mg/kg on day 1, 10mg/kg on day2 and 5mg/kg on day3.	Artemether- lumefantrine (1 tab bd for 3 days)	Followed by primaquine (0.25 mg/kg daily for 14 days)
15	Falciparum malaria	**Artesunate** 4 mg/kg body weight daily for3 days **Plus Sulfadoxine** (25 mg/kg body weight) and **Pyrimethamine** (1.25mg/kg body weight) on first day.	Artemether-lumefantrine (1tab 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 0.25mg per kg daily for14 days.
16	C. Difficile Colitis Mild disease	**Metronidazole** 400 mg orally three times daily for 10 to14 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	C. Difficile 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 m lnormal saline given six hourly) with intravenous metronidazole 500 mg 8hourly.	Monitor organ function closely; Consider surgery for severe persistent symptoms, toxic megacolon, severe ileus, or peritonitis.

18	Cholera	**Doxycycline** 300mg PO stat	Azithromycin 1 gm PO stat or Ciprofloxacin 500mg BD for 3 days	Rehydration(oral/IV) essential Antibiotics are adjuvant therapy
19	Bacterial dysentery	**Ceftriaxone** 2 gm IV OD for 5days	Azithromycin 1 gm od x 3d	
20	Amoebic dysentery	**Metronidazole** 500 to 750 mg IV q8h for 7-10 days	Tinidazole 2gm PO OD for 3days	Add diloxanide furoate 500 mg tds for 10d
21	Febrile Neutropenia	**Ceftazidime** (150mg/kg/day in 3 div 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

2.PEDIATRICS

Clinicalcondition		Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comments
1	Urinary Tract Infection	**Parenteral (for pylonephritis)** **Inj. Amikacin** 15mg/kg/d q2 4h X 10-14 days **OR Inj.Ceftriaxone** 75mg/kg/day in divided doses 10-14days **Oral for Uncomplicated UTI** **Amoxyclav** (30-50mg of Amoxicillin) for 7-10days **OR Co-trimoxazole** (8-10mg/kg/d of TMP component) orally12hourly **OR Nitrofurantoin** 8mg/kg/d orally 6 hourly for 5- 7days	Meropenem 120mg/kg/day 8 hourly Vancomycin 60mg/kg/day 6 hourly for 10-14days Piperacillin- Tazobactam 300mg/kg/d 8 hourly for 10- 14 days Teicoplanin 10mg/kg/day /dose every 12 hours for 3 doses then 10mg/kg/day once daily Ofloxacin 20mg/kg/d 12 hourly	Get urine cultures before antibiotics& modify therapy based on sensitivities
2	Upper Respiratory Tract Infections	**Amoxycillin** 40mg/kg/d orally 6- 8 hourly for 10 days **OR Amoxy-clav** (30-50 mg of Amoxicillin) for7-10days		
3	Lower respiratory tract infection	**Amoxy-clav** (30-50 mg of Amoxicillin) for 7-10 days	Meropenem 120mg/kg/day 8 hourly	

		OR Cefotaxime 100mg/kg/d IV 8 hourly for 10-14 days **OR Ceftriaxone** 100mg/kg/dIV 12 hourly for 10-14days	Vancomycin 60mg /kg/day 6 hourly for 10-14 days Piperacillin-Tazobactam 300mg/kg/d 8 hourlyfor 10-14days	
4	Enteric fever	**Ceftriaxone** 100mg/kg/d IV 12 hourly for 10-14days OR Cefixime 20mg/kg/d for 14 days	Ofloxacin 15mg/kg/d 12 hourly for 10- 14days Azithromycin 20mg/kg/dfor 7 days	Antibiotic therapy should be continued till one week post-fever defervescence shift to oral cefixime once fever resolves
5	Septicemia bacteremia	**Ampicillin** 100-400mg/kg/d IV 6 hourly **OR Ceftriaxone** 100mg/kg/d IV 12 hourly for 10-14days 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 IMorIV 24 hourlyfor7-10 days **OR Amikacin** 15-20mg/kg/d 24hourly	Meropenem 120mg/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	**Piperacillin-Tazobactam** 300mg/kg/d 8 hourly		Modify based on culture of lower respiratory tractsecretions.

	Pneumonia)	**OR Vancomycin** 40-60mg /kg/day 6-8 hourly **OR Meropenem 120 mg/kg/day 120 mg/kg/day 8hourly**		Stopantibioticsafter 5 days of clinicalresponse
8	Meningitis	**Ceftriaxone** 100mg/kg/dIV 12 hourly for 10-14days	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. meningitides, or H. Influenza
9	Diarrhoea Dysentery	**Co- trimoxazole** (8-10mg/kg/d of TMP component) orally 12 hourly **OR Cefixime** 8-10mg/kg/day individed doses for5days **Parenteral Ceftriaxone** 100mg/kg/d IV 12 hourly for 5- 7days		
10	Infective Endocarditis	**Cefotaxime** 150mg/kg/dIV 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 IMorIV24 hourly	
11	Shunt Infection	**Vancomycin** 60mg /kg/day 6 hourly + **Gentamicin** 5-7.5mg/kg/d IM or IV 24 hourly		

Clinical condition meningitis	Empiric antibiotics/1st lineantibiotics	Alternative antibiotics	Remarks/Comments
EOS including meningitis	**Ampicillin** 70-100mg/kg/day **Gentamicin** 5mg/kg/day Duration:14days (culture positive sepsis) 21days (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
LOS including meningitis	**Piperacillin - Tazobactam** **Gentamicin** 5mg/kg/day Duration - 14 days (culture positive sepsis) 21days (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
GramPositive	**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 days (culture positive sepsis) 21 days (Meningitis)	Meropenem 20mg/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
PanResistant	**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/ 1stline antibiotics	Alternative antibiotics	Remarks/Comments
MRSA infection	**Vancomycin** 25-30 mg IV loading followed by 15-20mg/kg 8-12hourly OR Teicoplanin 12 mg/kg x3 doses followed by 6 mg/kg once a day **OR** Piperacillin – Tazobactam 4.5gm IV 8 hourly	Linezolid 600mg IV/Oral 12 hourly Daptomycin 6mg/kg IV once a day	MRSA strains may be reported as susceptible to Fluoroquinolones, aminogycogides, chloramphenicol and doxycyclinein-vitro, these drugs are NOT to be used alone or as initial treatment for serious MRSA infections
MDR infections Enterobactericea & non-fermenting GNB	**Meropenem** 120mg/kg/day divided 8 hourly **OR** **Piperacillin-Tazobactam** 4.5gm IV 8 hourly for 7-10 days Ofloxacin 200-400mg orally/IV 12 hourly	Colistinbase 2.5–5mg/kg/day I/V every 6-12 hourly (1mg= 30000 IU) Polymyxin B 15,000-25,000 units/kg/day divided q 12hr; not to exceed 25000 units/kg/ day Tigecycline 100mg followed by 50mg every 12 hourly infusion over 30-60 minutes	

3.SURGERY

Sr No	Clinical condition	Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comments
1	UTI	**Tab. Nitrofurantoin** 100 mg 12 hrly **OR Tab. Cotriamoxazole** DS 12 hrly **OR TabDoxycycline** 100mg 12 hrly **OR Inj Amikacin** 250mg IV/IM 12 hrly **OR Inj. Gentamicin** 5mg/kg IV OD	Inj. Piperacillin with Tazobactam 3.375 IV 6 hourly OR Tab.Ofloxacin 300mg 12hourly OR Inj. Imipenam 500mg IV 6 hourly Meropenam 1gm IV 24 hourly	Can Be Changed According To Urine Culture Sensitivity
2	Skin soft tissue Cellulitis	**Tab Cotrimoxazole** 12 hrly + **TabAmoxycillin** 500mg **TabDoxycycline** 100mg 12 hrly OR **Inj.Clindamycin** 600 mg 6 hrly IV	Inj. Vancomycin 15 mg/kg IV12 hrly	Can Be Changed According ToPus Culture Sensitivity
3	Cutaneous Abcess	**TabDoxycycline** 100 mg 12 hrly, **Tab Cotrimoxazole DS 12 hrly+ TabCloxacillin** 500 mg 6 hrly	Inj. Vancomycin 15 mg/kg IV 12hrly	Can Be Changed According ToPus Culture Sensitivity
4	DiabeticFoot	**Inj.Vancomycin** 15mg/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** 1gm 12 hrly IV **Inj.Piperacillin with Tazobactam** 3.375 IV 6 hourly	Severe cases Inj. Imipenam 500 mg IV 6 hrly 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** 1gm 12hourly IV + **Inj. Metronidazole** 500mg 8hrly IV **Inj. Cefotaxim** 500mg IV 6 hrly **Inj. Amoxycillin +Clavulanicacid** 1.2gm BD **TabDoxycycline 100mg12 hrly,**	Inj.Meropenem 2 gm 8 hrly + Inj Vancomycin 1gm12hrlyIV, Inj. Piperacillin with Tazobactam 3.375 IV6 hrly Inj.Teicoplanin 6 mg/kg 12 hrly IV or IM	
7	SSI (Surgical site infection) G.U.T.	**Inj Amoxycillin + Clavulanic acid** 1.2gm BD, **Inj. Cefotaxim** 500mg IV 6 hrly **Inj. Cetriaxone** 1 gm 24 hrly, **Inj Pipercillin +Tazobactam** 3.375gm every 6 hrly OR 4.5 gm every 8 hrly IV, **TabDoxycycline** 100mg 12hrly **Tab Metronidazole** 500mg 8hrly IV	Inj.Meropenem 2gm 8hrly + InjVancomycin 1 gm 12hrly IV Inj. Piperacillin with Tazobactam 3.375 IV 6 hrly Inj.Teicoplanin 6 mg/kg 12 hrly IV or IM	

8	Wound infection	**Inj Amoxycillin + Clavulanic acid** 1.2gm BD, **Inj.Cetriaxone** 1gm 24hrly	Inj.Meropenem 2 gm 8 hrly + InjVancomycin 1gm 12hrly 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	**Inj Pipercillin +Tazobactam** 4.5gm IV q 6 hor **Cefoperazone-sulbactam** 3gm IV q12 hor **Ertapenem** 1 gm IV OD or **Ciprofloxacin** 750mg po bid	TMP/SMXDSPO 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 4-6weeks

4.OBSTETRICS AND GYNAECOLOGY

Sr No	Clinical condition	Empiricantibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comm ents
1	Vaginal delivery in the following situations: · • 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 1gm IV 4to 6 hourly till delivery	Inj. Cefazolin 2gm iv followed by 1gm 8hourly till delivery. If allergic then Vancomycin 1gm 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 Perinealtear	Single dose **Cefotaxime** OR **Ceftriaxone** 1gmIV	Single dose: Inj.Cefazoline 1gm IV +Inj. Metronidazole 500 mg IV OR 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	Prophylaxis is considered to prevent adverse outcomes arising frominfectione.g. 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** 2gm 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 in to the upper genital tract coincident with vaginal examinations during labor and/or instrumentation during surgery Titaetal 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.Ampicillin2gm single dose		To prevent ascending infection from vaginal flora to exposed membranes 500 mg IV8

6	Puerperal sepsis/ Septic abortion/ chorioamnionitis	**Inj. Piperacillin + Tazobactam** 4.5gm IV 8hourly for 7-14 days	Clindamycin 600-900mg IV 8 hourly + Gentamicin 60 mg IV 8 hourly + Metronidazole 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 -900mg IV + Gentamicin 1.5mg/kgIV	
8	Laparoscopy (uterus and/or vagina not entered)/ Hysteroscopy/ ectopic pregnancy	**Inj. Cefazolin** 1gm single dose IV	Cefuroxime 1.5 gm singledose IV If allergic use clindamycin 600 mg	
9	Abortions (medical and surgical)	**Tab.Azithromycin** 1gm orally + **Tab Metronidazole 800 mg** orally at time of abortion	Doxycycline 100mg orally twice daily for7 days, starting on dayofabortion+ Metronidazole 800mg orally at timeofabortion	No prophylaxis for missed/ incomplete abortion
10	Postoperative Surgical site infection Obstetrics	**Inj Amoxycillin + Clavulanicacid** 1.2 gm BD**+ Inj Metronidazole** 500mg TDS **OR Gentamicin** 5mg/kg IV OD **+ Inj. Metronidazole** 500mg 8hrly.		

11	HSG	**Tab Doxycycline** 100mg orally before procedure		Doxycycline continued for twice daily for 5 days if there is history of PID or fallopian tubes are dilated at procedure
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 400mg OD for 14 days with or without Metronidazole 500 mg BD for 14 days OR Ceftriaxone 250 mg IM single dose + Doxycycline 100mgorallyBD for 14 days with or without Metronidazole 500mg BD for 14days	
13	Pelvic Inflammatory disease (severe) eg tubo-ovarian abscess, pelvic abscess,	**Inj Cefotetan** 2gmIV BD+ **Doxycycline** 100mg orally or IV BD	Cefoxitin 2gm IV 6 hourly + Doxycycline 100mgorallyor IV 12 hourly OR Clindamycin 900mg IV 8 hourly +Gentamicin loading dose 2gm/kg IVor IM followed by maintaince dose 1.5mg/kg every 8 hours. Single daily dosing (3-5mg/kg)canbe substituted	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 be altered after obtaining culture reports of pus/or blood
14	Vaginal candidiasis	**Tab Fluconazole** 150mg orally single dose OR local Clotrimazole 500mgvaginaltablet once only	Miconazole, Nystatin, vaginal tablets/creams	Treat for 7days in pregnancy, diabetes,Recurrent infections: 150 mg Fluconazole onday1,4,7then weekly for 6 months

15	Vaginal trichomoniasis	**Tab Secnidazole** 2gm oral single dose **OR TabTinidazole** 500mg orally BD for 5days **ORTab.Metronidazole** 400 mg BD for 7days		Alcohol avoided during treatment and 24hours 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 7days **OR Metronidazole gel** 0.75% one applicator (5g) intra- vaginalfor5 days **OR Clindamycincream** 2% one applicator (5 gm) intra-vaginal for 7days	Secnidazole 2gm orally OD for one day OR 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 100 mg intravaginally OD HS for 3 days.	Refrain from sexual activity OR use condoms during the treatment. Clindamycin cream is oil-based and might weaken latex condoms.
17	UTI Uncomplicated	**Tab Nitrofurantoin** 50-100 mg for 4times **TabCiprofloxacin** 500 mg BD for 14 days **OR Tab Norfloxacin** 400mg BD for 14 days		
18	Pyelonephritis	**Piperacillin with Tazobactam** 3.375 IV 6 hourly for 14days		

19	Asymptomatic bacteruria in pregnancy	**Tab Nitrofurantoin** 50-100 mg for 4 times		
20	Cystitis	**Tab Nitrofurantoin** 50-100 mg for 4 times **TabCiprofloxacin** 500 mg BD for 14 days **OR TabNorfloxacin** 400mgBD for14 days		

5. ORTHOPEDICS

Sr no	Clinical condition	Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comm ents
1	Acute osteomyelitis/ Septicarthrit is	MRSA: **Inj.Vancomycin** 1gm IV 12hourly for 21days **Inj. Ceftriaxone IV** 12hourly **OR Inj. Amoxiclav** 1.2 gm 8 hourly with or without **Gentamicin** 3 to 5mg 24hrly 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 500mg IV 8 hrly
2	Prosthetic / implant associated infection	**Inj.Ceftriaxone + Inj.Vancomycin** 1gm 12 hrly **OR Inj. Teicoplonin** 400mg 12hrly IV **OR Inj Clindamycin** 600-900mg 8 hrly		
3	Preop– prophylaxis a)Laminectomy	**Inj. Ceftriaxone/ Cefotaxime** 1 to 2gm/ day IV or IM + **Inj Gentamicin** 5mg/kg IV OD fo r3 days		
4	b) THR/TKR	**Inj.Vancomycin** 15mg/kg IV 12 hrly **Inj. Ceftriaxone / Inj. Cefotaxime** 1 to 2gm/day Iv or IM		

6. OPHTHALMOLOGY

Sr no	Clinical condition	Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comments
1	Blepharitis Anteroir Posterior	**e/d Chloramphenicol** BD for 7 days **TabAzithromycin** 500mg for 3 days Topical e/d **Tobramycin 0.5%** **OR e/d Gentamicin 0.3%** Refractorycases **Tab Doxycycline** 100mg BD for 1week then daily for 6 to12 weeks		Lid margin care with baby shampoo and warm compress 24 hrly. 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 **TabCephalexin** 500mg QID		Hot fomentation Pus evacuation by epilation.
3	Bacterial conjunctivitis	**e/dGatifloxacin0.3%** **e/dLevofloxacin0.5%** **e/dMoxifloxacin0.5%** 2hrly for 1st 2days then 4-8 hourly upto7 days		
4	Acute bacterial keratitis	**e/dMoxifloxacin0.5%** 1 hourly for 48hrs then as per response	e/d Gatifloxacin 0.3% 1 drop 1 hourly for 48hrs then reduce as per response	Moxifloxacin t/t may fail against MRSA
5	Acute bacterial keratitis infectioncomplicateds	**e/d Tobramycin 0.5%** **ORGentamicin0.3%e/d** + e/dPiperacillin	e/d Ciprofloxacin 0.3% or e/d Levofloxacin 0.5%	

		Or Ticarcellin (6-12mg/ml) 15-60min around clock 24-72hr, then slowly reduce frequency		
6	Orbital Cellulitis	**Inj. Cloxacillin** 2gm IV 4 hrly **+** **Inj. Ceftriaxone** 2gm IV 24 hrly **+** **Inj. Metronidazole** 1gm IV 12hrly	If allergic to Penicillin then Vancomycin 1gm IV 12 hrly + Levofloxacin 750mg IV od + Metronidazole 1 gm 24 hrly	If MRSA is suspected substitute Cloxacillin with Vancomycin
7	Endophthalmiti s Bacterial	Immediate ophthalmology consultation. Immediate vitrectomy+intravitreal antibiotics (Inj vancomycin + Inj Ceftazidime) Intra vitreal antibiotics Inj. Vancomycin+ Inj Ceftazidine + systemic antibiotics Inj. Meropenam 1gm IV 8 hrly OR Inj. Ceftriaxone 2gm IV 24 hrly + Inj.Vancomycin 1 gm IV 12 hrly	Adjuvant systemic (doughtful value in post cataract surgery endophthalmitis) Inj Vancomycin +Inj Meropenam	
8	Cataract Sx	**Tab.Ciplox** 500mg BD for 5 days **e/dCiprofloxacin** 0.3% OR **e/dMoxifloxacin** 0.5% QID		
9	Acute Dacryocystitis	**Tab.Amoxicillin and Clavulinic acid** 625mg 12 hourly **e/dMoxifloxacin** 0.5% 8 hourly		

ANTI- VIRAL AND ANTI - FUNGAL

Sr no	Clinical condition	Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comm ents
1	Herpes simplex keratitis	**Trifluridine** ophthalmic solution 1drop 2 hour, upto 9times/day until re– epithelized then 1dro p4 hourly upto 5 times/ day for duration of 21 days	Ganciclovir 0.15% ophthalmic Ge lfor acute herpetic keratitis	Fluorescein staining shows topical dendritic figures 30-50% re-cure within2 years
2	Varicella Zoster ophthalmicus	**Famciclovi r** 500 mg BD Or TID **OR Valacyclovir** 1gm oral TID for 10 days	Acyclovir 800mg 5 times/ day for 10 days	
3	Fungal keratitis	**Natamycin5%** 1drop 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** 25mg/kgQID	Liposomal Amphotericin B 3-5mg/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 response to systemically administered antifungal.

7. ENT

Sr no	Clinical condition	Empiric antibiotics/ 1stline 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 100mg/kg/day.		
2	Acute mastoiditis	**Cefotaxime** 1–2g i.m./i.v .6–12 hourly, children 50–100mg/kg/day. **Inj.Ceftriaxone** 75mg/kg/day OD		
3	Acute epiglotitis	**Cefotaxime** 50 mg/kg IV 8 hourly **Ceftriaxone** 50 mg/kg IV 24 hourly	Levofloxacin 10mg/kg IV 24 hourly	
4	Acute tonsillitis/ Pharyngitis	**Penicillin V** oral x 10 days **OR** **Benzathine Penicillin** 1.2 MU IM x 1 dose OR **Cefdinir or cefpodoxime** x 5 days	Penicillin allergic, Clindamycin 300-450 mg orally 6-8 hourly x 5 days. Azithromycin clarithromycin are alternatives.	
5	Head and neck space infections	**Clindamycin** 600 mg IV q 8h or **Amox-clav** 1.2 gm IV/ PO q8h	Piperacillin- tazobactam 4.5 gm IV q6h	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 q6h	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** 1.2gm IV	Piperacillin tazobactam 4.5 gm IV 6 hourly	10-14 days and then can be prolonged based on response.

8. SKIN

Sr no	Clinical condition	Empiric antibiotics/ 1stline 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 IVOD Duration– 5-7days	Clindamycin 600-900mgIV 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 1gIV8hourly OR Meropenem 1gm IV 8 hourly AND Clindamycin 600-900mgIV TDS	Early surgical intervention crucial
4	Impetigo and skin soft-tissue infections	**Clindamycin** 300-400mg qid PO	Amoxicillin- clavulanate 875/125 mg bid po	Local: Mupirocin ointment Apply to lesions bid

9. RESPIRATORY MEDICINE

Sr no	Clinical condition	Empiric antibiotics/ 1stline antibiotics	Alternative antibiotics	Remarks/Comments
1	Lower respiratory tract infection	**Amoxicillin - clavulanate** 1.2g 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 q8-12hours IV	Piperacillin – Tazobactam 4.5gm IV 8 hourly for 7-10 days. Imipenem 1g IV 8 hourly OR Meropenem1g 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 q8- 12 hours IV **Gentamicin** 7.5mg/kg/day OD i.m or i.v for 10 days **Piperacillin - Tazobactam** 4.5gm IV 8 hourly for 7-10 days		Modify based on culture of lower respiratory tract secretions. Stop antibiotics after 5 days of clinical response

		Imipenem 1g IV 8 hourly or **Meropenem** 1g IV 8 hourly **Vancomycin** 15mg/kg IV 12 hourly		
3	Lung abscess	**Piperacillin-Tazobactam** 4.5gm IV 6 hourly	ADD Clindamycin 600-900mg IV 8 hourly	3-4 weeks treatment required
4	Acute bacterial exacerbation of COPD	**Amoxicillin-clavulanate** 1gm oral BD for 7 days	Azithromycin 500 mg oral OD × 3 days	

10. MDR organisms

Sr no	Clinical condition	Empiric antibiotics/ 1st line antibiotics	Alternative antibiotics	Remarks/Comments
1	MRSA infection	**Vancomycin** 25-30 mg IV loading followed by15-20mg/kg 8-12 Hourly **Teicoplanin** 12mg/kg x 3 doses followed by 6 mg/kg once a day **Piperacillin - Tazobactam** 4.5gm IV 8 hourly	Linezolid 600 mg 12hourly Daptomycin 6mg/kg IV once a day	MRSA strains may be reported as susceptible to Fluoroquinolones, aminogycogides,chloramphenicolanddoxycyclinein-vitro, these drugs areNOTtobeusedaloneorasinitial treatment for serious MRSA infections
2	MDR infections Enterobactericea & non-fermenting GNB	**Imipenem** 1g IV 8 hourly **or Meropenem** 1g IV 8 hourly **Piperacillin-Tazobactam** 4.5gm IV 8 hourly for 7-10days **Ofloxacin** 200-400mg orally/IV 12 hourly	Colistinbase 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 hurly infusion over 30-60 minutes	

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 moxifloxacillin), rimantadine, stavudine, telavancin, telbivudine, telithromycin, tenofovir, terbinafine, trimethoprimsulfamethoxazole, 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

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	PenicillinG,Ampicillin Amoxicillin-clavulanate Cloxacillin,Piperacillin Cephalosporins Erythromycin
Antitubercular	Pyrazinamide, Streptomycin	Isoniazid,Rifampicin, Ethambutol
Antiamoebic	Metronidazole,Tinidazole Quiniodochlor	Diloxanidefuroate, Paromomycin
Antimalarial	Artemether, Artesunate Primaquine	Chloroquine, Mefloquine, Proguanil Quinine (only in 1st trimester), Pyrimethamine + Sulfadoxine (only single dose)
Anthelmintic	Albendazole, Mebendazole, Ivermectin, Pyrantel pamoate, Diethyl carbamazine	Piperazine Niclosamide Praziquantel
Antifungal (superficialanddeep mycosis)	AmphotericinB, 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	

ANTIMICROBIAL AGENTS THAT ARE SAFE OR ARE CONTRAINDICATED IN BREAST FEEDING 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/Amoxicillin, 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

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.

DRUG INTERACTIONS IN DIABETES MELLITUS

Sulfonamides	Enhance sulfonylureas action (may precipitate hypoglycemia) 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 precipitatehypoglycaemia) by inhibiting metabolism
Rifampicin	Induce metabolism, decrease action of sulfonylurea & pioglitazones (vitiate diabetes control)

EMPIRIC ANTIMICROBIAL THERAPY BASED ON MICROBIOLOGICAL ETIOLOGY

Suspected or Proven Disease or Pathogen	Drugs of First Choice	Alternative Drugs
Gram-negativecocci(aerobic)		
Moraxella (Branhamella) catarrhalis	TMP-SMZ, cephalosporin (second or third-generation)	Quinolone, 3 macrolide 4
Neisseria gonorrhoeae	Ceftriaxone,cefixime	Spectinomycin, azithromycin
Neisseria meningitides	PenicillinG	Chloramphenicol, ceftriaxone,cefotaxime
Gram-negativerods(aerobic)		
Ecoli, 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
Brucellaspecies	Doxycycline+rifampin or Aminoglycoside	Chloramphenicol + aminoglycosideor TMP- SMZ
Helicobacter pylori	Protonpumpinhibitor+ amoxicillin +clarithromycin	Bismuth+metronidazole+ tetracycline + proton pump Inhibitor
Vibrio species	Tetracycline	Quinolone, TMP-SMZ

Pseudomonas aeruginosa	Antipseudomonal penicillin ± Aminoglycoside	Antipseudomonalpenicillin ± quinolone, cefepime, ceftazidime, antipseudomonal carbapenem,oraztreonam ±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	Azithromycinor quinolone	Clarithromycin, erythromycin
Gram-positive cocci (aerobic)		
Streptococcus pneumoniae	Penicillin	Doxycycline,ceftriaxone, antipneumococcal quinolone, macrolide,linezolid
Streptococcus pyogenes (groupA)	Penicillin,clindamycin	Erythromycin, cephalosporin(first-generation)
Streptococcusagalactiae (group B)	Penicillin (± aminoglycoside)	Vancomycin
Viridans streptococci	Penicillin	Cephalosporin(first-or third-generation), vancomycin
Staphylococcusaureus		
B-Lactamase negative	Penicillin	Cephalosporin (first-generation),vancomycin
B-Lactamase positive	Penicillinase-resistant penicillin	As above
Methicillin-resistant	Vancomycin	TMP-SMZ,minocycline, linezolid, daptomycin, tigecycline
Enterococcus species10	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*-lactamaseinhibitor 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	
Mycoplasma pneumoniae	Tetracycline, erythromycin	Azithromycin, clarithromycin,quinolone
Chlamydia		
Ctrachomatis	Tetracycline, azithromycin	Clindamycin,ofloxacin
Cpneumoniae	Tetracycline, erythromycin	Clarithromycin, azithromycin
Cpsittaci	Tetracycline	Chloramphenicol

Spirochetes		
Borrelia recurrentis	Doxycycline	Erythromycin, chloramphenicol, penicillin
Borrelia burgdorferi		
Early	Doxycycline, amoxicillin	Cefuroximeaxetil, 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	AmphotericinB, echinocandin	Fluconazole,itraconazole, voriconazole
Cryptococcus	AmphotericinB± 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

ANTICOVID DRUGS

1. FAVIPIRAVIR

SALIENT ACTIONS:

Favipiravir is an inhibitor of viral enzyme – RNA-dependent RNA polymerase, and a reserve drug for pandemics associated with novel Influenza infections. It is also effective on a wide range of RNA viruses (including are naviruses, phleboviruses, Hantaviruses, flaviviruses, enteroviruses, respiratory syncytial virus) including Ebola and SARS-CoV-2 and Covid-19.

INDICATIONS:

For the treatment of adults in mild to moderate COVID-19 disease under restricted emergency use

DOSAGE REGIMENS:

The recommended dosage of favipiravir for adults is 1800 mg orally twice daily on 1 Day followed by 800 mg orally twice daily, up to maximum of 14 days

CONTRAINDICATIONS:

Women known or suspected to be pregnant (Early embryonic deaths and teratogenicity have been observed in animal studies), lactating women, severe renal and hepatic impairment. Hyper sensitivity to the active substances or to any of the excipients

Warnings: When administering favipiravir to women of child-bearing potential, confirm a negative pregnancy test result before starting the treatment. Explain fully the risks and instruct thoroughly to use most effective contraceptive methods with her partner during and for 7 days after the end of the treatment. If pregnancy is suspected during the treatment, instruct to discontinue the treatment immediately and to consult a doctor. Favipiravir is distributed in sperm. When administering the drug to male patients, explain fully the risks and instruct thoroughly to use most effective contraceptive methods in sexual intercourse during and for 7 days after the end of the treatment (men must wear a condom). In addition, instruct not to have sexual intercourse with pregnant women. Prior to the treatment, explain thoroughly the efficacy and risks (including the risk of exposure to fetus) to patients or their family members and written

informed consent from each patient/ or his representative prior to administration of the drug shall be obtained by the prescriber.

PRECAUTIONS:

Caution in patients with history of abnormalities in metabolism of uric acid or having Gout. Psychoneurotic symptoms such as abnormal behavior after administration of anti-influenza virus agents including favipiravir have been reported.

INTERACTIONS: Favipiravir mostly metabolized by aldehyde oxidase (AO), and partly metabolized by xanthine oxidase (XO). The drug inhibits AO and CYP2C8, but does not induce CYP. Precautions for co- administration of Pyrazinamide, Repaglinide, Famciclovir, Sulindac.

ADVERSE EFFECTS: The major undesirable effects observed in clinical studies with favipiravir used at different doses included:Increase of blood uric acid level, diarrhoea, decrease of neutrophil count, increase of AST (SGOT), increase of ALT (SGPT), psychiatric symptoms. The following clinically significant adverse reactions have been reported with other anti-influenza virus agents. Patients should be carefully monitored, and if any abnormality is observed, the treatment should be discontinued and appropriate measures should be taken: Shock, anaphylaxis, Pneumonia, Hepatitis fulminant, Hepatic dysfunction, Jaundice, Toxic epidermal necrolysis (TEN), Oculo- muco-cutaneous syndrome (Stevens-Johnson syndrome), Acute renal failure, White blood cell count decreased, Neutrophil count decreased, Platelet count decreased.

2. ITOLIZUMAB

SALIENT ACTIONS:

Itolizumab is a 'first in class' humanized IgG1 monoclonal antibody. It selectively targets CD6, a pan T cell marker involved in co-stimulation, adhesion and maturation of T cells. Itolizumab, by binding to CD6, down regulates T cell activation, causes reduction in synthesis of pro-inflammatory cytokines and possibly plays an important role by reducing T cell infiltration at sites of inflammation. It is recently approved by DCGI for repurposed use in COVID 19: If

Tocilizumab is not available then Itolizumab may be considered as a substitute to Tocilizumab in cytokine storm after taking consent for repurposed use and keeping set up ready for dealing with allergic/anaphylactic reactions.

INDICATIONS:

To treat cytokine release syndrome (CRS) in moderate to severe acute respiratory distress syndrome (ARDS) patients with Covid-19. It is also indicated for treatment of patients with active moderate to severe chronic plaque psoriasis who are candidates for systemic therapy.

DOSAGE REGIMENS:

The recommended dosage of itolizumab for adults in Covid 19 is Up to 1.6 mg/kg IV, to begiven in 250 ml normal saline over 6 hours, Single dose . The recommended dosage of itolizumab for treatment of plaque psoriasis is 1.6mg/kg given asIV infusion once every 2 wks for 12 weeks, followed by 1.6mg/kg every 4 weeks up to 24 weeks.

CONTRAINDICATIONS:

Itolizumab shoud not be administered in patients with evidence of bacterial infections, Sepsis, Multi organ failure. Shock, Abnormal LFTs (Transaminitis more than 5 times of normal). Platelets less than 50000/mm3 and in Immune compromised state.

PRECAUTIONS:

During administration of itolizumab some patients may develop acute infusion reactions. Symptoms may include nausea, flushing, urticaria, cough, hypersensitivity, pruritus, rash, wheezing, dyspnea , dizziness, headache and hypertension. Infusion reactions are most likely to occur during the first cycle of dosing and tend to decrease in severity and frequency on subsequent infusions. Also caution is exerted in treatment of patients with history of recurrent infections or underlying condition which may predispose them to serious infection. Patients should be closely monitored for the development of signs and symptoms of infection during and after treatment with itolizumab.

INTERACTIONS:

Itoliumab should not be used along with other biological agents because of possibility of

increased immunosuppression and increased risk of infection.

ADVERSE EFFECTS:

Common adverse effects such as infusion related reaction, pyrexia due to infections mainly upper respiratory tract infections, pruritus and diarrhoea may be present with itolizumab treatment. These side effects are generally mild and did not cause most patients to stop taking itolizumab. These happen most often after the first dose and may decrease after additional doses.

3. REMDESIVIR

SALIENT ACTIONS:

Remdesivir is a prodrug of an adenosine triphosphate (ATP) analog, with potential antiviral activity against a variety of RNA viruses. Upon administration, remdesivir, being a prodrug, is metabolized into its active form GS-441524. As an ATP analog, GS-441524 competes with ATP for incorporation into RNA and inhibits the action of viral RNAdependent RNA polymerase. This results in the termination of RNA transcription and decreases viral RNA production

INDICATIONS:

Remdesivir (under Emergency Use Authorization as a treatment for Covid 19 - Now this drug isin 1 B category) may be considered in patients with Category 1 Group B and moderate disease (those on oxygen) Indications for use are as follows

1.Patients having duration of illness less than 10 days.

2.Showing evidence of pneumonia on X ray.

3.Showing evidence of hypoxia with increasing oxygen demand.

DOSAGE REGIMENS:

The recommended dose of remdesivir in treatment of covid 19 patients is 200 mg IV on day 1, to be given in 100 ml normal saline over a period of 30 min to 1 hour, flush with 30 ml normal saline after completing the dose and followed by 100 mg IV daily for 4 days in the same manner (Total 5 days). Written informed consent from patient before administration.

CONTRAINDICATIONS :

Remdesivir is contraindicated if,

- AST/ALT > 5 times Upper limit of normal (ULN)
- Severe renal impairment (i.e. eGFR < 30ml/min/m2 or need for hemodialysis)
- Pregnancy or lactating females
- Children (< 12 years of age)

PRECAUTIONS:

Hypersensitivity Including Infusion-Related and Anaphylactic Reactions : Hypersensitivity reactions including infusion-related and anaphylactic reactions have been observed during and following administration of remdesivir. Signs and symptoms may include hypotension, tachycardia, bradycardia, dyspnea, wheezing, angioedema, rash, nausea, vomiting, diaphoresis, and shivering. Slower infusion rates, with a maximum infusion time of up to 120 minutes, can be considered to potentially prevent these signs and symptoms Increased Risk of Transaminase Elevations Transaminase elevations have been observed in healthy volunteers who received 200 mg of remdesivir followed by 100 mg doses for 5-10 days. Transaminase elevations have also been reported in patients with COVID-19 who received remdesivir in clinical trials. Hepatic laboratory testing should be performed in all patients priorto starting remdesivir and daily while receiving it. • Remdesivir should not be initiated in patients with ALT greater than or equal to 5 times the upper limit of normal at baseline • Remdesivir should be discontinued in patients who develop: ALT greater than or equal to 5 times the upper limit of normal during.

INTERACTIONS:

Drug-drug interaction trials of remdesivir and other concomitant medications have not been conducted in humans. Due to antagonism observed in vitro, concomitant use of remdesivir with chloroquine phosphate or hydroxychloroquine sulfate is not recommended. In vitro, remdesivir isa substrate for drug metabolizing enzymes CYP2C8, CYP2D6, and CYP3A4, and is a substrate for Organic Anion Transporting Polypeptides 1B1 (OATP1B1) and Pglycoprotein (P-gp) transporters. In vitro, remdesivir is an inhibitor of CYP3A4, OATP1B1, OATP1B3, BSEP, MRP4, and NTCP.

Blood plasma concentrations of remdesivir are expected to decrease if it is administered together with cytochrome P450 inducers suchas rifampicin, carbamazepine, phenobarbital, phenytoin, primidone

ADVERSE EFFECTS:

Common adverse effects of Remdesivir for COVID-19 include respiratory failure and organ impairment, including low albumin, low potassium, low count of red blood cells, low count of platelets that help with clotting, and yellow discoloration of the skin. Other reported side effects include gastrointestinal distress, elevated transaminase levels in the blood (liver enzymes), and infusion site reactions. Other possible side effects of remdesivir include: Infusion-related reactions. Infusion-related reactions have been seen during a remdesivir infusion or around the time remdesivir was given. Signs and symptoms of infusion-related reactions may include: low blood pressure, nausea, vomiting, sweating, and shivering. Increases in levels ofliver enzymes, seen in abnormal liver blood tests.[Increases in levels of liver enzymes have been seen in people who have received remdesivir, which may be a sign of inflammation or damage to cells in the liver.

4. TOCILIZUMAB

SALIENT ACTIONS:

Tocilizumab is a recombinant humanized anti-human interleukin 6 (IL-6) receptor monoclonal antibody of the immunoglobulin IgG1τ (gamma 1, kappa) subclass with a typical H2L2 polypeptide structure. Tocilizumab has a molecular weight of approximately 148 kDa. The antibody is produced in mammalian (Chinese hamster ovary) cells. Tocilizumab is a novel monoclonal antibody that competitively inhibits the binding of interleukin-6 (IL-6) to its receptor (IL-6R). Inhibiting the entire receptor complex preventsIL-6 signal transduction to inflammatory mediators that summon B and T cells.

INDICATIONS:

1. Rheumatoid Arthritis (RA): tocilizumab is indicated for the treatment of adult patients with moderately to severely active rheumatoid arthritis who have had an inadequate response to one or

more Disease-Modifying Anti-Rheumatic Drugs (DMARDs).

2. Giant Cell Arteritis (GCA): tocilizumab is indicated for the treatment of giant cell arteritis (GCA) in adult patients.

3. Polyarticular Juvenile Idiopathic Arthritis (PJIA): tocilizumab is indicated for the treatment of active polyarticular juvenile idiopathic arthritis in patients 2 years of age and older.

4. Systemic Juvenile Idiopathic Arthritis (SJIA): tocilizumab is indicated for the treatmentof active systemic juvenile idiopathic arthritis in patients 2 years of age and older.

5. Cytokine Release Syndrome (CRS): tocilizumab is indicated for the treatmentof chimeric antigen receptor (CAR) T cell-induced severe or life- threatening cytokine release syndrome in adults and pediatric patients 2 years of age and older.

DOSAGE REGIMENS:

The recommended dose of tocilizumab in RA is 4mg/kg every 4 weeks followed by an increaseto 8 mg/kg every 4 weeks based on clinical response. In treatment of covid-19 / CRS the recommended dose is 5-6 mg/kg IV (400 mg maximum) to be given in 100 ml normal salineover 1 hour, 2 doses, 24 hours apart. Premedication with hydrocortisone 100 mg and 1 mlPheniramine (Avil) is recommended.

CONTRAINDICATIONS :

This drug not to be used if patient has

1. Evidence of bacterial infections,
2. Sepsis.
3. Multi organ failure.
4. Shock.
5. Abnormal LFTs (Transaminitis more than 5 times of normal).
6. Platelets less than 50000/mm 3.
7. Immune compromised state.

PRECAUTIONS:

1. Serious Infections – do not administer tocilizumab during an active infection, including localized

infections. If a serious infection develops, interrupt tocilizumab until the infection is controlled.

2. Gastrointestinal perforation – use with caution in patients who may be at increased risk.

3. Laboratory monitoring – recommended due to potential consequences of treatmentrelatedchanges in neutrophils, platelets, lipids and liver specific enzymes.

4. Hypersensitivity reactions including anaphylaxis and death.

5. Demyelinating Disorders—use with caution in patients with preexisting or recent onset demyelinating disorders.

6. Active Hepatic disease and Hepatic impairment—use is not recommended.

7. Live vaccines – avoid use with tocilizumab.

8. Pregnancy – may cause fetal harm.

9. Lactation – discontinue drug or nursing.

INTERACTIONS:

Tocilizumab has the potential to affect expression of multiple CYP enzymes including CYP1A2, CYP2B6, CYP2C9, CYP2C19, CYP2D6 and CYP3A4. The effect of tocilizumab on CYP enzymes may be clinically relevant for CYP450 substrates with narrow therapeutic index, where the dose is individually adjusted e.g. warfarin, cyclosporine, theophylline. Exercise caution when co administering tocilizumab with CYP3A4 substrate drugs where decrease in effectiveness is undesirable, e.g., oral contraceptives, lovastatin, atorvastatin, etc. The effect of tocilizumab on CYP450 enzyme activity may persist for several weeks after stopping therapy.

ADVERSE EFFECTS:

The most common side effects are: a cough or sore throat, blocked or runny nose, headaches or dizziness, mouth ulcers, high blood pressure, hypercholesterolaemia (increased cholesterol in the blood) allergic reactions - this can include aching muscles, feeling out of breath, having a tight chest, wheezing, and a high temperature, weight gain or swollen ankles, skin rashes, infections or itching, stomach irritation or abdominal pain. Tocilizumab can increase your cholesterol levels and can also affect liver function tests. Tocilizumab has been shown to increase the risk of infections in patients with rheumatoid arthritis. These include: upper respiratory tract infections, cold sores,

shingles, skin infections - such as cellulitis, pneumonia.

5. **LOPINAVIR AND RITONAVIR**

SALIENT ACTIONS:

Lopinavir and ritonavir is a fixed-dose combination medication for the treatment and prevention of HIV/AIDS. It combines lopinavir with a low dose of ritonavir. Lopinavir is an inhibitor of the HIV-1 protease. As co-formulated in lopinavir/ritonavir, ritonavir inhibits the CYP3A-mediated metabolism of lopinavir, thereby providing increased plasma levels of lopinavir. It is generally recommended for use with other antiretrovirals. Although lopinavir/ritonavir has in vitro activity against SARS-CoV, it is thought to have a poor selectivity index, indicating that higher than tolerable levels of the drug might be required to achieve meaningful inhibition in vivo

INDICATIONS:

Lopinavir/ritonavir is indicated in combination with other antiretroviral agents for the treatment of HIV1 infection in adults and pediatric patients (14 days and older). DOSAGE REGIMENS: The recommended dose for adult patients is 400/100mg (3 capsules or 5.0mL) twice daily administered with food. For children ages 6 to 12 years, the dosing of lopinavir/ritonavir oral solution is based on body weight. For children 7 to 40 kg should be administered. It is recommended that calculations based on body weight be done for all pediatric patients.

CONTRAINDICATIONS:

Lopinavir/ritonavir is contraindicated in patients with previously demonstrated clinically significant hypersensitivity (e.g., toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme) to any of its ingredients, including ritonavir. Co-administration of lopinavir/ritonavir is contraindicated with drugs that are highly dependent on CYP3A for clearance and for which elevated plasma concentrations are associated with serious and/or life- threatening reactions. Co-administration of lopinavir/ritonavir is contraindicated with potent CYP3A inducers where significantly reduced lopinavir plasma concentrations may be associated with the potential for loss of virologic response and possible resistance and crossresistance.Co- administration of this FDC is

contraindicated with astemizole, terfenadine, dihydroergotamine, ergonovine, ergotamine, methylergonovine, cisapride, pimozide, midazolam and triazolam.

PRECAUTIONS:

Drug Interactions-CYP3A Enzyme Inhibition: Lopinavir and ritonavir is a CYP3A inhibitor. Initiating treatment with lopinavir and ritonavir in patients receiving medications metabolized by CYP3A or initiating medications metabolized by CYP3A in patients already maintained on lopinavir and ritonavir may result in increased plasma concentrations of concomitant medications.

Pancreatitis: Pancreatitis has been observed in patients receiving lopinavir and ritonavir therapy, including those who developed marked triglyceride elevations. In some cases, fatalities have been observed. Although a causal relationship to lopinavir and ritonavir has not been established, marked triglyceride elevations are a risk factor for development of pancreatitis.

Hepatotoxicity: Patients with underlying hepatitis B or C or marked elevations in transaminase prior to treatment may be at increased risk for developing or worsening of transaminase elevations or hepatic decompensation with use of lopinavir and ritonavir.

Diabetes Mellitus/Hyperglycemia: New onset diabetes mellitus, exacerbation of preexisting diabetes mellitus and hyperglycemia have been reported during post-marketing surveillance in HIV-1 infected patients receiving protease inhibitor therapy. Some patients required either initiation or dose adjustments of insulin or oral hypoglycemic agents for treatment of these events. In some cases, diabetic ketoacidosis has occurred. In those patients who discontinued protease inhibitor therapy, hyperglycemia persisted in some cases.

PR Interval Prolongation: Lopinavir/ritonavir prolongs the PR interval in some patients. Cases of second or third degree atrioventricular block have been reported. Lopinavir and ritonavir should be used with caution in patients with underlying structural heart disease, preexisting conduction system abnormalities, ischemic heart disease or cardiomyopathies, as these patients may be at increased risk for developing cardiac conduction abnormalities.

QT Interval Prolongation: Cases of QT inteval prolongation and Torsade de pointes have been reported although causality of lopinavir and ritonavir could not be established. Avoid use in patients

with congenital long QT syndrome, those with hypokalemia, and with other drugs that prolong the QT interval.

Immune Reconstitution Syndrome: Immune reconstitution syndrome has been reported in patients treated with combination antiretroviral therapy, including lopinavir and ritonavir. During the initial phase of combination antiretroviral treatment, patients whose immune system responds may develop an inflammatory response to indolent or residual opportunistic infections (such as Mycobacterium avium infection, cytomegalovirus, Pneumocystis jirovecii pneumonia [PCP], or tuberculosis) which may necessitate further evaluation and treatment.

Fat Redistribution: Redistribution/accumulation of body fat including central obesity, dorsocervical fat enlargement (buffalo hump), peripheral wasting, facial wasting, breast enlargement and "cushingoid appearance" have been observed in patients receiving antiretroviral therapy. A causal relationship has not been established.

Lipid Elevations: Treatment with lopinavir and ritonavir has resulted in large increases in the concentration of total cholesterol and triglycerides. Triglyceride and cholesterol testing should be performed prior to initiating lopinavir and ritonavir therapy and at periodic intervals during therapy. Lipid disorders should be managed as clinically appropriate, taking into account any potential drug-drug interactions with lopinavir and ritonavir and HMG-CoA reductase inhibitors.

Patients with Hemophilia: Increased bleeding, including spontaneous skin hematomas and hemarthrosis have been reported in patients with hemophilia type A and B treated with protease inhibitors. In some patients additional factor VIII was given. In more than half of the reported cases, treatment with protease inhibitors was continued or reintroduced. A causal relationship between protease inhibitor therapy and these events has not been established.

Resistance/Cross-resistance: Because the potential for HIV cross-resistance among protease inhibitors has not been fully explored in lopinavir and ritonavir-treated patients, it is unknown what effect therapy with lopinavir and ritonavir will have on the activity of subsequently administered protease inhibitors.

INTERACTIONS:

In vitro, Lopinavir/ritonavir has been shown to be a substrate for, and inhibitor of, CYP3A. In vivo, lopinavir/ritonavir has shown autoinduction and induction of other drugs metabolized by CYP450 enzymes. Therefore, any medication metabolized through the CYP450 enzyme system may interact with lopinavir/ritonavir.

ADVERSE EFFECTS:

The most common adverse effects observed with lopinavir/ritonavir are diarrhea and nausea. Moderate or severe diarrhea occurred in up to 27% of patients, and moderate/severe nausea in up to 16%. Other common adverse effects include abdominal pain, asthenia, headache, vomiting and, particularly in children, rash.

Raised liver enzymes and hyperlipidemia (both hypertriglyceridemia and hypercholesterolemia) are also commonly observed during lopinavir/ritonavir treatment. Lopinavir/ritonavir is anticipated to have varying degrees of interaction with other medications that arealso CYP3A and/or P-gp substrates.

People with a structural heart disease, preexisting conduction system abnormalities, ischaemic heart disease, or cardiomyopathies should use lopinavir/ritonavir with caution. Because of the serious health problems that have been reported in premature babies, use of lopinavir/ritonavir should be avoided in premature babies.

SMT. KASHIBAI NAVALE MEDICAL COLLEGE AND GENERAL HOSPITAL

LIMITED ACCESS & RESTRICTED ANTIMICROBIAL AGENT ORDER FORM

Date & Time: - _____

Name of the patient: - _____

Age/Sex: - _____ Pt. Wt.:- _____

OPD/IPD No. : - _____ Ward: - _____

Treating consultant: - _____

Diagnosis: - _____

LIMITED ACCESS ANTIMICRIBIAL	
☐ Piperacillin-tazobactam	☐ Imipenem-Cilastatin
☐ Meropenem	☐ Tigecycline
RESTRICTED ANTIMICROBIAL AGENTS	
Antibacterial	Antifungal
☐ Rifampicin (other than for *Mycobacterium tuberculosis*) ☐ Polymyxin B ☐ Linezolid ☐ Vancomycin ☐ Teicoplanin ☐ Colistin ☐ Daptomycin	☐ Amphotericin B

Prescribed dosage:

_____

Justification for use:

- ☐ Sepsis with/without septic shock
- ☐ Soft tissue infection
- ☐ Genitourinary infection
- ☐ Joint replacement surgery
- ☐ Bone infection
- ☐ Gastrointestinal surgery
- ☐ Any other----------

Name & Signature of Doctor

Microbiologist opinion:

_____
_____
_____

Pharmacologist Remark:

_____
_____
_____

Note: Filled & Signed from to be submitted to Pharmacy

Prepared by: **Dr.Uma Bhosale**	**Dr.V. A. Muley**	**Approve d by:** **Dr.Krishnakant Patil**
Signature:	**Signature:**	**Signature:**

Summary:

SR.NO	NAME OF ANTIMICROBIAL AGENT	INDICATIONS (Infections)
1.	Oral: cephalexin IV: Cloxacillin, cefazolin	**Methicillin Sensitive Staph. aureus**
2.	Oral: Cotrimoxazole, doxycycline, clindamycin, linezolid IV: vancomycin, teicoplanin, daptomycin, tigecycline	**Methicillin Resistant Staph. aureus**
3.	Ampicillin, then vancomycin, then linezolid (vancomycin-resistant enterococcus:VRE), daptomycin (VRE), tigecycline (VRE)	**Enterococci**
4.	Penicillin, Clindamycin	**Strep. Pyogenes or Strep. Agalactia**
5.	Ceftriaxone, levofloxacin, amoxicillin-clavulanic acid	**Strep pneumonia or viridians group of streptococci**
6.	Oral: ciprofloxacin, levofloxacin IV: pip/taz, ceftazidime, ceftazidime-avibactam, cefepime, Cefoperazone-sulbactam, imipenem-cilastatin, meropenem, aztreonam, aminoglycosides, polymyxins	**Pseudomonas aeruginosa**
7.	Oral: cephalexin, amoxicillin-clavulanic acid, Cotrimoxazole, nitrofurantoin, fosfomycin, ciprofloxacin, Levofloxacin. IV: ceftriaxone, ampicillin-sulbactam, cefepime, piperacillin-tazobactam, ertapenem	**E.coli**
8.	Cotrimoxazole, levofloxacin	**Stenotrophomonas**
9.	Carbapenems, ceftazidime-avibactam, Polymyxins, fosfomycin	**ESBL producers**
10.	Polymyxins, fosfomycin, Ceftazidime-avibactam	**Carbapenem resistant**
11.	Oral: Metronidazole, clindamycin, amoxi-clav, moxifloxacin. IV: ampicillin-sulbactam, piperacillin-tazobactam, meropenem, imipenem, tigecycline	**Anaerobes**
12.	Macrolides, fluoroquinolones, tetracyclines	**Atypicals**

Prepared by: Dr.Uma Bhosale	Dr.V. A. Muley	Approve d by: Dr.Krishnakant Patil
Signature: 	Signature: 	Signature: 

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