

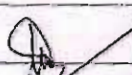
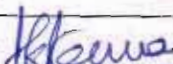
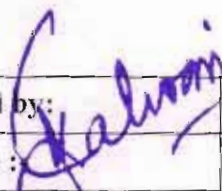
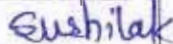


Bharati Hospital & Research Center

Antibiotic Policy

Version - 6.0: 2020



Prepared by:	Verified by:	Approved by:	Issued by:
Signature :- 	Signature :- 	Signature :- 	Signature :- 

Bharati Hospital & Research Centre
Dr. (Col) Mahadevan Kumar
Professor (Dept. of MICROBIOLOGY)
MCI REGN NO : 8272
MOB. NO. 7798225569/8250

Brig (Dr) A K VERMA
MBBS, MD, FIPHA
Reg No. B-19131(Punjab MC)
Dy Medical Director
Bharati Hospital Pune .

Dr. Sanjay Kalwani
Medical Director
Bharati hospital

Dr. Sushila Kawade
Asst. Manager QAD
Bharati Hospital.

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Introduction -

Over the last 60 years antibiotics have been widely used to treat infectious diseases. Their indiscriminate use has led to resistance developing to almost all known antibiotics. Antimicrobial resistance has become widespread not only in hospitals but also in the community.

A rational antibiotic policy and antimicrobial stewardship is a must for all hospitals and is mandated by the Ministry of Health and Family Welfare through its document "National Policy for Containment of Antimicrobial Resistance, India". The purpose of this document is to provide a guide for rational antibiotic use at Bharati Hospital based on local patterns of antimicrobial sensitivity.

Clinical Pathway

1. Resident of respective department will assess patient for symptoms and signs of infection, including laboratory evidence of infection.
2. He/she will document appropriately on the culture requisition form.
 - suspected cause/site of infection,
 - possibly community (CA)/hospital acquired (HA) ○ patient type (types 1-3 described below)
3. Appropriate site cultures and blood cultures will be sent according to HICC protocol.
4. Antibiotic will be chosen according to antibiotic guide after informing lecturer on call and checking for allergy risks.
5. Any deviation from the policy will be documented along with the reason for deviation.

6. Some antibiotics will be part of the restricted formulary and use of these "ALERT" antibiotics will require infectious disease/ critical care (ICU/PICU/NICU) consult. These include
 - Carbapenems, Colistin, Linezolid, Teicoplanin, Vancomycin,
 - Echinocandins, Voriconazole, Amphotericin B
7. Clinical response will be followed.
8. Once culture reports are available (Day 2 – Day 4) antibiotic is to be de-escalated (if possible) and duration of therapy is to be specified if not already done so.
9. Antibiotic prescription should have a record of the day and expected duration of antibiotics in the left-hand margin of the drug chart, eg D4/7
10. Infection control team will fill antibiotic audit form and conduct regular department wise audits.
11. Findings of the audit will drive improvement in antibiotic use.

Common antimicrobial resistant organisms :

Extended spectrum beta-lactamase producers (ESBL)

These are Gram negative organisms (GNB) like E coli & Klebsiella, which are resistant to the penicillins; first-, second and third-generation cephalosporins; In addition, the plasmids bearing genes-encoding ESBLs frequently also carry genes encoding resistance to other antimicrobial agents, such as aminoglycosides, trimethoprim, sulphonamides, tetracyclines and chloramphenicol. They remain susceptible to beta lactam- beta lactamase inhibitor combinations and carbapenems.

Amp C beta lactamases

These are inducible beta lactamases produced by certain organisms after exposure to cephalosporins. The organisms are resistant to the penicillins; first-, second- and third-generation cephalosporins and beta-lactam-beta lactamase inhibitor combinations. They may remain susceptible to cefepime and carbapenems. Seen in *Serratia*, *Pseudomonas*, *Proteus*, *Citrobacter* and *enterobacter* spp.

Metallo beta lactamase producers (MBL):

These are Gram negative organisms resistant to the Carbapenems and almost all beta-lactam antibiotics except monobactams. Colistin and polymyxins are currently used for these organisms.

Methicillin Resistant Staphylococcus aureus (MRSA)

These are resistant to all beta lactam antibiotics (Penicillins, BL-BLI, Cephalosporins, monobactams and Carbapenems.)

Vancomycin Resistant Enterococcus (VRE) :

These isolates are resistant to Vancomycin, Teicoplanin but susceptible to linezolid.

MDR (Multi-drug resistance):

Isolates resistant to representatives of three or more classes of antimicrobial agents,

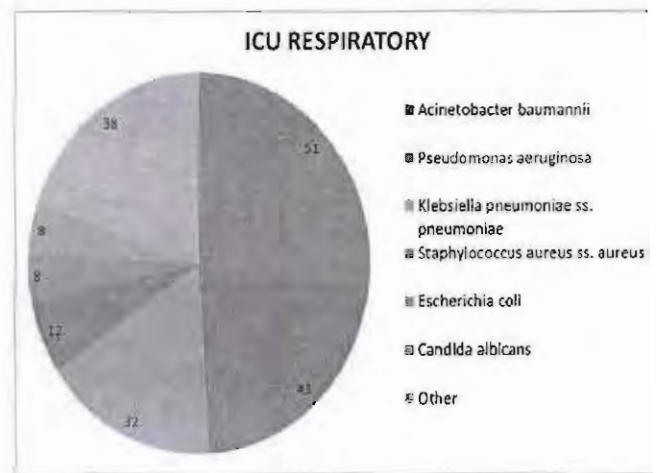
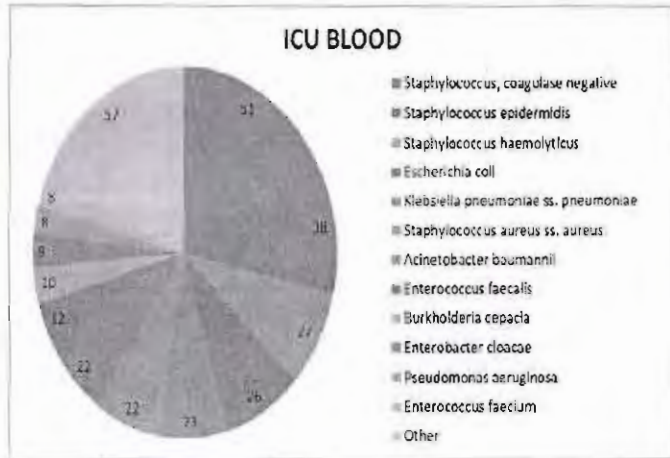
XDR (Extensive drug resistance):

Isolates resistant to all but one or two classes

PDR (Pan drug resistance):

Isolates resistant to all classes of antimicrobial agents available

Organisms commonly isolated: Area wise



MEDICINE

PUS



- Escherichia coli
- Staphylococcus aureus ss. aureus
- Pseudomonas aeruginosa
- Klebsiella pneumoniae ss. pneumoniae
- Acinetobacter baumannii
- Staphylococcus, coagulase negative
- Other

MEDICINE

URINE



- Escherichia coli
- Klebsiella pneumoniae ss. pneumoniae
- Enterococcus faecium
- Pseudomonas aeruginosa
- Acinetobacter baumannii
- Staphylococcus, coagulase negative
- Enterococcus faecalis
- Others

MEDICINE

BLOOD



- Staphylococcus, coagulase negative
- Klebsiella pneumoniae ss. pneumoniae
- Staphylococcus haemolyticus
- Escherichia coli
- Staphylococcus epidermidis
- Enterobacter cloacae
- Staphylococcus aureus ss. aureus
- Other

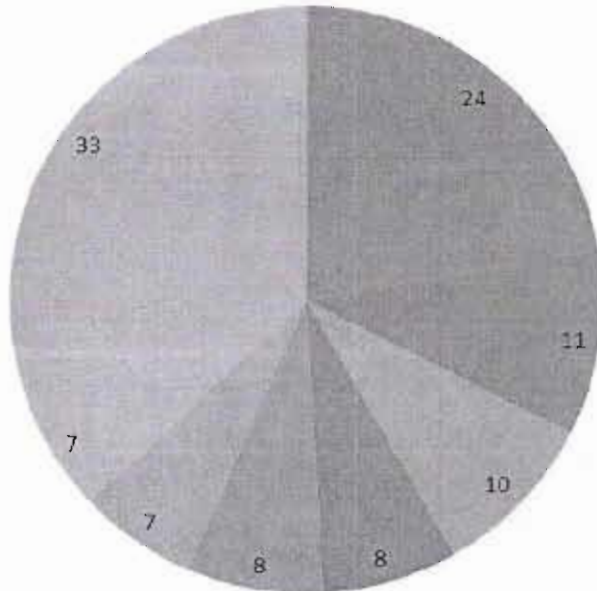
RESPIRATORY



- Klebsiella pneumoniae ss. pneumoniae
- Pseudomonas aeruginosa
- Acinetobacter baumannii
- Streptococcus sp.
- Others

ORTHOPEDICS

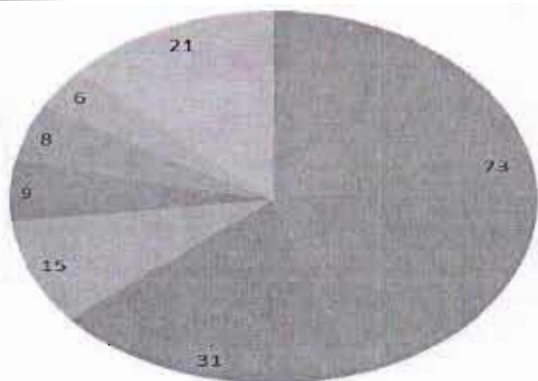
PUS



- Staphylococcus aureus ss. aureus
- Pseudomonas aeruginosa
- Escherichia coli
- Klebsiella pneumoniae ss. pneumoniae
- Staphylococcus, coagulase negative
- Acinetobacter baumannii
- Enterococcus faecium
- Others

SURGERY

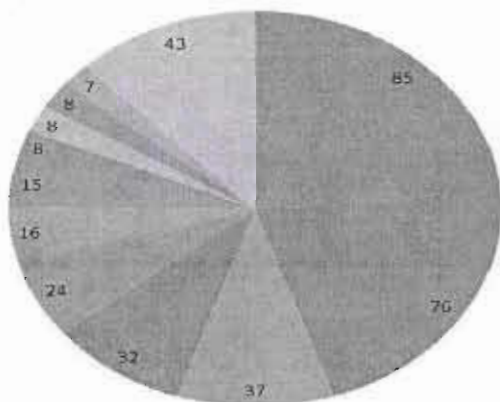
URINE



- Escherichia coli
- Klebsiella pneumoniae ss. pneumoniae
- Pseudomonas aeruginosa
- Enterococcus faecalis
- Enterococcus faecium
- Enterobacter cloacae
- Others

SURGERY

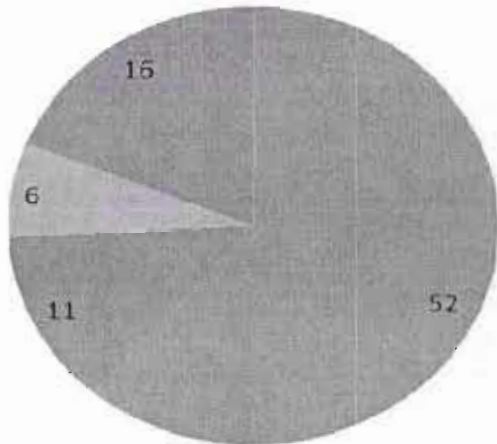
PUS



- Escherichia coli
- Staphylococcus aureus ss. aureus
- Pseudomonas aeruginosa
- Klebsiella pneumoniae ss. pneumoniae
- Staphylococcus, coagulase negative
- Staphylococcus epidermidis
- Acinetobacter baumannii
- Morganella morganii ss. morganii
- Enterobacter cloacae
- Proteus mirabilis
- Staphylococcus haemolyticus
- Others

OBST & GYNAE

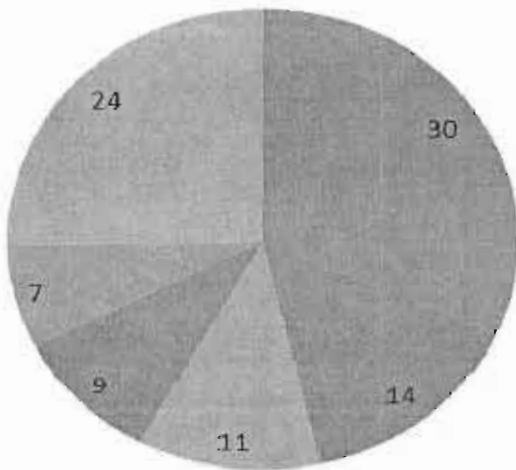
URINE



- Escherichia coli
- Klebsiella pneumoniae ss. pneumoniae
- Enterococcus faecalis
- Others

OBST & GYNAE

PUS



- Escherichia coli
- Staphylococcus, coagulase negative
- Staphylococcus aureus ss. aureus
- Klebsiella pneumoniae ss. pneumoniae
- Staphylococcus epidermidis
- Others

Antibiotic Sensitivity Gram Positive organisms 2019 – OPD

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																				
			COTRIMOXAZOLE	NITROFURANTOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAXONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN	TEICoplanin
Blood	Staphylococcus, coagulase negative	3	50		50	50			50	50		50	100		100		50	100	100	100	100		
	Staphylococcus epidermidis	3	0	0	0				66.7	66.7		0	100	33.3	100		66.7	100	100	100	100	66.7	
	Staphylococcus haemolyticus	1	100		0	0			0	0		0	100	0	100		0	100	100	100	100	100	100
Pus	Enterococcus avium	1			100				100	100		0			100		100	100	0	100	100		
	Enterococcus faecalis	11			81.8				36.4	45.5	18.2			54.5	100		27.3	100	100	100	81.8	81.8	
	Enterococcus faecium	2			0				0	0	0			50			0	100	100	50	50		
	Enterococcus sp.	2			0				0	0	0						0	100	100	100	100	100	
	Staphylococcus aureus ss. aureus	123	54.1	7.4	45.1				18.9	21.3	46.7	58.2	78.7		100		94.3	100	98.4	91	95.1		
	Staphylococcus, coagulase negative	30	59.3	11.1	26.9				33.3	33.3	22.2	59.3	70.4		100		81.5	100	100	100	100	96.3	
	Staphylococcus epidermidis	18	55.6	0	27.8				50	50	44.4	55.6	77.8		100		72.2	100	100	83.3	83.3		
	Streptococcus agalactiae	3			100					50							0	100	100	100	100		
	Staphylococcus haemolyticus	5	20	20	0				0	0	20	0	20		100		40	100	100	100	100	100	
	Streptococcus pyogenes	3	100	100	100		100	100		0	0	0	0				100	100	100	100	100	100	
Streptococcus sp.	7			100	100		100	100		100	100					100	100	100	100	100	100		
Semen	Staphylococcus aureus ss. aureus	1	100	100	0	0			0	0	0	0	0		100		0	100	100	100	100	100	
	Staphylococcus, coagulase negative	2	50	100	0	50			0	0	0	0	50		100		50	100	100	100	100	100	
	Staphylococcus haemolyticus	1	100	100	0	0			0	0	0	0	0		100		100	100	100	100	100	100	
Urine	Enterococcus faecalis	8		75	100				12.5	12.5	0			37.5	100		0	100	87.5	85.7	75		
	Enterococcus faecium	7		14.3	28.6				0	0	0			14.3			42.9	100	71.4	57.1	57.1		
	Enterococcus sp.	5		20	20				20	20	20			40			20	100	100	60	60		
	Staphylococcus saprophyticus	3	66.7	100	0	100			100	100	0	33.3	100		100		100	100	100	100	100	100	
	Staphylococcus aureus ss. aureus	9	77.8	88.9	11.1	75			22.2	11.1	33.3	62.5	77.8		100		77.8	100	100	88.9	100		
	Staphylococcus, coagulase negative	11	36.4	90.9	0	0			18.2	18.2	9.1	18.2	63.6		100		27.3	100	100	90.9	90.9		
	Staphylococcus epidermidis	1	0	100	0	0			0	0	0	0	0		100		0	100	100	100	100	100	
	Streptococcus agalactiae	3		66.7	100					66.7								33.3	100	100	100	100	
	Staphylococcus haemolyticus	5	80	100	0	20			20	60	20	40	80		100		60	100	100	100	100	100	
	Streptococcus sp.	2			100	100		100	100		0	100					100	0	100	100	100	100	
OTHER	Staphylococcus saprophyticus	1	100		0	100			100	100	0	0	100		100		100	100	100	100	100	100	
	Staphylococcus, coagulase negative	2	50		0	50			100	100	50	50	100		100		50	100	100	100	100	100	

Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Negative organism 2019 -OPD

Specimen Type	Organism	Number of patients	Antibiotics																											
			NALIDIXIC ACID	LEVOFLOXACIN	CIPROFLOXACIN	MORFLOXACIN	NITROFURANTOIN	COTRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	TICARCILLIN	TICARCILLIN/CLAVULANIC ACID	CEFUROXIM E	CEFTAZIDIM E	CEFIXIM E	CEFTRIAXONE	CEFOTAXIME	ICEFEPIM E	CEFOPERAZONE/SALBACTAM	PIPTAZ	AZTREONAM	AMIKACIN	GENTAMYCIN	DORIPENEM	ERTAPENEM	IMIPENEM	MEROPENEM	MINDIYCLINE	TIGECYCLINE	FOSEFOM YCIN
Blood	Enterobacter cloacae	4	75		75		75	25							25	0	75	100	50		100	25		100	100	100		100	100	
	Klebsiella pneumoniae ss. pneumoniae	1	0	100	100	100	0	0	0		0				0	0	100	100	0		100	0		100	100	100		100	100	
	Pseudomonas aeruginosa	1		100													100	100	100		100	100			100	100		0	100	
Fluid	Enterobacter cloacae	1	100	100			100			100		100				100	100	100	100	100	100	100	100	100	100	100	0	100	100	
	Escherichia coli	2	0	0	100	0	0	50			0				0	0	50	100	50		100	100	100	100	100	100	100	100	100	
PUS	Acinetobacter baumannii	7		33			50							0		33	33	33			33			33	33		100	100		
	Enterobacter aerogenes	1	0	0	0	0	0	0			0			0	0	0	0	0	0		0	0		0	0	0	0	0	100	
	Enterobacter cloacae	6	100	100	100	50	100	0		0	100		100	100	0	100	83	83	0	100	100	0	100	83	83	100	100	100	100	
	Escherichia coli	50	4	24		80	46	6	40		12		16	12	66	80	76		90	72		82	84	86	98	96				
	Klebsiella oxytoca	1	100	100		100	100	0	100		100		100	100	100	100	100		100	100		100	100	100	100		100	100	100	
	Klebsiella pneumoniae ss. pneumoniae	27	56	44		30	63	0	30		33		44	33	82	82	67		85	78		89	89	89	89	89	78	93		
	Pseudomonas aeruginosa	55	50	67							33		79			87	82	80		78	69	88		89	85	0	100	0	94	
	Proteus mirabilis	8	25	25	0	38	38	75			38		38	38	38	88	88		50	50		88	0	100	0	0	0	0	0	
	Semen	Acinetobacter baumannii	1		100		100								100	100	100					100	100		100	100		100	100	
Pseudomonas aeruginosa		1	100	100						0	100				100	100	100		100	100	100	100	100	100	100		0	100		
Stool	Escherichia coli	2	0	0	100	50	0	50		0		0	0	0	0	0	100	100		100	100	100	100	100	50	100	100	100		
Urine	Acinetobacter baumannii	8	0	50		57		33		50		29		0	0	57			57		0	100	100		100	100	100	100		
	Enterobacter aerogenes	1	0	0	0	100	100	0	0		0	0	0			0			100	0		0					100			
	Enterobacter cloacae	6	25	0	25	25	40	60	0	25	0	50	25	20	0	0	60		80	80		60	0	0	0	0	20	100		
	Escherichia coli	228	10	20	34	43	86	48	22	53	25	0	23	57	34	37	23	50	70	80	0	91	71	100	92	83	100	45	87	99
	Klebsiella oxytoca	3	33	33	33	33	100	0	0	33		33	33	33			33		67	33		33					100			
	Pseudomonas aeruginosa	30	26	18	0					0	18		30				35	40	30		33	33	47		35	41	0	0	75	
OTHER	Klebsiella pneumoniae ss. pneumoniae	1	0	0	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	
RESPIRATORY	Acinetobacter baumannii	1		0		100								0	0	0	0			0		0		0	0	0	100	100		
	Escherichia coli	1	0	0	100	100	0	0		0		0	0	0	0	0	0		100	100		0	0	0	0	0	100	100		
	Klebsiella oxytoca	1	100	100		100	100	0	0		0		0	0	0	0	0		0	100		0	0	0	0	0	100	100		
	Klebsiella pneumoniae ss. pneumoniae	2	100	100		0	100	0	50		100		100	50	100	100	100		100	100		100	100	100	50	100	50	100		
	Pseudomonas aeruginosa	5	75	50							0	100					100	100	75		100	100	100	100	100	100	0	100		

Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Positive organisms 2019 – Medicine

Specimen type	Organism	Number of patients	Antibiotic Sensitivity (%)																			
			COTRIMOXAZOLE	NITROFURANTOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAXONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVE	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN
Blood	<i>Enterococcus faecalis</i>	3	100	67					33	33	0			33	100		33	100	100	100	100	100
	<i>Enterococcus faecium</i>	4	0	0					0	0				50			0	100	75	75	75	75
	<i>Staphylococcus saprophyticus</i>	1	100	100	0		100		100	100		100	100	100	100	100		100	100	100	100	100
	<i>Staphylococcus aureus ss. aureus</i>	6	50	100	0		17		0	0	33	17	50		100		83	100	100	100	100	100
	<i>Staphylococcus, coagulase negative</i>	22	74	84	11		21		63	58	21	56	95		100		79	100	100	90	95	95
	<i>Staphylococcus epidermidis</i>	11	64	100	9		27		64	64	18	27	73		100		91	100	100	100	100	91
RESPIRATORY	<i>Staphylococcus aureus ss. aureus</i>	2	100	100	0		0		50	50	0	50	100		100		50	100	100	50	50	50
	<i>Staphylococcus epidermidis</i>	1	100	100	0		0		100	100	0	100	100				0		100	0	0	0
	<i>Staphylococcus haemolyticus</i>	1	0	100	0		0		0	0	0	0	0		100		0	100		100	100	100
	<i>Staphylococcus, coagulase negative</i>	3	100	100	0		0		25	25		25	25	50	100		100	100	100	100	100	100
	<i>Streptococcus pyogenes</i>	1	100		100	100		100	100	100	100	100	100				100	100	100	100	100	100
	<i>Streptococcus sp.</i>	7			0	0		17	17	0	50	0	0				67	0	100	100	100	100
CSF	<i>Staphylococcus, coagulase negative</i>	1	0	100	0		0		100	100		0	0	100	100		100	100	100	100	100	100
	<i>Staphylococcus haemolyticus</i>	1	100	100	0		0		100	100	0	0	100		100		0	100	100	100	100	100
Fluid	<i>Enterococcus faecalis</i>	1		100	100				0	0	0			0	100		0	100	100	100	100	100
	<i>Enterococcus faecium</i>	1		0	0				0	0	0			0			100	100	100	100	100	100
	<i>Staphylococcus aureus ss. aureus</i>	1	100	100	0		0		0	0	0	0	100		100		100	100	100	100	100	100
	<i>Staphylococcus, coagulase negative</i>	1	100	100	0		0		100	100	0	0	100				100	100	100	100	100	0
	<i>Staphylococcus epidermidis</i>	6	83	83	0		0		50	50	17	17	100		100		67	100	100	100	100	100
	<i>Staphylococcus haemolyticus</i>	1	0	100	0		0		0	0	0	0	0		100		100	100	100	100	100	100
Other	<i>Staphylococcus aureus ss. aureus</i>	1	0	100	0		100		0	0	0	0	0	100		100	100	100	100	100	100	
Pus	<i>Enterococcus faecalis</i>	3		100	67				0	33	33			33	100		33	100	100	100	100	100
	<i>Staphylococcus aureus ss. aureus</i>	13	46	100	8		69		8	8	39	69	85		100		92	100	100	100	100	100
	<i>Staphylococcus, coagulase negative</i>	7	86	100	0		29		57	57	29	43	86		100		57	100	100	71	71	71
	<i>Staphylococcus epidermidis</i>	1	0	100	0		0		0	0	0	0	0		100		0	100	100	100	100	100
	<i>Streptococcus agalactiae</i>	1	100							100	0	0	0				100	0	100	100	100	100
	<i>Staphylococcus haemolyticus</i>	2	0	100	0		0		0	0	0	0	0		100		50	100	100	100	100	100
Urine	<i>Enterococcus faecalis</i>	6		83	67				0	17	0			0	100		17	100	83	83	100	100
	<i>Enterococcus faecium</i>	24		0	0				0	0	0			0			18	100	73	59	64	64
	<i>Enterococcus gallinarum</i>	1		0	100				0	0	0			0			0	100	0	0	0	0
	<i>Staphylococcus aureus ss. aureus</i>	5	100	100	0		25		0	0	40	40	60		100		60	100	100	80	80	100
	<i>Staphylococcus, coagulase negative</i>	9	56	67	0		11		44	44	22	22	56		100		33	100	100	56	56	56
	<i>Staphylococcus epidermidis</i>	3	67	33	0		0		0	0	67	0	67		100		100	100	100	100	100	100
<i>Staphylococcus haemolyticus</i>	1	0	100	0		0		0	0	0	0	0		100		100	100		100	100	100	

■ Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Negative organism 2019 – Medicine

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																								
			NALIDIXIC ACID	NORFLOXACIN	LEVOFLOXACIN	CIPROFLOXACIN	NITROFURATOIN	COTRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	CEFUROXIME	CEFTAZIDIME	CEFIXIME	CEFTRIAXONE	CEFOTAXIME	CEFTIPIME	CEFOPERAZONE/SALBACTAM	AZTREONAM	PIPTAZ	AMIKACIN	GENTAMYCIN	DOBRIPENEM	ERTAPENEM	IMIPENEM	MEROPENEM	MINOCYCLINE	TIGECYCLINE
Blood	<i>Acinetobacter baumannii</i>	1			100	100						100	100	100	100	100	100	100	100		100	100	100	100	100	100	1
	<i>Enterobacter cloacae</i>	7			29	57	0	14			29	14	57	85	86	86	43	71	71	86		71			71		1
	<i>Escherichia coli</i>	11		100	27	64	10	10	10	100	10	10	73	82	0	82	91	73	100	90	91	91	100	100	100	100	1
	<i>Klebsiella oxytoca</i>	1			100	100	0	100	100			100	100	100	100	100	100	100		100	100	100			100		1
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	10		0	29	41	0	31	31	0		30	31	59	65	0	59	65	41	0	63	65	65	0	59		1
	<i>Pseudomonas aeruginosa</i>	2		50	50					50			50	50		50	50	50	50		50	50			50	50	0
Fluid	<i>Acinetobacter baumannii</i>	2		100	50	50				100	0	50	50		50	50	100		50	50	100	100	100	100	100	100	1
	<i>Enterobacter cloacae</i>	3			100	100	0	0			100	0	100	100	100	100	100	100		100	100	100			67		1
	<i>Escherichia coli</i>	5			20	60	0	20	0		0	0	40	40	40	80	60		40	40	40			100			1
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	4			25	50	0	25	0			25	0	100	100	100	100	25		100	100	100			100		1
	<i>Pseudomonas aeruginosa</i>	1		100	100					100			100	100	100	100	100	100	100		100	100			100	100	0
Pus	<i>Acinetobacter baumannii</i>	7			0	14					0	0	14	0	0	14	0	0		0	0		0	0	100		1
	<i>Enterobacter aerogenes</i>	1			100	100	0	0			100	0	100	100	100	100	100	100		100	100	100			100		1
	<i>Enterobacter cloacae</i>	2			50	50	0	0			50	0	50	100	50	100	50		100	100	100			50			1
	<i>Escherichia coli</i>	16		0	19	50	40	27	100		27	27	75	75	100	69	88	69	100	73	75	69	100	94			1
	<i>Klebsiella sp.</i>	1			0	0	0	0			0	0	0	0	0	0	0	0		0	0	0		0	0		1
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	11			27	27	16	27			46	27	55	46	46	64	46		64	55	64			55			1
	<i>Pseudomonas aeruginosa</i>	11		50	45					67			82	82	73	82	73	89		73	73			73	73	0	
Stool	<i>Acinetobacter baumannii</i>	1			0	0					0	0	100	100	100	100		100	100		100	100			100		1
	<i>Escherichia coli</i>	17	0	0	5.9	88	35	6.2	10	13	0	19	6.2	47	77	0	77	100	88	100	94	88	94	0	100		1
urine	<i>Acinetobacter baumannii</i>	9			17		67					17	17	17	17	17		17		17			67	67	83		1
	<i>Enterobacter cloacae</i>	2			0	0	100	0	0			50	0	100	50	50	50		50	50			50	100	50		1
	<i>Escherichia coli</i>	116	7.7	17	9.7	23	79	40	15	36	16	33	33	18	14	43	66	62	86	63	75	75	86	60	97	95	1
	<i>Klebsiella oxytoca</i>	2			0	0	50	50	0			0	0	0	100	50	100	100		100	100			50	50	100	1
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	38	40	0	24	40	18	40	0	18	22	0	0	24	22	28	38	37	47	45	40	36	67	21	50	51	1
<i>Pseudomonas aeruginosa</i>	23			10	21	0				21			26	30	30	30	31		30	29	0	0					1
RESPIRATORY	<i>Acinetobacter baumannii</i>	14			3.3	27						3.3	3.3	3.3	3.3	3.3		3.3		3.3	3.3			93			1
	<i>Enterobacter cloacae</i>	3			100	67	0	0			67	0	67	67	67	100	100		67	67	67			100			1
	<i>Escherichia coli</i>	4			0	17	0	17	0			0	0	17	17	17	17		17	17	17			100			1
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	23			40	74	0	41	17			41	41	72	67	64	77	74		64	72	67			94		1
<i>Pseudomonas aeruginosa</i>	23			35	30					47			62	48	44	76	57	64		64	48			0			1

Reserve Antibiotic Use with Caution

Antibiotic Sensitivity Gram Positive organisms 2019 – ICU

Specimen type	Organism	Number of patients	Antibiotic Sensitivity (%)																				
			COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAXONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN	TEICOPLANIN
Blood	Enterococcus faecalis	12	92	100	100				35	33		0		50	100		33	100	92	83	83		
	Enterococcus faecium	8	0	0				0	0					13			13	100	100	75	75		
	Enterococcus hirae	1	0	100				100	100		100			100			100	100	100	100	100		
	Staphylococcus saprophyticus	1	100	100	0	100		100	100		100	100	100	100	100	100	100	100	100	100	100		
	Staphylococcus aureus ss. aureus	22	57	100	0	67		24	24	57	67	81		100			91	100	100	95	100		
	Staphylococcus, coagulase negative	51	70	94	21	42		62	66	30	60	94		100			89	100	100	98	87		
	Staphylococcus epidermidis	38	53	100	5	16		26	26	13	71	79		100			66	100	100	97	92		
	Staphylococcus haemolyticus	27	37	96	7	7		11	11	7	37	19		100			70	100	100	96	93		
	Streptococcus pneumoniae	3	100		100			100	100		100	100		100						100	100		
	Streptococcus pyogenes	2	100		100	100		100	100	100	100	100		100			0	100	100	100	100		
Cerebrospinal fluid	Enterococcus faecium	1	0	0				0	0		0		0			0	100	100	100	100			
	Staphylococcus, coagulase negative	7	71	100	14	29		86	86	14	43	86		100			86	100	100	71	71		
	Staphylococcus epidermidis	1	0	100	0	0		0	0	0	0	100		100			0	100		0	0		
Fluid	Staphylococcus haemolyticus	2	0	100	0	0		0	0	0	0	50		100			50	100	100	100	100		
	Enterococcus faecium	1	0	0				0	0		0			0			0	100	100	100	100		
	Staphylococcus, coagulase negative	2	100	100	0	0		100	100	0	0	100		100			100	100	100	100	100		
	Staphylococcus epidermidis	2	50	100	0	0		100	100	50	100	50		100			50	100	100	100	50		
Pus	Staphylococcus haemolyticus	3	0	100	50	50		50	50	50	50	50		100			50	100	100	100	100		
	Enterococcus faecalis	3	33	33				33	33	0				0	100		33	100	33	33	67		
	Enterococcus faecium	4	0	0				0	0	0	0			0			0	100	75	0	0		
	Staphylococcus aureus ss. aureus	18	41	100	0	47		6	6	24	53	82		100			100	100	100	100	100		
	Staphylococcus, coagulase negative	7	83	83	17	33		83	83	50	50	83		100			83	100	100	100	100		
	Staphylococcus epidermidis	1	100	100	0	0		100	100	0	0	100		100			100	100	100	100	100		
	Staphylococcus haemolyticus	1	100	100	0	0		0	0	0	0	0		100			100	100	100	100	100		
	Streptococcus pyogenes	1	100	100	100	100	100	100	100	100	100	100		100			100	100	100	100	100		
Urine	Streptococcus sp.	3		0	100	100	100	100	100	100	100					100	100	100	100	100			
	Enterococcus faecalis	6	83	67				0	17	0				33	100		0	100	100	83	83		
	Enterococcus faecium	11	9	0				0	0	0				27			36	100	82	55	55		
	Enterococcus hirae	1	0	100				100	100	100				0			100	100	100	100	100		
	Staphylococcus saprophyticus ss. saprophyticus	1	100	100	0			0	0	0	0	100		100			100	100	100	100	100		
	Staphylococcus aureus ss. aureus	3	100	100	0	100		0	0	67	100	100		100			100	100	100	100	100		
	Staphylococcus, coagulase negative	4	50	75	0	0		25	25	0	0	0		100			25	100	100	75	75		
Staphylococcus haemolyticus	1	100	100	0	0		0	0	0	0	0		100			0	100	100	100	100			
RESPIRATORY	Enterococcus faecium	3	50	50				75	75	0				50			75	100	75	25	75		
	Staphylococcus aureus ss. aureus	12	79	100	0	30		11	11	48	54	84		100			90	100	100	100	100		
	Staphylococcus epidermidis	2	0	100	0	50		0	0	100	100	100		100			100	100	100	100	100		
	Staphylococcus haemolyticus	2	0	100	0	0		0	0	0	50	0		100			50	100	100	0	50		
	Staphylococcus, coagulase negative	1	100	100	0			0	0	100	100	100		100			100		100	100	100		
	Streptococcus pneumoniae	1	100	100				100	100		100	100		100						100	100		
	Streptococcus sp.	3		50	50			50	50	50	75	50					100	50	100	100	100		
	Streptococcus, beta-haem. Group A	2	100	100	100	100	100	100	100	100	100	100					100	100	100	100	100		

Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Negative organism 2019 – ICU

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																							
			NAIPIXIC ACID	LEVOFLOXACIN	CIPROFLOXACIN	NITROFURANTOIN	CETRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	CERUROKIME	CERTAZIDIME	CERIVIME	CETRINAXONE	CEFOFOXIME	CEFEPIME	CEFOPIAZONE/SALBUTAM	PIPIZ	AMIKACIN	GENTAMYCIN	DORIPETEM	ERTAPENEM	IMIPENEM	MEROPENEM	MINOCYCLINE	TIGECYCLINE	CEFTAZIDIME
BLOOD	<i>Acinetobacter baumannii</i>	22	0	18	55				0		0		14	18	14	100	23	0		14	14	100	86		96	
	<i>Enterobacter cloacae</i>	9		44	22	72		0	0		14	0	57	78	78	89	14		89	89	78		89		78	
	<i>Escherichia coli</i>	26	0	23	96	43	13	40	12			16	12	52	80	72	88	96		84	84	83	100	96	100	100
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	23		31	26	75	0	30	22			27	22	57	48	43	69	82		57	57	81		51		96
	<i>Pseudomonas aeruginosa</i>	8	71	75							71			75	75	75	85	88	71		75	75		0		100
	<i>Burkholderia cepacia</i>	10	50	0	88					50				0							75	25	50			
PUS	<i>Acinetobacter baumannii</i>	12		0	98								0	17	83					83	83		100		100	
	<i>Enterobacter cloacae</i>	6		30	17	98		0	0		30	0	50	50	50	50	50		50	50	50		50		83	
	<i>Escherichia coli</i>	25		12	80	52	4	40	8		8	8	52	76	52	88	68		79	83	84		100		100	
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	18		33	67	41	0	33	27		40	20	60	53	53	60	60		60	60	60		53		93	
	<i>Pseudomonas aeruginosa</i>	12	10	33							10			50	50	46	50	50	60		58	58		0		97
Proteus mirabilis	7	0	33	0	71	33	33	67	100		83	67	86	100	100	100	71		100	14	100	0	0		0	
Cerebrospinal fluid	<i>Enterobacter cloacae</i>	1		0	0	0		0	0		0	0	0	0	0	100	0		100	100	100		0		100	
Fluid	<i>Acinetobacter baumannii</i>	1		0	0								0	0	0	0	0			0	0		100		100	
	<i>Escherichia coli</i>	4		25	75	47	25	40	0		25	0	50	75	75	100	50		75	75	75		100		100	
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	3		33	0	33	0	33	33		33	33	100	67	33	100	33		67	67	33		33		100	
	<i>Pseudomonas aeruginosa</i>	2	0	50							0			50	50	50	100	50	100		100	100		0		100
Other	<i>Klebsiella pneumoniae ss. pneumoniae</i>	1		0	100	0	0	0	0		0	0	100	100	100	100	0		100	100	100		100		100	
Stool	<i>Escherichia coli</i>	10	0	0	78	22	0	56	0			11	0	44	100	100	100	50		100	100	100	100	100	100	100
	<i>Pseudomonas aeruginosa</i>	1	100	100						100				100	100	100	100	100		100	100		0		100	
Urine	<i>Acinetobacter baumannii</i>	6	17		83						17		17	33	17	50				17	33	83		83		
	<i>Enterobacter aerogenes</i>	1	0		100		0	0			0	0	0	0	0	0	0		0	0	0		100	0	100	
	<i>Enterobacter cloacae</i>	5	40		60		0	0			40	0	50	50	50	50	75		50	50		75	50	75	75	
	<i>Escherichia coli</i>	73	14	14	14	76	47	0	32	57	30	50	97	57	30	69	49	86	86	78	80	60	55	94	97	99
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	35	0	24	0	86	57	0	26	17		20	14	28	31	26	46	40		34	34	100	35	40	51	86
	<i>Pseudomonas aeruginosa</i>	15	27	40							27			40	47	20	53	80	80		43	40		0		64
	<i>Proteus mirabilis</i>	11	0	0	0	10	0		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	29	0
RESPIRATORY	<i>Acinetobacter baumannii</i>	51	100	16	36						6		16	23	16	100	16	0		16	16	100	97		99	
	<i>Enterobacter cloacae</i>	1		100	0	100		0	0		100	0	100	100	100	100	100		100	100	100		100		100	
	<i>Escherichia coli</i>	8		42	92	33	38	75	38		38	30	92	92	92	100	92		92	92	92		100		100	
	<i>Klebsiella oxytoca</i>	1		100	100	0	0	0	0		0	0	100	100	100	100	0		100	100	100		100		100	
	<i>Pseudomonas aeruginosa</i>	45	88	80							75		100	75	80	81	82	80	80		78	79		2.6		94

Reserve Antibiotic - Use with Caution

ORTHOPAEDICS Sensitivity Gram Positive Organism 2019

Specimen type	Organism	Number of patients	Antibiotic Sensitivity (%)																						
			COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOXATIME	CEFTRIAZONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN	TEICoplanin		
Blood	Staphylococcus saprophyticus	1	100	100	0		100			100	100	100	100	100		100		100	100	100	100	100	100		
	Staphylococcus aureus ss. aureus	3	100	100	0		66.7			0	0	0	66.7	66.7		100		100	100	100	100	100	100		
	Staphylococcus haemolyticus	1	0	100	0		0			0	0	0	100	0		100		100	100	100	100	100	100	100	
Fluid	Staphylococcus aureus ss. aureus	2	100	100	0		0			0	0	0	100	100		100		100	100	100	100	100	100	100	
	Streptomyces sp.	2			100	100		100	100		0	0	0	0			100	100	100	100	100	100	100		
Pus	Enterococcus casseliflavus	3		100	100					50	50	0			50			50	100	100	0	100	100		
	Enterococcus faecalis	1		100	100					0	0	0			0	100		0	100	100	100	100	100	100	
	Enterococcus faecium	7		0	0					0	0	0		14.3			14.3	100	57.1	71.4	71.4	71.4	71.4		
	Staphylococcus aureus ss. aureus	24	75	100	8.3		58.3			8.3	12.5	54.2	70.8	91.7		100		95.8	100	100	95.8	100	100		
	Staphylococcus, coagulase negative	8	50	87.5	0		12.5			25	25	0	12.5	50		100		50	100	100	87.5	87.5	87.5		
	Staphylococcus epidermidis	4	100	100	0		0			66.7	100	33.3	0	66.7		100		100	100	100	66.7	66.7	66.7	66.7	
	Streptococcus agalactiae	1		100	100						0							100	100	100	100	100	100	100	
	Staphylococcus haemolyticus	1	100	100	0		0			0	0	0	0	0		100		100		100	100	100	100	100	
	Streptococcus pneumoniae	1	100		100				100	100			100	100	100						100	100	100	100	100
	Streptococcus pyogenes	1	100		100	100		100	100		100	100	100	100			100	100	100	100	100	100	100	100	100
Urine	Enterococcus faecalis	2		100	50					0	0	0		50	100		0	100	100	100	100	100	100	100	
	Enterococcus faecium	1		100	100					0	0	0		0			0	100	100	100	100	100	100	100	
	Staphylococcus aureus ss. aureus	2	50	100	0		50			0	0	0	50	50		100		100	100	100	50	100	100	100	

Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Negative organism 2019 – Orthopedic

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																													
			NALIDIXIC ACID	NORFLOXACIN	LEVOFLOXACIN	CIPROFLOXACIN	NITROFURANTOIN	CO-TRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	CEFUROXIME	CEFTAZIDIME	CEFIXIME	CEFTRIAXONE	CEFO-TAXIME	CEFEPIME	CEFOPERAZONE/SULBACTAM	PIPI-TAZ	AZTREONAM	AMIKACIN	GENTAMYCIN	DORPENEM	ERTAPENEM	IMPENEM	MEROPENEM	MINOCYCLINE	TIGECYCLINE	FOSFOMYCIN	COLISTIN			
Blood	<i>Escherichia coli</i>	2	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
	<i>Pseudomonas aeruginosa</i>	1			100	100	100						100	100	100	100	100	100	100	100		100	100	100	100	100	100	100	100	100	100	100
Pus	<i>Acinetobacter baumannii</i>	7			14.3	28.6						14.3	14.3	14.3	0	100	14.3			14.3	14.3		100	100		100	100		100	100		
	<i>Enterobacter cloacae</i>	5	80		80	20	100		0	0		80	0	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	
	<i>Escherichia coli</i>	10	70		70	70	100	0	0	10		70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	<i>Klebsiella oxytoca</i>	1	100		100	100	100	0	100	100		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	8	50		25	37.5	25	0	25	37.5		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
	<i>Pseudomonas aeruginosa</i>	11			63.6	72.7						81.8			81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8
	<i>Escherichia coli</i>	1	0		0	0	0	0	100	0		0	0	100	100	0	100	100	0	100	100	0	100	100	100	100	100	100	100	100	100	100
Urine	<i>Acinetobacter baumannii</i>	2		0		0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100		
	<i>Enterobacter cloacae</i>	1		0		0	100		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100		
	<i>Escherichia coli</i>	15	0	0	0	0	80	66.7	0	33.3	16.7	0	0	20	8.3	33.3	83.3	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	3		33.3		0	0		33.3	0		0	0	0	0	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	33.3	100	

Reserve Antibiotic - Use with Caution

SURGICAL WARDS Sensitivity Gram positive organisms 2019

Specimen type	Organism	Number of patients	Antibiotics																			
			COTRIMOXAZOLE	NITROFURANTOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAZONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN
Blood	Enterococcus faecalis	2		100	100				100	100		50		100	100		50	100	100	100	100	100
	Staphylococcus aureus ss. aureus	3	100	100	0	66.7		33.3	33.3		33.3	66.7	100	100	100	100	100	100	100	100	100	
	Staphylococcus epidermidis	4	50	100	25	25		25	25		25	25	50	100	100	75	100	100	100	100	75	
	Staphylococcus haemolyticus	3	33.3	100	0	0		0	0		0	66.7	33.3	100	100	66.7	100	100	100	100	100	
RESPIRATORY	Staphylococcus aureus ss. aureus	5	62.5	100	12.5	25		25	25		25	50	100	100	100	100	100	100	100	100	100	
	Staphylococcus, coagulase negative	1	0	100	0	0		0	0		100	0	100			100	100	100	0	0		
	Staphylococcus epidermidis	2	100	100	0	50		50	50		0	50	100	100	100	50	100	100	100	100		
Cerebrospinal Fluid	Staphylococcus, coagulase negative	1	100	100	100	100		100	100		0	100	100	100	100	100	100	100	0	100		
	Staphylococcus haemolyticus	2	100	100	0	0		0	0		0	0	0	100	100	100	100		100	100		
	Streptococcus sp.	1																				
Pus	Enterococcus avium	2		100	0			0	0		0		100			0	100	0	0	0		
Fluid	Enterococcus faecalis	4		100	100				0	0		0		0	100		0	100	100	100	100	
	Enterococcus faecium	3		33.3	33.3				33.3	33.3		0		33.3			0	100	100	66.7	66.7	
	Enterococcus sp.	1		100	100				100	100		100		100			100	100	100	100	100	
	Enterococcus raffinosus	1																				
	Staphylococcus aureus ss. aureus	78	79.1	99.3	1.35	21.9		5.9	7.45		23.7	30.8	89.2	100	93.3	100	100	100	97.3	98.7		
	Staphylococcus epidermidis	16	75	100	0	6.2		25	25		31.2	50	81.2	100	62.5	100	100	100	81.2	81.2		
	Staphylococcus haemolyticus	7	57.1	85.7	0	0		28.6	28.6		28.6	33.3	28.6	100	57.1	100	100	100	57.1	57.1		
	Staphylococcus, coagulase negative	26	88.7	100	4.55	59.1		70.5	70.5		15.9	72.8	86.4	100	81.8	100	100	100	90.9	88.7		
	Streptococcus agalactiae	2	100	100	100			100		100	100		100		100	0	100	100	100			
	Streptococcus sp.	4																				
Other	Streptococcus pneumoniae	1																				
Urine	Enterococcus faecalis	9		66.7	66.7				0	0		0		11.1	100		0	100	88.9	100	100	
	Enterococcus faecium	8		25	25				0	0		0		12.5			37.5	100	75	62.5	62.5	
	Staphylococcus aureus ss. aureus	3	33.3	100	0	33.3		100	100		66.7	66.7	66.7	100	100	100	100	100	100	100		
	Staphylococcus, coagulase negative	1	100	0	0	0		0	0		0	0	0	100	100	0	100	100	100	100		
	Staphylococcus epidermidis	1	0	100	0	0		0	0		0	100	0	100	100	100	100	100	100	100		
	Staphylococcus haemolyticus	1	100	100	0	0		0	0		0	0	0	100	100	100	100	100	100	100		
	Streptococcus sp.	1																				

Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Negative organism 2019 – Surgery

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																												
			NALIDIXIC ACID	NORFLOXACIN	LEVOFLOXACIN	CIPROFLOXACIN	NITROFLURATOIN	COTRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	TICARCILLIN	TICARCILLIN/CLAVULANIC AC	CEFUROXIME	CEFTAZIDIME	CEFIXIME	CEFTRIAZONE	CEFOTAXIME	CEFPIME	CEFOPERAZONE/SABACTAM	BIPITAZ	ACTHEDNAM	AMIKACIN	GENTAMYCIN	TOPIPENEM	ERTAPENEM	IMPENEM	MEROPENEM	MIMOCYCILLIN	THIACYCLINE	FOSFOMYCIN	COLISTIN
Blood	<i>Acinetobacter baumannii</i>	1				0	100								0	0	0	0							0	0	0	0	100		
	<i>Enterobacter aerogenes</i>	1	100		100	0	100	0				0			0	0	100	100	0	100	100	100	100	100	100	100	100	100	100		
	<i>Enterobacter cloacae</i>	1	100		100	0	100	0				0			100	0	100	100	100	100	100	100	100	100	100	100	100	100	100		
	<i>Escherichia coli</i>	2	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	3	67												0	0	67	67	67	67	67	67	67	67	67	67	67	67	67	100	
Stool	<i>Pseudomonas aeruginosa</i>	3			100	57	100				100			100			100	100	100	67	67	100		100	67	67	100	67	100		
	<i>Acinetobacter baumannii</i>	1			100		0								100		100	100	100			100		100	100	100	100	100	100		
Urine	<i>Escherichia coli</i>	8	13		13	75	10	13	0			25			25	25	100	88	100	100	100	100	100	100	100	100	100	100	100		
	<i>Acinetobacter baumannii</i>	4			25		25								0	25	25	25			25		25		25	75	75	100	100		
	<i>Enterobacter cloacae</i>	6			17	33	50	0			0				0	0	0	50	50	67	67	50	50	50	50	33	67	67	100		
	<i>Escherichia coli</i>	73	3.1	14	9.8	18	76	42	0	17	0	12	43	14	15	9.2	34	75	100	88	88	88	88	86	85	100	31	97	96	100	
RESPIRATORY	<i>Klebsiella pneumoniae ss. pneumoniae</i>	31	0	40	28	43	10	65	0	27	0	0	25	100	50	10	25	85	41	39	0	61	55	100	43	41	100	31	48	57	79
	<i>Pseudomonas aeruginosa</i>	15			17	9.1						0		10			15	14	13	19	14	10		15	9.1		0		52		
	<i>Acinetobacter baumannii</i>	3				33	100								100		33	33	33			0		33	33		67		67		
Fluid Pus	<i>Escherichia coli</i>	2	0		0	100	100	0	0		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	4	50			75	75	0	75		25			25		25	75	75	75	75	75	75	75	75	75	75	75	75	75	100	
	<i>Pseudomonas aeruginosa</i>	6			100	75					0		100			100	83	83	83	83	100	83	17	17		17		0	83		
Fluid Pus	<i>Acinetobacter baumannii</i>	16			3.4	73									3.4	3.4	3.4	3.4			6.7		6.7	6.7		97		100			
	<i>Enterobacter aerogenes</i>	1	100		100	0	100	0				0			100	0	100	100	100	100	100	100	100	100	100	100	100	100	100		
	<i>Enterobacter cloacae</i>	9	33		33	19	44	0			0				33	0	33	33	33	33	33	33	33	33	33	33	33	33	33	100	
	<i>Escherichia coli</i>	90	25		43	83	44	14	11			47			47	85	75	81	76	95	75	96	96	96	96	96	96	96	96	99	
	<i>Klebsiella oxytoca</i>	1	0		0	100	0	0	100			0			0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
	<i>Klebsiella pneumoniae ss. pneumoniae</i>	36	44		0	27	83	0				36			36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	95	
	<i>Klebsiella sp.</i>	1	100		100	0	100	0	100			0			100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	0	
	<i>Pseudomonas aeruginosa</i>	38			28	30						13		34			13	34	37	84	31	31	31	31	31	31	31	31	31	99	

Reserve Antibiotic - Use with Caution

Obstetrics & Gynecology Sensitivity Gram Positive organisms 2019

Specimen type	Organism	Number of patients	Antibiotics																			
			COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAXONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH L	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINZOOLID	VANCOMYCIN
Pus	Enterococcus faecalis	5	100	80					20	20		20			40	100		0	100	100	100	100
	Enterococcus faecium	2		50	0				0	0		0			0			50	100	50	50	50
	Staphylococcus aureus ss. aureus	11	45.5	100	0	9.1			18.2	18.2		18.2	45.5	63.6		100		81.8	100	100	100	100
	Staphylococcus, coagulase negative	14	53.8	100	0	0			15.4	15.4		0	23.1	61.5		100		61.5	100	100	92.3	92.3
	Staphylococcus epidermidis	7	85.7	85.7	14.3	14.3			28.6	28.6		42.9	28.6	85.7		100		57.1	100	100	100	85.7
	Streptococcus agalactiae	3		66.7	100					66.7								33.3	100	100	100	
	Staphylococcus haemolyticus	1	0	100	0	0			0	0		0	0	0		100		100	100	100	100	100
Streptococcus sp.	3									0							0	100	100			
Other	Enterococcus faecalis	1	100	100					100	100		0			100	100		100	100	100	100	100
Sputum	Staphylococcus haemolyticus	1	0	0	0	0			0	0		0	0	0	100			0	100	100	100	100
Urine	Enterococcus faecalis	6	83.3	50					16.7	16.7		0			0	100		0	100	83.3	66.7	66.7
	Staphylococcus aureus ss. aureus	2	100	100	50	50			100	100		100	100	100		100		100	100	100	100	100
	Staphylococcus, coagulase negative	2	100	100	0	0			50	50		0	0	100		100		0	100	100	100	100
	Staphylococcus epidermidis	1	100	100	0	0			100	100		0	0	100		100		100	100	100	100	100
	Streptococcus agalactiae	1	100	100						0								0	100	100	100	
	Streptococcus sp.	1																				

Reserve Antibiotic - Use with Caution

Antibiotic Sensitivity Gram Negative organism 2019 - Obstetrics & Gynecology

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																							
			NALIDIXIC ACID	LEVOFLOXACIN	CIPROFLOXACIN	NORFLOXACIN	NITROFURATOIN	COTRIMOXAZOLE	AMPICILIN	AMOX/CLAV	CEFUROXIME	CEFTAZIDIME	CEFIXIME	CEFTRIAZONE	CEFOTAXIME	CEFEPIME	CEFOPERAZONE/SALBACTAM	PIPTAZ	AMIKACIN	GENTAMYCIN	DORIPENEM	ERTAPENEM	IMIPENEM	MEROPENEM	MINDCYCLINE	TIGECYCLINE
Blood	<i>Acinetobacter baumannii</i>	1			100		100					100		100	100	100	100	100			100	100		100		
Other	<i>Enterobacter cloacae</i>	1			100	100	100	0	0		100	0	100	100	100	100	100	100			100	100	100		100	
	<i>Escherichia coli</i>	1			100	100	100	100	100		100	100	100	100	100	100	100	100			100	100	100		100	
Pus	<i>Acinetobacter baumannii</i>	2			0		0					0		0	50	50					50	50		100		
	<i>Escherichia coli</i>	29		0	51	85.3	43.3	14.3	37.1	17.5	0	21.4	14.3	75.9	89.7	86.2	95.6	86.2	100	89.3	89.7	86.2	100	96.6		
	<i>Klebsiella pneumoniae</i> ss. <i>pneumoniae</i>	9		100	62.5	55.6	88.9	0	55.6	55.6		88.9	55.6	100	100	100	100	100		100	88.9	100	100	88.9	100	
	<i>Pseudomonas aeruginosa</i>	3		66.7	66.7		0				100			100	100	100	100	100	100		100	100	0	0		
Urine	<i>Acinetobacter baumannii</i>	5		60			100					40	60	80	60		60			60		80	100			
	<i>Escherichia coli</i>	52	0	42.4	0	100	92.2	56.9	0	66.7	14.3	50	0	19.6	14.3	69.4	91.8	86.3	96.1	84.3	80.2	91.8	50	63.1	100	98
	<i>Klebsiella pneumoniae</i> ss. <i>pneumoniae</i>	11		45.5			54.5	54.5		63.6	36.4		36.4	36.4	63.6	72.7	72.7	72.7	63.6		81.8	81.8		63.6	81.8	72.7

Reserve Antibiotic - Use with Caution

Neonatology Sensitivity Gram Positive Organisms 2019

Specimen type	Organism	Number of patients	Antibiotics																			
			COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AM PICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAXONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN
Blood	Enterococcus faecalis	2	100	100				100	100		0			100	100		0	100	100	100	100	100
	Enterococcus faecium	1	0	0				0	0		0			0			0	100	100	100	100	100
	Staphylococcus aureus ss. aureus	7	85.7	100	0	71.4		28.6	28.6		71.4	100	85.7		100		71.4	100	100	85.7	100	100
	Staphylococcus, coagulase negative	3	33.3	66.7	33.3	33.3		33.3	33.3		0	66.7	66.7		100		66.7	100	100	66.7	66.7	66.7
	Staphylococcus epidermidis	15	33.3	100	0	6.7		6.7	6.7		33.3	40	20		100		93.3	100	100	86.7	100	100
	Staphylococcus haemolyticus	5	0	100	0	0		0	0		40	60	0		100		100	100	100	100	100	100
	Streptococcus pneumoniae	3	100		0		0	0	100	100	0	100					0	100	100	100	100	100
	Streptococcus pyogenes	2	100		100	100		100	100		100	100	100				100	0	100	100	100	100
CSF	Enterococcus faecium	1	0	0				0	0		0			0			0	100	100	100	100	100
	Staphylococcus saprophyticus	1	100	100	0			100	100		100	100	100		100		100	100	100	100	100	100
	Staphylococcus epidermidis	1	0	100	0	0		0	0		100	100	0		100		100	100	100	100	100	100
	Staphylococcus haemolyticus	1	0	100	0	0		0	0		0	0	0		100		100	100	100	100	100	100
Other	Staphylococcus haemolyticus	1	0	100	0	0		0	0		0	100	0		100		100	100	100	100	100	100
Pus	Enterococcus faecium	2	0	0				0	0		0			0			100	100	50	0	0	0
	Staphylococcus aureus ss. aureus	17	70.6	100	0	29.4		11.8	11.8		47.1	58.8	70.6		100		82.4	100	100	100	100	100
	Staphylococcus, coagulase negative	2	0	100	0	0		0	0		0	50	50		100		50	100	100	100	100	100
	Staphylococcus epidermidis	1	100	100	0	0		100	100		0	0	100		100		0	100	100	100	100	100
	Staphylococcus haemolyticus	3	33.3	100	0	0		0	0		0	0	0		100		100	100	100	33.3	33.3	33.3
Urine	Enterococcus faecalis	3	0	0				33.3	33.3		0			33.3	100		0	100	66.7	33.3	33.3	33.3
	Enterococcus faecium	5	20	0				0	0		0			0			40	100	60	60	60	60
	Staphylococcus, coagulase negative	1	100	100	0	0		0	0		0	100	0		100		100	100	100	100	100	100
	Staphylococcus epidermidis	3	66.7	100	0	0		33.3	33.3		0	0	33.3		100		0	100	100	66.7	100	100
	Staphylococcus haemolyticus	3	0	100	0	0		0	0		0	50	0		100		100	100	100	50	100	100

Reserve Antibiotic - Use with Caution

Pediatrics - Sensitivity Gram Positive organisms 2019

Specimen type	Organism	Number of patients	COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAXONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN	TEICoplanin	
Blood	Enterococcus faecium	1	0	0						0	0		0			100			0	100	100	100	100	100
	Staphylococcus saprophyticus	1	100	100	0					100	100		0	0	100		100		100	100	100	100	100	100
	Staphylococcus aureus ss. aureus	7	29	100	0		29			0	0		29	57	86		100		100	100	100	100	86	100
	Staphylococcus, coagulase negative	25	57	80	58	0	41		88	89	73	5	45	88	100	13	100	100	47	54	94	54	93	93
	Staphylococcus epidermidis	4	75	100	0		25			25	25		25	50	50		100		75	100	100	100	100	100
	Staphylococcus haemolyticus	2	50	100	0		0			0	0		0	0	50		100		100	100	100	100	100	100
	Streptococcus pneumoniae	20	8	20	95			77	89	14	86	100	63	71	100			100	43	37	54	100	100	100
	Streptococcus pyogenes	2	50	100	100	100		100	50	0	0	100	0	0	100			100	0	50	50	100	100	100
Streptococcus sp.	5	2		83	100		100	100		50	50	75	100	100			100	50	34	50	100	100	100	
Respiratory	Staphylococcus aureus ss. aureus	1	100	100	0		0			0	0		0	0	0			100		100	100	100	100	100
Cerebrospinal fluid	Staphylococcus, coagulase negative	3	100	100	67		67		0	100	100		100	67	100	100			100	34	100	34	100	100
Fluid	Enterococcus faecium	8		0	0					0	0		0			25			0	100	25	25	25	25
	Staphylococcus aureus ss. aureus	3	67	100	0		33			0	0		0	33	100		100		100	100	100	100	100	100
Pus	Enterococcus faecalis	3			100					0	0		0				100		0	100	100			
	Enterococcus faecium	4		0	0					25	25		0			100			0	100	50	50	50	50
	Enterococcus gallinarum	1		0	0					0	0		0			100			0	100	100	0	100	100
	Staphylococcus aureus ss. aureus	25	16	92	4		48			4	4		44	72	76		100		100	100	100	100	92	96
	Staphylococcus epidermidis	1	0	100	0		0			0	0		0	0	0				100	100			0	0
	Staphylococcus, coagulase negative	2	0	50	50		0		0	0	50	1	0	0	50	0	100	100	100	50	100	50	100	100
	Streptococcus agalactiae	2		100	100						100		100	100	100				100	100	100	100	100	100
	Streptococcus pneumoniae	2	100		100				100	100			100	100	100						100	100	100	100
Streptococcus sp.	3																							
Urine	Enterococcus faecalis	3		100	100					0	0		0			33	100		0	100	100	100	100	100
	Enterococcus faecium	3		33	0					0	0		0			33			67	100	100	100	100	100
	Staphylococcus aureus ss. aureus	3	33	67	0		0			67	67		67	67	33		100		67	100	67	67	67	67
	Staphylococcus, coagulase negative	4	50	75	50		0		0	0	50	1	0	50	100	0	100	100	50	50	75	50	100	100

Reserve Antibiotic - Use with Caution

Pediatrics— Antibiotic Sensitivity Gram Negative organism 2019

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																										
			NALIDIXIC ACID	LEVOFLOXACIN	CIPROFLOXACIN	NORFLOXACIN	NITROFURATOIN	COTRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	CEFUROXIME	CEFTAZIDIME	CEFEPIME	CEFTRIAZONE	CEFOTAXIME	CEFEPIME	CEFOPERAZONE/SALBACTAM	PIPTAZ	AZTREONAM	AMIKACIN	GENTAMYCIN	DORIPENEM	ERTAPENEM	IMPENEM	MEROPENEM	MINOCYCLINE	TIGECYCLINE	FOSFOMYLIN	COLISTIN
Blood	<i>Acinetobacter baumannii</i>	5		20		100					0	20	20	20					20			20	20	100	100				
	<i>Escherichia coli</i>	6	0	0	83.3	0	0	16.7	0		16.7	0	66.7	50	33.3			50	50	66.7	66.7	66.7	66.7	100	100				
	<i>Klebsiella pneumoniae</i> ss. pneumoniae	2	50	50	50	100	0	50	0		0	0	50	50	50			50	50	50	50	50	50	50	50	100	100		
	<i>Pseudomonas aeruginosa</i>	4	100	75							100			75	100	75			75	75	100	100	100	100	0	100			
Cerebrospinal fluid	<i>Escherichia coli</i>	2	0	0	100	100	0	100	0		0	0	100	100	100			100	100	100	100	100	100	100	100	100	100	100	100
Fluid	<i>Escherichia coli</i>	1	0	0	100	100	0	0	0		0	0	100	100	100			100	0	100	100	100	100	100	100	100	100	100	100
	<i>Pseudomonas aeruginosa</i>	2	0	0						50			0	0	50			50	0	50	100	50	50	0	100				
Pus	<i>Acinetobacter baumannii</i>	2		0		100					0	0	0	0				0	0	0	0	0	0	100	50				
	<i>Escherichia coli</i>	7	0	0	71.4	28.6	16.7	14.3	14.3		14.3	14.3	28.6	57.1	42.9			83.3	28.6	57.1	57.1	57.1	57.1	100	100				
	<i>Klebsiella pneumoniae</i> ss. pneumoniae	2	100	50	100	100	0	0	0		0	0	50	0	0			50	100	0	50	50	100	100	100	100	100	100	100
	<i>Pseudomonas aeruginosa</i>	3	50	66.7						100			66.7	66.7	100			66.7	66.7	100	100	100	100	100	0	100			
Stool	<i>Escherichia coli</i>	2	0	0	50	0	0	0	0		0	0	50	50	50			100	100	100	100	100	100	100	100	100	100	100	100
Trachea aspirate	<i>Acinetobacter baumannii</i>	8		12.5		87.5					0	12.5	25	12.5				37.5		12.5	12.5			75	100				
	<i>Escherichia coli</i>	2	0	0	50	0	0	50	0		0	0	50	0	0			100	50	100	100	100	100	100	100	100	100	100	100
	<i>Klebsiella pneumoniae</i> ss. pneumoniae	1	100	0	0	0	0	0	0		0	0	100	100	0			100	0	100	100	0	0	0	0	100	100	100	100
	<i>Pseudomonas aeruginosa</i>	2	100	100						100			100	100	100			100	100	100	100	100	100	100	0	100			
Urine	<i>Enterobacter cloacae</i>	1	100		0	0		0	0		100	0	100	100	100			100	100	100	100	100	0	100	100	100	100	100	
	<i>Escherichia coli</i>	33	0	14.8	33.3	25	72.7	24.2	0	48.5	20.7	25	25	21.2	17.2	41.4	72.4	51.5	78.8	62.6	69.7	75.9	50	29.6	93.1	96.8	100	100	
	<i>Klebsiella pneumoniae</i> ss. pneumoniae	9	0	57.1	0	0	55.6	55.6	0	12.5	14.3	0	0	12.5	14.3	14.3	12.5	100	62.5	25	28.6	50	50	57.1	71.4	87.5	100	100	
	<i>Pseudomonas aeruginosa</i>	2	0	0							0		50	50				50	0	50	50	50	50	0	50				

Reserve Antibiotic Use with Caution

Oncology- Sensitivity Gram Positive organisms 2019

Specimen type	Organism	Number of patients	Antibiotics																			
			COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOTAXIME	CEFTRIAZONE	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN
Blood	Enterococcus faecalis	1		0	0				0	0		0			0	100		0	100	100	0	0
	Staphylococcus, coagulase negative	2	50	50	50				50	50		50	100		100			50	100	100	100	100
	Staphylococcus epidermidis	1	100	100	100	100			100	100		100	100	100				100	100	100	100	100
	Streptococcus agalactiae	1	100							0	100	0	100				100	0		100	100	
	Streptococcus sp.	1																				
Pus	Enterococcus faecium	1		0			0		0	0		0	100	0	0		100		100		100	
Urine	Enterococcus faecalis	2		100	100				100	100		0		100	100			0	100	100	100	100
	Enterococcus faecium	1		0	0				0	0		0		0				0	100	0	100	100

Reserve Antibiotic - Use with Caution

Oncology - Antibiotic Sensitivity Gram Negative organism 2019

Specimen Type	Organism	Number of patients	NALIDIXIC ACID	LEVOFLOXACIN	CIPROFLOXACIN	NORFLOXACIN	NITROFURATOIN	AMPICILLIN	AMOX/CLAV	CEFUROXIME	CEFTAZIDIME	CEFIXIME	CEFTRIAXONE	CEFOTAXIME	CEFEPIME	CEFOPERAZONE/SALBACTAM	PIPTAZ	AZTREONAM	AMIKACIN	GENTAMYCIN	DORIPENEM	ERTAPENEM	IMIPENEM	MEROPENEM	MINOCYCLINE	FOSFOMYCIN
Blood	<i>Acinetobacter baumannii</i>	1					100			100		100		100	100	100	100	100				100	100			100
	<i>Enterobacter cloacae</i>	3					100	0	100	66.7	0	66.7	100	0	100	100	100	100				100	100	100	33.3	100
	<i>Escherichia coli</i>	1					100	0	0	0	0	0	100	0	0	100	100	100				0	100	0	0	100
	<i>Pseudomonas aeruginosa</i>	1			0	0				0				100	0	0	0	0	0	0		0	0			
Pus	<i>Pseudomonas aeruginosa</i>	1							0				100	0	0	0	0	0			0	0				0
Stool	<i>Escherichia coli</i>	1				0	0	0	0	0	0	0	100	0	0	100	0	0			0	0	0	0	0	0
Urine	<i>Escherichia coli</i>	11	63.6	63.6		27.3	36.4			9.1	18.2	90.9	63.6	18.2	100	54.5	72.7	27.3	90.9	54.5					72.7	72.7
	<i>Klebsiella pneumoniae ss, pneumoniae</i>	3	100	66.7		0	33.3			0	0	100	100	0	100	0	100	33.3	66.7		100				100	100
	<i>Pseudomonas aeruginosa</i>	2	50		0	0			0				100	50	0	50	50	50	50		50	0				50

Reserve Antibiotic - Use with Caution

ENT Sensitivity Gram Positive organisms 2019

Specimen type	Organism	Number of patients	Antibiotics																			
			COTRIMOXAZOLE	NITROFURATOIN	PENICILLIN	AMPICILLIN	CEFOXITIN	CEFOJAXIM F	CEFTRIAXONE F	CIPROFLOXACIN	LEVOFLOXACIN	MOXIFLOXACIN	ERYTHROMYCIN	CLINDAMYCIN	GENTAMYCIN	GENTAMYCIN HIGH LEVEL	DAPTOMYCIN	CHLORAMPHENICOL	TETRACYCLINE	TIGECYCLINE	LINEZOLID	VANCOMYCIN
Pus	Staphylococcus aureus ss. aureus	14	85.7	7.1	85.7	28.6			7.1	100	85.7	35.7	50	85.7	7.1	100	42.9		92.9	100	78.6	
	Staphylococcus, coagulase negative	4	75	0	100	0			0	100	50	0	25	100	0	100	100		100	100	100	
	Staphylococcus epidermidis	3	100	0	100	0			66.7	100	100	100	100	100	66.7	100	66.7		100	100	100	
	Staphylococcus haemolyticus	1	100	0	100	100			100	100	100	100	100	100	100	100	100	100		100	100	0
	Streptococcus sp.	3	100	0		0	100	100		100			0	100		100		100	100		100	100
Respiratory	Streptococcus sp.	1	100	0		0	0		100			0	0		100		100	0		100	0	

Reserve Antibiotic - Use with Caution

ENT –Antibiotic Sensitivity Gram Negative organism 2019

Specimen Type	Organism	Number of patients	Antibiotic Sensitivity (%)																								
			NALIDIXIC ACID	LEV OFLOXACIN	CIPROFLOXACIN	NORFLOXACIN	NITROFURATOIN	COTRIMOXAZOLE	AMPICILLIN	AMOX/CLAV	TICARCILLIN	TICARCILLIN/CLAVULANIC ACID	CEFUROXIME	CEFTAZIDIME	CEFIXIME	CEFTRIAXONE	CEFOTAXIME	CEFEPIME	CEFOPERAZONE/SALBACTAM	PIPTAZ	AZTREONAM	AMIKACIN	GENTAMYCIN	DORIPENEM	ERTAPENEM	IMIPENEM	MEROPENEM
PUS	<i>Escherichia coli</i>	1	100	100	0	0	0	0	0	0	0	100	0	0	100	0	100	0	100	100	100	100	100	100	0	0	100
	<i>Klebsiella pneumoniae</i> ss. <i>pneumoniae</i>	4	75	100	100	0	25	0	0	0	0	75	50	75	75	75	75	100	0	100	75	75	75	75	75	25	75
	<i>Pseudomonas aeruginosa</i>	9	66.7	88.9	71.4	0	0	0	0	0	0	77.8	0	66.7	88.9	0	0	0	0	0	88.9	71.4	66.7	77.8	0	0	0
Respiratory	<i>Enterobacter cloacae</i>	1	100	0	100	0	0	0	0	0	0	100	0	100	100	100	100	100	100	100	100	100	100	100	100	0	100

Reserve Antibiotic Use with Caution



Antibiotic Stewardship



- A set of coordinated strategies to improve the use of antimicrobials

Goal

- Enhancing patient health outcomes
- Reducing resistance to antibiotics
- Decreasing unnecessary costs



Process



Prescription antibiotic

Justification form to be filled by prescriber
Appropriate culture sampling before initiation of antimicrobial (ICN to ensure)
Initial duration two days

Prospective audit/feedback

Audited for appropriateness within 48-72h

- a) Clinical pharmacist (also collect data)
- b) Microbiologist
- c) ID physician

Intervention

AMSP Team :
Assess

Stop order
Or

De-escalate based on antimicrobial policy/culture results

Clinical pharmacist

Duration of antimicrobial

Ensure stopping of antimicrobial.

Clinical Pharmacist
Microbiologist
ID physician
Antimicrobial Champion

Antimicrobial consumption data

Consumption based on Duration of Therapy



Metrics used in AMSP



- Days of therapy
- Cost metrics
- Average length of stay
- Mortality rate
- Acceptance of intervention
- Resistance pattern
- Comparison of HAI with ABX consumption rate

List of Restricted Antimicrobials : These will not be prescribed without obtaining concurrence of HoD

1. Piperacillin tazobactam
2. Carbapenems
3. Linezolid
4. Vancomycin
5. Teicoplanin
6. Daptomycin
7. Tigecycline
8. Echinocandins : Caspofungin, Micro

Antibiotic therapy in hospitalized patients

Antibiotic therapy is used in hospitalized patients in three situations

1. **Empirical therapy** before the causative organism has been identified
2. **Definitive therapy** once the causative organism is identified
3. **Prophylactic therapy** to prevent infection, eg. surgical prophylaxis

Empirical therapy

Patient requiring empirical antibiotic therapy should be classified into three types (Table 1) depending on the past history, prior exposure to health care, previous antibiotics and associated co-morbidities. Antibiotic should then be chosen according to the site of infection and suspected micro-organism based on local hospital microbiologic data (antibiogram). Appropriate cultures must be sent prior to antibiotic therapy. Identification of the micro-

organism will then dictate definitive therapy and also contribute to the hospital antibiogram for choosing empiric therapy.

TABLE 1- Patient Types for selecting empiric antibiotic therapy

Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
No contact with health care system	Contact with health care system (e.g. recent hospital admission, nursing home, dialysis) without invasive procedure within last 90 days. Current hospitalization less than 7 days	Current hospitalization > 7 days. Invasive procedures within last 90 days
No prior antibiotic treatment	Recent antibiotic therapy (within last 90 days)	Recent & multiple antibiotic therapies within last 90 days
No procedures done	Minimum procedures done	Major invasive procedures done
Patient young with only a few co-morbid conditions.	Patient old with Multiple co-morbidities.	Cystic fibrosis, structural lung disease, advanced AIDS, neutropenia, other Severe Immunodeficiency.

ANTIBIOTIC GUIDE

Recommended antibiotics for common conditions are listed below. This guide is broad outline; not all-inclusive and; not meant to replace treating physician's judgment.

Table 1: Acute gastroenteritis

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Acute gastroenteritis	<p>Most cases are self limited. Require only supportive treatment & hydration. Selected very sick patients can be treated as per following guidelines.</p> <ul style="list-style-type: none"> • Co-trimoxazole 1DS tab for 3 days OR • Cap. Doxycycline 100 mg BD-3-5 days OR • Tab Nitazoxanide 500mg BD 3days <p>If stool examination shows invasive diarrhoea (> 5 leucocytes /HPF or blood in the stool). Then consider stool culture followed by</p> <ul style="list-style-type: none"> • Inj. Piperacillin – Tazobactam 4.5 gm TDS 3-5 days • Inj Cefpearzone/Sulbactam 1.5 gm BD 3-5 days 		

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Table 2: Pneumonia

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Pneumonia	<p>1} For non-ICU patients with community acquired pneumonia (CAP)Ceftriaxone (2g IV q24h X 5-7 days)/ Amoxicillin/Clavulanic acid (1.2g q8h IV)</p> <p style="text-align: center;">+</p> <p>Macrolide (Azithromycin- 500mg IV/PO once a day), x 5-7 days).</p> <p>2} ICU patients with CAP</p> <p>Ceftriaxone (2g IV q24hr X 5-7 days)/ Amoxicillin/Clavulanic acid (1.2g q8hr IV)</p> <p style="text-align: center;">+</p> <p>MacrolideAzithromycin- 500mg IV/PO q24h)/ Doxycycline 100mg PO q12h x 5-7 days).</p> <p>If aspiration is suspected clindamycin 600mg q8h</p> <p>Early onset HAP/VAP (less than 48 hours</p>	<p>Late Onset HAP/VAP (For more than 48 hours of hospitalization but less than 7 days)</p> <p>If septic shock or multisystem organ failure, Imipenem0.5-1 gm q6h or Meropenem1-2 gm q8h</p>	<p>Late onset HAP/VAP suspected MDR Gram negative –</p> <p>Imipenem (0.5-1 gm q6h /Meropenem (1-2 g IV q8h)</p> <p>Suspected XDR Gram negative</p> <p>Colistin 4.5 MU/BD</p> <p>Suspected MRSA- Vancomycin (1g IV q12h OR Teicoplanin (400mg IV q12h for 3 doses, then q24h)</p> <p>For suspected VRE- Linezolid (600mg IV/PO q12hr)**x 7-14 days</p> <p>For suspected Fungal infections-</p> <p>Consider Antifungals in immunocompromisedhost. AddLiposomal Amphotericin B. Substitute Voriconazole, if Aspergillus suspected on radiological evidence or galactomannanpositive</p> <p>If PCP suspected- add TMP-SMX or Clindamycin</p>

<p>H1N1 Flu-like illness</p>	<p>admission)</p> <p>Antibiotic choice as above unless Pseudomonas or Gram negative bacilli are suspected. Then use</p> <p>Cefoperazone-Sulbactam* (1.5g-3gm q6h) or piperacillin-tazobactam (PIP-TZ) 4.5gm q6h</p> <p>Look for typical viral symptoms such as sneezing and running nose.</p> <p>If fever, sore throat, dry cough and viral symptoms present, initiate Oseltamivir 75 mg BD x 5 d without waiting for confirmation by PCR</p>		
<ol style="list-style-type: none"> 1. Fluoroquinolones should not be used for empiric treatment. 2. Fluoroquinolones should not be used routinely for treating Acute exacerbation of COPD 3. In the uncommon scenario of hypersensitivity to β-lactams, respiratory Fluoroquinolones (e.g. levofloxacin 750 mg daily) may be used if tuberculosis is not a diagnostic consideration at admission. Patients should also undergo sputum testing for acid-fast bacilli simultaneously if fluoroquinolones are being used in place of β-lactams. 4. **Patients with suspected MRSA infection, we recommend the use of empiric Vancomycin or Teicoplanin. The use of linezolid in India should be reserved because of its potential use in extensively drug-resistant tuberculosis. 5. Suspected viral pneumonia [influenza] Oseltamivir and/or Zanamavir should be given. 6. In late HAP/VAP with suspected Acinetobacter infection combination of Colistin + carbapenem / sulbactam. 7. Duration of treatment for community acquired pneumonia should be minimum 5-7 days and patient should be afebrile 48-72 hours prior to stopping treatment. 			

8. For ESBL / MRSA health care associated pneumonia minimum duration of treatment should be 10-14 days.
9. For proven pseudomonal / Acinetobacter health care associated pneumonia treatment should be for minimum 2 weeks and preferably combination of antibiotic therapy should be used.
10. Colonization should be suspected if respiratory secretions culture show growth but following features are absent like Fever, leukocytosis, increased bronchorrhea, increasing oxygen requirement, new lung infiltrates.
11. In presence of Fever, leukocytosis, increased bronchorrhea, increasing oxygen requirement but absence of lung infiltrates with positive cultures [MDR GNB / MRSA] to be treated as health care associated tracheobronchitis with appropriate broad spectrum antibiotics.
12. Aerosolised Tobramycin/ Colistin can be added to IV antibiotics as an adjunctive therapy for MDR gram negative infection with specialized nebulisers.

Table 3: Meningitis

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Meningitis	<p>1] Age 2yrs-50yrs Vancomycin 1gm q12h + Ceftriaxone 2gm q12h</p> <p>2] Age > 50yrs Above Antibiotics + Ampicillin 2gm q4h</p>	<p>Vancomycin 1gm q12h + cefepime 2gm q12h /Ceftazidime 2gm q8h</p>	<p>Empirical Therapy Vancomycin 1gm q12h + Colistin 4.5 MU BD+/- Meropenem 2gm q8h. Consider IntrathecalGentamicin/ Colistin 4.5 MU BD</p> <p>Organism specific A] Suspected MRSA Meningitis – Vancomycin 1gm q12h +/- Rifampicin 600mg q12hor Linezolid 600mg q12h</p>

			B] ESBL Gram negative/Pseudomonas or Acinetobacter (MDR / XDR) Meropenem 2gm q8h + Colistin 4.5 MU BD .
Intrathecal/ Intraventricular route dosage- Vancomycin 10-20mgq24h; Gentamicin 4-8 mgq24h; Amikacin 30-50mg q24h; Colistin 5-20mg q24h[1mg = 12,500 units]			
IV Dexamethasone should be given in suspected pneumococcal meningitis before antibiotic therapy and should be continued only if GM stain / Culture confirms pneumococcal etiology.			

Table 4: Urinary tract infection

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
UTI	<p>Asymptomatic bacteriuria No empirical therapy. Send C/S.</p> <p>Non complicated UTI (Cystitis, Urethritis, No evidence of obstructive uropathy) PO TMP SMX 160/800 q12h / PO Nitrofurantoin 100 mg q12h 5-7 days</p> <p>Acute Uncomplicated Pyelonephritis Fluroquinolones Ofloxacin 400 mg q12h OR Gentamicin 3 – 5 mg q24h 5-7 days If hospitalized Ceftriaxone 1gm q12h 5-7 days</p>	<p>Complicated UTI (Obstruction, reflux, azotemia, CAUTI) IV Meropenem 1gm q8h/ IV Imipenem-cilastatin 0.5 gm q6h</p> <p>Antibiotics Up to 2 weeks in presence of obstruction.</p> <p>Complicated Pyelonephritis (Obstruction, reflux, azotemia, CAUTI, Shock, perinephric abscess) Meropenem 1gm q8h/Imipenem-cilastatin 0.5 gm q6h Up to 2 weeks in presence of obstruction.</p>	<p>Complicated UTI and Pyelonephritis (Suspected MDRO's/ Post renal transplant/ Recurrent UTI's) IV Meropenem 1gm q8h/IV Imipenem-cilastatin 500mg q6h +/- IV Colistin 4.5 MU BD</p> <p>If MRSA or enterococcus, Consider Vancomycin 1 gm q12h/ Teicoplanin 400 mg q24h 2-3 weeks of treatment required. Urgent USG or CT to look for obstruction. Surgical management is</p>

			mandatory to relieve obstruction.
Lower Urinary tract infection(UTI) in antenatal patients up to 20 weeks gestation	OPD- Cap.Amoxyicillin500 mg q8h PO In-patient IV Ceftriaxone 1gm q12h		Meropenem 1gm q8h Or Colistin 4.5MUBD
Lower Urinary tract infection(UTI) in antenatal patients after 20 weeks gestation	OPD Tab. Nitrofurantoin SR100 mg BD oral for 5 days In patient- IV Ceftriaxone 1gm q12h	IV PIP-TZ 4.5 gm q6h	Meropenem 1gm q8h

Table 5- Skin & soft tissue infections

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Erysipelas / uncomplicated cellulitis	IV Ceftriaxone 2 gm q24h If beta lactam allergy IV Clindamycin 600 – 900 mg q8h		
Necrotizing infection of skin/fascia and muscle	IV Ceftriaxone 2gm q12h + IV Clindamycin 600-900mg q8h / IV Metronidazole 500mg q6h If Suspected MRSA IV Vancomycin 1 gm q12h/ IV Teicoplanin 400 mg q24h		

Fournier gangrene	Mixed aerobic and anaerobic cover including S.aureus, pseudomonas suspected IV PIP-TZ 4.5gm q6h + MRSA cover IV Vancomycin 1gm q12h		
Diabetic foot	IV Co-amoxiclav 1.2 gm q8h/ IV Ceftriaxone 1gm q12h if beta lactam allergy- IV Clindamycin 600 q8h	IV PIP-TZ 4.5 gm q6h If Suspected MRSA infection IV Vancomycin 1 gm q12h	IV Meropenem 1gm q8h IV Imipenem + Cilastatin 1gm q6h IV/IV. If MRSA infection Vancomycin 1 gm IV q12h

Table 6- Bone and joint infections

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Acute Osteomyelitis / Septic Arthritis	Ceftriaxone IV q12h OR Co-amoxiclav 1.2 gm q8h with/without Gentamicin 3 – 5 mg q24h Total duration- Minimum 21 days; upto 4-6 weeks	-	-

	<p>If MRSA suspected- Vancomycin 1gm IV q12h minimum 21 days; upto 4-6 weeks</p>		
<p>Early implant associated infection (< 3 months)</p>	-	<p>Usual Suspected organism- Staph aureus/ MRSA</p> <p>IV Vancomycin 1 gm q12h/ Teicoplanin(400mg IV q12h for 3 doses, then q24h) + If Suspected MDR Gram negative organism</p> <p>IV Meropenem 1gm q8h IV Imipenem + Cilastatin 1gm q6h IV/IV Colistin</p>	-
<p>Late implant associated infection (after 3 months)</p>	-	-	<p>Usually low grade infection If Coagulase negative staphylococcus suspected -</p> <p>IV Vancomycin 1 gm q12h / Teicoplanin (400mg IV q12h for 3 doses, then q24h)</p> <p>If Anaerobe (Propionibacterium Acne) suspected IV Clindamycin 600-900 mg q8h.</p>

Table 7 Intra-abdominal infections -

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Intra Abdominal A) Extra – biliary	IV Ceftriaxone 1-2 gm q12h+IV Metronidazole 500mg q8h or IV PIP-TZ 4.5gm q6h	IV Meropenem 1gm q8h/ IV Imipenem- cilastatin 500mg q6h	IV Meropenem 1gm q8h / IV Imipenem -cilastatin 500mg q6h In case of suspected Acinetobacter or XDR Gram negative organisms Colistin.5 MU BD If MRSA or Enterococcus suspected IV Vancomycin 1 gm q12h/ Teicoplanin (400mg IV q12h for 3 doses, then q24h) If VRE suspected Linezolid 600 mg IV

			<p>q12h</p> <p>If Fungal Infection suspected, Add Fluconazole 400 mg IV q24h</p> <p>If non albicans Candida- IV Caspofungin 70 mg stat and 50 mg q24h Or Ampho B</p>
Intra Abdominal B) Biliary	<p>IV Ceftriaxone 1-2 gm q12h + IV Metronidazole 500mg q8h</p> <p>or</p> <p>IV PIP-TZ 4.5gm q6h</p>	<p>IV Meropenem 1 gm q8h / IV Imipenem - cilastatin 500mg q6h</p>	<p>Eg- Acute cholangitis following bilioenteric anastomosis IV Meropenem 1 gm q8h / IV Imipenem - cilastatin 500mg q6h</p> <p>If MRSA or Enterococcus suspected IV Vancomycin 1 gm q12h / Teicoplanin (400mg IV q12h for 3 doses, then q24h)</p> <p>If VRE suspected Linezolid 600 mg IV q12h</p> <p>If Fungal Infection suspected, Add Fluconazole 400 mg IV q24h</p> <p>If non Albicans candida- IV Caspofungin 70 mg stat and 50 mg q24h Or Ampho B</p>

Metronidazole dosing based on pharmacokinetic studies is 1.5 gm q24h.

PIP-TZ covers all anaerobic infections except Bacteroides fragilis.

For lower GI surgeries add Metronidazole.

Table 8: Infective Endocarditis

Native Valve	IV Ceftriaxone 2gmq24h for 4weeks	Alternative 1. Penicillin G2-3mu IV q4h for 4 weeks or 2. Vancomycin500 mg q12h for 4weeks 3. Ceftriaxone 2 gmq24h for 2 weeks plus Gentamicin 3mg per kg divided into equal doses q8h for 2 weeks
Prosthetic Valve	Cloxacillin 2gm IV q4h for 4-6 weeks or IV Vancomycin500 mg q12h for 4-6 weeks + Rifampin 300mg q8hPO 6-8 weeks	IV Cefazolin 2g q8h for 4-6 weeks

Note:-

If Penicillin resistant Streptococi - Ceftriaxone 2 gram per day IV q24h for 6 weeks plus Gentamicin 3mg per kg divided into equal doses q8h for 6 weeks

Enterococci – Ampicillin 2gm IV q4h + Gentamicin3mg per kg divided into equal doses q8hboth 4-6 weeks or Vancomycin 500 mg q12h + Gentamycin for 4weeks.

Staphylococi –Nafcillin or Oxacillin 2gm IV 4 hourly for 4-6 weeks or Vancomycin 15 mg /kg IV 12 hourly for 4-6 weeks

If Methicillin Resistant Staphylococcus aureus -Vancomycin 15mg/kg Iv 12hourly for 6-8 weeks + Gentamycin

3mg per kg divided into equal doses q8hfor 2 weeks + Rifampin 300mg 8 hourly oral 6-8 weeks

Table 9: Malaria, Leptospirosis, Scrub Typhus, Enteric fever

Plasmodium Vivax Malaria	Chloroquine Sensitive Chloroquine (10mg base/kg stat followed by 5 mg/kg at 12,24,36 hours) plus	Chloroquine resistant – any of the ACT therapy excluding SP 1. Artesunate +Amodiaquine
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	Primaquine (7.5 mg (base) q12h PO x14days) (Primaquine should not be given in severe G6PD deficiency)	2. Artesunate +Mefloquine 3. Dihydroartemisin plus piperazine
Plasmodium Falciparum Malaria 5 days	OPD Artesunate(2.4 mg/kg at 12 & 24 hours) plus Sulfadoxine (25 mg/ kg) &Pyrimethamine (1.25 mg/kg) as a single dose or Artesunate (same dose as above) plus Amodiaquine (10mg) base per kg OD for 3 days (Fixed dose combinations are available) orArtemether plus Lumefantrine (1.5/9mg/kg BD for 3 days) Drug combination of A+L(mg)available 40+240:60+360:80+480 or Artesunate +Mefloquine (25mg base/kg –total) (8mg/kg once a day for 3 days) Hospitalized patient Artesunate IV 2.4 mg/kg at 12 & 24 hours and 2.4 mg/kg q24h X 5 days + Doxycycline 100mg q12h x 7 days	Drug resistant Falciparum Malaria Artesunate 2.4 mg/kg for 7 days or Quinine (10mg/kg TDS for 7 days plus one of the following three 1. Tetracycline 4mg/kg Odx7 days 2. Doxycycline 3mg/kg OD x 7days 3. Clindamycin 10mg/kg BD x 7days
Leptospirosis (Mild)	Doxycycline 100mg q12h x 7 days	Alternative Amoxicillin (500 mg)PO TDS x 7 days Ampicillin (500mg)PO TDS x 7 days
Leptospirosis (Moderate or Severe)	Ceftriaxone (1gm 12 hourly x7 days or Cefotaxime (1gm 6 hourly IV x 7 days	Alternative Penicillin (1.5 million units /IV /IM 6 hourly x7 days
Scrub Typhus	Doxycycline (100mg) BD x 7 to 15 days or Azithromycin (500mg) OD x 3days	Alternative Chloramphenicol (500mg)QID x7-15 days
Enteric Fever (OPD)	T. Cefixime 400 mg TDS for 14 days	Alternative T. Azithromycin (1gm)OD for 5 days
Enteric Fever(IPD)	Ceftriaxone (4gm/day)IV for 7-14 days	

Table 10: Paediatric Infections

Name of	Patient Type 1	Patient Type 2	Patient Type 3
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condition	(Community acquired)		
Pneumonia	Community acquired Pneumonia	Either Type II or Early HAP/VAP	Either Type III or late HAP/VAP,
AGE: 3 weeks to 3 months	Ceftriaxone 100mg/kg/d od or Cefotaxime 150mg/kg/d tds x 10-14 days and *Azithromycin 10mg/kg/day x 5 days	Piperacillin-tazobactam 300 mg/kg/d qid	IV Meropenem (60-120 mg /kg/day divided 8 hrly) plus Vancomycin (40-60 mg/ kg/ day divided 6-8 hrly
AGE: 4 months to 5 years	Lobar pneumonia/effusion Ceftriaxone 100mg/kg/d od with Cloxacillin 100-200mg/kg/d for 10-14 days	Piperacillin-tazobactam 300 mg/kg/d qid plus Vancomycin (40-60 mg/ kg/ day divided 6-8 hrly	IV Meropenem (60-120 mg /kg/day divided 8 hrly) plus Vancomycin (40-60 mg/ kg/ day divided 6-8 hrly. Add Fluconazole 6-12 mg/kg/day or caspofungin or liposomal amphotericin B (if renal dysfunction) x 2-6 weeks Same as above
	Bronchopneumonia without effusion Ampicillin 200mg/kg/d qid x 10- 14 days	Ceftriaxone 100mg/kg/d od Or Piperacillin-tazobactam 300 mg/kg/d qid	
	*consider adding macrolide (azithromycin,) to cover Pertussis in partially unimmunized with DPT		
Meningitis	Community acquired	Either type II/post neurosurgical meningitis	Either type II/III or post shunt infection

	Piperacillin-tazobactam 300 mg/kg/d tds/qid +/- Amikacin 15-20mg/kg/d od X10-14 days		
HEENT Infections Orbital cellulitis	Cloxacillin 200mg/kg/d plus either Cefotaxime 150mg/kg/d tds or Ceftriaxone 100mg/kg/d od/bd x 10-14 days	Piperacillin-tazobactam 300 mg/kg/d tds/qid plus Vancomycin 60mg/kg/d qid	IV Meropenem (120 mg /kg/day divided 8 hrly)/ plus Vancomycin 60mg/kg/d qid
Bone and Joint Infections Acute Osteomyelitis/s Septic arthritis	Cloxacillin 200mg/kg/d plus either Cefotaxime 150mg/kg/d tds or Ceftriaxone 100mg/kg/d od/bd x 10-14 days	Vancomycin 60mg/kg/d qid or Clindamycin 20-40 mg/kg/d tds/qid Plus either Cefotaxime 150mg/kg/d tds or Ceftriaxone 100mg/kg/d od/bd	IV Meropenem (120 mg /kg/day divided 8 hrly)/ plus Vancomycin 60mg/kg/d qid or Clindamycin 20-40 mg/kg/d tds/qid
Osteochondritis	Piperacillin-tazobactam 300 mg/kg/d tds/qid or combination therapy with cloxacillin 200mg/kg/d plus Cefazidime 100mg/kg/d tds 7-10 days after surgery		
Skin and soft tissue infections	Cloxacillin 200mg/kg/d or Cefazolin 60-100mg/kg/d or Clindamycin 20-40 mg/kg/d tds/qid x 7-10 days	Vancomycin 60mg/kg/d qid	Piperacillin-tazobactam 300 mg/kg/d tds/qid or IV Meropenem (120 mg /kg/day divided 8 hrly plus Vancomycin 60mg/kg/d qid

Animal bite wounds (dog / cat)	Amoxicillin/clavulanate 50mg/kg/d tdsi.v or p.o	Alternatives Piperacillin 300mg/kg/d qid 7-10 days <u>Penicillin allergy</u> Clindamycin 20-40mg/kg tds/qid plus TMP /SMX 80mg/kg/ bd X 7-10 days (dog bites); or cefuroxime 20-30mg/kg/d x 7-10 days (cat bites)	NA
Vascular catheter associated Infections		Piperacillin-tazobactam 300 mg/kg/d tds/qid + Vancomycin 60mg/kg/d qid	Meropenem 120mg/kg/d tds plus Vancomycin 60mg/kg/d qid
Severe Sepsis/septic shock	Cefotaxime 150 mg/kg/day divided 6-8 hrly OR Ceftriaxone 100 mg/kg/day divided 12 hrly +/- amikacin 15-20 mg/kg/d od	IV Piperacillin – Tazobactam 300-400 mg/kg/day divided 8 hrly + IV Vancomycin 45-60 mg/kg/day divided 6-8 hrly	IV Meropenem 80-120 mg/kg/8 hrly + IV Vancomycin 45-60 mg/kg/day divided 6-8 hrly

Diagnosis	Organisms isolated	Early onset	Late onset	Nosocomial	Community acquired	Duration
Sepsis	Klebsiella, Acinetobacter, E.coli, Enterococcus, Others :Serratia, Burkholderia, Pseudomonas, Proteus	Gentamycin (for haemodynamically stable) Piperacillin-Tazobactam (for haemodynamically unstable)	1 st line :Piperacillin-Tazobactam 2 nd line:Meropenem 3 rd line:Colistin	1 st line Piperacillin-Tazobactam 2 nd line: Meropenem 3 rd line: Colistin	1 st line :Cefotaxime and Amikacin 2 nd line:Piperacillin-Tazobactam 3 rd line: Meropenem 4 th line: Colistin	10days
Pneumonia	E coli, Klebsiella, Acinetobacter, Enterococcus, Staphylococcus(CONS) Others :Serratia, Burkholderia, Pseudomonas, Proteus	Gentamycin (haemodynamically stable) Piperacillin-Tazobactam (haemodynamically unstable)	1 st line :Piperacillin-Tazobactam 2 nd line: Meropenem 3 rd line: Colistin	1 st line Piperacillin-Tazobactam 2 nd line Meropenem 3 rd line Colistin	Ceftriaxone plus Azithromycin	7days
NEC			1 st line Piperacillin-Tazobactam and Amikacin 2 nd line Meropenem 3 rd line Colistin	1 st line Piperacillin-Tazobactam 2 nd line Meropenem 3 rd line Colistin	1 st line Piperacillin-Tazobactam 2 nd line Meropenem 3 rd line Colistin	7-10days
Meningitis	For early onset: E coli, GBS, enteric bacilli, listeria, streptococcus, H influenza, Neisseriameningitides. For late onset: Klebsiella, Acinetobacter	1 st line: Cefotaxime plus Gentamycin 2 nd line: Meropenem	Meropenem	Meropenem	Ceftriaxone /cefotaxime	Gram Positive : 14-days Gram negative : 21 days# #Ventriculitis/B

	netobacter, E. coli, Enterococcus, Staphylococcus (CONS) Others :Serratia, Burkholderia, Pseudomonas, Proteus					rain abscess: 6-8 weeks
UTI	Enterococcus, E coli, Enterobacter		1 st line: Piperacillin - Tazobactam 2 nd line: Meropenem 3 rd line: Colistin	1 st line Piperacillin - Tazobactam 2 nd line: Meropenem 3 rd line: Colistin	Amikacin	10days
Skin and soft tissue infection	Staphylococcus		1 st line: Cloxacillin 2 nd line: Vancomycin	Vancomycin	Cloxacillin	7days
Arthritis	Staphylococcus, Klebsiella		1 st line Piperacillin - Tazobactam 2 nd line Meropenem 3 rd line Colistin	1 st line: Piperacillin - Tazobactam 2 nd line: Meropenem 3 rd line Colistin	Ceftriaxone plus Vancomycin	Culture Negative: 2weeks Culture positive: 3 weeks
Osteomyelitis	Staphylococcus, Gram Negative Bacilli		1 st line Piperacillin -Tazobactam 2 nd line Meropenem 3 rd line	1 st line Piperacillin -Tazobactam 2 nd line Meropenem 3 rd line	Ceftriaxone plus Vancomycin	4 weeks

			Colistin	Colistin		
Catheter related Infection	Staphylococcus(CONS), S.aureus, Gram negative bacteria		1 st line: Vancomycin and Amikacin 2 nd line:Piperacillin-Tazobactam 3 rd line: Meropenem 4 th line Colistin			10days
Fungal infection	Candida albicans and Candida Non albicans		Amphotericin B or Fluconazole(depending on Culture and sensitivity report)			Depending on location

Table 11: Empiric Therapy of Neonatal Intensive Care Unit Sepsis and Meningitis (Above)

Table 12: Empiric therapy of Ophthalmic infections

Sr. No	Category	Organisms	First Line	Alternative
1	Bacterial conjunctivitis	S aureus and albus H Aegyptius H Influenzae, C diiphtheriae	Topical Moxifloxacin 0.5% eyedrops 3-6 times per day Tobramycin eye ointment at bed time Penicillin eye drops 10,000 units/ml	
2	Bacterial Keratitis	Pseudomonas, S aureus Pneumococcus N gonorrhoea	Moxifloxacin eye drops 0.5% 1 hourly Fortified Tobramycin eye drops	Fortified Vancomycin eye drops Amikacin eye drops
3	Fungal Keratitis	Aspergillus, Fusarium, Candida albicans	Natamycin eye drops 6 times a day Itraconazole eye drops /ointment at bed time Tablet Fluconazole 150mg twice a day & eye drops 4-6 times per day Nystatin eye ointment	Amphotericin B eye drops Voriconazole eye drops Intracameral Amphotericin B
4	Viral Keratitis	H Simplex H Zoster	Acyclovir Tablet 800mg 5 times a day and ointment 5 times a day Gancyclovir ointment	Tablet Valacyclovir 1000mg 3 times a day
5	Endophthalmitis	S aureus, Sepidermidis Streptococcus, Pseudomonas, H Influenzae Candida /fusarium	Intravitreal Vancomycin 1 mg /0.1 ml and Amikacin 400microgrames /.ml Intravitreal Amphotericin B	Intravitreal Vancomycin 1mg /0.1ml and Ceftriaxone 2.25mg/0.1ml
6	Orbital cellulitis	Staphylococci Mucormycosis/Aspergillus	Intravenous Piperacillin and Tazobactam 4.5g twice a day Intravenous Metronidazole 100ml 3 times a day Intravenous Amphotericin B	Intravenous Ceftriaxone
7	Acute Dacryocystitis	Staphylococcus, Streptococcus, Pneumococcus	Tablet Amoxicillin and Clavulanic acid 625 mg twice a day Moxifloxacin eye drops 0.5% 3-6 times a day	

Table 13: ENT Infection

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2	Patient Type 3
Acute infection like acute membranous tonsillitis, ASOM, Acute epiglottitis without complication	Inj Ampicillin 1 gm q6h Amoxicillin + clavulanic acid 1.2 gm q8h	-	-
Acute infection with complications like acute mastoiditis, Quinsy	Addition of aminoglycoside for gram negative coverage and metronidazole for anaerobic coverage	-	-

Chronic infection without complication like CSOM, chronic sinusitis	Amoxicillin +clavulanic acid 1.2 gm q8h IV Ceftriaxone 1 gm q12h IV	ID/ Medicine consult	ID/Medicine consult
Chronic infection with complications like meningitis, orbital cellulitis, brain abscess	InjCeftriaxone+injamikacin+injmetronidazole	ID/ Medicine consult	ID/ Medicine consult

Table 14: Surgical site infection

Name	Type 1	Type 2	Type 3
Head & Neck	Ceftriaxone 1gm q12h IV + Metronidazole Or PIP-TZ 4.5 gm q6h IV If MRSA suspected Add Vancomycin 1gm IV q12h If CNS infection Ceftazidime 2 gm q8h IV instead of Ceftriaxone/PIP-TZ	Meropenem 2gm q8h IV + Vancomycin 1 gm q12h IV	If fungal infection suspected Ampho B If VRE suspected Linezolid If XDR or PDR Gram negative infection suspected Colistin 4.5MUBD If CNS infection Add intrathecal antibiotics as above
Other infections Sternal infections Chest Abdominal Perineal	Ceftriaxone 1gm q12h IV + Metronidazole Or PIP-TZ 4.5 gm q6h IV If MRSA suspected Add Vancomycin 1gm IV q12h	Meropenem 2gm q8h IV + Vancomycin 1 gm q12h IV	If fungal infection suspected Ampho B If VRE suspected Linezolid If XDR or PDR Gram negative infection suspected Colistin 4.5MUBD If clostridium difficile colitis or sepsis suspected Oral Vancomycin 250 mg q6h + Metronidazole 500 mg q8h IV

Note:

Surgical debridement is almost always necessary.

Any graft, device or foreign body must be removed.

Table 15: Catheter related blood stream infections (CRBSI)

Name	Type 1	Type 2	Type 3
Peripheral catheter	Cloxacillin 1 gm q6h IV	Ceftriaxone 1gm q12h IV	-
Central venous catheter (short term) Dialysis catheter (short term)	-	+ Meropenem 2gm q8h IV Vancomycin 1 gm q12h IV	Meropenem 2gm q8h IV + Vancomycin 1 gm q12h IV
Dialysis catheter (long term) Hickman or other implanted catheter (long term)			If fungal infection (Non-AlbicansCandida suspected) Ampho B iv Or Caspofungin 70 mg IV q24h flowed by 50 mg If VRE suspected Linezolid If XDR or PDR Gram negative infection suspected Colistin 4.5MU BD

Note:

Catheter cultures and blood cultures to be sent as per HICC protocol.

Catheter maybe kept in situ pending culture reports especially if CRBSI not strongly suspected and no other IV access is available

Remove catheter immediately if local signs of suppuration present or if central venous catheter and blood cultures are positive

Definitive therapy once the causative organism is identified

It is vital to send cultures before empiric **antibiotics** are prescribed. Once cultures results are available the next steps are

1. Decide whether the **organism grown is** a colonizer or an actual pathogen. Ask for colony counts. Evaluate **carefully** if the site from which culture has been sent has active infection **either from clinical signs** or from elevated WBC counts or radiological **evidence**.
2. Don't treat colonizing **organisms**
3. Choose the simplest **antibiotic class** to which the **organism** shows sensitivity
4. If the cultures show **intermediate sensitivity** ask for **MIC** levels and consult infectious disease specialist for choice of appropriate antibiotic.
- 5.

Linezolid should be given only in culture confirmed MRSA infections after consultation with ID experts

Antibiotic Prophylaxis for Surgery

Procedure	Antibiotic
Clean surgeries (example: elective hernia repair, breast surgeries)	Cefazolin / Cefuroxime
Orthopedic surgery	Cefazolin / Cefuroxime
Cardiovascular / vascular surgery	Cefazolin / Cefuroxime
Neurosurgery	Cefazolin / Cefuroxime
Ophthalmic surgery	Topical quinolone. Systemic- Cefazolin / Cefuroxime
Head, neck and ENT surgery	Cefazolin / Cefuroxime
Gastroduodenal	Cefuroxime / Cefazolin
Appendicular / Colorectal surgery	Cefuroxime / Cefazolin and Metronidazole
Biliary	Cefuroxime / Cefazolin/ cefoperazone-sulbactam
Abdominal / Vaginal hysterectomy /	Cefazolin / Cefuroxime

Caesarian section	+Metronidazole
Urologic surgery	Cefuroxime (or as guided by urine culture)
Preoperative (cataract surgery)	Moxifloxacin eye drops 0.5% 4 times a day 2days prior to surgery
Post operative (cataract surgery)	Moxifloxacin eye drops 0.5% 4 times a day for 15 days

Note:

Preoperative dose of antibiotic is to be given within 60 minutes before incision

Dose of Cefazolin 2 gm IV

Dose of Cefuroxime 1.5 gm IV

Dose is to be repeated if surgery > 4 hours

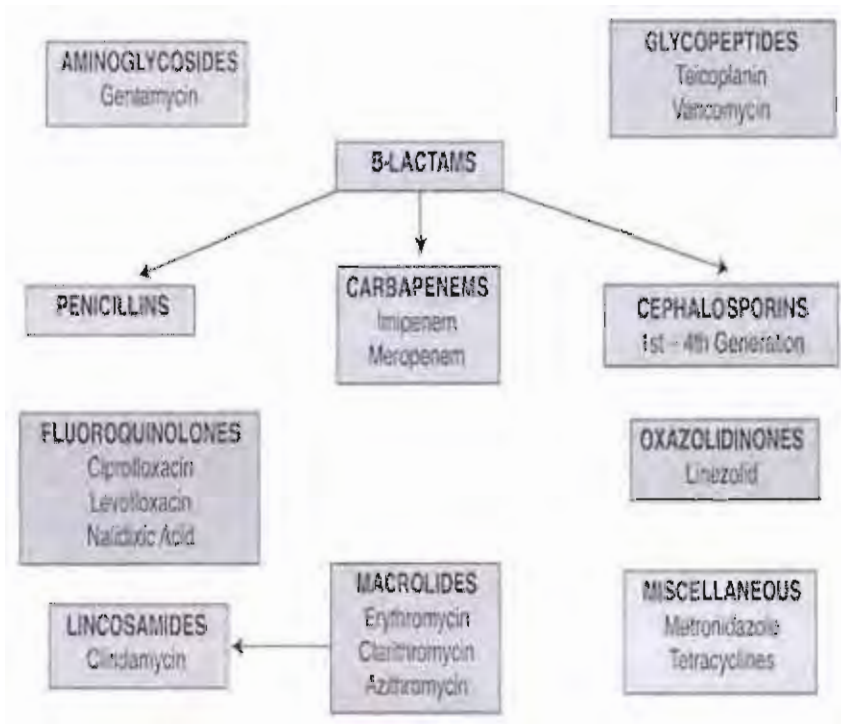
Consider either clindamycin or Vancomycin, if penicillin allergy.

Antibiotic prophylaxis must not be continued for more than 24 hours after surgery.

Appendix 1

Commonly used antibiotics

CLASSIFICATION OF ANTIBIOTICS



Spectrum of commonly used antimicrobials:

Antibiotic Class	Name	Organisms	Indication & Dose	Side effects
Penicillins				Allergy
β-lactamase susceptible	Penicillin G Penicillin V Ampicillin. Amoxicillin (PO)	Gram +ve Gram +ve Gram +ve& Gram -ve Gram +ve	Not easily available 1-2 gms q6h 500 mg q8h	
β – lactamase resistant	Cloxacillin	Gram +ve	0.5-1gm q6h	
β-lactam/ β-lactam inhibitor combination	Piperacillin-tazobactam. Ampicillin-sulbactam. Amoxicillin-clavulanate (IV)	ESBL Gram -ve organisms ESBL Gram -ve organisms Gram +ve&Haemophilus. influenzae	4.5 gm q6h as infusion 1 gm q6h 1.2 gm q8h	
Cephalosporins				
1 st Generation	Cefazolin (IV) Cephalexin (PO)	Gram +ve	1gm q8h 500 mg q8h	
2 nd Generation	Cefadroxil (PO) Cefuroxime (PO & IV)	Gram +ve Gram +ve	500 mg q12h 750 mg q8h	
3 rd Generation	Cefotaxime Ceftriaxone Ceftizoxime Ceftazidime Cefixime (PO) Cefpodoxime (PO) Cefdinir (PO)	Gram +ve& Gram -ve Gram +ve& Gram -ve Gram +ve& Gram -ve Gram +ve& Gram -ve Anti-pseudomonal	1 gram q6h 1-2gm q12h 1 gm q12h 1-2 gm q8h 200 mg q12h	

4 th Generation Cephalosporin Plus beta lactamase inhibitor	Cefepime Cefoperazone /sulbactam	Anti-pseudomonal Anti-pseudomonal	1-2 gm q12h 1.5 gm – 3gm q12h	
Aminoglycosides	Streptomycin Kanamycin Gentamicin Amikacin Tobramycin Netilmicin	Gram –ve Gram –ve Gram –ve Gram –ve Gram –ve Gram -ve	0.75 – 1gm q24h 3mg/kg q24h 13mg/kg q24h 3mg/kg q24h 5mg/kg q24h	Deafness Vertigo Muscle weakness
Quinolones Extended spectrum	Nalidixic acid Norfloxacin Ciprofloxacin Ofloxacin Levofloxacin Moxifloxacin		1 gm q6h 400 mg q12h 500 mg q12h 200 mg q12h 750 mg q24h 400 mg q24h	Seizures
Carbapenems Imipenem-cilastatin Meropenem Doripenem Ertapenem		Gram +ve except MRSA, ESBL Gram –ve except Stenotrophomonas, Burkholderia, Corynebacterium, Enterococcus faecium not covered Does not cover Pseudomonas, Acinetobacter & Enterococcus	0.5gm -1gm q6h 1 – 2 gm q8h 1gm q24h	Seizures
Polymyxins Polymyxin B Colistin		ESBL, Metalloproteinase producing Gram –ve	Colistin 4.5MU BD	Muscle weakness Renal toxicity
Lincosamide Clindamycin		Gram +ve and anaerobes	600mg q8h	C. difficile colitis
Glycopeptides				Renal

Vancomycin Teicoplanin		MRSA	1gm q12h 400 mg q24h	toxicity
Oxazolidinedione Linezolid		VRE	600 mg q12h	Thrombocytopenia
Lipopeptides Daptomycin		MRSA	4-6mg/kg q24h	
Antifungals Fluconazole Voriconazole Caspofungin Anidulafungin AmphoB aqueous AmphoB colloidal AmphoB liposomal		Candida albicans Aspergillus Non albicans candida Non albicans candida Broad spectrum covers all above + Mucor etc	400 mg q12h 6mg/kg q12h first day then 4mg/kg 70mg IV then 50 mg q24h Refer product insert	



BHARATI VIDYAPEETH UNIVERSITY MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE

**ANTIMICROBIAL AGENT FORM
BHRC/HIC/F23**

List of high end antibiotics:

1. Carbapenems 2. Piptaz 3. Levofloxacin ,4. Colistin, 5. Polymyxin B , 6. Fosfomycin/daptomycin 7. Teicoplanins
8. Vancomycin, 9. Tigecycline/ Minocycline 10. Teicoplanins 11. Linezolid 12. Echinocandins 13. Voriconazole/ Posaconazole
14. Amphotericin B

Ward : ICU I/II/III (Surg/ Ortho) Med 3/6/10/11 Other Wards: _____

Bed No : _____ Clinician/Unit Head : _____

Date of Admission: _____ Date of _____

Confirmed

Date of _____

fi
P

Paste Patient
Barcode here

Suspected cause/ site of infection: _____

Initiation of antibiotic: JRI JR II JR III Asst F f Assoc. of Professor Wt of patient _____ kg.

Date of Surgery: _____

AMA Details: _____ 1. High End Antibiotics _____ 2. Other _____

Antibiotics

IA(Generic ne)	E/D/SP*	Route , Freq and Dose (mg/g)	Start Date	Day 1	Day3	Day7	IV to Oral	Stop Date	CHANGE (AMA (remarks))
				(TEMP, TLC ,PCT, SERUM CREATININE)					

*=E- Empirical; D- Definitive; SP- Surgical Prophylaxis

Device in situ : 1. Central Line 2. Peripheral line 3. HD Catheter 4. Urinary Catheter 5. ETT/TT 6. Drains

Date of insertion _____ Date of removal _____

Culture/ Sensitivity Investigations done: YES / NO; If YES; Date of Report: _____

Specimen taken B/P/U/Resp/CSF)* and Date(DD/MM/YY) (1BEFORE,2AFTER)	Microorganism isolated Date received(DD/MM/YYYY)	Sensitivity Pattern (Name of imp antibiotics)	Change of AMA Y/N	Response after change Y/N

*=B- Blood ; P- Pus ; U- Urine; Resp – Sputum,ETT,BAI ; CSF- Cerebro spinal fluid

Assessment of Appropriateness:

Collected Data By : _____

Prescriber Sign : _____
(In case of High end Antibiotic)

Appropriate 1	Score	Description
	A	Empiric
	B	Definitive
	C	Surgical prophylaxis
	D	De-escalation / Escalation
Inappropriate 2	A	No Indication
	B	Empiric
	C	Definitive (No de-escalation / escalation based on culture/ advice)
	D	Surgical Prophylaxis
	E	Duration longer than indication
	F	Duration longer for surgical prophylaxis
	G	Dose/ Freq (underdosing /overdosing)
Others 3	A	Indication not documented
	B	ID reference
	C	Referred from outside
	D	Readmitted