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Antibiogram-AIIMS, Bhopal (1st January to 30th June 2023)

- The cumulative antimicrobial susceptibility test data presented is for the period of 1st January to 30th June 2023.
- The percent susceptibility for each organism/antimicrobial combination was generated by including only the first isolate of that organism recovered from a given patient during the time period analyzed.
- This data is based on the final verified test results interpreted based on the current CLSI and EUCAST guidelines.
- To be a statistically significant minimum of 30 isolates are generally considered in the antibiogram; however, the current antibiogram reflects the important species with ≥ 15 isolates. Species with more ≥ 15 but ≤ 30 isolates are marked with * and should be interpreted cautiously. The only exception is Burkholderia pseudomallei which is included with only eight isolates being an important pathogen.
- All the microorganisms are alphabetically arranged.
- A shift of more than 5% in susceptibility for antimicrobials tested compared to the last antibiogram (July to December 2022) has been depicted by arrows "↓" (indicating decrease) and "↑" (indicating Increase) [Table 5 & 6]
- A total of 3221 isolates were analyzed as per the above criteria, with 2680 Gram Negative bacteria and 541 Gram Positive bacteria
- Sample-wise consolidated percent susceptibility to Gram Negative and Gram Positive organisms has been added. [Table 7 & 8]
- For any further details and/or clarification, please contact –

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Table 1. Sample Wise Distribution of important Gram-Negative bacteria [Number (%)] from 1st January to 30th June 2023

Sr. No	Name of Isolates	Total	Blood	Pus	Urine	Respiratory Samples	CSF	Others
1	Acinetobacter Species	480	103(21.4)	114(23.7)	30(6.25)	203(42.29)	6(1.25)	24(5.0)
2	Burkholderia cepacia*	15	6(40.0)	3(20.0)	4(26.6)	2(13.3)	-	-
3	Burkholderia pseudomallei *	8	3(37.5)	5(62.5)	-	-	-	-
4	Citrobacter Species	31	1(3.22)	22(70.96)	8(25.8)	-	-	-
5	Enterobacter cloacae	97	24(24.74)	43(44.32)	20(20.61)	9(9.27)	-	1(1.03)
6	Escherichia coli	1008	69(6.84)	257(25.49)	568(56.3)	29(2.87)	-	85(8.43)
7	Klebsiella Species	559	52(9.30)	193(34.52)	188(33.63)	78(13.95)	-	48(8.58)
8	Morganella morganii ss. Morganii *	18	1(5.55)	9(50.0)	6(33.3)	1(5.55)	-	1(5.55)
9	Proteus mirabilis	34	-	18(52.94)	14(41.17)	2(5.88)	-	-
10	Providencia Species *	19	1(5.26)	3(15.78)	11(57.8)	4(21.0)	-	-
11	Pseudomonas Species	300	32(10.6)	107(35.66)	68(22.66)	77(25.66)	2(0.66)	14(4.66)
12	Typhoidal Salmonella *	26	25(96.15)	1(3.84)	-	-	-	-
13	Serratia Species	31	5(16.12)	9(29.03)	13(41.93)	3(9.67)	-	1(3.22)
14	Sphingomonas paucimobilis *	18	14(77.7)	2(11.11)	1(5.55)	1(5.55)	-	-
15	Stenotrophomonas maltophilia	36	25(69.44)	3(8.33)	1(2.77)	4(11.11)	-	3(8.33)
	Total	2680	361	789	932	413	8	177

* Indicates Species with more ≥ 15 but ≤ 30 isolates during the period of analysis, with the exception of Burkholderia pseudomallei

Table 2. Sample Wise Distribution of important Gram-Positive bacteria [Number (%)] from 1st January to 30th June 2023

Sr. No.	Name of Isolates	Total	Blood	Pus	Urine	Respiratory Samples	CSF	Others
1	CONS	208	179(86.05)	12(5.76)	1(0.48)	1(0.48)	-	15(7.21)
2	Enterococcus faecalis	40	6(15.0)	10(25.0)	22(55.0)	-	-	2(5.00)
3	Enterococcus faecium	89	35(39.32)	29(32.58)	14(15.73)	2(2.24)	1(1.12)	8(8.98)
4	Staphylococcus aureus ss. aureus	204	25(12.25)	169(82.84)	-	1(0.49)	-	9(4.41)
	Total	541	245	220	37	4	1	34

Table 3. Location Wise Distribution of important Gram-Negative bacteria from 1st January to 30th June 2023

Sr. No.	Name of Isolates	Total	OPD	IPD	ICU	Emergency
1	Acinetobacter Species	480	29	189	242	20
2	Burkholderia cepacia*	15	2	9	4	0
3	Burkholderia pseudomallei *	8	4	3	0	1
4	Citrobacter Species	31	12	17	1	1
5	Enterobacter cloacae	97	32	50	8	7
6	Escherichia coli	1008	412	473	83	40
7	Klebsiella Species	559	141	264	129	25
8	Morganella morganii ss. Morganii *	18	4	11	0	3
9	Proteus mirabilis	34	17	14	3	0
10	Providencia Species *	19	3	14	2	0
11	Pseudomonas Species	300	87	139	64	10
12	Typhoidal Salmonella*	26	16	7	0	3
13	Serratia Species	31	12	13	5	1
14	Sphingomonas paucimobilis *	18	8	7	2	1
15	Stenotrophomonas maltophilia	36	0	17	16	3
	Total	2680	779	1227	559	115

* Indicates Species with more ≥ 15 but ≤ 30 isolates during the period of analysis, with the exception of Burkholderia pseudomallei

Table 4. Location Wise Distribution of important Gram-Positive bacteria from 1st January to 30th June 2023

Sr. no.	Name of Isolates	Total	OPD	IPD	ICU	Emergency
1	CONS	208	13	86	102	7
2	Enterococcus faecalis	40	18	13	7	2
3	Enterococcus faecium	89	7	45	32	5
4	Staphylococcus aureus ss. aureus	204	81	94	16	13
	Total	541	119	238	157	27

Table 5. Percent susceptibility/no. of isolates tested for important Gram-Negative bacteria from 1st January to 30th June 2023

Gram Negative Organisms	Total number of isolates	Cefepime	Ceftazidime	Aztreonam	Ertapenem	Meropenem	Gentamicin	Amikacin	Ciprofloxacin	Levofloxacin	Imipenem	Trimethoprim/ Sulfamethoxazole	Piperacillin/ Tazobactam	Cefoperazone/ Sulbactam	Minocycline	Tigecycline	Cefuroxime	Fosfomycin	Nitrofurantoin	Amoxicillin/ Clavulanic acid
		Percent Susceptibility / Number of isolates tested																		
Acinetobacter Species	480	4.8	7.6	R	R	7.2	11.6	11.6	9.1	10.6	7.4	19.2	4	9.6	49.3	50	3.7	R	-	R
		442	407	R	R	471	474	473	472	404	462	468	445	469	400	2	190	R	-	R
Burkholderia cepacia *	15	0 ↓	69.2 ↑	12.5	R	73.3 ↑	0 ↓	0 ↓	0	15.4 ↑	0 ↓	38.5	0 ↓	16.7 ↓	18.2 ↓	-	R	R	-	R
		12	13	8	R	15	12	11	12	13	12	13	12	12	11	-	R	R	-	R
Burkholderia pseudomallei *	8	NR	50 ↓	NR	NR	87.5 ↑	0 ↓	NR	NR	NR	100 ↑	100 ↑	NR	NR	NR	NR	NR	NR	NR	100
		NR	8	NR	NR	8	6	NR	NR	NR	8	5	NR	NR	NR	NR	NR	NR	NR	NR
Citrobacter Species	31	38.7 ↓	23.1	15.4 ↓	29.4 ↓	41.9 ↓	38.7 ↓	51.6 ↓	19.4 ↓	30.8 ↓	41.9 ↓	29 ↓	43.3 ↑	31	69.2 ↓	89.7	R	-	-	-
		31	13	13	17	31	31	31	31	13	31	31	31	30	29	13	29	R	-	-
Enterobacter cloacae	97	52.1 ↑	36.7 ↑	30.5 ↑	55.3	60.4	59.4	60.4 ↑	50.5 ↑	51.7 ↑	57.7	63.5 ↑	40.2 ↑	43.8 ↑	74.6 ↑	92.6 ↑	13.5 ↑	-	35.3 ↑	R
		96	60	59	38	96	96	96	97	60	97	96	97	96	59	95	37	-	17	R
Escherichia coli	1008	23.8	20.3	16.9 ↑	61.9	66.9 ↑	65.7	82.3	3.2	3.8	68.3 ↑	38.8	42.4 ↑	49.3 ↑	81.2	99 ↑	6.9 ↓	99.7	90.8	24.3 ↑
		995	237	231	766	1004	1003	1003	1004	239	995	1000	996	1002	234	989	768	398	544	769
Klebsiella Species	559	21.6	7.9	8.1	30.2	26.2	31.1 ↓	31.7 ↓	15.4	6.3 ↓	25.9	33.5	22	25.2	37	67.1	12.6 ↑	-	34.1 ↑	11.4
		556	127	124	430	557	556	556	557	127	556	555	558	555	127	550	430	-	185	430
Morganella morganii ss. Morganii *	18	-	17.6 ↑	18.8	-	72.2 ↑	72.2 ↑	83.3 ↑	5.6 ↓	5.9 ↓	0 ↓	38.9 ↑	72.2 ↑	22.2	11.8	R	R	-	R	R
		-	17	16	-	18	18	18	18	17	18	18	18	18	17	R	R	-	R	R
Proteus mirabilis	34	47.1 ↓	32.4 ↑	35.3 ↑	-	52.9 ↑	29.4 ↓	52.9 ↓	11.8 ↓	8.8 ↓	38.2 ↑	20.6 ↓	79.4 ↓	38.2 ↑	0 ↓	R	51.9	-	R	90.5
		34	34	34	-	34	34	34	34	34	34	34	34	34	34	34	R	27	-	R
Providencia Species *	19	21.1	16.7	23.5 ↑	-	26.3 ↓	47.4	36.8	21.1	22.2	10.5	31.6 ↓	21.1	15.8	0 ↓	R	R	-	R	R
		19	18	17	-	19	19	19	19	18	19	19	19	19	17	R	R	-	R	R
Pseudomonas Species	300	31.1 ↑	32.3 ↑	-	R	50.3	53.8	55.2	47.4 ↓	46 ↓	52.7	R	28.1 ↑	27.8 ↑	-	R	R	-	44.4 ↑	R
		293	279	-	R	290	247	290	289	278	292	R	295	291	-	R	R	-	9	R
Typhoidal Salmonella *	26	96.2	50 ↓	20 ↓	100	88.5 ↓	NR	NR	3.8	10	100	73.1 ↓	69.2 ↑	46.2 ↑	90 ↓	NR	43.8 ↑	-	-	100 ↑
		26	10	10	16	26	NR	NR	26	10	26	26	26	26	10	NR	16	-	-	16
Serratia Species	31	74.2 ↑	47.6 ↑	61.9 ↑	70 ↓	77.4 ↑	87.1	87.1	51.6 ↓	66.7 ↓	80 ↑	77.4 ↓	57.1 ↓	56.7 ↑	81 ↓	100 ↑	R	-	R	R
		31	21	21	10	31	31	31	31	21	30	31	14	30	21	2	R	-	R	R
Sphingomonas paucimobilis *	18	71.4 ↑	68.8 ↑	40 ↑	-	88.9 ↑	83.3 ↑	83.3 ↑	77.8 ↑	100 ↑	88.9 ↑	82.4 ↑	78.6 ↑	77.8 ↑	93.3 ↑	-	-	-	-	87.5
		14	16	15	-	18	18	18	18	14	18	17	14	18	15	-	-	-	-	8
Stenotrophomonas maltophilia	36	25 ↑	66.7 ↑	R	R	R	R	R	0	94.3	R	38.9 ↑	R	75 ↑	100	-	R	R	-	R
		4	30	R	R	R	R	R	4	35	R	36	R	4	34	-	R	R	-	R

(-) : Not tested, NR: Not routinely Reported, R: Intrinsically Resistant, * Indicates Species with more ≥ 15 but ≤ 30 isolates during the analysis period
 "↓" (Decrease) and "↑" (Increase) indicate a shift of more than 5% in susceptibility for antimicrobials tested compared to the last antibiogram

Note: Additional information on percent susceptibility (number of isolates tested):

🚩 Typhoidal Salmonella: Chloramphenicol 70% ↑ (20), Azithromycin 91.7% ↑ (24) & Ampicillin 70.8% ↑ (24)

Table 6. Percent susceptibility/no. of isolates tested for important Gram-Positive bacteria from 1st January to 30th June 2023

Gram Positive Organisms	Total no. of isolates	Ciprofloxacin	Levofloxacin	Ampicillin	Trimethoprim/ Sulfamethoxazole	Penicillin	Teicoplanin	Vancomycin	Erythromycin	Linezolid	Nitrofurantoin	Tigecycline	Daptomycin	Doxycycline	Tetracycline	High Level Gentamicin	Clindamycin	Oxacillin
	n	Percent Susceptibility / Number of isolates tested																
CONS	208	11	7	7	38	7	87	91	9	68.5 ↑	100	96.8 ↑	99 ↑	100	67	-	-	13
		206	205	181	203	207	201	204	204	197	6	155	103	118	201	-	-	205
Enterococcus faecalis	40	10	10	100 ↑	-	67.5 ↑	100	71.8 ↓	5	90 ↓	44	94.6 ↑	33	100	21	31	R	-
		40	40	26	-	40	39	39	40	40	16	37	40	7	38	39	R	-
Enterococcus faecium	89	1	1	100	-	2	65	60	0	72.4 ↓	0	92.7 ↑	-	21.2 ↓	19	23	R	-
		88	88	2	-	88	88	88	88	87	10	82	-	33	83	88	R	-
MSSA	87	1	1	5	61.6 ↑	5	100	95	56	69	100	100 ↑	96	100	95	-	-	100
		86	85	85	86	86	86	83	86	86	1	85	46	77	83	-	-	87
MRSA	117	0	0	0	28.7 ↑	0	100	86 ↑	21	60.3 ↑	100	95.3 ↑	95.9 ↑	100	90.5 ↑	-	-	0
		117	116	103	115	115	115	114	116	116	1	106	49	93	116	-	-	117

(-) : Not tested, R: Intrinsically Resistant

MSSA- Methicillin Sensitive Staphylococcus aureus

MRSA- Methicillin Resistant Staphylococcus aureus

"↓" (Decrease) and "↑" (Increase) indicate a shift of more than 5% in susceptibility for antimicrobials tested compared to the last antibiogram

Note: Additional information on percent susceptibility (number of isolates tested) :

🚩 Staphylococcus aureus sp. aureus: Rifampicin – MSSA strains 98 % (84) & MRSA strains 95.3% ↑ (107)

Antimicrobial Resistance Profile:

- Carbapenem resistance of around 94 percent was observed in Acinetobacter species, whereas in Enterobacterales and other non-fermenters, it ranged from 33% to 75 %.
- 57.35 % S. aureus were MRSA strains.
- 87 % of Coagulase Negative Staphylococcus were found to be Methicillin Resistant (MRCONS).
- 28.2 % & 40% isolates of E. faecalis and E. faecium respectively were found to be Vancomycin Resistant.

Table 7. Sample-wise consolidated percent susceptibility for Gram Negative bacteria from 1st January to 30th June 2023

Gram Negative Organisms	Total number of isolates (n=2751)	Cefepime	Ceftazidime	Aztreonam	Meropenem	Gentamicin	Amikacin	Ciprofloxacin	Levofloxacin	Imipenem	Trimethoprim/Sulfamethoxazole	Piperacillin/Tazobactam	Cefoperazone/Sulbactam	Minocycline	Tigecycline	Cefuroxime	Fosfomycin	Nitrofurantoin	Amoxicillin/Clavulanic acid
		Percent Susceptibility / Number of isolates tested																	
Blood	403	33.5	32	17.7	49.2	48.8	52.9	30.1	39.7	48.5	43.9	32.8	36.8	69.2	89.8	45	NR	NR	90
		349	375	209	372	369	374	375	375	365	367	348	372	334	176	20	NR	NR	20
Pus	802	19.6	19	15.4	39.8	42.9	48.2	13.6	20.7	38.7	31.2	25.1	27.9	57.8	86.8	5.7	NR	NR	12.6
		776	343	136	794	772	793	793	347	791	690	780	789	237	515	424	NR	NR	421
Urine	942	33.3	26.3	27.9	61.6	58.8	70	13.3	15.3	62.1	44.2	45.1	49.4	67.5	90.4	13.2	93.2	73.1	27.2
		916	270	179	935	921	931	932	268	926	866	921	931	200	778	650	410	806	650
Respiratory Samples	414	13	12.6	18.6	20.9	24.5	27.4	14.2	16.8	21.2	18.9	13.7	15	36	75.2	8.4	NR	NR	9.6
		401	286	43	402	392	401	401	285	401	334	402	400	211	113	83	NR	NR	83
CSF	9	0	0	0	11.1	44.4	44.4	33.3	28.6	12.5	42.9	14.3	11.1	40	NR	NR	NR	NR	NR
		7	7	1	9	9	9	9	7	8	7	7	9	5	NR	NR	NR	NR	NR
Others	181	7.4	18.5	7.1	36.9	39.1	50.8	9.5	23.1	36	29.5	15.9	21.2	47.9	83.5	1.8	NR	NR	4.5
		175	65	28	179	179	179	179	65	178	166	176	179	48	133	110	NR	NR	110

Note: Total number of isolates for various specimens varies in the table as it is consolidated percent susceptibility of all Gram-Negative bacteria wherein all the isolates which are less than 15 have also been included, which was otherwise the minimum number for inclusion in the analysis.

Table 8. Sample-wise consolidated percent susceptibility for Gram Positive bacteria from 1st January to 30th June 2023

Gram Positive Organisms	Total no. of isolates (n=557)	Ciprofloxacin	Levofloxacin	Ampicillin	Penicillin	Teicoplanin	Vancomycin	Erythromycin	Linezolid	Nitrofurantoin	Tigecycline	Daptomycin	Doxycycline	Tetracycline	High Level Gentamicin	Clindamycin	Oxacillin
	n	Percent Susceptibility / Number of isolates tested															
Blood	254	8.8	6.4	8.5	7.6	85.2	85.9	8.9	70.5	NR	96	94.5	100	63.4	22.2	32.5	16.3
		250	250	189	251	244	248	247	244	NR	201	110	136	246	45	203	203
Pus	225	1.3	2.2	6.4	5.9	94.5	84.4	28.7	65.8	NR	96.6	87.4	100	79.2	35.7	70.2	38.9
		223	223	171	222	220	218	223	222	NR	206	95	152	216	42	181	180
Urine	38	7.9	7.9	100	44.7	84.2	63.2	2.6	67.6	29.6	91.7	36.4	67	19.4	24.3	NR	NR
		38	38	17	38	38	38	38	37	27	36	22	17	36	37	NR	NR
Respiratory Samples	5	0	20	0	20	100	100	20	80	NR	100	NR	100	40	100	50	50
		5	5	2	5	5	5	5	5	NR	3	NR	3	5	3	2	2
CSF	1	0	0	0	0	100	100	0	100	NR	100	NR	NR	NR	0	NR	NR
		1	1	1	1	1	1	1	1	NR	1	NR	NR	NR	1	NR	NR
Others	34	6.1	3	16.7	11.8	84.8	81.8	18.2	84.4	NR	100	100	100	48.5	40	47.8	25
		33	33	24	34	33	33	33	32	NR	29	12	14	33	10	23	24

Note: Total number of isolates for various specimens varies in the table as it is consolidated percent susceptibility of all Gram-Positive bacteria wherein all the isolates which are less than 15 have also been included, which was otherwise the minimum number for inclusion in the analysis.

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