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Antibiogram-AIIMS, Bhopal (July-December 2022)

- The cumulative antimicrobial susceptibility testing data gathered is for the period of July to December 2022.
- Only the first isolate of a given species from an individual patient is included during the period of analysis.
- This data is based on the final verified test results interpreted based on the current CLSI and EUCAST guidelines.
- To be statistically significant minimum 30 isolates are generally considered in antibiogram however the current antibiogram reflects the important species with ≥ 10 numbers of isolates. Species with more ≥ 10 but ≤ 30 isolates are marked with * and should be interpreted with caution.
- All the microorganisms are alphabetically arranged.
- A total of 3093 isolates were analysed as per above criteria which included 2504 Gram Negative and 589 Gram Positive bacteria.
- For any further details and/or clarification please contact – Dr. Shashank Purwar

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Table 1. Sample Wise Distribution of important Gram-Negative bacteria (July-December 2022)

Sr. No	Name of Isolates	Total	Blood (%)	Pus (%)	Urine (%)	Respiratory Samples (%)	CSF (%)	Others (%)
1	<i>Acinetobacter Species</i>	366	63 (20.32)	93 (12.15)	20 (2.24)	172 (55.84)	4 (36.36)	14(6.39)
2	<i>Achromobacter species</i> *	13	7 (2.25)	6(0.78)	-	-	-	-
3	<i>Burkholderia cepacia</i> *	13	7 (2.25)	3(0.39)	3(0.33)	-	-	-
4	<i>Burkholderia pseudomallei</i> *	26	13 (4.19)	9(1.17)	2(0.22)	1(0.32)	-	1(0.45)
5	<i>Citrobacter Species</i> *	21	1 (0.32)	14(1.83)	3(0.33)	2(0.64)	-	1(0.45)
6	<i>Enterobacter cloacae</i>	71	14(4.51)	32(4.18)	15(1.68)	6(1.94)	1(9.09)	3(1.36)
7	<i>Escherichia coli</i>	978	69(22.25)	250(32.67)	565(63.41)	23(7.46)	1(9.09)	70(31.96)
8	<i>Klebsiella Species</i>	463	40(12.90)	138(18.03)	175(19.64)	20(0.64)	-	108(49.31)
9	<i>Morganella Species</i> *	26	3(0.96)	15(1.96)	6(0.67)	-	-	2(0.91)
10	<i>Proteus Species</i>	39	1(0.32)	24(3.13)	11(1.23)	1(0.32)	-	2(0.91)
11	<i>Providencia Species</i> *	29	2(0.64)	15(1.96)	7(0.78)	4(1.29)	-	1(0.45)
12	<i>Pseudomonas Species</i>	360	41(13.22)	147(19.21)	75(8.41)	85(27.59)	1(9.09)	11(5.02)
13	<i>Typhoidal Salmonella</i>	30	28(9.03)	1(0.13)	1(0.11)	-	-	-
14	<i>Serratia Species</i> *	19	1(0.32)	5(0.65)	5(0.56)	2(0.64)	3(27.27)	3(1.36)
15	<i>Sphingomonas paucimobilis</i> *	17	11(3.54)	2(0.26)	1(0.11)	2(0.64)	1(9.09)	-
16	<i>Stenotrophomonas maltophilia</i>	33	9(2.90)	11(1.43)	2(0.22)	8(2.59)	-	3(1.36)
	Total	2504	310	765	891	308	11	219

Table 2. Sample Wise Distribution of important Gram-Positive bacteria (July-December 2022)

Sr. No.	Name of Isolates	Total	Blood (%)	Pus (%)	Urine (%)	Respiratory Samples (%)	CSF (%)	Others (%)
1	CONS	215	153 (79.27)	51 (16.83)	1 (1.75)	3 (17.64)	2 (100)	5 (29.41)
2	<i>Enterococcus faecalis</i>	42	1(0.51)	9(2.97)	30(52.63)	2(11.76)	-	-
3	<i>Enterococcus faecium</i>	74	19(9.84)	19 (6.27)	26(45.61)	2(11.76)	-	8 (47.05)
4	<i>Staphylococcus aureus ss. aureus</i>	236	20 (10.36)	203 (66.99)	0 (0.00)	10(58.82)	-	3 (17.64)
5	<i>Streptococcus pyogenes</i> *	22	-	21 (6.93)	0 (0.00)	0(0.00)	-	1 (5.88)
	Total	589	193	303	57	17	2	17

* Organisms isolated in ≥ 10 but ≤ 30 patients during period of analysis.

Table 3. Location Wise Distribution of important Gram-Negative bacteria (July-December 2022)

Sr. No.	Name of Isolates	Total	OPD	IPD	ICU	Emergency
1	<i>Acinetobacter species</i>	366	32	138	185	11
2	<i>Achromobacter species</i> *	13	1	9	2	1
3	<i>Burkholderia cepacia</i> *	12	2	4	5	1
4	<i>Burkholderia pseudomallei</i> *	26	2	15	7	2
5	<i>Citrobacter species</i> *	21	13	8	0	0
6	<i>Enterobacter cloacae</i>	70	20	39	10	1
7	<i>Escherichia coli</i>	996	351	496	115	34
8	<i>Klebsiella species</i>	448	108	233	92	15
9	<i>Morganella species</i> *	26	4	18	3	1
10	<i>Proteus species</i>	36	15	19	1	1
11	<i>Providencia species</i> *	27	6	15	3	3
12	<i>Pseudomonas species</i>	354	73	196	75	10
13	<i>Typhoidal Salmonella</i>	31	13	10	2	6
14	<i>Serratia species</i> *	20	5	8	7	0
15	<i>Sphingomonas paucimobilis</i> *	21	2	6	7	6
16	<i>Stenotrophomonas maltophilia</i>	37	6	15	10	6
	Total	2504	653	1229	524	98

Table 4. Location Wise Distribution of important Gram-Positive bacteria (July-December) 2022

Sr. no.	Name of Isolates	Total	OPD	IPD	ICU	Emergency
1	CONS	215	29	47	136	3
2	<i>Enterococcus faecalis</i>	42	14	23	2	3
3	<i>Enterococcus faecium</i>	74	4	41	26	3
4	<i>Staphylococcus aureus ss. aureus</i>	236	97	110	22	7
5	<i>Streptococcus pyogenes</i> *	22	8	13	0	1
	Total	589	152	234	186	17

* Organisms isolated in ≥ 10 but ≤ 30 patients during period of analysis.

Table 5. Percent susceptibility/no. of isolates tested for important Gram-Negative bacteria (July-December 2022)

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
	n	Percent Susceptibility / Number of isolates tested																		
<i>Acinetobacter species</i>	366	4.9	10.7	R	R	10.5	13.4	12.8	10.8	10.6	10.6	19.9	2.7	7.7	52.3	75	3.7	R	-	R
		327	289	R	R	351	352	351	353	284	339	351	331	350	283	4	190	R	-	R
<i>Achromobacter species</i> *	13	0	33.3	0	-	69.2	0	0	7.7	16.7	30.8	30.8	23.1	30.8	54.5	-	-	-	-	-
		13	12	11	-	13	13	13	13	12	13	13	13	13	11	-	-	-	-	-
<i>Burkholderia cepacia</i> *	13	11.1	58.3	11.1	R	58.3	11.1	11.1	0	8.3	22.2	36.4	12.5	33.3	54.5	-	-	R	-	R
		9	12	9	R	12	9	9	9	12	9	11	8	9	11	-	-	R	-	R
<i>Burkholderia pseudomallei</i> *	26	NR	70.8	NR	NR	77.3	23.5	NR	NR	NR	83.3	90.9	NR	NR	NR	NR	NR	NR	NR	95.8
		NR	24	NR	NR	22	17	NR	NR	NR	24	22	NR	NR	NR	NR	NR	NR	NR	24
<i>Citrobacter species</i> *	21	47.4	25	33.3	66.7	57.9	52.6	57.9	36.8	45.5	68.4	47.4	33.3	42.1	81.8	88.2	R	-	-	-
		19	12	12	6	19	19	19	19	11	19	19	18	19	11	17	R	-	-	-
<i>Enterobacter species</i>	71	43.9	16.7	16.7	55.9	58	55.1	68.1	39.1	44.4	57.1	47.8	21.4	27.9	47.2	81	2.9	-	7.7	R
		66	36	36	34	69	69	69	69	36	70	69	70	68	36	63	34	-	13	R
<i>Escherichia coli</i>	978	21.2	18.6	11.2	58.9	59.3	61.2	77.9	3.4	5.5	61.9	36.4	32.1	35.5	79.8	93.5	13.3	83.3	88	18.4
		923	253	251	688	939	943	942	941	254	929	938	931	933	238	800	694	548	523	691
<i>Klebsiella species</i>	463	21.7	10.8	7.5	34.3	30.1	36.8	39.4	15	13.3	30	34.4	23.4	25.1	30.6	64.3	7.4	-	16	10.1
		443	111	106	332	442	446	447	448	113	443	448	444	443	108	395	336	-	163	337
<i>Morganella species</i> *	26	-	4.3	19	-	47.8	43.5	69.6	21.7	20.8	4.3	30.4	45.5	21.7	8.7	R	R	-	R	R
		-	23	21	-	23	23	23	23	24	23	23	22	23	23	R	R	-	R	R
<i>Proteus species</i>	39	59.5	18.4	14.3	-	37.8	57.9	73	36.8	34.2	32.4	34.2	89.5	26.3	5.3	R	R	-	R	89.5
		37	38	35	-	37	38	37	38	38	37	38	38	38	38	R	R	-	R	19
<i>Providencia species</i> *	29	20.8	20.8	9.5	-	37	R	38.5	22.2	24	7.4	40.7	25.9	28.6	5.3	R	R	-	R	R
		24	24	21	3	27	R	26	27	25	27	27	27	28	19	R	R	-	R	R
<i>Pseudomonas species</i>	360	24.9	25.1	0	R	52.6	56.4	59.8	54.9	53.3	57.5	R	21.1	20.4	-	R	R	-	25	R
		345	339	2	R	348	349	348	348	338	348	R	346	348	-	R	R	-	12	R
Typhoidal Salmonella	30	96.4	68.8	37.5	100	96.6	NR	NR	0	12.5	100	82.1	50	25	100	NR	0	-	-	76.9
		28	16	16	13	29	NR	NR	28	16	29	28	28	28	16	NR	13	-	-	13
<i>Serratia species</i> *	19	55.6	23.1	23.1	80	61.1	83.3	88.9	58.8	76.9	66.7	83.3	75	38.9	90.9	0	R	-	R	R
		19	13	13	6	19	19	19	18	14	19	19	4	19	12	1	R	-	R	R
<i>Sphingomonas paucimobilis</i> *	17	40	50	16.7	-	73.3	62.5	56.3	50	66.7	76.5	53.3	57.1	62.5	84.6	-	-	-	-	87.5
		15	12	12	-	15	16	16	16	12	17	15	14	16	13	-	-	-	-	8
<i>Stenotrophomonas maltophilia</i>	33	0	50	R	R	R	R	R	0	90.3	R	33.3	R	50	96.8	-	R	R	-	R
		2	2	R	R	R	R	R	2	31	R	33	R	2	31	-	R	R	-	R

(-) = Not tested, NR = Not routinely Reported, R= Intrinsically Resistant * Organisms isolated in ≥ 10 but ≤ 30 patients during period of analysis.

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

- Burkholderia pseudomallei:** Chloramphenicol 80% (20) & Doxycycline 87.5% (16)
- Typhoidal Salmonella:** Chloramphenicol 63.6% (22), Azithromycin 63% (27) & Ampicillin 77.8% (27)

Table 6. Percent susceptibility/no. of isolates tested for important Gram-Positive bacteria (July-December 2022)

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	215	14.1	8.2	2.8	32.4	6.3	84.2	90.1	12.6	58.5	92.3	82.1	88.6	100	70.3	-	-	15.1
		205	207	144	207	208	202	203	206	205	26	134	88	87	195	-	-	205
<i>Enterococcus faecalis</i>	42	15	15	94.7	100	56.1	100	79.5	7.3	95	45	84.8	38.2	100	20.5	31.6	R	-
		40	19	1	41	37	39	41	40	20	33	34	8	39	38	38	R	-
<i>Enterococcus faecium</i>	74	0	0	10.9	-	-	67.6	64.8	0	83.1	3.8	80	-	100	20.6	20.9	R	-
		70	71	55	-	-	71	71	71	71	26	55	-	11	68	67	R	-
MSSA	97	6.4	7.4	0	55.8	0	100	93.5	56.8	67	85.7	86	93.3	100	91	-	-	100
		94	95	85	95	95	93	92	95	94	7	86	45	76	89	-	-	97
MRSA	139	0	0	0	19.9	0	99.3	74.8	20.1	31.3	78.6	84.1	88.5	100	84.2	-	-	0
		137	137	95	136	136	135	135	134	134	14	107	26	72	133	-	-	139
<i>Streptococcus pyogenes</i> *	22	-	41.2	100	-	100	-	100	41.2	100	-	73.3	-	-	-	-	50	-
		-	17	15	-	15	-	17	17	17	-	15	-	-	-	-	16	-

(-) = Not tested , **NR** =Not routinely Reported , **R**= Intrinsically Resistant

* Organisms isolated in ≥ 10 but ≤ 30 patients during period of analysis.

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

MSSA- Methicillin Sensitive *Staphylococcus aureus*

MRSA- Methicillin Resistant *Staphylococcus aureus*

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

- Streptococcus pyogenes*: Cefotaxime 100% (16) & Chloramphenicol 53.3% (15)
- Staphylococcus aureus sp. aureus*: Rifampicin – MSSA strains 98.9% (87) & MRSA strains 89.4% (123)

Antimicrobial Resistance Profile:

- Carbapenem resistance of around 90 percent was observed in *Acinetobacter species* whereas in Enterobacterales and other non-fermenters it ranged from 41 to 70 %.
- 58.89% *S. aureus* were MRSA strains.
- 84.90 % of Coagulase Negative *Staphylococcus* were found to be Methicillin Resistant (MRCONS).
- 20.5 % & 35.2% isolates of *E. faecalis* and *E. faecium* respectively were found to be Vancomycin Resistant.