



DEPARTMENT OF MICROBIOLOGY GOVERNMENT MEDICAL COLLEGE, SRINAGAR



ANTIBIOGRAM 2024

1. Introduction

This antibiogram represents the antimicrobial susceptibility testing (AST) profile of priority pathogens obtained from various clinical samples in the Department of Microbiology at Government Medical College, Srinagar. The profile is generated using aggregate data on the WHONET software. Results of antimicrobial drugs routinely tested and clinically useful are included.

The priority pathogens, as listed by the WHO in 2024, include *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, Enterobacteriaceae (*E. coli*, *Klebsiella* species, *Salmonella* species, and *Shigella* species), *Staphylococcus aureus*, and *Enterococcus* species.

2. Patient and sample details.

2.1 Patient Demographics.

Age and Gender distribution of reported AMR data

Among 3922 unique patients, the AST data in this Antibiogram are from 55% of male and 45% of female patients (Fig. 1).

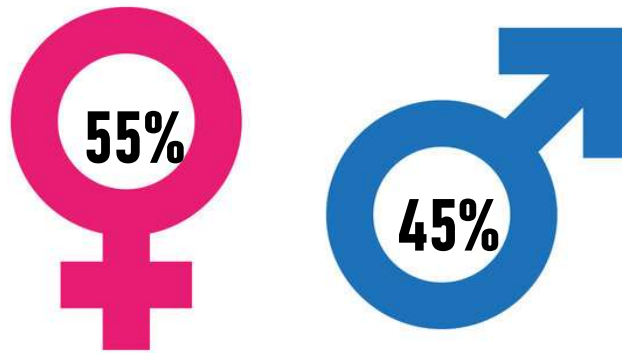


Figure 1: Gender distribution.

Majority of patients were in the age category 35-64 years (49.9%) and 2% patients were in the age category 1-4 years. About 74.1% were from the productive age group of 15-64 years (Fig 2).

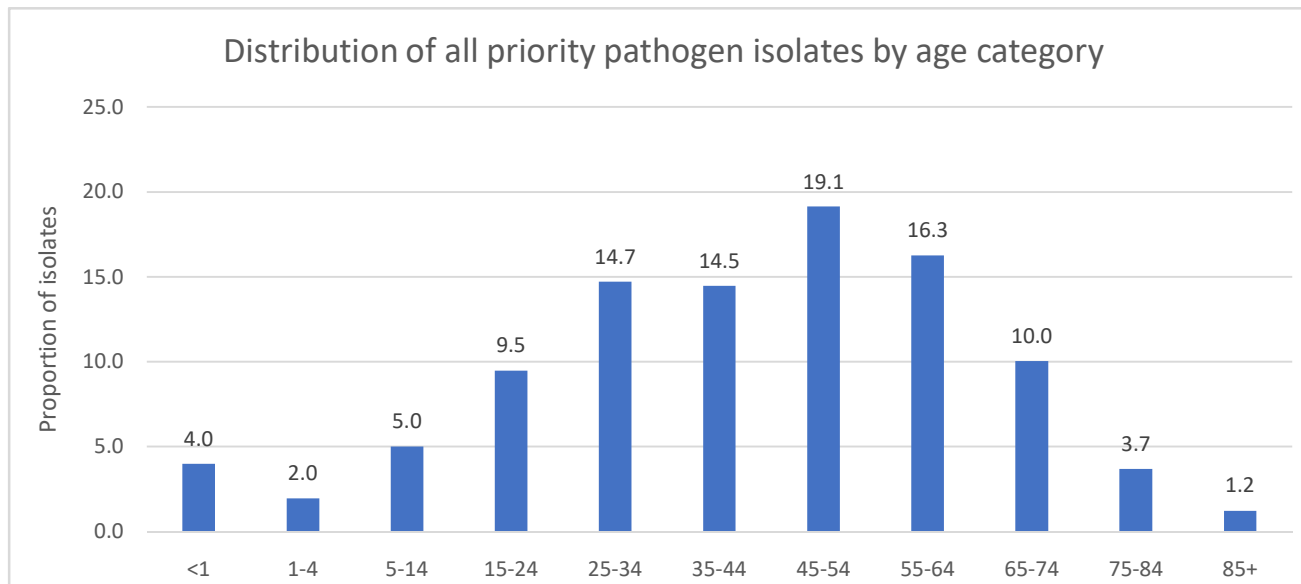


Figure 2: Distribution of all priority pathogen isolates by age category

2.2 Data De duplication

Distribution of priority pathogen isolates and unique patient isolates

Deduplication of reported data of 4533 isolates using WHONET revealed 3922 unique patient isolate data. For the surveillance period, only one result has been considered for each patient per specimen type and each pathogen. The unique patient isolate data file has been used for AST analysis. Figure 3 depicts the distribution of AMR surveillance priority pathogen isolates before and after deduplication.

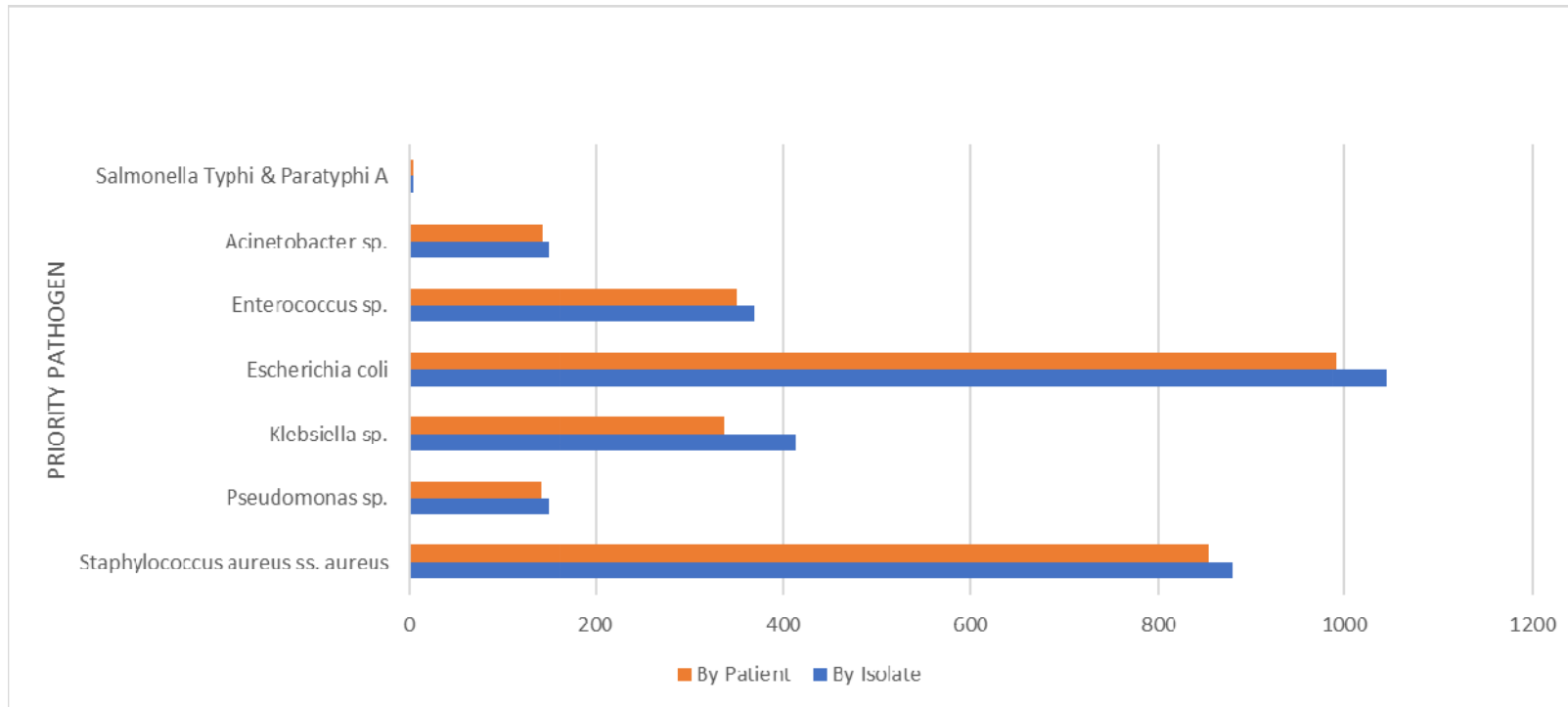


Figure 3: Distribution of priority pathogen isolates and unique patient isolates

2.3 Location wise distribution of isolates.

In the 2024 AMR surveillance data, the majority of isolates (73.44%) were from patients admitted in hospital wards, whereas the least number of isolates 11.36%) belonged to patients from the ICU. Almost one-sixth of the isolates (15.13%) were from patients visiting the outpatient clinics (Figure 4).

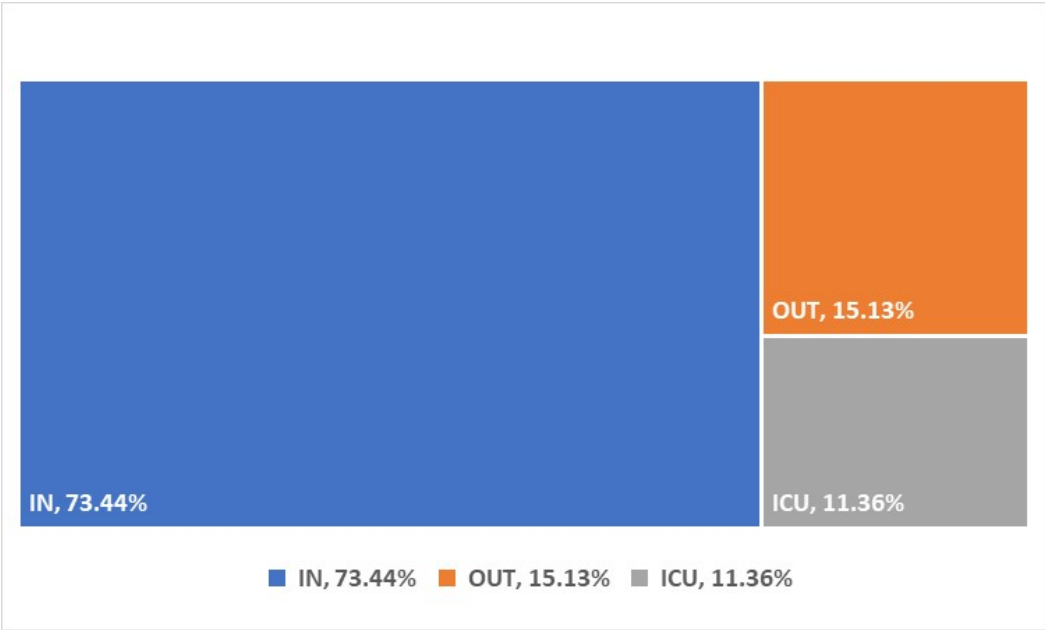


Figure 4: Distribution of Isolates by location type

Among total priority pathogens in IPD & OPD maximum were E.coli($n=926$) followed by staphylococcus aureus($n=751$) & Klebsiella species($n=672$). In ICU, the maximum number of isolates were Acinetobacter species($n=146$) followed by Klebsiella($n=139$) & Pseudomonas species($n=81$). (Figure:5 ; Table:1).

Table 1: Distribution of priority pathogen isolates by location type.($n=3924$)

Priority Pathogens	Inpatient	Outpatient	ICU
Escherichia coli	721	205	50
Pseudomonas Spp.	372	79	81
Klebsiella Spp.	608	64	139
Acinetobacter Spp.	309	27	146
Staphylococcus aureus ss. Aureus	610	141	24
Enterococcus spp.	262	78	6
Salmonella Typhi and Paratyphi	2	0	0

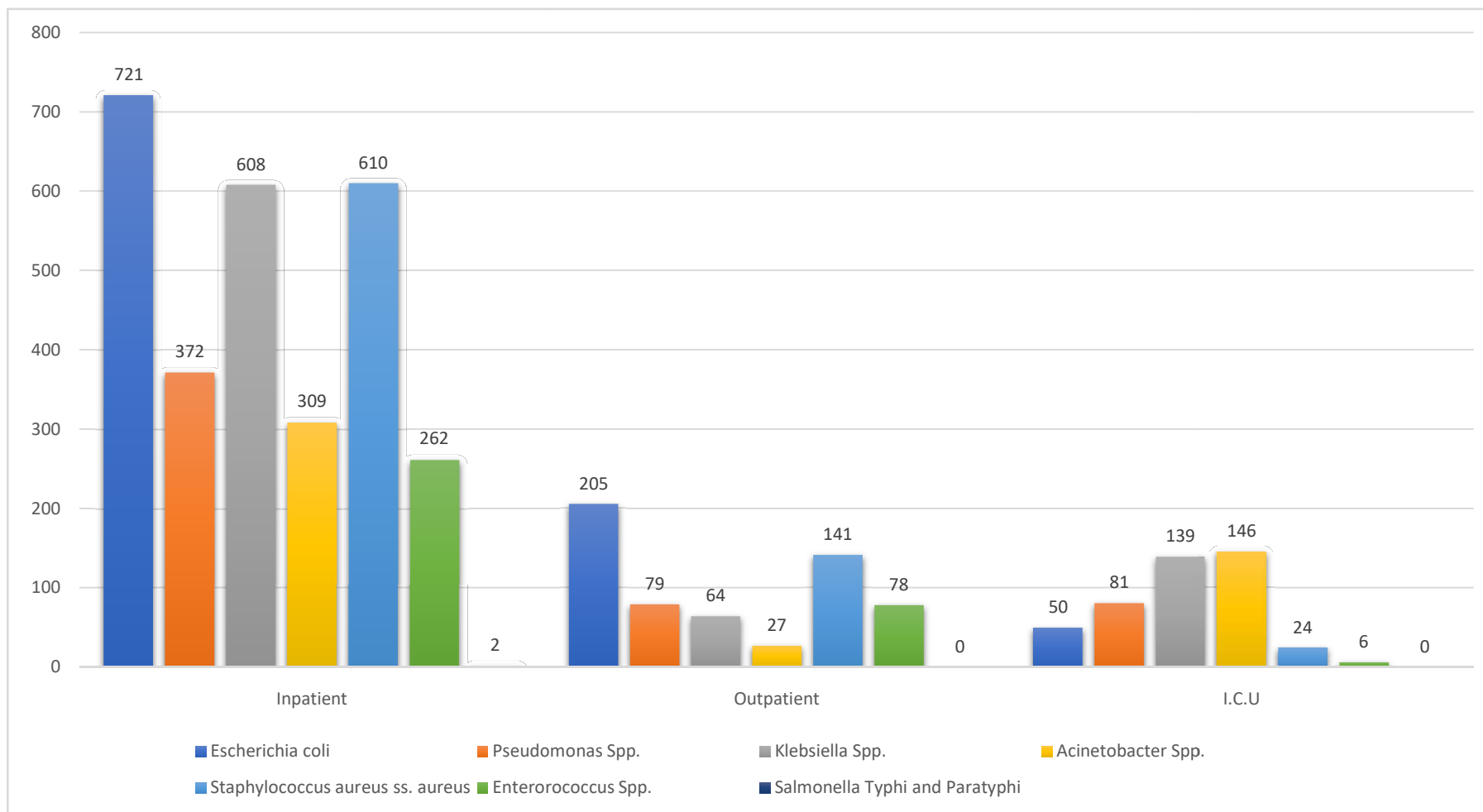


Figure 5: Bar diagram shows distribution of isolates(Location–Wise)

2.4 Sample and Pathogen Details

Of the total 21943 samples received 29.7% were culture positive. Clinical significant bacteria were 83.22% of the culture positive samples. Priority pathogens comprised 72.25% of the total culture positive clinical significant bacteria isolated. (Table 2).

Table 2: AST Profile of Priority Pathogens from Culture-Positive Clinical Samples for 2024

	Blood	PUS	Urine	TRACHEAL ASPIRATE	Sterile Body Fluids	Respiratory Samples	Total
Total	6195	7614	7454	320	85	275	21943
No Growth	4833	4968	5229	-	8	5	15043
Contaminated	486	150	389	30	3	40	1058
Clinically Significant Bacteria	800	2479	1570	288	74	220	5431
Priority Pathogens from clinical samples	512	1761	1063	250	69	197	3924

2.4.1 Specimen-wise distribution of priority pathogens

Among culture positive samples ,In urine maximum isolates were E.coli (46.7%), in Blood culture, maximum isolates were Acinetobacter species (30.3%) & In PUS samples maximum isolates were of Staphylococcus aerues (36.1%)(Table 3)

Table 3: Specimen type-wise distribution of isolates

Priority Pathogens	Urine (%)	Blood (%)	Pus (%)	Tracheal Aspirate (%)	Sterile Body Fluids (%)	Respiratory Samples (%)	Total
E. coli	496 (46.7%)	35 (6.8%)	329 (18.7%)	33 (10.3%)	31 (44.9%)	52 (26.4%)	976(24.8%)
Pseudomonas species	102 (9.6%)	150 (29.3%)	201 (11.4%)	52 (16.3%)	2 (2.9%)	25 (12.7%)	532 (13.56%)
Klebsiella species	133 (12.5%)	45 (8.8%)	429 (24.4%)	123 (38.4%)	10 (14.5%)	71 (36.0%)	811(20.67)
Acinetobacter species	32 (3.0%)	155 (30.3%)	145 (8.2%)	100 (31.3%)	1 (1.4%)	49 (24.9%)	482 (12.28%)
Enterococcus species	263 (24.7%)	53 (10.4%)	22 (1.2%)	–	8 (11.6%)	–	346 (8.82%)
Staphylococcus aureus species	37 (3.5%)	74 (14.5%)	635 (36.1%)	12 (3.8%)	17 (24.6%)	–	775 (19.76%)
TOTAL	1063 (100%)	512 (100%)	1761 (100%)	320 (100%)	69 (100%)	197 (100%)	3922 (100%)

2.5 Antimicrobial Statistics

The following tables from table 5 to table 12 shows the antimicrobial susceptibility profile of the priority pathogens isolated from various clinical samples.

Among the gram negative isolates maximum number of isolates were of E.coli followed by Klebsiella Spp.

Overall, among the gram negative isolates, Antimicrobial sensitivity to most of the routinely used antibiotics was found to be below 50% (Table 5).

Table 5:

Gram-negative organisms isolated from January 2024 to December 2024 and their percentage susceptibility

Organism	Number of Isolates	Amikacin	Gentamicin	Ampicillin	Ampicillin/Sal-bactam	Amoxicillin-Clavulanate	Aztreonam	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Cefuroxime	Imipenem	Meropenem	Piperacillin/Tazobactam	TetraCycline	Trimethoprim/Sulfamethoxazole
<i>Acinetobacter sp.</i>	525	46.2	38.5	IR	39.0	IR	IR	-	38.0	-	58.0	-	30.0	46.0	43.9	31.4	60.0
<i>Escherichia coli</i>	1045	57.3	53	12.6	-	35	-	23	-	16.7	15.2		50	51.7	40		42.9
<i>Klebsiella Sp.</i>	904	25	29.1	IR	-	2.8	-	5.6	-	12	7.9	13	39	30	13	57.1	20
<i>Pseudomonas</i>	604	58.1	41.6	IR	IR	IR	64	-	44.6	IR	33.5	-	17.9	51	74.3	IR	100

The Percentage Susceptibility of bacterial isolates more than 30 in number is considered significant.

IR = intrinsic resistance

- = Not tested

Among the gram positive isolates *Staphylococcus aureus* spp. were the maximum in number (n=878). Overall Methicillin resistance in staphylococci was found to be 60%. Vancomycin resistant Enterococci were 23.2%.

Table 6: Gram-positive organisms isolated from January 2024 to December 2024 and their percentage susceptibility

Organism	Number of Isolates	Amikacin	Ampicillin	Cefoxitin	Ciprofloxacin	Clindamycin	Erythromycin	Gentamicin	Gentamicin-High	Linezolid	Teicoplanin	Trimethoprim/Sulfamethoxazole	Vancomycin	Inpatients	OPD	ICU
<i>Enterococcus sp.</i>	370	IR	16.8	IR	14.3	IR	9.7	IR	57.9	91.3	75.0	IR	77.8	283	78	9
<i>Staphylococcus aureus ss. aureus</i>	878	66.7		39.7	13.6	59.5	26.6	83.2	-	99.0	66.7	100.0	Mic Nd	706	157	15

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

IR = intrinsic resistance

- = Not tested

Table 7: Percentage susceptibility of Gram-negative isolates from IPD, OPD, and ICUs (**BLOOD**)

Organism	Location	Number of isolates	Amikacin	Gentamicin	Ampicillin	Ampicillin/sulbactam	amoxicillin/clavulanic acid	Aztreonam	Cefepime	Ceftazidime	Ceftriaxone %S	Ciprofloxacin	Imipenem	Meropenem	Piperacillin/Tazobactam	TetraCycline
<i>Escherichia coli</i> N=(35)	in	29	75	67	-	-	35	-	23	-	12	16	36	41	33	
	opd	0	0	0	-	-	0	-	0	-	0	0	0	0	0	0
	icu	6	50	67	-	-	0	-	0	-	67	33	25	33	33	0
<i>Klebsiella sp.</i> N=(45)	in	44	56	50	IR	0	16	-	29	-	50	0	39	39	13	0
	opd	0	-	0	IR	0	0	-	0	-	0	0	0	0	0	0
	icu	1	0	0	IR	0	0	-	0	-	0	0	0	0	0	0
<i>Pseudomonas sp.</i> N=(150)	in	125	75	70	IR	IR	IR	63	0	54	IR	60	70	75	70	-
	opd	0	0	0	IR	IR	-	0	0	0	IR	0	0	0	0	-
	icu	25	40	0	IR	IR	-	0	0	30	IR	0	0	0	0	-
<i>Burkholderia sp.</i> N=(76)	in	48	25	25	IR	IR	-	-	-	73	-	0	0	0	0	0
	opd	0	0	0	IR	IR	-	-	-	0	-	0	0	0	0	0
	icu	28	57	0	IR	IR	0		-	0	-	0	0	0	0	0
<i>Acinetobacter sp.</i> N=(155)	in	117	58	50	IR	IR	IR	IR		36	-	40	32	42	40	53
	opd	0	0	0	IR		IR	IR		0	-	0	0	0	0	0
	icu	38	50	40	IR		IR	IR		30	-	30	22	32	30	43
<i>Salmonella Typhi</i> N=(2)	in	2	-	-	IR	-	-	-	-	-	100	-	-	-	-	-
	opd	0	-	-	IR	-	-	-	-	-	0	-	-	-	-	-
	icu	0	-	-	IR	-	-	-	-	-	0	-	-	-	-	-

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

Abbreviations

IR = intrinsic resistance

IPD= Inpatient

OPD= Outpatient

ICU= Intensive care unit

- = Not tested

Table 8: Percentage susceptibility of Gram-positive isolates from IPD, OPD, and ICUs (**BLOOD**)

Organism	Location	Number of isolates	Ampicillin	Cefoxitin	Ciprofloxacin	Clindamycin	Erythromycin	Gentamicin	Gentamicin-High	Linezolid	Vancomycin
<i>Enterococcus Sp.</i>	IPD (n=49)	49	10	-	-	-	16	-	55	100	90
	ICU (n=3)	3	0	-	-	-	33	-	67	100	100
	OPD (n=1)	1	0	-	-	-	0	-	100	100	0
<i>Staphylococcus aureus ss. aureus</i>	IPD(N=66)	66	-	43	43	52	29	84	-	100	Not Done
	OPD(n=1)	1	-	0	0	100	0	0	-	100	Not Done
	ICU (n=7)	7	-	14	33	43	14	100	-	100	Not Done

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

IR = intrinsic resistance

IPD= Inpatient

OPD= Outpatient

ICU= Intensive care unit

- = Not tested

Table 9: Percentage susceptibility of Gram-negative isolates from IPD, OPD, and ICUs (**URINE**)

Organisms	Location	Number of Isolates	Amikacin	Gentamicin	Ampicillin	Ampicillin/Sa lbactam	Amoxicillin- Clavunate	Aztreonam	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxacin	Fosfomycin	Imipenem	Meropenem	Piperacillin/T azobactam
<i>Escherichia coli</i>	IPD(N=339)	339	80	78	13.0	-	28	-	53	-	14	13	94	49	59	75
	OPD(N=151)	151	81	68	15.0	-	24	-	54	-	16	17	91	45	56	75
	ICU(N=6)	6	67	0	0	-	0	-	0	-	60	75	92	0	0	100
<i>Acinetobacter spp.</i>	IPD(N=24)	24	67	38	-	60	IR	IR	-	30		60	IR	28	54	79
	OPD(N=7)	7	67	50	-	70	IR	IR	-	40		33	IR	25	33	57
	ICU(N=1)	1	100	0	-	0	IR	IR	-	0		0	IR	0	100	0
<i>Klebsiella spp.</i>	IPD(N=97)	97	47	31	-	0	57	-	44	-	32	30	83	65	70	72
	OPD(N=30)	30	0	33	-	0	67	-	43	-	37	0	87	8	29	56
	ICU(N=6)	6	0	0	-	0	0	-	0	-	0	0	70	0	0	20
<i>Pseudomonas Spp</i>	IPD(N=71)	71	45	40	-	IR	IR	69	50	69	0	41	0	61	65	85
	OPD(N=29)	29	55	50	-	IR	IR	70	83	46	0	0	0	14	56	77
	ICU(N=2)	2	0	0	-	IR	IR	0	0	100	0	100	0	0	100	100

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

IR = intrinsic resistance

IPD= Inpatient

OPD= Outpatient

ICU= Intensive care unit

- = Not tested

Table 10: Percentage susceptibility of Gram-positive isolates from IPD, OPD, and ICUs (**URINE**)

Organism	Location type	Number of isolates	Ampicillin	Cefoxitin	Ciprofloxacin	Fosfomycin	Gentamicin	Gentamicin High	Linezolid	Teicoplanin	Vancomycin
<i>Enterococcus Spp.</i> (N=263)	IPD(N=187)	187	33	-	13	87	-	54	92	81	86
	OPD(N=72)	72	50	-	17	93	-	57	97	57	83
	ICU(N=4)	4	0	-	33	75	-	50	100	0	50
<i>Staphylococcus aureus ss. Aureus</i> (N=37)	IPD(N=26)	26	-	48	38	98	70	-	100	77	0
	OPD(N=11)	11	-	88	100	100	71	-	100	0	0
	ICU(N=0)	0	-	0	0	0	0	-	0	0	0

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

IR = intrinsic resistance

IPD= Inpatient

OPD= Outpatient

ICU= Intensive care unit

- = Not tested

Table 11: Percentage susceptibility of Gram-negative isolates from IPD, OPD, and ICUs (**PUS**)

Organism	Location	Number of Isolates	Amikacin	Gentamicin	Ampicillin	Ampicillin/S alabactam	Amoxicilli n- Clavunate	Aztreonam	Cefepime	Ceftazidime	Ceftriaxone	Ciprofloxaci n	Impenem	Meropene m	Piperacillin/Ta zobactam	Tetracycline
<i>Escherichia coli</i>	IPD(283)	283	74	64	11		34	-	24	-	15	19	53	63	66	
	OPD(42)	42	78	72	12		36	-	20	-	27	17	70	73	80	
	ICU(4)	4	50	50	0		0	-	0	-	0	0	60	60	50	
<i>Acinetobacter spp.</i>	IPD(129)	129	60	46	IR	34	IR	-	-	42	-	30	22	46	46	75
	OPD(15)	15	67	47	IR	30	IR	-	-	50	-	33	30	55	57	50
	ICU(1)	1	0	0	IR	0	IR	-	-	0	-	0	0	0	100	100
<i>Klebsiella spp.</i>	IPD(399)	399	46	38	IR	0	30	-	33	-	26	30	60	63	43	64
	OPD(25)	25	28	83	-	0	0	-	0	-	9	20	0	23	54	33
	ICU(5)	5		0	-	0	0	-	0	-	0	0	0	0	0	0
<i>Pseudomonas Spp</i>	IPD(153)	153	63	45	-	-	IR	69	-	58	IR	47	59	65	79	-
	OPD(46)	46	76	50	-	-	IR	75	-	60	IR	41	11	45	90	-
	ICU(2)	2	100	50	-	-	IR	100	-	0	IR	100	50	0	0	-
<i>Protues Mirabilis</i>	IPD(25)	25	25	40	-	0	100	-	33	-	44	16	33	57	94	0
	OPD(1)	1	100	0	-	0	0	-	0	-	100	100	0	0	0	0
	ICU(0)	0	0	0	-	0	0	-	0	-	0	0	0	0	0	0

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

IR = intrinsic resistance

IPD= Inpatient

OPD= Outpatient

ICU= Intensive care unit

- = Not tested

Table 12: Percentage susceptibility of Gram-positive isolates from IPD, OPD, and ICUs (**PUS**)

Organism	Location type	Number of isolates	Ampicillin	Cefoxitin	Ciprofloxacin	Clindamycin	Erythromycin	Gentamicin	Gentamicin-High	Linezolid	Trimethoprim/Sulfameth	Vancomycin
<i>Enterococcus Spp.</i>	IPD(18)	18	13	-	-	-	-	-	72	100	-	88
	OPD(3)	3	100	-	-	-	-	-	67	100	-	100
	ICU(1)	1	0	-	-	-	-	-	0	100	-	100
<i>Staphylococcus aureus ss. aureus</i>	IPD(503)	503	-	40	35	59	32	84	-	100	75	Not Done
	OPD(128)	128	-	35	40	73	47	86	-	100	85	Not Done
	ICU(4)	4	-	50	0	50	25	100	-	100	0	Not Done

The Percentage Susceptibility of isolates with numbers greater than 30 is considered significant.

IR = intrinsic resistance

IPD= Inpatient

OPD= Outpatient

ICU= Intensive care unit

- = Not tested

2.6 Overall Resistant trends

Extended spectrum Betalactamase producing enterobacteria (ESBL-) 80%

Carbapenem resistant acinetobacter bamauni-(CRAB)64%

Carbapenem resistant-Enterobacteraci-(CRE)48.3%

Methicillin resistance staphylococcal (MRSA)60%

Vancomycin resistance Enterococcus (VRE)23.2%