



MICROBIOLOGY DEPARTMENT (PATHOLOGY)
IH, PAKISTAN INSTITUTE OF MEDICAL SCIENCES

ANTIBIOGRAM JAN-DEC 2023 GUIDELINES FOR ANTIMICROBIAL
STEWARDSHIP / INFECTION CONTROL

Objectives

- To help the clinical colleagues in choosing the appropriate empirical antimicrobial therapy against the suspected microorganisms. This antibiogram is data collection of Antibiotic susceptibility pattern of isolates from various clinical specimens submitted at Department of Microbiology, IH, PIMS Islamabad.
- To help the clinicians in the selection of appropriate empirical therapy, overall cumulative antimicrobial susceptibility (% Sensitivity) for commonly isolated gram positive organism (*S. aureus*, *Enterococcus* spp.) and gram negative organisms (*E.coli*, *K. pneumoniae*, *A. baumannii*, *P. aeruginosa*) has been added.
- To enlighten the clinicians regarding changing trends of antimicrobials resistance and to increase the judicious use of antimicrobials as per antimicrobial stewardship (AMS) program, antimicrobial resistance trends of commonly used individual antimicrobials (from January 2023 to Dec 2023) against commonly isolated Gram positive and Gram negative organisms have been added.

How to use this Antibiogram

- **The figures in the boxes represent the % Sensitivity isolates against particular antibiotic.**
- **NT means the isolate has not been tested against the drug since the result is not validated by latest CLSI testing protocols.**
- **IR means the isolate is intrinsically resistant against the drug and it should not be used clinically and does not require testing.**
- **Resistance to Cloxacillin/Oxacillin/Cefoxitin indicates MRSA. Such isolate is resistant to currently available all β -Lactam antimicrobials with exception of newer cephalosporins with anti-MRSA activity i.e. Ceftaroline, Ceftobiprole.**
- All sensitivity results are according to Clinical Laboratory Standard Institute (CLSI) 2023, 33rd Ed Supp. M100 except Tigecycline, Fusidic acid and Polymyxin B/ Colistin (EUCAST 2022).
- The data presented is initially according to specimens. Later we will work on indoor and outdoor patients.

Disclaimer

- CLSI guideline M-39-A3 suggests making antibiogram when individual isolate number (n) is >30. In case where n is <30, the interpretation may be impaired due to small number.



PUS, PUS SWAB, TISSUE (% SENSITIVE)

Antimicrobial susceptibility of Gram-positive bacteria isolated from pus:

Antibiotic drugs	<i>S. aureus</i> Sensitive%	MRSA Sensitive%	<i>Streptococcus</i> <i>Pyogenes</i> Sensitive %	<i>Enterococcus</i> spp. Sensitive %
Penicillin	1 %	--	100%	35%
Ampicillin	1%	--	100%	36%
Cefoxitin	100%	0%	NT	NT
Erythromycin	40%	32%	95%	30%
Clindamycin	82%	80%	98%	IR
Co-trimoxazole	88%	64%	NT	IR
Doxycycline	88%	50%	NT	78%
Minocycline	98%	92%	NT	90%
Linezolid	100%	98%	100%	94%
Ciprofloxacin	34%	24%	95%	43%
Levofloxacin	45%	35%	99%	65%
Chloramphenicol	90%	84%	98%	96%
Vancomycin	100%	100%	100%	86%

NT: Not Tested
IR: Intrinsically Resistant

Antimicrobial susceptibility of Gram-negative bacteria isolated from pus:

Antibiotic drugs	<i>K. pneumonia</i> Sensitive%	<i>Enterobacter</i> spp. Sensitive%	<i>E. coli</i> Sensitive%	<i>Proteus</i> spp. Sensitive%	<i>Pseudomonas</i> spp. Sensitive%
Ampicillin	IR	IR	5%	IR	IR
Amox-clavulanate	12%	IR	14%	50%	IR
Pipra-tazobactam	41.5%	60%	50%	78%	78%
Cefoperazone-sulbactam	54.5%	61%	62%	80%	73.5%
Cefipime	20%	7%	25%	65%	60%
Ceftriaxone	20%	23%	29%	60%	IR
Ceftazidime	NT	NT	NT	NT	68%
Ciprofloxacin	26%	25%	20%	25%	60%
Levofloxacin	27%	27%	22%	26%	67%
Co-trimoxazole	29.5%	27.5%	22%	25%	IR
Gentamicin	57%	50%	71%	67%	70%
Amikacin	80%	82%	93%	80%	80%
Imipenem	60%	75%	79%	95%	66.5%
Meropenem	62%	77%	83%	95%	67%
Doxycycline	35%	47.5%	40%	IR	IR
Tigecycline	89%	90%	97%	IR	IR
Chloramphenicol	71.5%	80.5%	80%	90%	IR
Aztreonam	NT	NT	NT	NT	75%
Colistin*	95%	98%	99%	IR	92%

* Colistin sensitivity was determined by Disk diffusion method.



URINE (% SENSITIVE)

Antimicrobial susceptibility of Gram-positive bacteria isolated from urine:

Antibiotic	<i>S. aureus</i> Sensitive%	MRSA Sensitive%	Enterococcus spp. Sensitive%
Penicillin	4%	0	61%
Ampicillin	4%	0	61%
Cefoxitin	100%	0	NT
Ciprofloxacin	30%	19%	37%
Levofloxacin	40%	20%	48%
Co-trimoxazole	60%	40%	IR
Doxycycline	90%	70%	40%
Vancomycin	100%	100%	96%
Linezolid	100%	97%	100%
Fosfomycin	NT	NT	90%
Nitrofurantoin	88%	85%	71%

Antimicrobial susceptibility of Gram-negative bacteria isolated from urine:

Antibiotic	<i>E. coli</i> Sensitive%	Enterobacter spp. Sensitive%	<i>K. pneumonia</i> Sensitive%	Proteus spp. Sensitive%	<i>P. aeruginosa</i> Sensitive%
Ampicillin	10%	10%	IR	IR	IR
Amox-clavulanate	15%	14%	21%	58%	IR
Pipra-tazobactam	58%	58%	40%	90%	65%
Cefoperazone-sulbactam	58%	57%	50%	89%	64%
Cefipime	20%	22%	25%	NT	40%
Ceftriaxone	28%	26%	25%	68%	IR
Ceftazidime	NT	NT	NT	NT	38%
Ciprofloxacin	20%	19%	22%	45%	67%
Levofloxacin	20%	20%	21%	50%	60%
Co-trimoxazole	28%	26%	38%	25%	IR
Gentamicin	72%	70%	50%	73%	63%
Amikacin	94%	95%	80%	95%	81%
Imipenam	87%	88%	55%	95%	60%
Meropenam	92%	93%	55%	98%	64%
Doxycycline	36%	40%	50%	IR	IR
Nitrofurantoin	93%	95%	41%	IR	IR
Fosfomycin	96%	NT	NT	NT	NT

NT: Not tested

IR: Intrinsically Resistant



BLOOD CULTUES (% SENSITIVE)

Antibiotics	<i>Salmonella typhi</i> Sensitivity	<i>Salmonella paratyphi A</i> Sensitivity
Ampicillin	50%	67%
Co-trimoxazole	53%	98%
Chloramphenical	75%	98%
Ciprofloxacin	I [42%] S[9.5%]	69%
Ceftriaxone	53%	100%
Azithromycin	95.47%	100%
Meropenum	100%	100%
MDR	25%	0%
XDR	47%	0%

BLOOD CULTUES/ CVP/ LINE TIP (% SENSITIVE) other then Typhoid

Antimicrobial susceptibility of Gram- positive bacteria isolated from Blood:

Antibiotic drugs	<i>S. aureus</i> Sensitive%
Penicillin	1 %
Ampicillin	1%
Cefoxitin	100%
Erythromycin	34%
Clindamycin	36%
Co-trimoxazole	58%
Doxycycline	88%
Linezolid	98%
Ciprofloxacin	40%
Levofloxacin	44%
Rifampicin	86%
Vancomycin	100%

Antimicrobial susceptibility of Gram-negative bacteria isolated from Blood:

Antibiotic drugs	<i>K. pneumonia</i> Sensitive%	<i>Acinetobacter baumannii</i> Sensitive%	<i>E.coli</i> Sensitive%
Ampicillin	IR	IR	10%
Amox-clavulanate	12%	IR	14%
Pipra-tazobactam	25%	28%	45%
Cefoperazone-sulbactam	32%	30%	54%
Cefipime	20%	18%	23%
Ceftriaxone	20%	18%	20%
Ceftazidime	NT	20%	NT
Ciprofloxacin	20%	20%	20%
Levofloxacin	27%	22%	22%
Co-trimoxazole	29.5%	23%	22%
Gentamicin	40%	15%	75%
Amikacin	42%	18%	85%
Imipenem	30%	18%	80%
Meropenem	32%	23%	83%
Doxycycline	51%	75%	55%
Minocycline	NT	85%	NT
Tigecycline	89%	NT	90%
Colistin*	66%	87%	98%

Dr. Umme Farwa, consultant Microbiologist

**RESPIRATORY SPECIMEN: SPUTUM, TRACHEAL ASPIRATE, EB WASHING, NBL,
BAL ANTIBIOGRAM (% SENSITIVE)**

Antibiotic drugs	<i>K. pneumonia</i> Sensitive%	<i>Acinetobacter baumannii</i> Sensitive%	<i>Pseudomonas spp.</i> Sensitive%
Ampicillin	IR	IR	IR
Amox-clavulanate	12%	IR	IR
Pipra-tazobactam	45%	20%	78%
Cefoperazone-sulbactam	52%	21%	73.5%
Cefipime	20%	4%	60%
Ceftriaxone	20%	18%	IR
Ceftazidime	NT	20%	70%
Ciprofloxacin	26%	4%	60%
Levofloxacin	27%	7%	67%
Co-trimoxazole	29.5%	27%	IR
Gentamicin	57%	13%	70%
Amikacin	80%	15%	80%
Imipenem	60%	5%	65%
Meropenem	62%	7%	67%
Doxycycline	35%	75%	IR
Minocycline	NT	92%	IR
Tigecycline	89%	NT	IR
Colistin*	95%	98%	92%

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General Guidelines Regarding Antimicrobial Stewardship (AMS)

Due to increase in antimicrobial resistance (AMR) and the impending threat of post antibiotic era, Antibiotic Stewardship is the NEED OF THE HOUR. Antimicrobial stewardship is the systematic effort to educate and persuade prescribes of antimicrobials to follow evidence based prescribing, in order to stem. Following are few general guidelines helpful for the prescribing doctors.

1. Before prescribing antibiotic, consider if it is really a bacterial illness and antibiotics are really needed? Most URTIs and diarrheas are viral that are self limited and need nothing more than symptomatic treatment.
2. Always remember 5 'Ds' of Antibiotic Stewardship. The **right Diagnosis, the right Drug, in the right Dose, for the right Duration and then De-escalation.**
3. For outdoor patients, oral empirical antibiotics appropriate to the site of infection and causative agents can be prescribed. Generally, community acquired bacteria are sensitive to most antibiotics.
4. For inpatients or healthcare associated infections, always send appropriate samples for cultures. If patient has severe infection and cannot wait for culture results, start with a broad spectrum drug appropriate for likely causative agent. However, once the culture and sensitivity result is available, always de-escalate to a narrow spectrum antibiotic whenever choice is available.
5. For clean surgery, give single dose of antibiotic, either AMC or TZP or first or second generation cephalosporin, within an hour before incision. Antibiotic has to be repeated for prolonged surgeries according to the antibiotic selected. Antibiotics can be stopped within 24 hours of clean surgery.
6. Always remember hand hygiene in the busy hospital routine. That is surely the single best measure to stop the spread of deadly hospital acquired pathogens.
7. For patients confirmed to have multidrug resistant pathogens on culture and sensitivity report, infection prevention and control precautions need to be taken to prevent their spread to other patients in the ward.
8. The common use of oral AZM for Upper respiratory tract and other common infections must be curtailed to save this drug for typhoid fever caused by XDR *Salmonella* Typhi strains. Clarithromycin can be used alternatively for respiratory infections.
9. For any queries regarding appropriate sample collection and/ or appropriate antimicrobial treatment, please contact Microbiology department PIMS.
10. Training of all healthcare workers (HCW) in hospital infection control precautions must be carried out. Microbiology dept PIMS would welcome any call to undertake such training workshops for HCWs and for the training of dedicated, effective infection control teams in our hospitals which is a dire need of the hour.

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