



# Department of Clinical Microbiology & Infectious Diseases, AIIMS Mangalagiri



## NEWSLETTER

Antimicrobial Stewardship Committee

# Annual Hospital Antibioqram

July 2025 – June 2026

**Compiled by Dr Sumit Rai**

Professor and Head, Dept of Clinical Microbiology & Infectious Diseases  
Member Secretary, AMS Committee, AIIMS Mangalagiri

*To Save Lives, Save Antimicrobials*



# Contents of the Newsletter and Antibioqram

- Ministerial Letters and Office Orders from Union Minister of Health, MohFW, Director General Health Services and National Medical Commission to Support Antimicrobial Stewardship & Structure of the AMS Committee at AIIMS Mangalagiri [\[3-6\]](#)
- Demography and Cumulative Antibioqram of AIIMS Mangalagiri w.e.f. July 2025 to June 2026, including Combination Antibioqrams, Cautions on Intrinsic Resistance and Resistance Trends of MRDO's over Four Years [\[7-41\]](#)
- Antibiotic Usage Guides and Pearls of What Antimicrobials to be Used at Which Specific Sites [\[42-54\]](#)
- Census of Department of Clinical Microbiology and Infectious Diseases w.e.f. July 2025 to June 2026 [\[55-93\]](#)
- Status of Current AMS Program in the 42-Point Integrated Stewardship Program of SASPI [\[94-98\]](#)
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# Antimicrobial Resistance is Critical Agenda for MoHFW

Ministry of Health and Family Welfare



## Union Health Minister Shri J P Nadda Launches National Action Plan on Antimicrobial Resistance 2.0

AMR is a major public health concern that can only be addressed through collective action: Union Health Minister

“Overuse and misuse of antibiotics has unfortunately become common practice, underscoring the urgency of corrective measures”

“Key strategies of AMR containment to be implemented under NAP AMR 2.0 which includes strengthening awareness, education and training, enhancing laboratory capacity and infection control in healthcare facilities”



Ref No:-#DIR/2021-2022/100

Date: - 31/01/2022.

The Organogram of the AMSP Team is as follows:

### Office Order

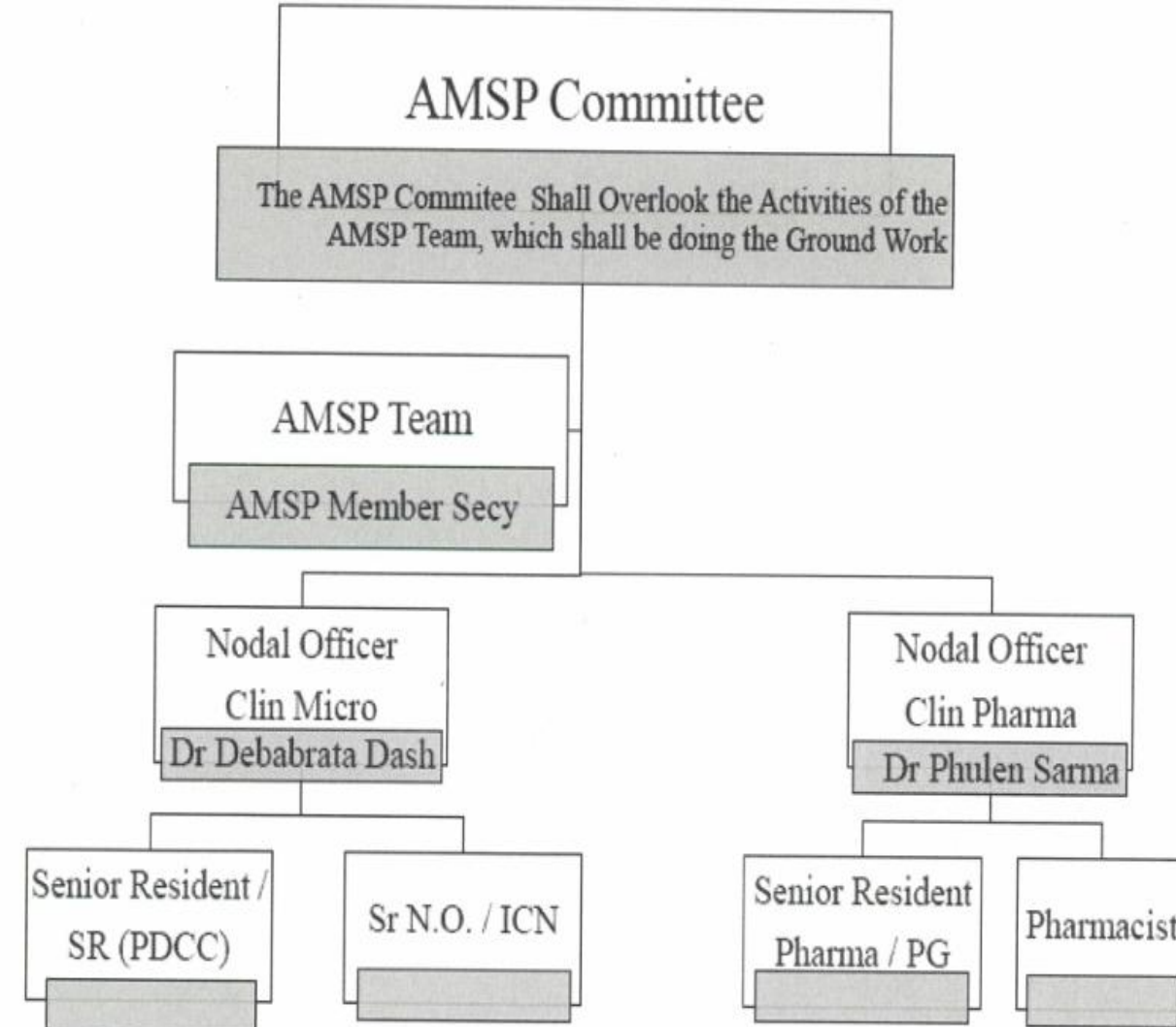
An Antimicrobial Stewardship Program (AMSP) Committee is being constituted at AIIMS Mangalagiri with the following members:

- |                                                                    |                     |
|--------------------------------------------------------------------|---------------------|
| 1. Director & CEO                                                  | - Chairman          |
| 2. Medical Superintendent                                          | - Member            |
| 3. HOD, Clinical Microbiology                                      | - Member Secretary  |
| 4. HOD, Clinical Pharmacology                                      | - Member            |
| 5. HOD, General Surgery                                            | - Member            |
| 6. HOD, General Medicine                                           | - Member            |
| 7. HOD, OBG                                                        | - Member            |
| 8. HOD, Paediatrics                                                | - Member            |
| 9. HOD, Orthopaedics                                               | - Member            |
| 10. HOD, Anaesthesia and Critical Care (ICU)                       | - Member            |
| 11. HOD, Paediatric Surgery                                        | - Member            |
| 12. Dr. Debabrata Dash, Clinical Microbiology as Nodal officer -1: | -Nominated Faculty  |
| 13. Dr. Phulen Sarma, Clinical Pharmacology as Nodal officer -2:   | - Nominated Faculty |
| 14. Pharmacist                                                     | - Member            |
| 15. Senior Nursing officer                                         | - Member            |

The ground work of the committee shall be conducted by an AMSP Team under the AMSP Committee. The Constitution, Mandate, Domain and Working shall be put up for Discussion during the first meeting of the Committee.

*Mukesh Tripathi*

(Dr. Mukesh Tripathi),  
Director & CEO.



राष्ट्रीय आयुर्विज्ञान आयोग  
NATIONAL MEDICAL COMMISSION

File No. NMC/NAP-AMR/2022/01/ 010293

Date: 15/02/2022

To,

The Director/Principal/Dean  
All the Govt. / Pvt. Medical Colleges/  
Medical Colleges of deemed universities

Subject: National Action Plan (NAP) on Antimicrobial Resistance (AMR)- regarding

Dear Sir/Madam,

Antimicrobial resistance (AMR) has been recognized as a serious and growing threat to public health globally. The World Health Organization (WHO) has identified AMR as one of the top 10 global public health threats facing humanity. Misuse and overuse of antimicrobials are the main drivers in the development of drug-resistant pathogens.

India is among the nations with one of the highest burden of bacterial infections. The crude mortality from infectious diseases in India is very high.

2. Ministry of Health and Family Welfare has developed the National Action Plan which needs to be launched across the country so as to bring about an alignment with the Global Action Plan on AMR with a "One Health" approach.

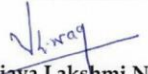
3. The NAP-AMR Strategic intervention activity (1.2.1.1; 1.2.1.4 & 4.6.1.1) under NMC, can be accessed at <http://www.ncdc.gov.in/writeReadData/linkimages/AMR/File545.pdf>.

4. To operationalize NAP-AMR, medical institutions should be conducting various activities for AMR containment. To generate a common module on this topic, we need information to proceed with the implementation of the plan. To enable this, it is requested, to provide the details of action taken by the Institute in the concerned areas and the information about the same shall be updated through the attached google form latest by 28 Feb, 2022 for which the link is :- <https://bit.ly/3LDcKbN>

5. It is proposed that your Institute may nominate One Nodal Officer, preferably at the level of Professor / Addl. Professor / Associate Professor from any of the Department of Microbiology, Pharmacology, Medicine or Community Medicine for future interaction /discussions on the subject. His/her contact details may be shared with the undersigned in the form provided.

Thanking You,

Yours sincerely,

  
Dr Vijaya Lakshmi Nag  
Officer Incharge  
(NAP-AMR), NMC  
Full Time Member, EMRB  
And Professor & HOD of Microbiology  
AIIMS, Jodhpur

Office Order  
from NMC for  
Mandatory AMS  
Implementation  
in All Medical  
Colleges by NMC

MAKING AMR  
AWARENESS &  
AMSP  
COMPULSORY IN  
ALL MEDICAL  
COLLEGES

Instruction for the filling of the Google Form

AIM & OBJECTIVES

1. To Improve awareness and understanding of AMR among Undergraduate, Postgraduate students, and Teaching professionals
  - i. Activity / Sub activity already going on, in the medical institution (regarding Undergraduate, Postgraduate students, and Teaching Professionals)
  - ii. Time of Activity (How many times the activity is being conducted in a year?), select the dropdown from the menu.
  - iii. Activity document to be uploaded in format (Ms Word, Ms Excel or PDF)  
The concerned activity document to be annexed in the google form as per the format aforementioned.
2. To Improve awareness and understanding of AMR among Allied health professionals
  - i. Activity / Sub activity already going on, in the medical institution (regarding Allied health professionals)
  - ii. Time of Activity (How many times the activity is being conducted in a year?). Select the dropdown from the menu.
  - iii. Activity document to be uploaded in format (Ms Word, Ms Excel or PDF)  
The concerned activity document to be annexed in the google form as per the format aforementioned.
3. Developed any AMR module to bring together the segmented knowledge imparted under different subjects
  - i. Developed any AMR module to bring together the segmented knowledge imparted under different subjects.  
Microbiology, Pharmacology, Medicine, Community Medicine (PSM), select the dropdown from the menu.
  - ii. Module document to be uploaded in format (Ms Word, Ms Excel or PDF)  
The concerned module document to be annexed in the google form as per the format aforementioned.



प्रो (डॉ.) अतुल गोयल

Prof. (Dr.) Atul Goel

MD (Med.)

स्वास्थ्य सेवा महानिदेशक

DIRECTOR GENERAL OF HEALTH SERVICES

भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
स्वास्थ्य सेवा महानिदेशालय  
Government of India  
Ministry of Health & Family Welfare  
Directorate General of Health Services

D.O. No.X.11035/52/2024-DRS

Dated: 16<sup>th</sup> May 2024.

**Subject: Constitution of Hospital Pre-Authorization Committee and Implementation of Audit on Antibiotic Usage under institutional Antimicrobial Stewardship Program.**

Dear *Colleagues & friends,*

I hope this letter finds you in good health and spirits.

I am writing to bring to your attention an urgent and critical matter concerning the implementation of an audit on antibiotic usage and the constitution of a Hospital Pre-Authorization Committee as part of institutional Antimicrobial Stewardship Program.

As you are well aware, antimicrobial resistance (AMR) is a global health threat that requires exigent and concerted action to mitigate its impact. One of the key drivers of AMR is the irrational use of antibiotics, including inappropriate prescribing practices and the misuse of watch and particularly reserve category antibiotics.

To address this pressing issue and uphold our commitment to patient safety and quality of care, it is imperative that we establish robust mechanisms for monitoring and regulating antibiotic usage within our medical institution. Therefore, I propose the following measures:

**1. Constitution of a Hospital Pre-Authorization Committee (Similar to A Tumor Board):**

To ensure judicious use of antibiotics, particularly watch and reserve category antibiotics, I recommend the establishment of a Hospital Pre-Authorization Committee. This committee will be responsible for reviewing and approving requests for the use of specific antibiotics, ensuring that their usage aligns with established guidelines and is justified based on clinical need. The committee may comprise of various domain experts from Clinical specialties and experts from Microbiology and Pharmacology etc.

**2. Implementation of Audit on Antibiotic Usage:**

We must conduct regular audits to evaluate the patterns and trends of antibiotic prescribing and usage within our institution. This audit will provide valuable insights into prescribing practices, identify areas of improvement, and enable us to track progress in our antimicrobial stewardship efforts. The antibiotics under strict stewardship may be based on various criteria viz. Broad-spectrum usage, newer agents, Drugs subject to misuse, antibiotics with a high incidence of adverse reactions etc.

Cont'd....

By implementing these measures, we may be able to combat the menace of emergence of antimicrobial resistance and promote responsible antibiotic use within our institution. Additionally, these efforts will contribute to improving patient outcomes, reducing incidence of adverse drug reactions, and preserving the effectiveness of antibiotics for future generations.

I urge you to consider the importance of these initiatives and drive their implementation as part of our ongoing commitment to excellence in patient care and antimicrobial stewardship.

Thank you for your attention to this matter. I look forward to your positive response and commitment in advancing these essential initiatives. I'm confident that with your esteemed supervision we can effectively combat the looming threat of antibiotic resistance.

Warm personal regards,

Sincerely yours,

*Atul Goel*  
(Atul Goel)

To

1. Additional Chief Secretaries (Health), all States.
2. Directors/CEOs of all AIIMS.
3. Director JIPMER, Puducherry.
4. Director PGI, Chandigarh.
5. Director LHMC & associated Hospitals, New Delhi.
6. Medical Superintendent, ABVIMS & RML Hospital, New Delhi.
7. Medical Superintendent, VMMC & Safdarjung Hospital, New Delhi.
8. Director, NEIGHRIMS, Shillong.
9. Principals, All Medical Colleges.

**Office Order from MoHFW, DGHS for the:  
Constitution of Hospital Pre-Authorization Committee and  
Implementation of Audit and Antibiotic Usage Under  
Institutional Antimicrobial Stewardship Program**





# Cumulative Antibioigram AIIMS Mangalagiri July 2025 to June 2026



# WHONET: AMR & AST Data Capture and Storage Platform

- Free WHO Based Software for AMR Data Capture and Configuration
- Also, used as the Base Software for making Basic AST Reports with patient, drug, bug and site-specific Customization done by Faculty, Dept of Clinical Microbiology
- AMR Data captured daily & in Real Time
- Data Files are Cleaned and Completed to include maximum information

## Part 1 - Summary statistics

| Data field            | %Completed |
|-----------------------|------------|
| Laboratory            | 100%       |
| Identification number | 100%       |
| First name            | 99.8       |
| Last name             | 99%        |
| Sex                   | 100%       |
| Age                   | 100%       |
| Age category          | 99.9       |
| Location              | 36%        |
| Department            | 100%       |
| Location type         | 100%       |
| Specimen number       | 100%       |
| Specimen date         | 100%       |
| Specimen type         | 100%       |
| Organism              | 99.9       |
| Beta-lactamase        | 66%        |
| ESBL                  | 54%        |
| Carbapenemase         | 65%        |
| MRSA                  | 9%         |
| Comment               | 77%        |



# Antibiogram is Based on CLSI M39: International Guidance Document for Cumulative Presentation of AMR Data

- Paid Document: Purchased by Faculty i/c
- Purpose of Cumulative Data [Hospital Antibiogram]: Hospital Antibiotic Policy
- Basis of this AMR Data Presentation
- At least One Year Data presented as **%Susceptibility (and not as %Resistance)**
- Include Only the First Isolate from the Patient
- Do not include / consider superficial / commensal flora
- Significant Data Stratification is Possible Only for at least 30 Non – Repeat Isolates to create Enhanced Antibiograms



# **All India Institute of Medical Sciences** **Mangalagiri** **Department of Clinical Microbiology**



## **AMR Epidemiology report**

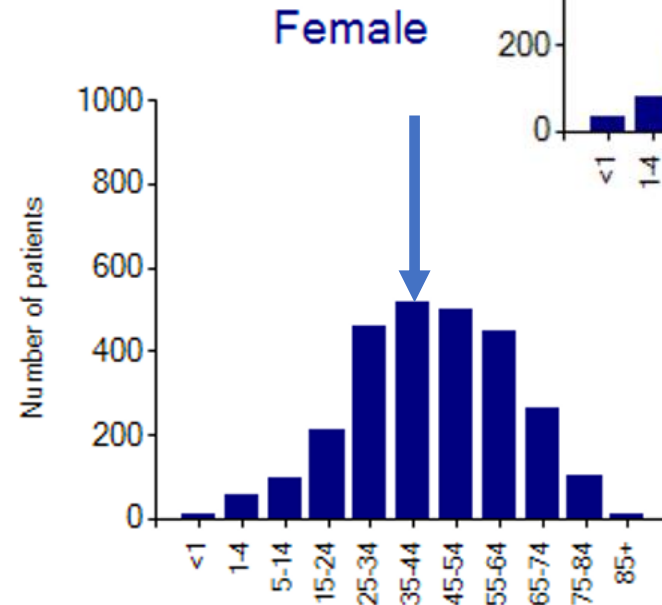
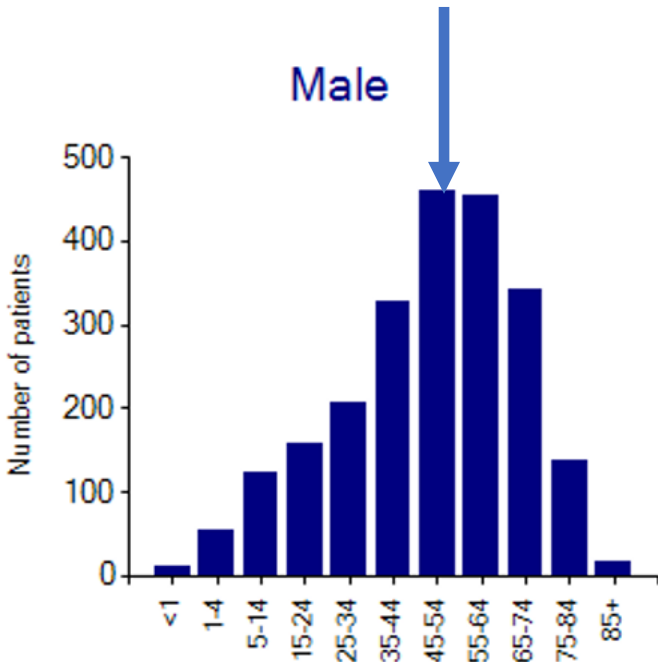
ALL INDIA INSTITUTE OF MEDICAL SCIENCES - Mangalagiri

**July 2025 to June 2026**

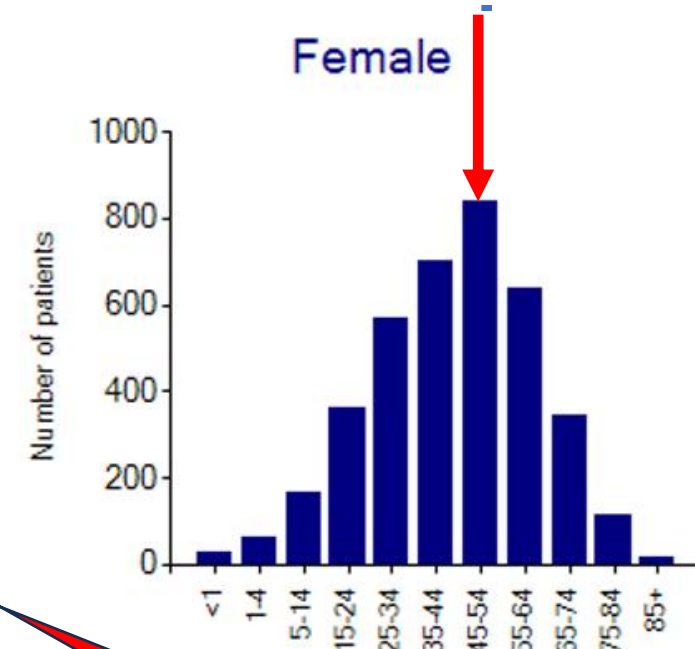
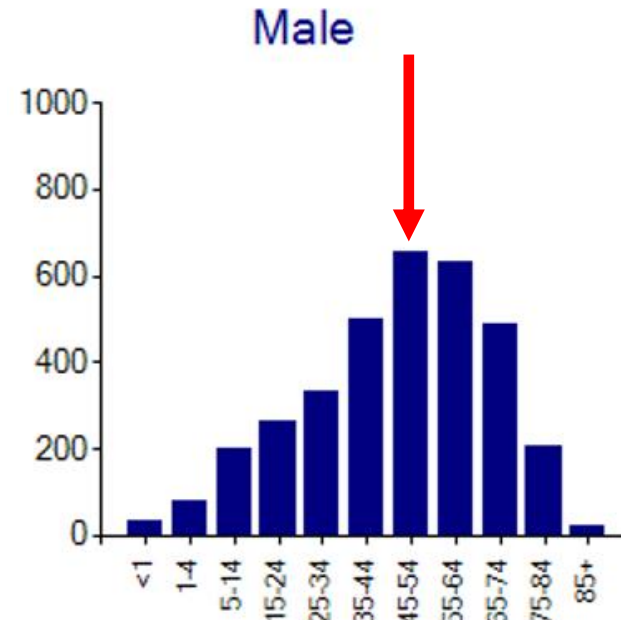


**More Bacterial Infections  
Being Encountered in  
Males  
Infections Affecting  
Younger Age Group of  
Females since last Years**

## **Distribution of Number Of Patients By Sex And Age Group July 2025 – June 2026**



## **Distribution of Number Of Patients By Sex And Age Group July 2023 – June 2025**



**Older Data**

**Latest Data**



# The distribution of bacterial isolates and patients by location type [July 2025 – June 2026]

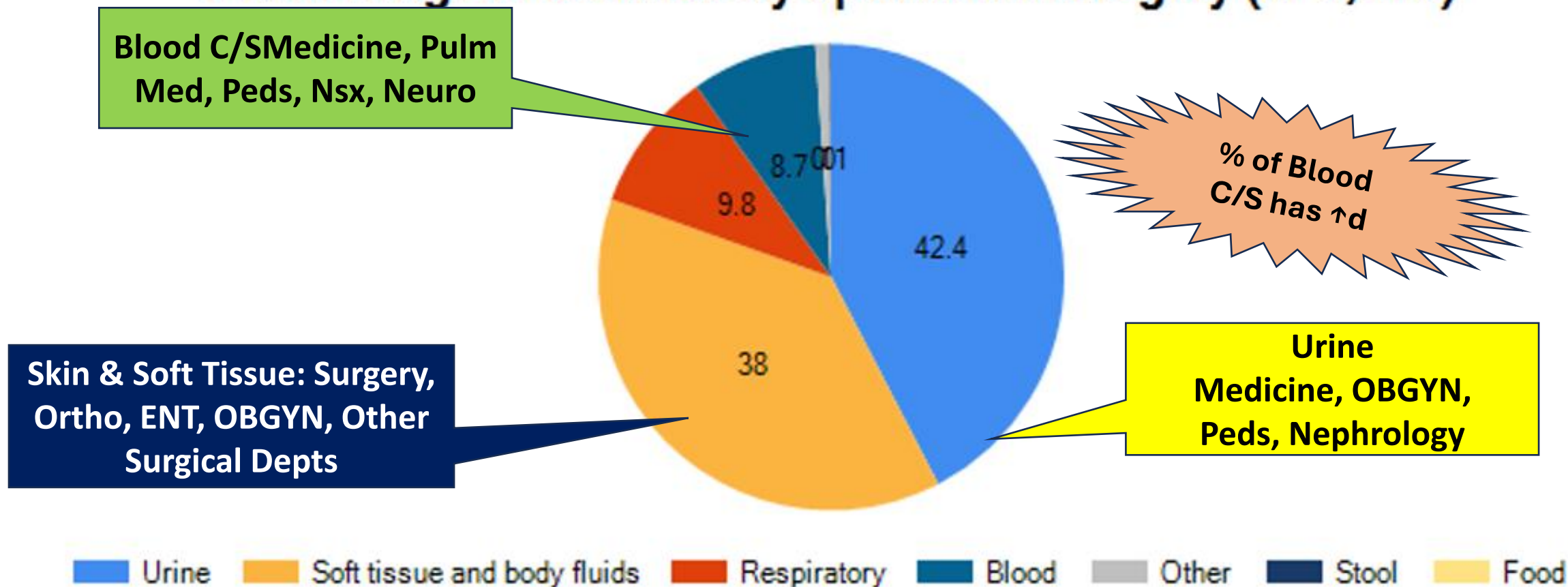
| Location type | Number of isolates | (%)  | Number of patients | Isolates per patient | Female | Male  |
|---------------|--------------------|------|--------------------|----------------------|--------|-------|
| out           | 3,896              | 54   | 3,196              | 1.2                  | 1,867  | 1,329 |
| in            | 2,233              | 30.9 | 1,477              | 1.5                  | 703    | 774   |
| icu           | 761                | 10.5 | 426                | 1.8                  | 168    | 258   |
| ccu           | 202                | 2.8  | 113                | 1.8                  | 40     | 73    |
| hdu           | 79                 | 1.1  | 68                 | 1.2                  | 29     | 39    |
| (Blank)       | 22                 | 0.3  | 22                 | 1                    | 6      | 16    |
| oth           | 10                 | 0.1  | 10                 | 1                    | 2      | 8     |
| eme           | 8                  | 0.1  | 8                  | 1                    | 4      | 4     |
| inx           | 8                  | 0.1  | 8                  | 1                    | 2      | 6     |
| TOTAL         | 7219               | 100  | 5328               | 1.27                 | 2821   | 2507  |



# Bacterial Isolates: Specimen wise

## July 2025 – June 2026

### Percentage of isolates by specimen category (n=7,219)



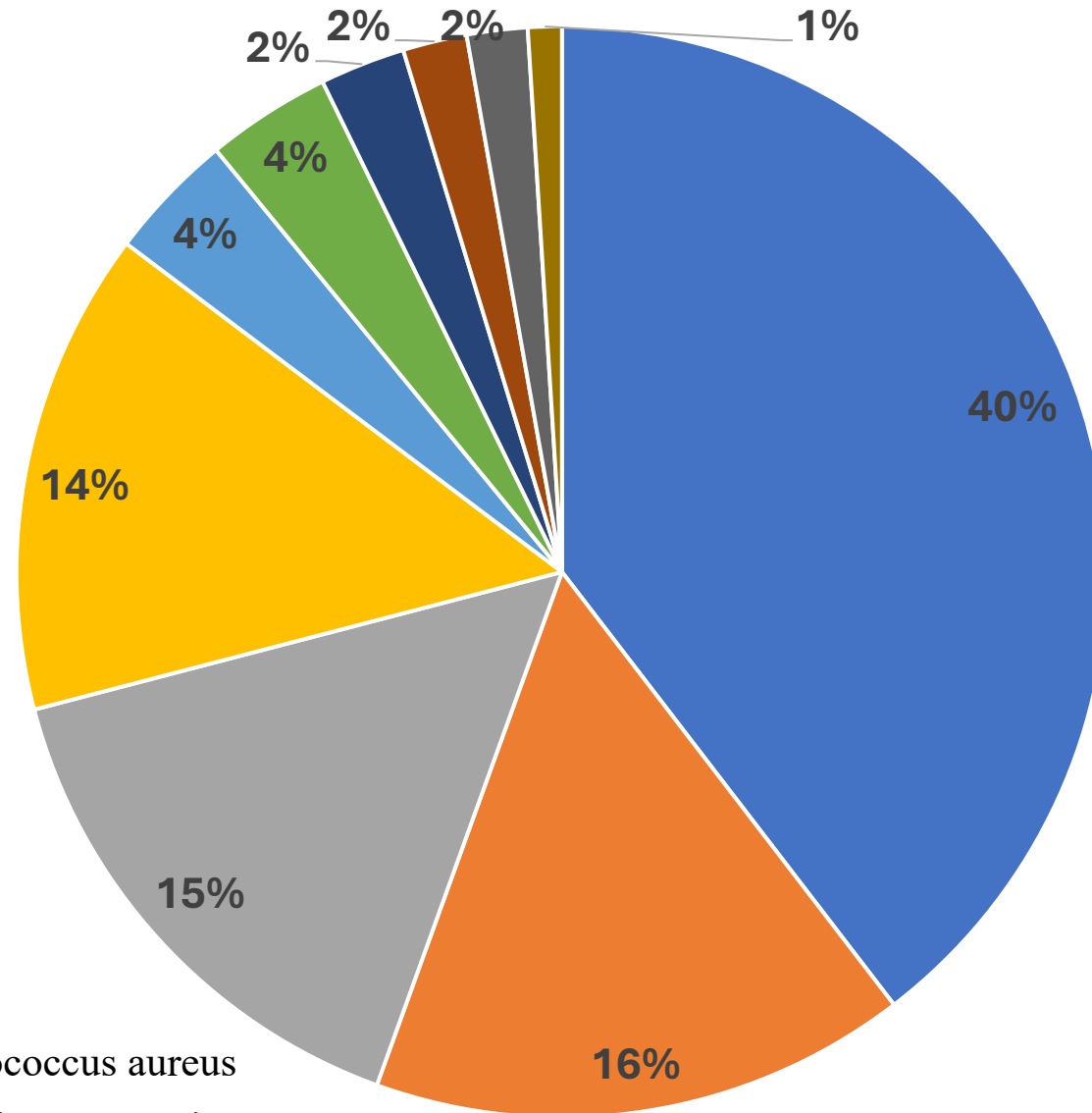


# Distribution Of The Most Common Organisms

July 2025 – June 2026

- Escherichia coli
- Pseudomonas aeruginosa
- Acinetobacter baumannii
- Enterococcus faecalis
- Klebsiella aerogenes

- Staphylococcus aureus
- Klebsiella pneumoniae
- Proteus mirabilis
- Streptococcus, beta-haem. Group A
- Enterococcus faecium





# Public health alerts - important species



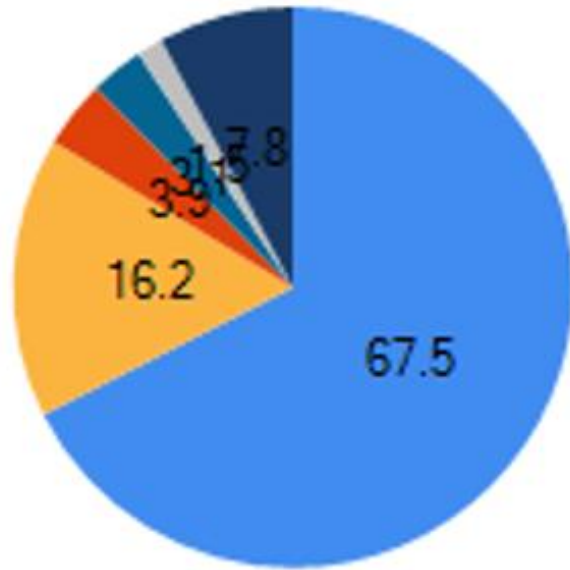
| Organisms [MALDI-ToF Identified]            | Priority        | Numbers Isolated @AIIMS-MG |
|---------------------------------------------|-----------------|----------------------------|
| Burkholderia pseudomallei                   | High priority   | 13                         |
| Francisella tularensis                      | High priority   | 1                          |
| Salmonella Typhi                            | High priority   | 30                         |
| Brucellosis                                 | High priority   | 1                          |
| Salmonella sp.                              | Medium priority | 52                         |
| Francisella tularensis                      | Medium priority | 1                          |
| Aeromonas hydrophila                        | Medium priority | 3                          |
| Aeromonas veronii                           | Medium priority | 2                          |
| Brucella melitensis                         | Medium priority | 1                          |
| Enterococcus avium                          | Medium priority | 1                          |
| Salmonella Typhimurium                      | Medium priority | 2                          |
| Stenotrophomonas maltophilia                | Medium priority | 36                         |
| Streptococcus agalactiae                    | Medium priority | 13                         |
| Streptococcus agalactiae                    | Medium priority | 13                         |
| Streptococcus dysgalactiae ss. dysgalactiae | Medium priority | 1                          |
| Streptococcus dysgalactiae ss. equisimilis  | Medium priority | 3                          |



# Site Specific Bacterial Isolates

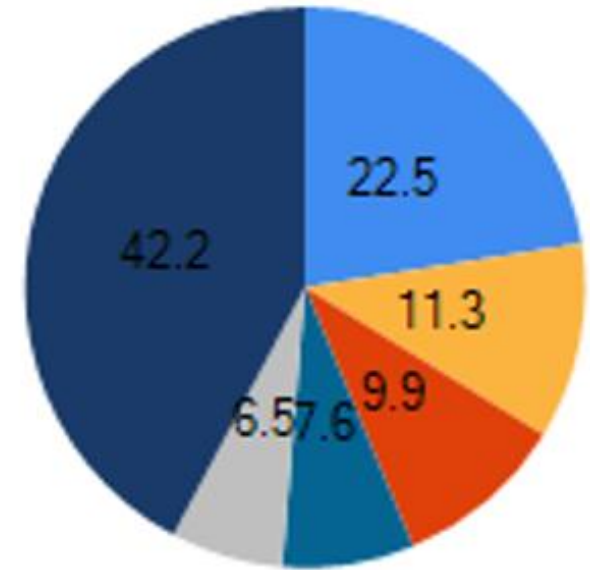
## July 25 – June 26

**Urine (%) (n=3,058)**



- Escherichia coli
- Klebsiella pneumoniae
- Pseudomonas aeruginosa
- Enterococcus faecalis
- Enterococcus faecium
- All others

**Blood (%) (n=628)**



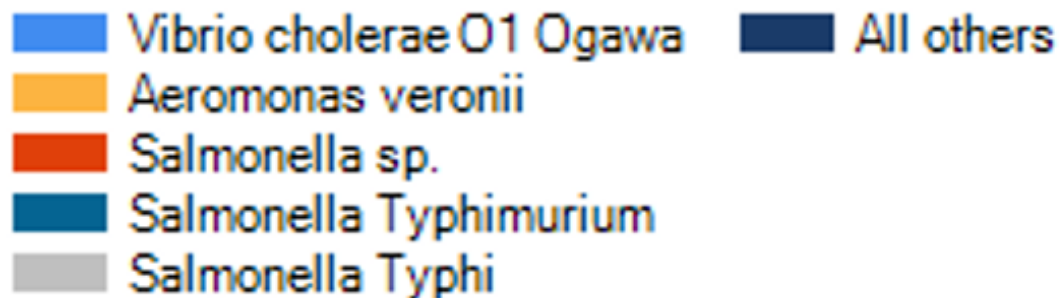
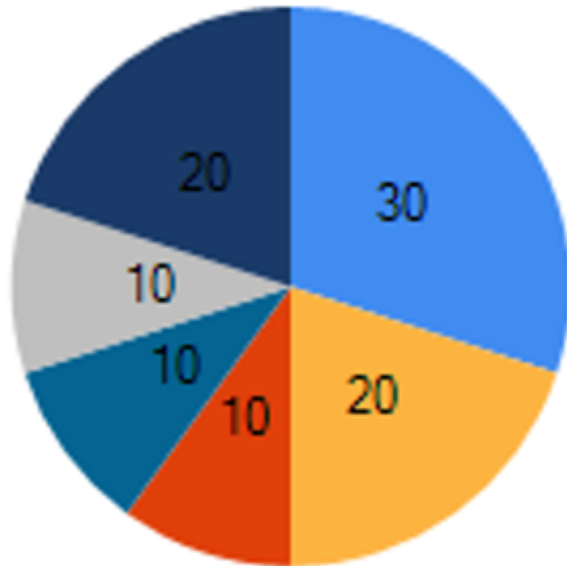
- Escherichia coli
- Klebsiella pneumoniae
- (Blank)
- Staphylococcus aureus
- Acinetobacter baumannii
- All others



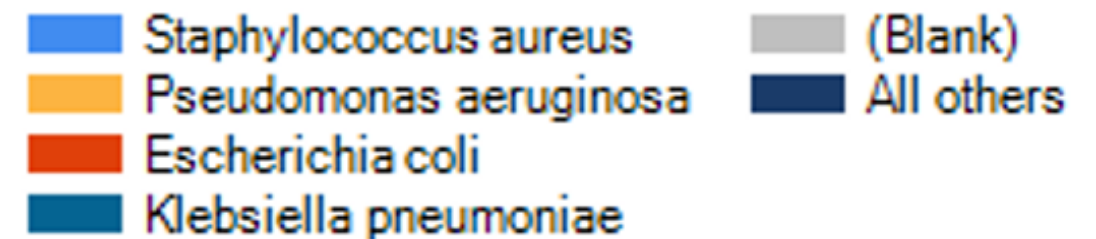
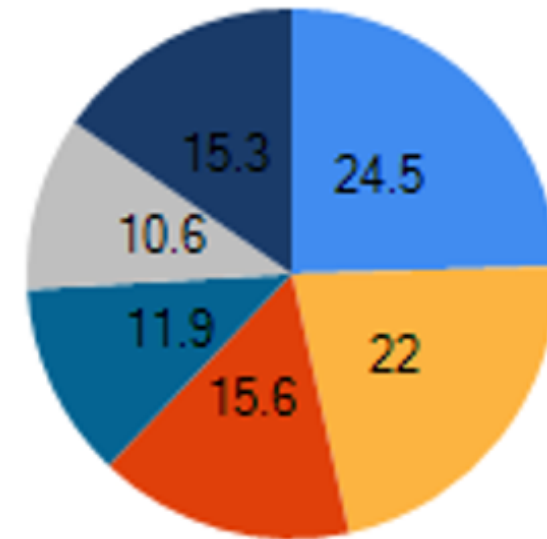
# Site Specific Bacterial Isolates

## July 25 – June 26

**Stool (%) (n=10)**



**Soft tissue and body fluids (%) (n=2,743)**

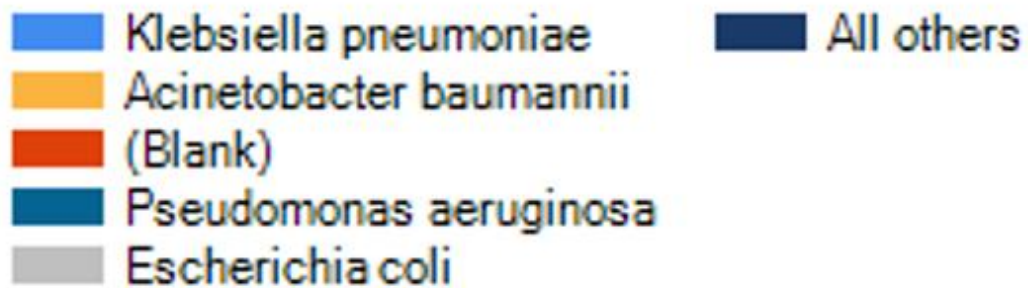
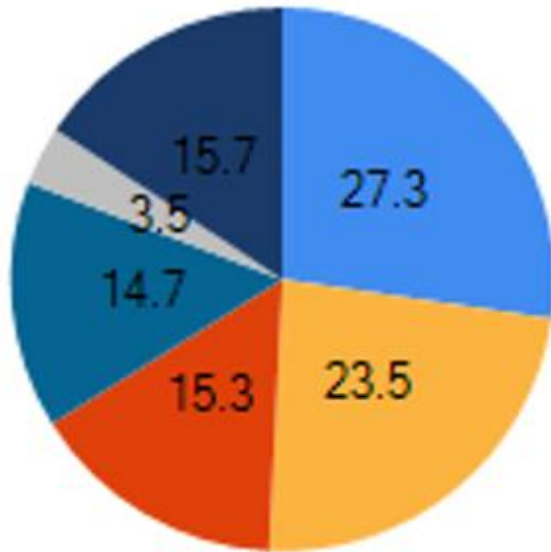




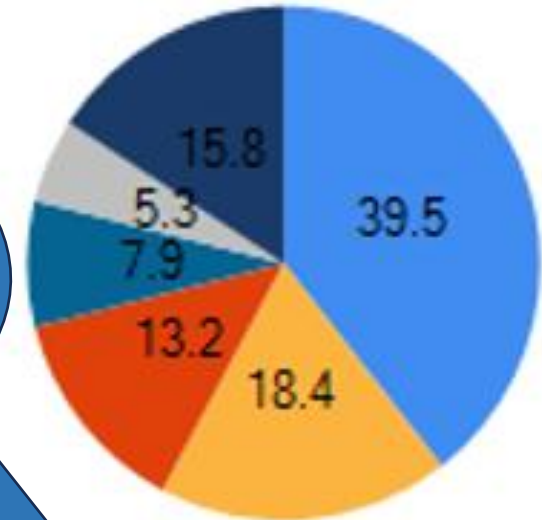
# Site Specific Bacterial Isolates

## July 25 – June 26

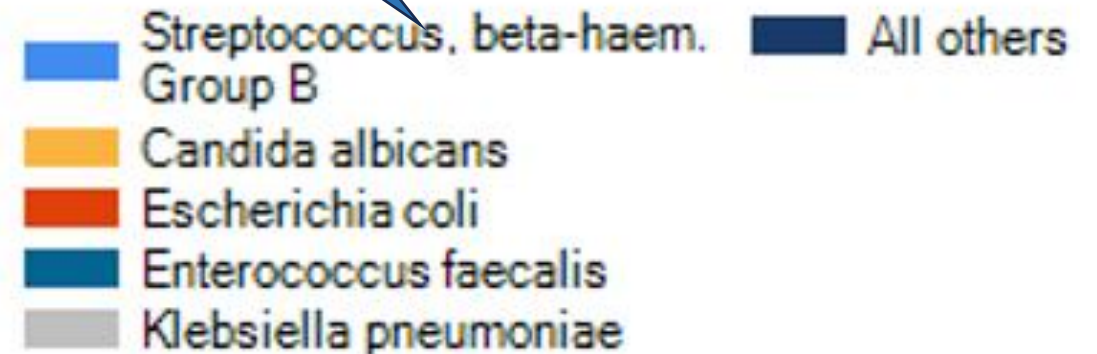
### Respiratory (%) (n=707)



### Genital (%) (n=38)



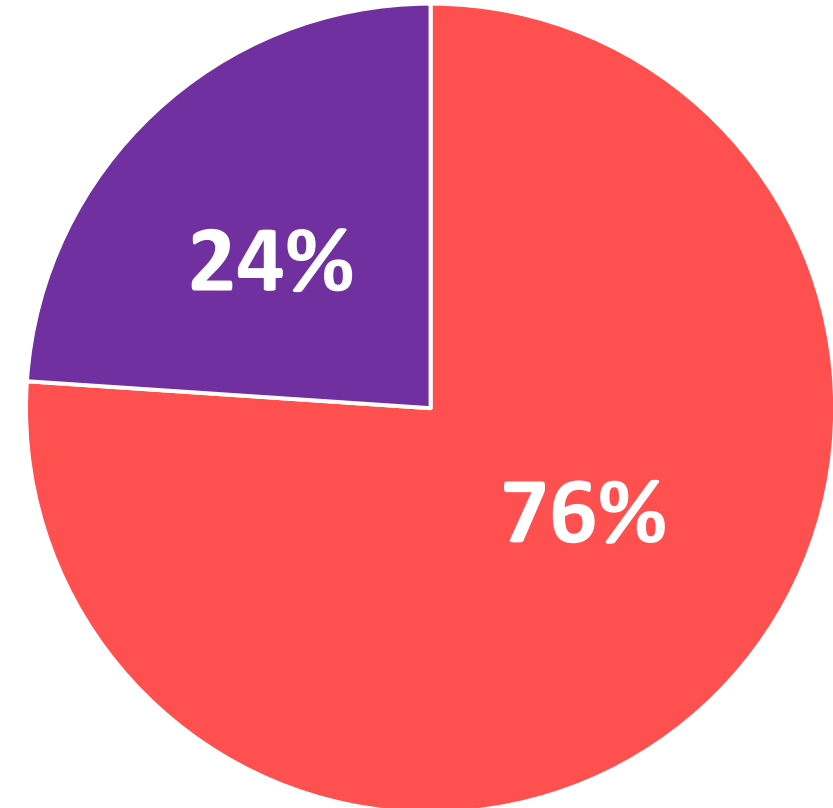
Vaginal Carriage of GB-BHS ↓





# Our Major Bugs Are...

- Gram Negatives
- ESBL's Rising
- AmpC are Worrisome as they Become Resistant with Augmentin [Amox-Clav]
- CRE's Difficult to Treat
- Tougher Challenge:
  - Stenotrophomonas
  - Burkholderia cepacia
  - Burkholderia pseudomallei [Thurkapalem “outbreak”]



■ Gram Negs

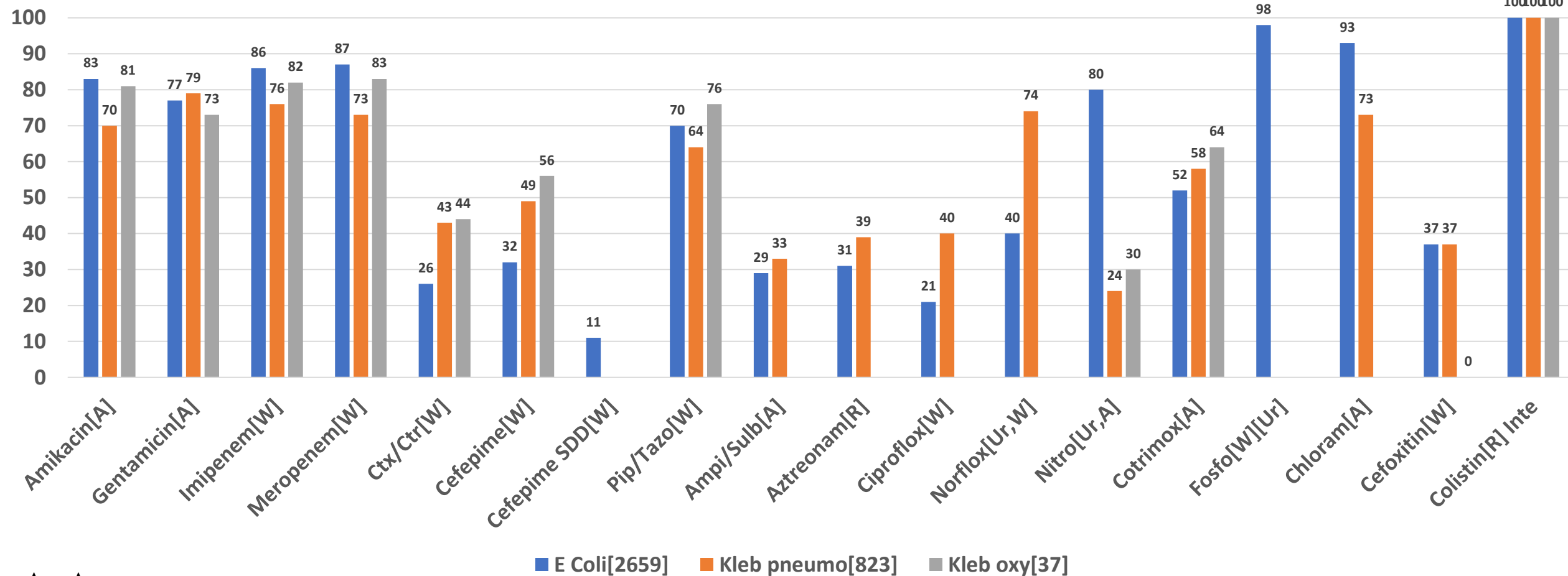


# Cumulative Antibigram – Enterobacterales (Gm Neg)

## July 2025 to June 2026 [% Susceptibility]



Major Enterobacterales Organisms [E coli, Klebsiella] %Susceptibility



A = Access  
W = Watch  
R = Reserve  
Ur = Urine Only

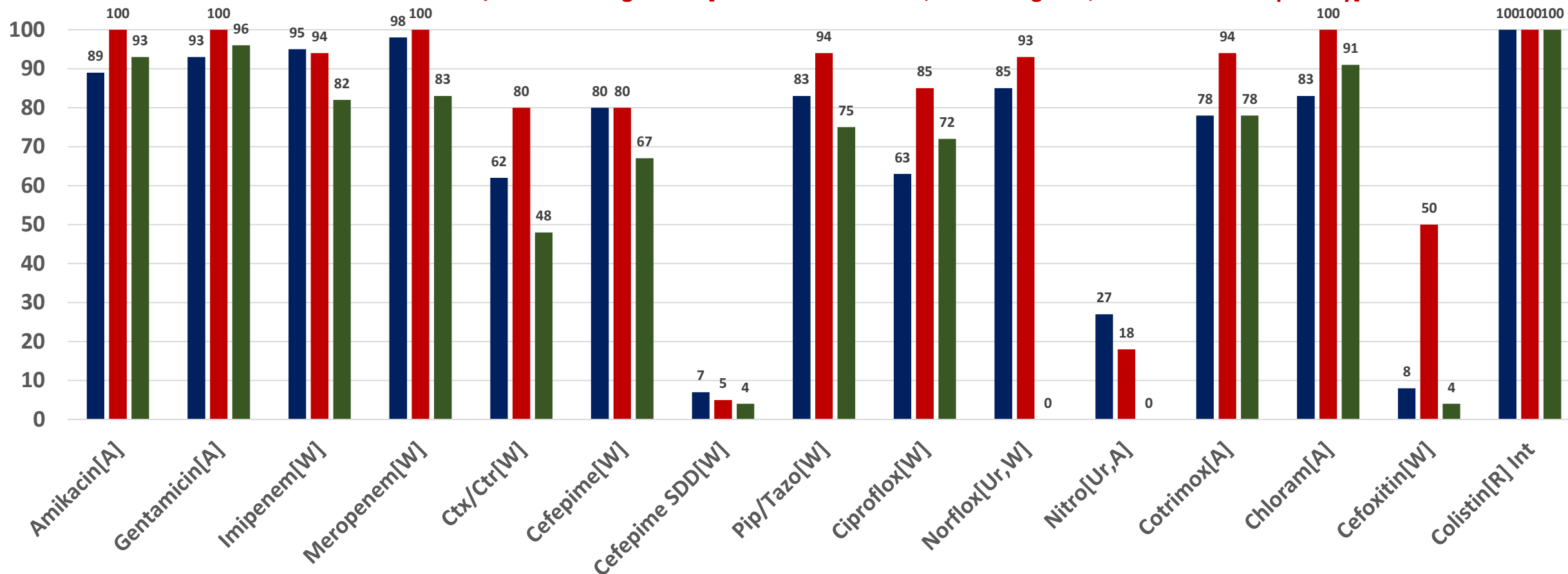
### NOTE:

- Use of Fosfomycin Is recommended Only for E. coli and Not Other Pathogens, as no breakpoints are available
- Use of Fosfomycin is recommended Only for Lower Urinary tract Infections and NOT otherwise
- Use of Fosfomycin as an Off Label antimicrobial for serious blood stream infections is based only on its MIC Values in E. coli



# Cumulative Antibigram – ESCPM / HECK-Yes (Gm Neg) July 2025 to June 2026 [% Susceptibility]

Enterobacterales ESCPM / HECK-Yes Organisms [Enterobacter cloacae, Kleb aerogenes, Serratia - %Susceptibility]



A = Access  
W = Watch  
R = Reserve  
Ur = Urine Only

■ Ent cloacae[72] ■ Kleb aerogenes[25\*] ■ Serr marsascens[30]

NOTE:

- *Hafnia alvei*, *Enterobacter cloacae*, *Citrobacter freundii*, *Klebsiella aerogenes*, *Yersinia* and *Serratia* Organisms often contain inherent presence of an inducible de-repressed chromosomal AmpC beta lactamases. Hence, AVOID giving Resistance Inducing Antibiotics like Imipenem, Amox-Clav.
- In these class of bacteria, avoid using 3G Cephalosporins as they not only induce resistance but they themselves get



# Words of Caution for ESCPM / HECK-Yes Group of Organisms [Chromosomal AmpC]

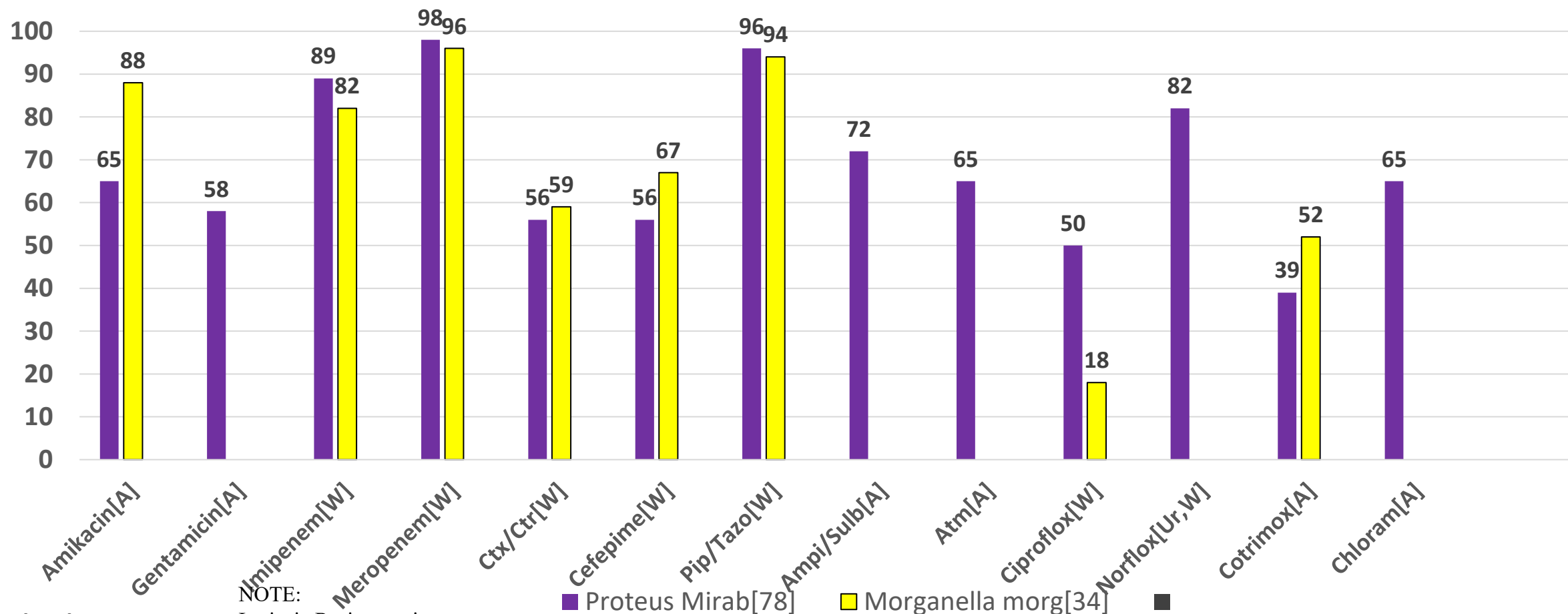
- For Antibiotic Naïve Strains: If 3GC have been started, resistance is likely to develop. Please Repeat cultures after 48 – 72 hours after initiation of Antimicrobial Therapy. Under any circumstances, do not give Imipenem or any clavulanate-based combinations.
- *HECK-Yes* [*Hafnia alvei*, *Enterobacter cloacae*, *Citrobacter freundii*, *Klebsiella aerogenes*, *Yersinia* and *Serratia*] organisms often contain inherent presence of an inducible de-repressed chromosomal Ampc beta lactamases. Resistance to cefotaxime and ceftriaxone indicates possible co – existence of *bla*-ctx-m type ESBL enzyme
- These strains are likely to develop resistance in vivo during treatment with beta lactam antibiotics which are good inducers of Ampc beta lactamases like imipenem, amoxi-clav, cefazolin or cephalothin or any clavulanate consisting FDC.
- First-generation and second-generation cephalosporins are inactive against *Enterobacter* infections. This is exemplified by resistance to Cephameycin group of drugs like Cefoxitin.
- Third-generation cephalosporins frequently show good in vitro activity against these organisms, but have a significant risk of developing full resistance during therapy.
- Resistance develops much less frequently with fourth-generation cephalosporins like cefepime, because they are relatively stable and do not induce ampc beta-lactamases.



# Cumulative Antibigram – Tribe Proteae (Gm Neg)

## July 2025 to June 2026 [% Susceptibility]

Enterobacterales, Tribe Proteae [*Proteus mirabilis*, *Morganella morganii* %Susceptibility]



A = Access  
W = Watch  
R = Reserve  
Ur = Urine Only

NOTE:

Intrinsic Resistance is

*Proteus* spp, *Providencia* spp and *Morganella* spp are intrinsically resistant to:

- Ampicillin
- Amoxicillin-clavulanate
- Polymyxin B

- 1st Generation Cephalosporins
- Tigecycline
- Colistin

- 2nd Generation Cephalosporins
- Nitrofurantoin
- Tetracycline, Tigecycline



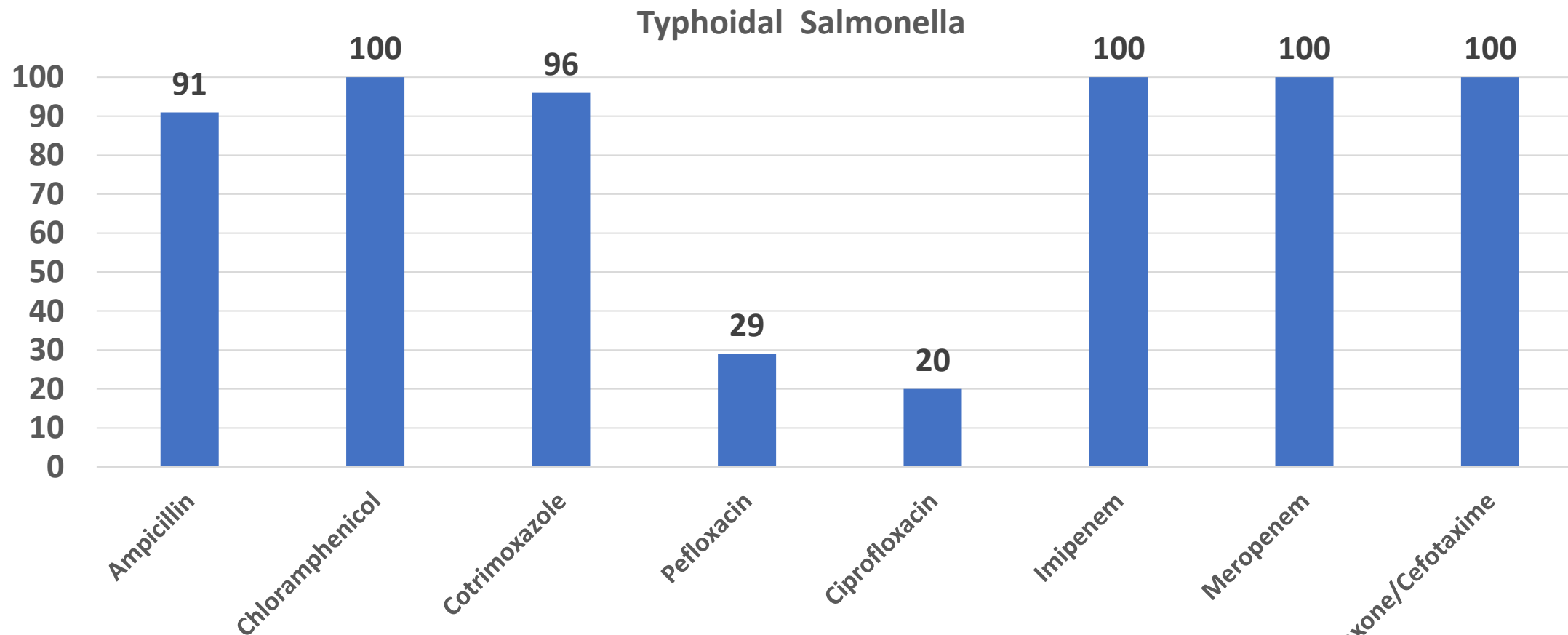
# Words of Caution for Tribe Proteae

- Proteus spp, Providencia spp and Morganella spp are intrinsically resistant to:
  - Ampicillin
  - 1st Generation Cephalosporins
  - 2nd Generation Cephalosporins
  - Amoxicillin-clavulanate
  - Tigecycline
  - Nitrofurantoin
  - Polymyxin B
  - Colistin
  - Tetracycline



# Cumulative Antibigram – Typhoidal Salmonella

## July 2025 to June 2026 [% Susceptibility]



- For Salmonella spp and Shigella spp, Aminoglycosides, 1<sup>st</sup> and 2<sup>nd</sup> Generation Cephalosporins and Cephamycin's may appear active in vitro, but are not effective clinically.
- Blood Isolates of Salmonella are Intrinsically Resistant to Aminoglycosides
- Pefloxacin resistance is an indicator of possible Clinical Non-Response to Fluoroquinolones despite in vitro susceptibility to other Fluoroquinolones
- Tigecycline should never be given for Blood Isolates of Gram-Negative or Gram-Positive Bacteria as it doesn't concentrate in Blood.

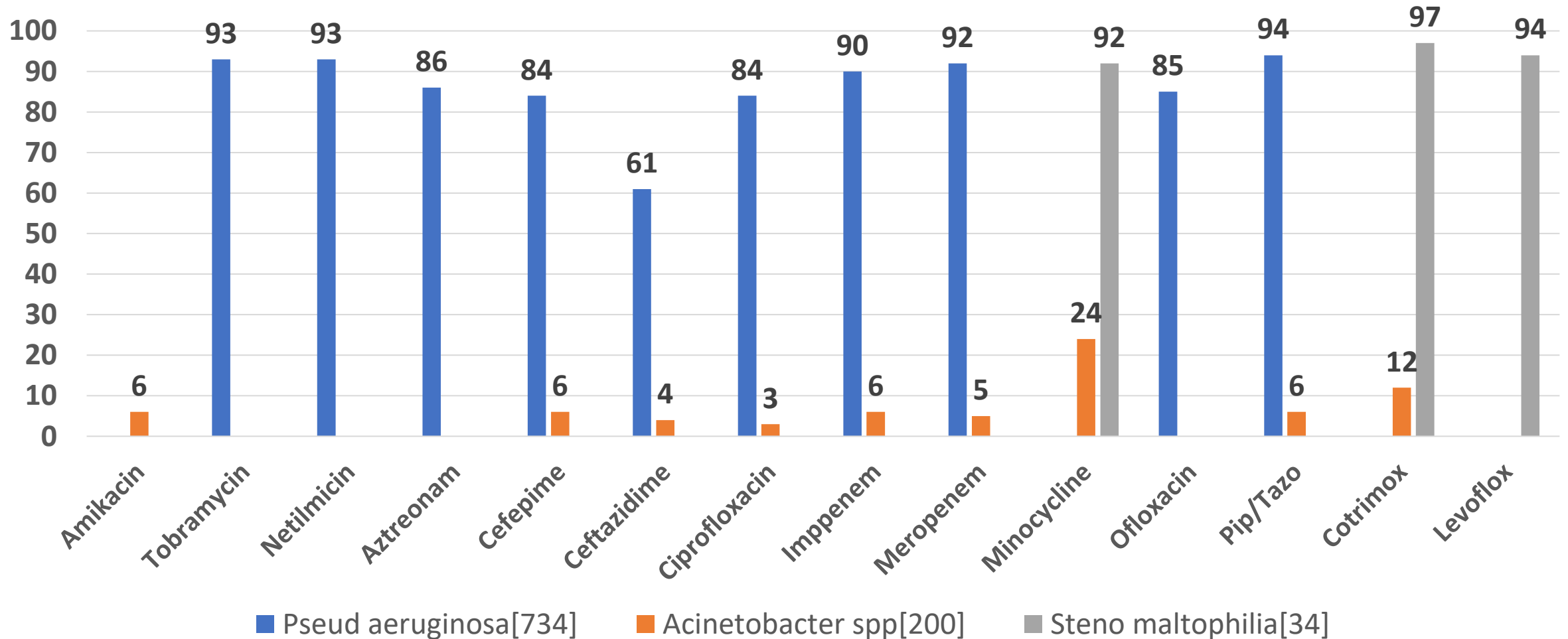
**Caution for Use of Abx in  
Salmonella from Blood**



# Cumulative Antibigram – Nil Fermenters (Gm Neg)

## July 2025 to June 2026 [% Susceptibility]

Glucose Nil Fermenting Gram Negative Bacilli [%Susceptibility]  
Pseudomonas, Acinetobacter, Stenotrophomonas





# Intrinsic Resistance in Glucose Nil Fermenting Gram Negative Bacilli: Treatment Not to be Attempted

*Acinetobacter baumannii / lwoffii, Acinetobacter calcoaceticus complex are Intrinsically Resistant to the Following Antibiotics:*

|               |             |                |                             |
|---------------|-------------|----------------|-----------------------------|
| • Ampicillin  | • Aztreonam | • Fosfomycin   | • Chloramphenicol           |
| • Amoxicillin | • Ertapenem | • Trimethoprim | • Amoxicillin / Clavulanate |

*Pseudomonas aeruginosa are Intrinsically Resistant to the Following Antibiotics:*

|                          |               |                            |                              |
|--------------------------|---------------|----------------------------|------------------------------|
| Ampicillin / Amoxicillin | Ertapenem     | Ampicillin / Sulbactam     | Tigecycline and Tetracycline |
| Amoxiclav                | Cotrimoxazole | Cefotaxime and Ceftriaxone | Chloramphenicol              |

*Do Not Attempt treatment with Gentamicin for Pseudomonas aeruginosa*

*Stenotrophomonas maltophilia is Intrinsically resistant to the following Antibiotics:*

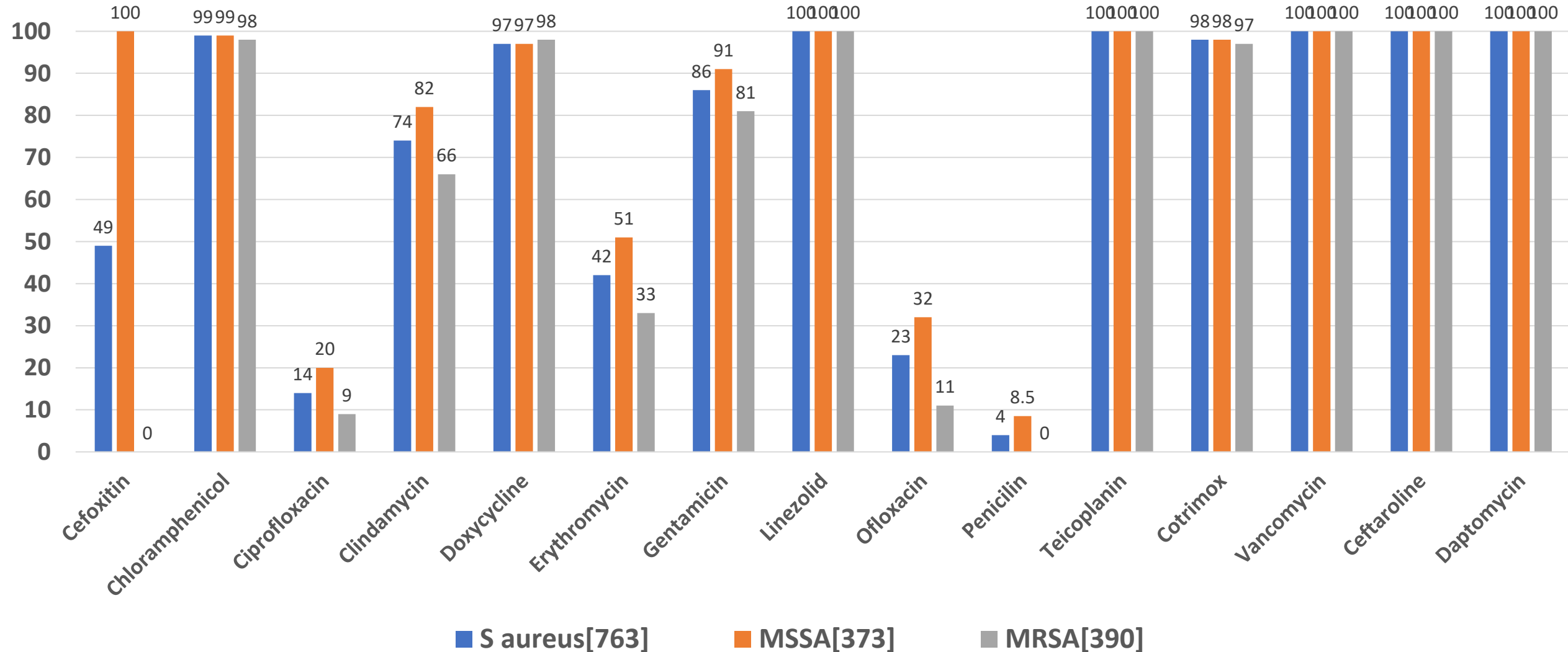
|                          |                |               |                       |
|--------------------------|----------------|---------------|-----------------------|
| • Ampicillin             | • Amoxiclav    | • Ceftriaxone | • All Aminoglycosides |
| • Amoxicillin            | • Pip / Tazo   | • Aztreonam   | • Trimethoprim        |
| • Ticarcillin            | • Cefotaxime   | • Imipenem    | • Fosfomycin          |
| • Ampicillin / Sulbactam | • Piperacillin | • Ertapenem   | • Meropenem           |



# Staphylococcus aureus (N=763)

## MSSA(n=373) & MRSA(n=390~51%)

Staph aureus, MSSA, MRSA %Susceptibility





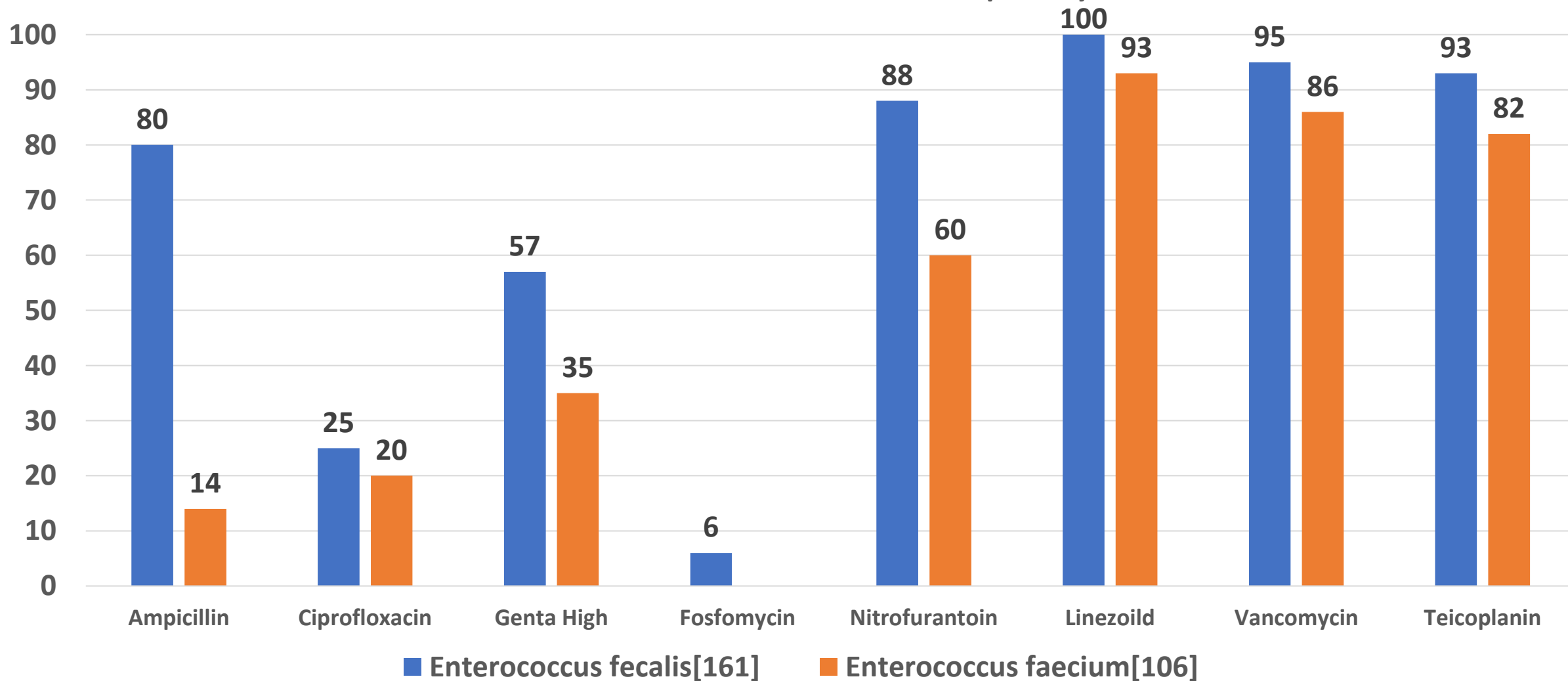
# Words of Caution for S. aureus

- **Never give Glycopeptides [Vancomycin, Teicoplanin] for MSSA**
- **Never Attempt Monotherapy with**
  - Vancomycin / Teicoplanin
  - Rifampicin
  - Gentamicin
- **Preferable to Use Teicoplanin:** Better BMQ's – We Recommend Teicoplanin for MRSA, not Vancomycin
- **Teicoplanin Loading Doses:** Advised, up to 3 to 5 loading doses of 12 mg/kg q12hrly with OD Gentamicin 7.5mg/kg/day as a Single Undivided Dose
- Vancomycin Doses will Strictly Depend On Vancomycin MIC and Site of Infection
- **Good Oral Options for MRSA:** *Doxycycline, Cotrimoxazole, Chloramphenicol*



# Enterococcus faecalis (n=161); Enterococcus faecium (n=106) [July 2025 to June 2026]

Ent faecalis and Ent faecium %Susceptibility





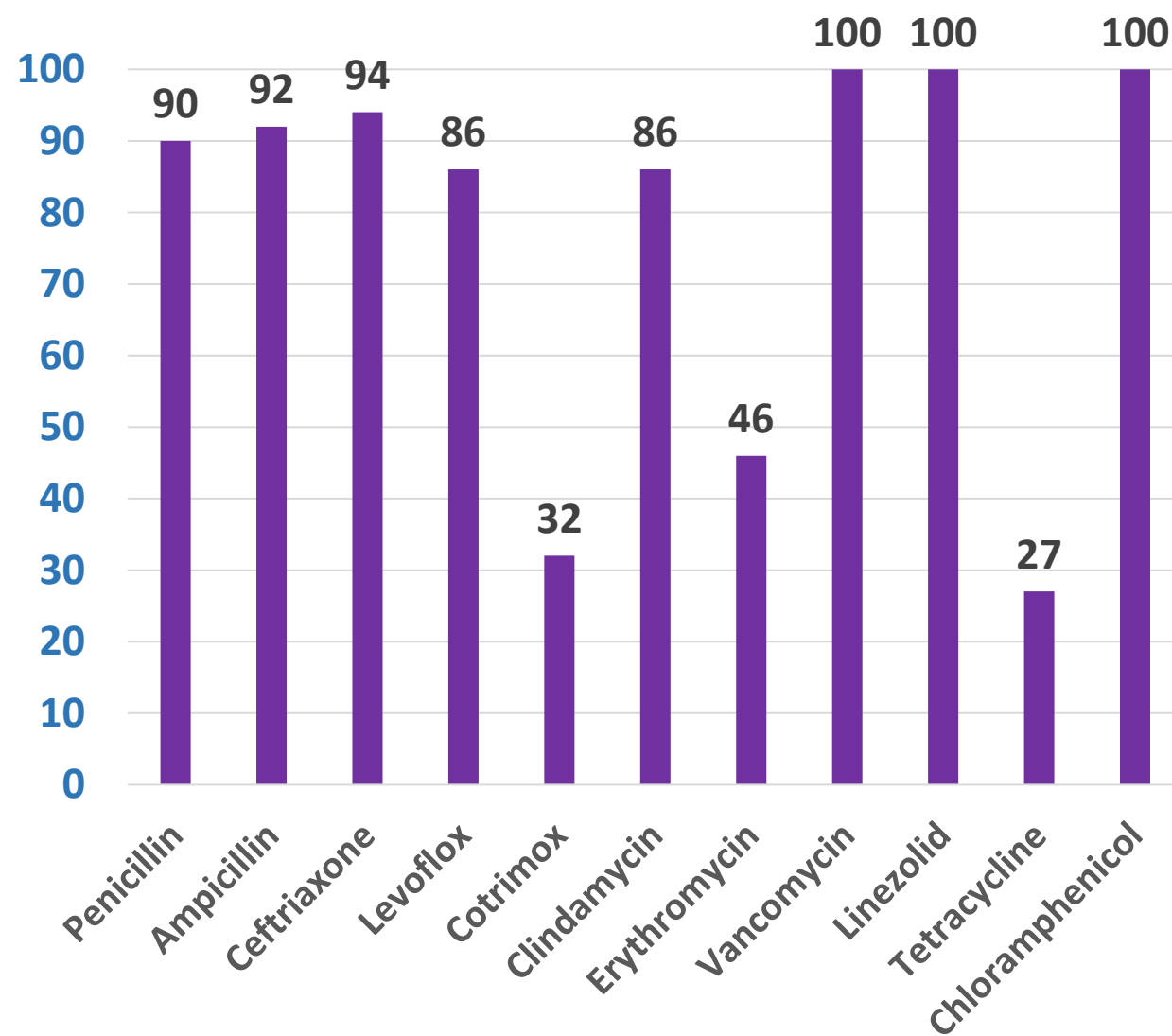
# Words of Caution for Enterococcus

- For Enterococcus spp, Aminoglycosides (Except high level resistance testing), Cephalosporins [low affinity PBP's], Clindamycin and Cotrimoxazole (The 3C's) are NOT effective clinically and are therefore NOT reported.
- There are no Breakpoints MIC's for Tigecycline and Daptomycin for Enterococcus faecium and therefore NOT reported
- Species like *E. gallinarum* and *E. casseliflavus* carry intrinsic low-level vancomycin resistance (*vanC* gene). Do not mistake this for acquired VRE (*vanA* or *vanB*), which requires entirely different infection control protocols
- Resistance to Linezolid arises much faster in *E. faecium* than *E. faecalis*
- If the laboratory identifies High-Level Aminoglycoside Resistance (HLAR), this synergy is completely lost. In these cases, alternate combinations—such as dual beta-lactam therapy (Ampicillin + Ceftriaxone)—must be deployed to achieve the necessary bactericidal effect

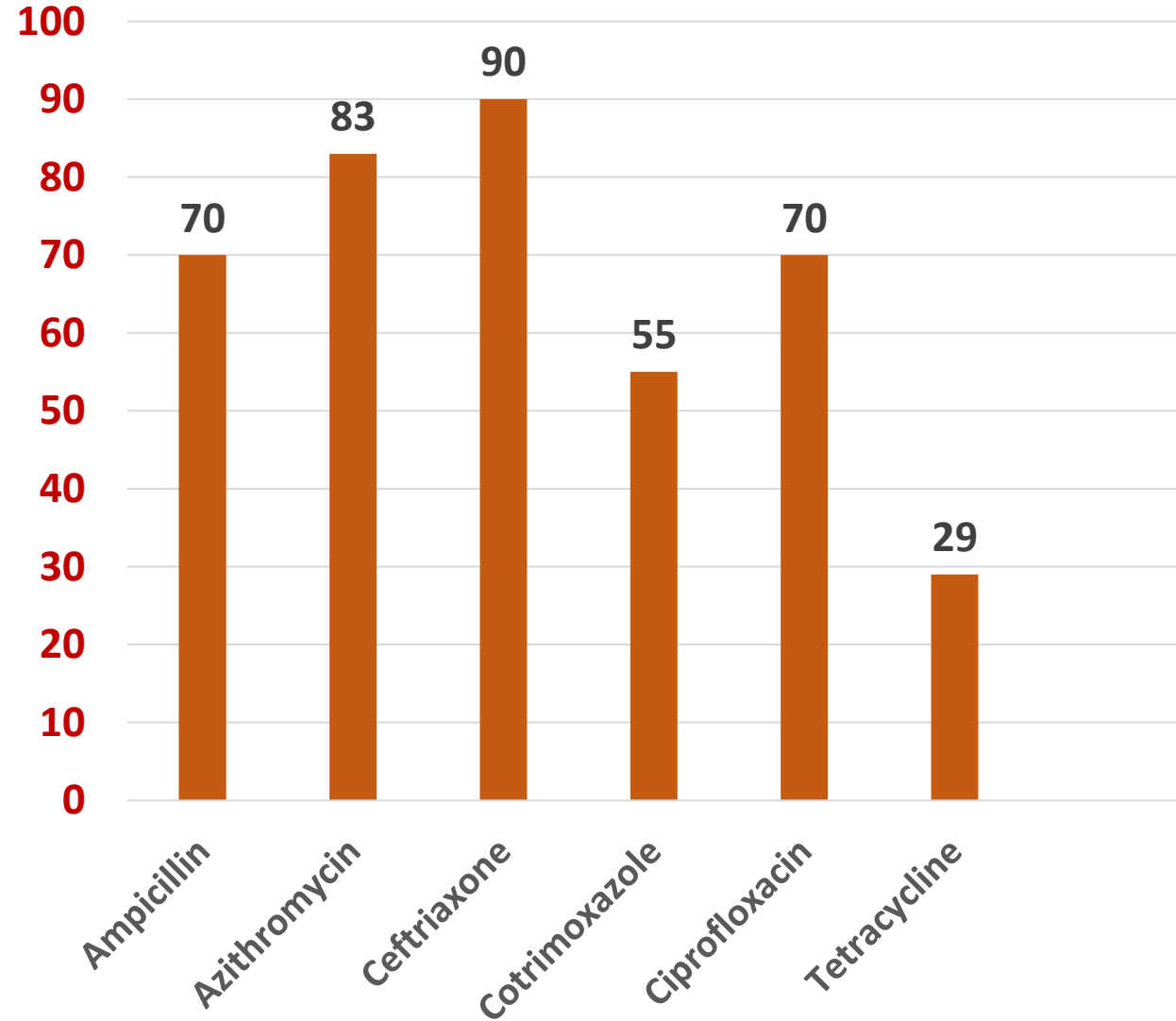


# Streptococcus pneumoniae [N=44], Haemophilus influenzae [N=32] [July 2025 to June 2026]

Streptococcus pneumoniae [%S]



Haemophilus influenzae [%S]





# Combination AntibioGrams [% Susceptible]



|                        | Enterobacterales<br>(E coli & Kleb pneu)                                                                                                                                     | HECK-Yes /<br>ESCPM                                                                                             | Tribe Proteae    | Acinetobacter    | Pseudomonas<br>aeruginosa | MRSA       | Enterococcus spp |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------|------------------|---------------------------|------------|------------------|
| Meropenem              | 86.5 [Level I Escalation]                                                                                                                                                    | 94                                                                                                              | 97               | 5.1              | 90                        |            |                  |
| Amikacin               | 81                                                                                                                                                                           | 88.7                                                                                                            | 71.7             | 5.4              | 88 [U]                    |            |                  |
| Gentamicin-10 / 120    | 75[G-10]                                                                                                                                                                     | 96[G-10]                                                                                                        | 55.6[G-10]       | 9.2[G-10]        |                           | 81.3[G-10] | 51[G-120]        |
| Tobramycin             |                                                                                                                                                                              |                                                                                                                 |                  |                  | 90.5                      |            |                  |
| Pipercillin/Tazobactam | 69.4                                                                                                                                                                         | 83.5                                                                                                            | 91.5             | 5.4              | 92                        |            |                  |
| Meropenem+Amikacin*    | 87.9                                                                                                                                                                         | 95.8                                                                                                            | 99.2             | 6.3              |                           |            |                  |
| Meropenem+Gentamicin*  | 87.2                                                                                                                                                                         | 100                                                                                                             | 98.1             | 28.6             |                           |            |                  |
| Pip/Tazo+Amikacin*     | 84.2 [Empirical]                                                                                                                                                             | 95                                                                                                              | 97.8 [Empirical] | 5.7              | 90 [U]                    |            |                  |
| Pip/Tazo+Gentamicin*   | 85.6                                                                                                                                                                         | 100                                                                                                             | 92.5             | 23.1             |                           |            |                  |
| Pip/Tazo+Tobramycin    | Please Don't use Amox/Clav (Augmentin),<br>Imipenem & 3GC for HECK-Yes and AmpC<br>Positive Enterobacterales as they Induce severe<br>resistance in these class of organisms |                                                                                                                 |                  |                  | 94.1 [Empirical]          |            |                  |
| Minocycline            |                                                                                                                                                                              |                                                                                                                 |                  | 23               |                           |            |                  |
| Minocycline+Amp/Sulb   |                                                                                                                                                                              |                                                                                                                 |                  | 50.4 [Empirical] |                           |            |                  |
| PolymyxinB / Colistin  | 100                                                                                                                                                                          | 100                                                                                                             |                  | 100              | 100                       |            |                  |
| Ampicillin+Gentamicin  |                                                                                                                                                                              | Cefepime ±<br>Aminoglycoside is<br>the Drug of Choice<br>in the HECK-Yes<br>group as they are<br>AmpC Producers |                  |                  |                           |            | 67 [Synergy]     |
| Vancomycin             |                                                                                                                                                                              |                                                                                                                 |                  |                  |                           | 100        | 91               |
| Teicoplanin            |                                                                                                                                                                              |                                                                                                                 |                  |                  |                           | 100        | 89               |
| Vancomycin+Gentamicin  |                                                                                                                                                                              |                                                                                                                 |                  |                  |                           | 100[G-10]  | 95.2[G-120]      |
| Teicoplanin+Gentamicin |                                                                                                                                                                              |                                                                                                                 |                  |                  |                           | 100[G-10]  | 93.6[G-120]      |

\*Y – Site Incompatible Drugs [Do Not Mix in Same Vial / Bottle for Administration to the Patient]  
[U] – Breakpoints for Amikacin are validated for Pseudomonas in Urinary Isolates only  
Aminoglycosides: Genta = Gram Positives, Amika – Enterobacterales, Tobra = Pseudomonas

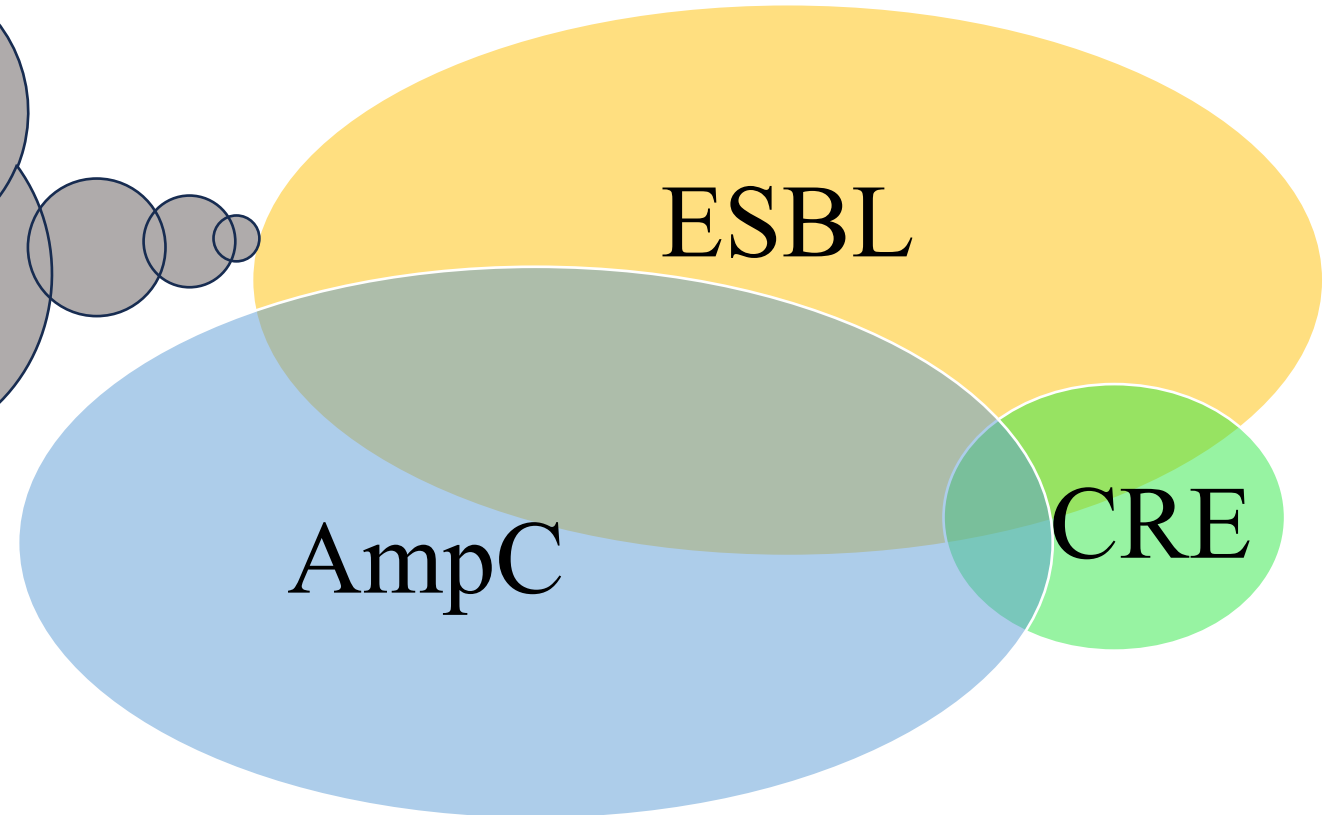
- Genta-10 for S. aureus and G-120 for Enterococcus Isolates
- Ceftazidime/Avibactam + Aztreonam is the Drug of Choice for Carbapenem Resistant Enterobacterales Positive for Synergy Positive Cases [Level II Escalation]

# Overlap of Resistance Mechanisms with Multiple Mechanisms in One Isolate

~70% 3GC

Resistance in E

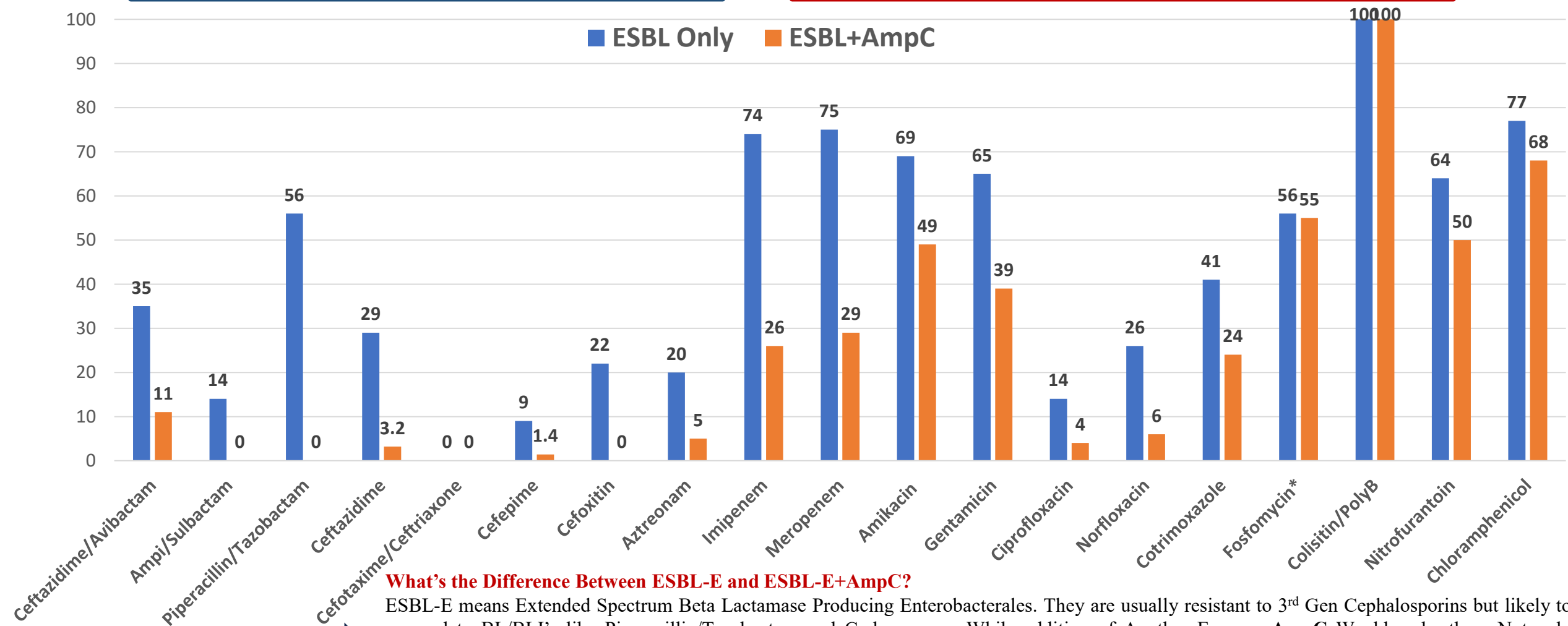
- ESBL
- AmpC
- ESBL + AmpC
- Induced AmpC
- CRE





AST Profile of **ESBL-E**  
3GC=R & Pip/Tazo=S, Fox=S  
[n=2541/4100~62%]

AST Profile of **ESBL-E + AmpC**  
3GC=R & Pip/Tazo=R, Fox=R  
[n=800/4100~19.5%]



**What's the Difference Between ESBL-E and ESBL-E+AmpC?**

ESBL-E means Extended Spectrum Beta Lactamase Producing Enterobacterales. They are usually resistant to 3<sup>rd</sup> Gen Cephalosporins but likely to respond to BL/BLI's like Piperacillin/Tazobactam and Carbapenems, While addition of Another Enzyme **AmpC** Would make them Not only resistant to BL/BLI's, but after Exposure to Drugs like Imipenem and Augmentin, they can get De-Repressed & become resistant even to Carbapenems as well. The Plasmid carrying ESBL-E+AmpC particularly can be a threat for Healthcare Associated Infections

**Caution for ESBL-E+AmpC**



# Have the ESBL-E & ESBL-E+AmpC Changed from 2025 to 2026?

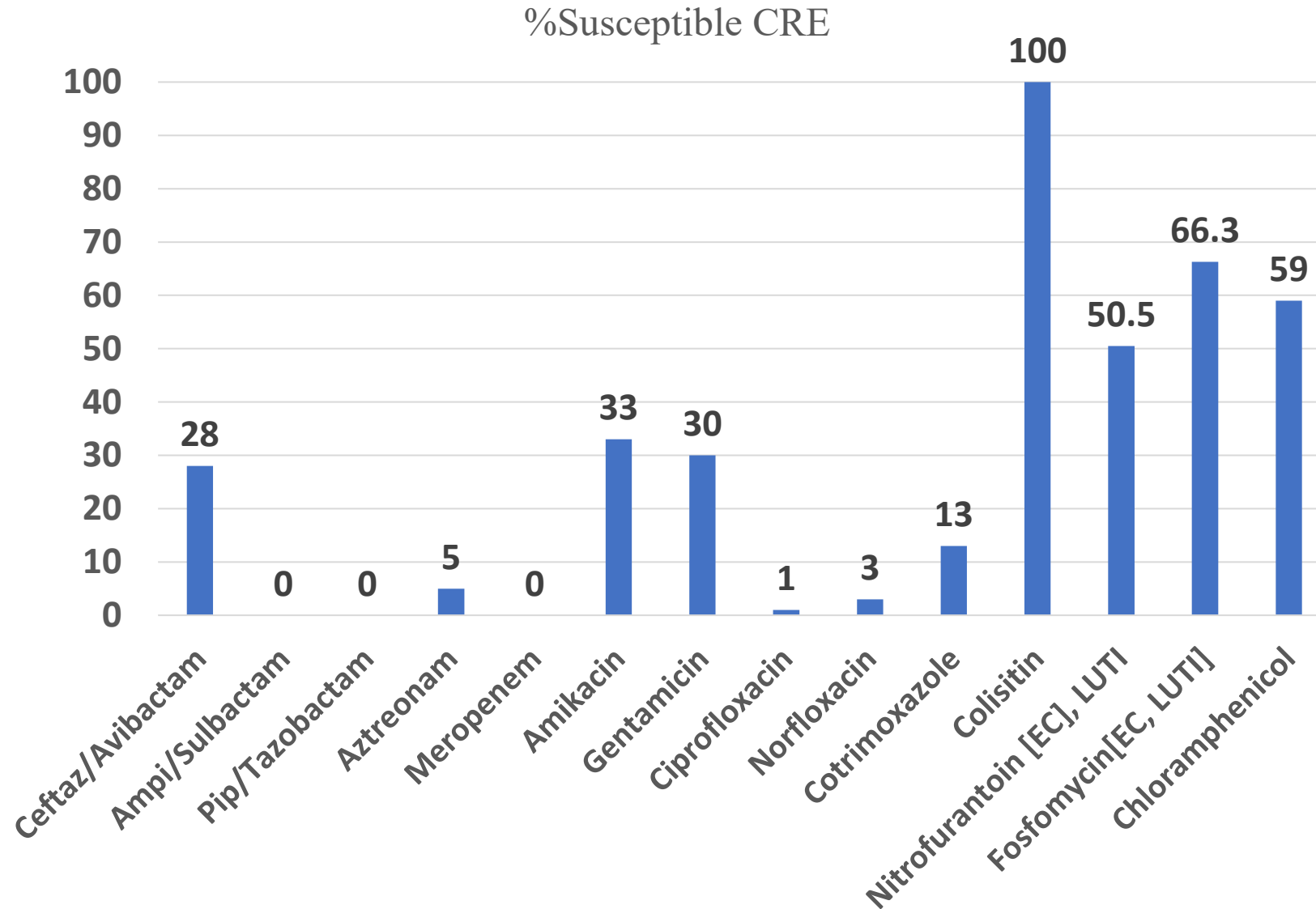


| Antibiotic<br>[% Susceptibility] | 2024-2025<br>ESBL-E | 2025-2026<br>ESBL-E | 2024-2025<br>ESBL-E + AmpC | 2025-2026<br>ESBL-E + AmpC |
|----------------------------------|---------------------|---------------------|----------------------------|----------------------------|
| Ampicillin/Sulbactam             | 54                  | 14                  | 2.5                        | 0                          |
| Ceftazidime/Avibactam            | 100                 | 35                  | 26                         | 11                         |
| Piperacillin/Tazobactam          | 100                 | 56                  | 0                          | 0                          |
| Cefepime                         | 5                   | 9                   | 0                          | 1.4                        |
| Cefotaxime                       | 0                   | 0                   | 0                          | 0                          |
| Cefoxitin                        | 75                  | 22                  | 7.2                        | 0                          |
| Aztreonam                        | 18                  | 20                  | 9                          | 5                          |
| Imipenem                         | 98                  | 74                  | 35                         | 26                         |
| Meropenem                        | 100                 | 75                  | 37                         | 29                         |
| Amikacin                         | 75                  | 69                  | 48                         | 49                         |
| Gentamicin                       | 79                  | 65                  | 56                         | 39                         |
| Netilmicin                       | 92                  | 61                  | 61                         | 45                         |
| Ciprofloxacin                    | 20                  | 14                  | 2                          | 4                          |
| Norfloxacin[U]                   | 39                  | 26                  | 6                          | 6                          |
| Cotrimoxazole                    | 51                  | 41                  | 30                         | 24                         |
| Fosfomycin[U]                    | 97                  | 56                  | 89                         | 55                         |
| Nitrofurantoin[U]                | 85                  | 64                  | 62                         | 50                         |
| Chloramphenicol                  | 85                  | 77                  | 73                         | 68                         |

ESBL-E = Extended Spectrum Beta Lactamase Enterobacterales; AmpC = Ampicillinases Type C [Beta Lactamase Inhibitor Resistant]



# Carbapenem Resistant Enterobacterales Subset [CRE] 606/4100 (14.8%) [July 2025-June 2026]



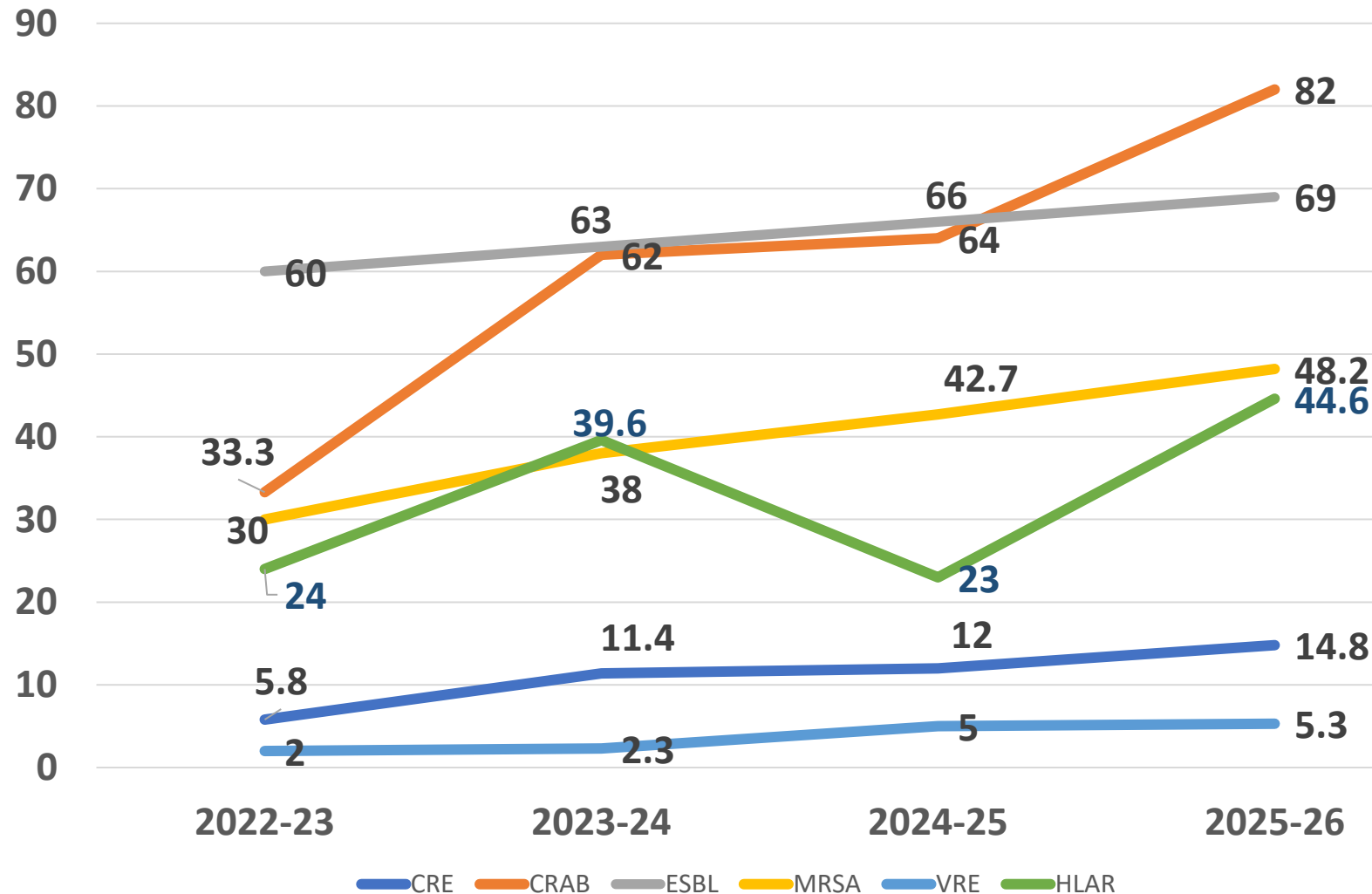
For All CRE Isolates:

- Ceftazidime/Avibactam + Aztreonam Synergy Testing is Performed
- If positive: then dosing's sent on AST Reports
- If Negative the alternatives given:
  - Colistin + Meropenem
  - Colistin + Minocycline
  - Gentamicin + PolyB
  - Amika + Chloramphenicol
- CRE Panel Templates Used to Detect the Cause of Carbapenem resistance: MBL or Serine Carbapenemases



# MDRO Trends @AIIMS Mangalagiri from 2022 - 2026

CRE, CRAB, ESBL, MRSA, VRE, HLAR



**MDRO** = Multi Drug Resistant

Organisms, include:

**CRAB** = Carbapenem Resistant

Acinetobacter baumannii [Meropenem Resistance]

**CRE** = Carbapenem Resistant

Enterobacterales [Meropenem Resistance]

**ESBL** = Extended Spectrum Beta Lactamases [R to 3<sup>rd</sup> Gen Cephalosporins]

**MRSA** = Methicillin Resistant Staph aureus [Resistance to Cefoxitin]

**VRE** = Vancomycin Resistant Enterococci

**HLAR** = High Level Aminoglycoside Resistant [Resistance to High Level Gentamicin]

**CAUTION:** As evident from this trend, the Prevalence of MDRO's is Steadily Rising from 2022, to date and will rise further, subject to misuse of Antimicrobials



# Salient Features of the Antibigram

## Salient Features of the Antibigram

- **Predominant Pathogens:** *Escherichia coli* (1,933 patients) is by far the most frequently isolated pathogen, followed by *Klebsiella pneumoniae* (823 patients) and *Pseudomonas aeruginosa* (734 patients).
- **MRSA** rates have steeped from **25% in 2022** to **51% in 2026** showing a more than 50% increase in a span of Just 4 years.
- **Gram-Positive Strengths:** *Staphylococcus aureus* retains 100% susceptibility to **Vancomycin** and **Teicoplanin**, and **Linezolid**, indicating that these remain reliable reserve agents for severe Gram-positive infections.
- **ICU vs. Outpatient Disparity:** Susceptibility drop-offs are steep across the board for patients admitted to the **ICU** compared to outpatients. For example, *E. coli* susceptibility to Meropenem falls from **94%** in outpatients to **71%** in the ICU.
- **Urine Isolates Specifics:** For *E. coli* urinary tract infections, **Fosfomycin** (72% susceptible) and **Nitrofurantoin** (81% susceptible) show strong therapeutic potential compared to fluoroquinolones.

## Prevalence of MDRO Marker Pathogens

- While direct multidrug-resistant organism (MDRO) epidemiological percentages are not completely aggregated in the raw patient totals, specific resistance marker traits reveal highly concerning prevalence rates:
- **MRSA (Methicillin-Resistant *Staphylococcus aureus*):** The susceptibility of *Staphylococcus aureus* to **Cefoxitin (FOX)** is **50%**. This indicates that **50% of all isolated *S. aureus* strains are MRSA**.
- **ESBL-Producing *E. coli*:** The confirmatory testing row reveals that **100% of tested *E. coli* strains met ESBL phenotypical criteria** within its subgroup selection, mirroring the low **26%** susceptibility to third-generation cephalosporins like **Cefotaxime (CTX)**.
- **Carbapenem-Resistant Enterobacteriaceae (CRE):** *Klebsiella pneumoniae* demonstrates a **Meropenem (MEM)** susceptibility of only **73%**, implying a **27% prevalence rate of CRE/CRKP**.



# Salient Features of the Antibigram



## The Most Resistant "Bugs" (Pathogens)

- **1. *Acinetobacter baumannii* (Critical Threat)**
- This is visually and statistically the most drug-resistant pathogen in the facility. It displays near-total pan-drug resistance across all 200 patients tested:
- **0%** susceptibility to **Aztreonam** and **Colistin**.
- **5%** susceptibility to **Meropenem** and **6%** to **Imipenem** (Extremely high carbapenem resistance).
- **6%** susceptibility to Aminoglycosides (**Amikacin**) and Cefepime.
- *Only Minocycline (MNO) retains any modest activity at 24% susceptibility [2].*
- **2. *Klebsiella pneumoniae***
- A highly problematic Gram-negative pathogen showing deep resistance to broad-spectrum combinations:
- **0%** susceptibility to **Fosfomycin**.
- **37%** susceptibility to **Cefoxitin** and **43%** to **Cefotaxime**.
- **49%** susceptibility to the advanced beta-lactamase inhibitor combination **Ceftazidime/Avibactam (CZA)**.
- **3. *Enterococcus faecium***
- Compared to *Enterococcus faecalis*, *E. faecium* shows classic high-level resistance patterns:
- **13%** susceptibility to **Ampicillin**.
- **8%** susceptibility to **Erythromycin** and **0%** to **Fosfomycin**.
- **12% Vancomycin Resistance (VRE) rate (88% susceptibility)**



# WHO Global Priority List of Antibiotic-Resistant Bacteria

## July 2025 to June 2026

| Priority | Organism                 | Antibiotic results                        | Number (%)        |
|----------|--------------------------|-------------------------------------------|-------------------|
| Critical | Acinetobacter spp.       | Carbapenem resistance                     | 194/209 (93%)     |
|          | Pseudomonas aeruginosa   | Carbapenem resistance                     | -                 |
|          | Escherichia coli         | Cefotaxime-resistant                      | 1,305/1,805 (72%) |
|          | Escherichia coli         | Ceftriaxone-resistant                     | 139/181 (77%)     |
|          | Escherichia coli         | Meropenem-resistant                       | 226/1,833 (12%)   |
| High     | Enterococcus faecium     | Vancomycin-resistant                      | 9/89 (10%)        |
|          | Staphylococcus aureus    | Methicillin-resistant (MRSA)              | 320/636 (50%)     |
|          | Staphylococcus aureus    | Vancomycin-resistant                      | 0/531 (0%)        |
|          | Staphylococcus aureus    | Vancomycin-intermediate                   | 0/531 (0%)        |
|          | Helicobacter pylori      | Clarithromycin-resistant                  | -                 |
|          | Campylobacter spp.       | Fluoroquinolone-resistant                 | -                 |
|          | Salmonella spp.          | Fluoroquinolone-resistant (Ciprofloxacin) | 20/45 (44%)       |
|          | Neisseria gonorrhoeae    | Third generation cephalosporin-resistant  | -                 |
|          | Neisseria gonorrhoeae    | Fluoroquinolone-resistant                 | -                 |
|          | Streptococcus pneumoniae | Penicillin non-susceptible                | 2/7 (29%)         |
| Medium   | Haemophilus influenzae   | Ampicillin-resistant                      | 6/22 (27%)        |
|          | Shigella spp.            | Fluoroquinolone-resistant                 | -                 |



# Brief Summary and Pearls for Rational Use of Antibiotics

## Excellent Activity

Aminopenicillins + Beta Lactamase Inhibitors  
Extended Spectrum Penicillin's + Beta Lactamase Inhibitors  
Glycopeptides (Vanco, Teico)  
Streptogramins  
Linezolid  
Daptomycin



## Gram Positive Cocci



## Excellent Activity

Extended Spectrum Penicillin's + Beta Lactamase Inhibitors  
Carbapenems  
3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> G Cephalosporins  
Monobactams  
Aminoglycosides  
Colistin  
Quinolones



## Gram Negative Bacilli

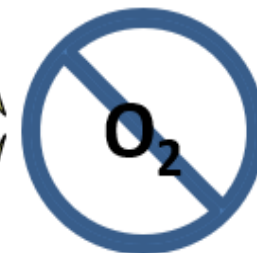


## Excellent Activity

Aminopenicillins + Beta lactamase Inhibitors  
Extended Spectrum Penicillin's + Beta Lactamase inhibitors  
Carbapenems  
Metronidazole  
Chloramphenicol



## Anaerobic bacteria



## Modest Activity

Natural Penicillin's  
Anti Staph Penicillin's  
Aminopenicillins  
Extended Spectrum Penicillin's  
Cephalosporins  
Rifamycin's (Rifampicin)  
Aminoglycosides (synergy)  
Macrolides (Erythromycin)  
Tetracyclines  
Clindamycin  
Sulfa Drugs  
Quinolones



## Modest Activity

Aminopenicillins  
Aminopenicillins + Beta Lactamase Inhibitors  
Extended Spectrum Penicillin's  
2G Cephalosporins  
Macrolides  
Tetracyclines  
Sulfa Drugs



## Modest Activity

Natural Penicillin's  
Aminopenicillins  
Extended Spectrum Penicillin's  
Some 2G Cephalosporins  
Vancomycin  
Tetracyclines  
Clindamycin  
Daptomycin



Reference: 1) Clinical and Laboratory Standards Institute M-100 S-24 [January 2014] 2) Antibiotic basics for Clinicians 2<sup>nd</sup> ed. Alan Hauser. Wolters Kluwer, Lippincott Williams and Wilkins 2013



# Antimicrobials with Anaerobic Coverage

| Beta Lactams                            | Classical Drugs                   |
|-----------------------------------------|-----------------------------------|
| Ampi – Sulbactam                        | Metronidazole                     |
| Amoxi – Clavulanate                     | Chloramphenicol                   |
| Pip – Tazobactam (Double AnO2 Coverage) | <b>Polymyxins</b>                 |
| Cefop - Sulbactam                       | Polymyxin                         |
| <b>Carbapenems:</b>                     | Colistin                          |
| • Imipenem                              | <b>Tetracyclines &amp; Others</b> |
| • Meropenem                             | Doxycycline                       |
| • Ertapenem                             | Minocycline                       |
| • Doripenem                             | Tetracycline                      |
| Cefotetan                               | Tigecycline                       |
| Cefoxitin                               | Clindamycin and Moxifloxacin      |



# Interpretive Reading Panels with Drug-Drug & Drug-Bug



Among Enterobacteriaceae Members: ©Dr Sumit Rai

On the lines of Appendix G [Table G3; M100:S35], But May Include in M2

|   | PATTERN                                                                                                             | INTERPRETATION                                                                                                          |
|---|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1 | Synergism between Ctx/Ctr & Pip/Tazo or Any Synergism b/w 3GC & Any BI/BLI. Irrespective of >5mm↑ of 3GC & 3GC/Clav | Possible ESBL Production (Ctx being substrate for CTX-M; the most common ESBL); <b>Doesn't mean AmpC is Not Present</b> |
| 2 | Enhancement of Zone of Ctx or Caz with addition of Clav                                                             | ESBL Production [Classical rule] – <b>But if 3GC has No Zone –There are at least Two R Mechanisms</b>                   |
| 3 | R or I to Pip/Tazo, AMS, but S to Carbapenems                                                                       | Possible AmpC [or Hyper AmpC] with or without ESBL or low level carbapenamase production                                |
| 4 | D Zone in Pip/Tazo or AMS or 3GC due to induction by Imipenem                                                       | Possible Inducible AmpC beta lactamase, induced by Imipenem <b>[HECK-Yes]</b>                                           |
| 5 | Some Zone in Ctx/Ctr but No Zone in Ctx/Ctr+Clav irrespective of Fox S                                              | Possible Inducible AmpC beta lactamase [D zoning], induced by Clav / plamid AmpC [if No D zoning]                       |
| 6 | No Zone in Ctx: Meh...in Ctx/Ctr+Clav                                                                               | Single R Mech Cannot Totally Break a 3GC                                                                                |

Its Not Always the AmpC Hides the ESBL; ESBL's Also Hide the AmpC's



# Primary Testing Panel of Enterobacterales

With Special Word of CAUTION for HECK-Yes Bugs and AmpC Positive E coli and K pneumoniae  
[Hafnia alvei, Ent cloacae, Citrobacter freundii, Klebsiella aerogenes, Yersinia]

©Dr Sumit Rai: Presented at CLSI Symposium at MICROCON2025, New Delhi

| CLSI Tiers →            | Tier 2 | Tier 2    | Tier 2              | Tier 2               | Tier 1/2  |                 | Tier 1    | Tier 2 | Tier 2 | Tier 5? |
|-------------------------|--------|-----------|---------------------|----------------------|-----------|-----------------|-----------|--------|--------|---------|
|                         | Imi    | Amox-Clav | Cefepime With MIC's | Fox<br>©Dr Sumit Rai | Ctx / Ctr | Ctx+CA / Ctr+CA | Pip/ Tazo | CZA    | Atm    | Temo    |
| Therapeutic Disc        |        |           |                     |                      |           |                 |           | 15     | mm     |         |
| Diagnostic Disc/Cascade |        |           |                     |                      |           |                 |           | 15     | mm     |         |

These Discs May Not Be Used / Avoided for Therapeutic Use as they are Strong Inducers of AmpC Beta Lactamases [Imipenem & Amox/Clav]; Ctx/CA & Ctr/CA are used for ESBL & Temocillin are used for Oxacillinase detection resp

Cefepime with MIC of 1 and above, One may check for ESBL Production. Despite in "S" range, it may be avoided

Any Resistance to 3GC indicates ESBL or AmpC or Both. Susceptibility to 3GC May Indicate Repressed AmpC, in which case look as Fox resistance, but there are Fox susceptible AmpC as well

- All QC should be Flawless – With KBDD: Daily QC
- There are Fox Susceptible AmpC [ACC]; So Fox S shouldn't imply – No AmpC's



# Intrinsic and Associated Resistance to Antimicrobial Agents Among MDR Pathogens



| Bacteria                                               | Intrinsic Resistance                                                                                                                                         | Associated Resistance                                                                                                                                             |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MRSA [Methicillin Resistance<br>Staphylococcus aureus] | All beta-lactams, beta-lactam/beta-lactamase inhibitor combinations. This is NOT same as Beta Lactamase production (except Ceftaroline and Ceftobiprole)     | Common: erythromycin, clindamycin, aminoglycosides, cotrimoxazole, Fluoroquinolones                                                                               |
| VRE fm (vancomycin-resistant Enterococcus faecium)     | Glycopeptides, cotrimoxazole, clindamycin, aminoglycosides (conventional doses)                                                                              | Common: ampicillin, carbapenems, fluoroquinolones, high level aminoglycoside resistance                                                                           |
| ESBL-positive Enterobacteriaceae                       | All cephalosporins including third generation cephalosporins, (variable activity against fourth generation cephalosporins), all penicillin's and monobactams | Common: fluoroquinolones, aminoglycosides, cotrimoxazole                                                                                                          |
| CRE [Carbapenem Resistant Enterobacteriaceae]          | All beta-lactams including carbapenem (except aztreonam, unless concomitant ESBL gene present)                                                               | Common: fluoroquinolones, aminoglycosides, cotrimoxazole<br>Associated resistance to aztreonam is associated with other co-existing enzymes (AmpC beta-lactamase) |
| CRAB [Carbapenem-resistant A. baumannii]               | All beta-lactams including carbapenem (except monobactam)                                                                                                    | Common: fluoroquinolones, aminoglycosides, cotrimoxazole                                                                                                          |

|                      | Lungs / ELF | Kidneys | Bladder & Urine | Abdomen | Bone & Joints       | CNS   | Skin/Sof t Tissues | Serum/ Plasma | Bile / GB |
|----------------------|-------------|---------|-----------------|---------|---------------------|-------|--------------------|---------------|-----------|
| BL; BL/BLI Carba     |             |         |                 |         |                     | Ctr   |                    |               |           |
| Aminoglyco sides     |             |         |                 |         |                     |       |                    |               |           |
| Fluoroquin olones    |             |         |                 |         |                     |       |                    |               |           |
| Tetracyc lines / TGC |             |         |                 |         |                     |       |                    |               |           |
| Glyco Peptides       |             |         |                 |         | Created & Copyright |       |                    |               |           |
| Sulpha Drugs         |             |         |                 |         | Dr Sumit Rai, AIIMS |       |                    |               |           |
| Chloram phenicol     |             |         |                 |         |                     |       |                    |               |           |
| Macrolides           |             |         |                 |         |                     |       |                    |               |           |
| Linezolid            |             |         |                 |         |                     |       |                    |               |           |
| Polymyx B            |             |         |                 |         |                     |       |                    |               |           |
| Colistin             |             |         |                 |         |                     |       |                    |               |           |
| Clinda               |             |         |                 |         |                     |       |                    |               |           |
| Rifampicin           |             |         |                 |         |                     |       |                    |               |           |
| Metro                |             |         |                 |         |                     |       |                    |               |           |
| Fosfomycin           | combo       |         |                 | combo   | combo               | combo | combo              | combo         | combo     |
| Daptomycin           |             |         |                 |         |                     |       |                    |               |           |



AIIMS Mangalagiri

### Legend

Good Abx Conc Reached

Average Conc Use in Combination

Poor Concentration Ineffective

Time Dependent Drugs

Conc Dependent Drugs

AUC/MIC Not Clear

### References

- Mandell
- Goodman Gillman
- Victor Lorian
- Kucers
- PubMed

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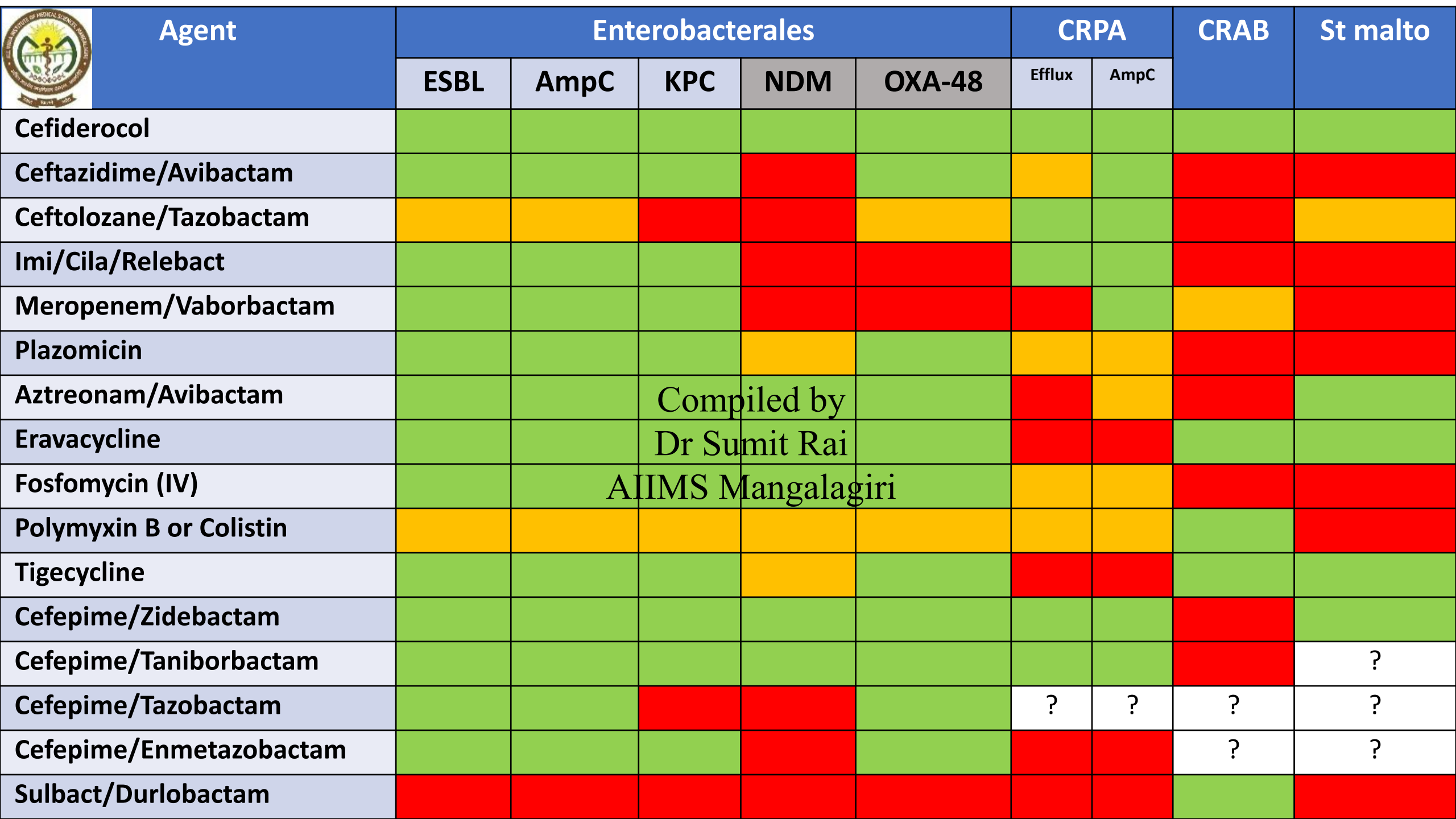
| Which Antibiotic NOT to Report in Which Specimen and Patient Type: Few Examples |                                                                                                                                                                               |
|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SITE / PATIENT                                                                  | WHAT ANTIBIOTIC NOT TO REPORT in A.S.T.                                                                                                                                       |
| Blood                                                                           | Tigecycline (High Vd: Doesn't Stay in Blood)                                                                                                                                  |
| CSF [Table 1B, M100]                                                            | 1 <sup>st</sup> 2 <sup>nd</sup> GC & Cephameycins, Colistin, Oral Agents, Doripenem, Ertapenem, Imipenem, Clindamycin, Lefamulin, Macrolides, Tetracyclines, Fluoroquinolones |
| Abscesses                                                                       | Aminoglycosides (& Never for AnO2 Infections & Salmonella / Shigella)                                                                                                         |
| Lungs                                                                           | Daptomycin ©Dr Sumit Rai                                                                                                                                                      |
| Urine                                                                           | Macrolides, Tigecycline, Chloramphenicol, Clindamycin                                                                                                                         |
| Children                                                                        | Fluoroquinolones, Tetracyclines, Chloram, Cotrimoxazole (Infants)                                                                                                             |
| Pregnancy                                                                       | Tetracyclines, Fluoroquinolones, Aminoglycosides, Metronidazole                                                                                                               |

| Which Antibiotic to Report for Specific Sites Only: Few Examples |                                                  |
|------------------------------------------------------------------|--------------------------------------------------|
| ANTIBIOTIC                                                       | TO BE REPORTED FOR SPECIFIC SITE ONLY            |
| Tigecycline                                                      | Complicated Skin and Soft Tissue Infections ONLY |
| Nitrofurantoin                                                   | Lower UTI                                        |
| Fosfomycin                                                       | Lower UTI (E coli & E. fecalis)                  |
| Beta Lactams                                                     | NOT For Lower UTI                                |



## Particular Bug-Drug Combination Inappropriate for a Given Site of Infection (Despite $\geq 1$ BMQ)

| SITE / PATIENT       | WHAT ANTIBIOTIC <b>NOT</b> TO REPORT in A.S.T.                                                                                                                               |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Blood                | Tigecycline [High Volume of Distribution]                                                                                                                                    |
| CSF [Table 1B, M100] | 1 <sup>st</sup> 2 <sup>nd</sup> GC & Cephamycins, Colistin, Oral Agents, Doripenem, Ertapenem, Imipenem, Clindamycin, Lefamulin, Macrolides, Tetracyclines, Fluoroquinolones |
| Abscesses            | Aminoglycosides (& Never for AnO2 Infections & Salmonella / Shigella)                                                                                                        |
| Lungs                | Daptomycin                                                                                                                                                                   |
| Urine                | Macrolides, Tigecycline, Chloramphenicol, Clindamycin                                                                                                                        |
| Beta Lactams         | Lower UTI                                                                                                                                                                    |





## Beta-lactam Antibiotic Cross-Allergy Chart

| Beta-lactams  | AMOXICILLIN*   | AMPICILLIN     | CLOXACILLIN    | PENICILLIN     | PIPERACILLIN*  | CEFADROXIL     | CEFAZOLIN | CEPHALEXIN     | CEFOXITIN      | CEFTROZIL      | CEFUROXIME     | CEFIXIME       | CEFOTAXIME     | CEFTAZIDIME    | CEFTRIAXONE    | CEFEPIME       | ERTAPENEM      | IMIPENEM       | MEROPENEM      |
|---------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| AMOXICILLIN*  |                | X <sup>1</sup> | X <sup>5</sup> | X <sup>4</sup> | X <sup>3</sup> | X <sup>1</sup> | ✓         | X <sup>1</sup> | ✓              | X <sup>2</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| AMPICILLIN    | X <sup>1</sup> |                | X <sup>5</sup> | X <sup>4</sup> | X <sup>3</sup> | X <sup>2</sup> | ✓         | X <sup>2</sup> | ✓              | X <sup>2</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CLOXACILLIN   | X <sup>5</sup> | X <sup>5</sup> |                | X <sup>5</sup> | X <sup>5</sup> | ✓              | ✓         | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| PENICILLIN    | X <sup>4</sup> | X <sup>4</sup> | X <sup>5</sup> |                | X <sup>5</sup> | ✓              | ✓         | ✓              | X <sup>3</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| PIPERACILLIN* | X <sup>3</sup> | X <sup>3</sup> | X <sup>5</sup> | X <sup>5</sup> |                | X <sup>3</sup> | ✓         | X <sup>3</sup> | ✓              | X <sup>3</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CEFADROXIL    | X <sup>1</sup> | X <sup>2</sup> | ✓              | ✓              | X <sup>3</sup> |                | ✓         | X <sup>1</sup> | ✓              | X <sup>2</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CEFAZOLIN     | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |           | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CEPHALEXIN    | X <sup>1</sup> | X <sup>2</sup> | ✓              | ✓              | X <sup>3</sup> | X <sup>1</sup> | ✓         |                | ✓              | X <sup>2</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CEFOXITIN     | ✓              | ✓              | ✓              | X <sup>3</sup> | ✓              | ✓              | ✓         | ✓              |                | ✓              | X <sup>2</sup> | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CEFTROZIL     | X <sup>2</sup> | X <sup>2</sup> | ✓              | ✓              | X <sup>3</sup> | X <sup>2</sup> | ✓         | X <sup>2</sup> | ✓              |                | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |
| CEFUROXIME    | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | X <sup>2</sup> | ✓              |                | X <sup>3</sup> | X <sup>1</sup> | X <sup>3</sup> | X <sup>1</sup> | X <sup>2</sup> | ✓              | ✓              | ✓              |
| CEFIXIME      | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | X <sup>3</sup> |                | X <sup>3</sup> | X <sup>3</sup> | X <sup>3</sup> | X <sup>3</sup> | ✓              | ✓              | ✓              |
| CEFOTAXIME    | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | X <sup>1</sup> | X <sup>3</sup> |                | X <sup>3</sup> | X <sup>1</sup> | X <sup>1</sup> | ✓              | ✓              | ✓              |
| CEFTAZIDIME   | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | X <sup>3</sup> | X <sup>3</sup> | X <sup>3</sup> |                | X <sup>3</sup> | X <sup>3</sup> | ✓              | ✓              | ✓              |
| CEFTRIAXONE   | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | X <sup>1</sup> | X <sup>3</sup> | X <sup>1</sup> | X <sup>3</sup> |                | X <sup>1</sup> | ✓              | ✓              | ✓              |
| CEFEPIME      | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | X <sup>2</sup> | X <sup>3</sup> | X <sup>1</sup> | X <sup>3</sup> | X <sup>1</sup> |                | ✓              | ✓              | ✓              |
| ERTAPENEM     | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              |                | X <sup>5</sup> | X <sup>5</sup> |
| IMIPENEM      | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | X <sup>5</sup> |                | X <sup>5</sup> |
| MEROPENEM     | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓         | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | ✓              | X <sup>5</sup> | X <sup>5</sup> |                |

\* Also applies to beta-lactamase inhibitor combinations (amoxicillin-clavulanate and piperacillin-tazobactam)

### AVOID ALL beta-lactam antibiotics if:

- ICU admission related to allergy
- Delayed beta-lactam antibiotic allergy causing:
  - interstitial nephritis
  - hepatitis
  - hemolytic anemia
- Delayed severe skin allergic reactions:
  - Stevens-Johnson syndrome
  - toxic epidermal necrolysis
  - exfoliative dermatitis
  - acute generalized exanthematous pustulosis (AGEP)
  - drug reaction with eosinophilia and systemic symptoms (DRESS)

### LEGEND:

|                |                                                                                             |
|----------------|---------------------------------------------------------------------------------------------|
|                | Penicillins                                                                                 |
|                | 1st Generation Cephalosporins                                                               |
|                | 2nd Generation Cephalosporins                                                               |
|                | 3rd Generation Cephalosporins                                                               |
|                | 4th Generation Cephalosporins                                                               |
|                | Carbapenems                                                                                 |
| ✓              | Different structure.<br>CONSIDERED SAFE TO PRESCRIBE                                        |
|                | Reaction likely based on side chain:                                                        |
| X <sup>1</sup> | Same side chain - clinical evidence of cross reaction.<br>DO NOT PRESCRIBE                  |
| X <sup>2</sup> | Same side chain - Theoretical risk of cross reaction, no clinical studies. DO NOT PRESCRIBE |
| X <sup>3</sup> | Similar side chain - Potential for cross reaction.<br>DO NOT PRESCRIBE                      |
|                | Reaction likely based on Beta-lactam ring:                                                  |
| X <sup>4</sup> | Clinical evidence of cross reaction.<br>DO NOT PRESCRIBE                                    |
| X <sup>5</sup> | Theoretical risk of cross reaction, no clinical studies.<br>DO NOT PRESCRIBE                |

FIGURE 1. Beta-lactam cross-allergy chart.

Source: Interior Health Authority.



# Beta-lactam Side Chains and Cross-reactivity Handout



- **Cross-reactivity between penicillins, cephalosporins, carbapenems, and monobactams is not a class effect.**
  - Contemporary data indicates the R1 sidechain on cephalosporins and monobactams and the R sidechain on penicillins are the antigenic component responsible for cross-reactivity.
  - All carbapenems have dissimilar sidechains to other beta-lactams and are not cross-reactive.
  - The table identifies penicillins and cephalosporins that share identical side chains and known cross-reactivity unrelated to sidechains between natural penicillins (penicillin, amoxicillin, ampicillin).
- **Cross-reactivity risk between penicillins and cephalosporins with the same side chain**
  - History of Type I hypersensitivity (immediate, anaphylaxis) = 40%
  - History of Type IV hypersensitivity (delayed, dermatologic) = 20%
- **Cephalosporin-penicillin cross-reactivity nuance**
  - There are two important cephalosporin-penicillin sidechain pairs: cefadroxil-amoxicillin and cephalexin-ampicillin. There is little clinical data about the risk of cross-reactivity between these two pairs as well as between penicillin, cefadroxil, and cephalexin. One large database study found no increased risk of hypersensitivity reactions between ampicillin-cephalexin compared to a TMP/SMX control.
  - A more conservative approach is to avoid the use of cefadroxil and cephalexin due to known cross-reactivity between penicillin, amoxicillin, and ampicillin. The ideal approach is to perform an oral amoxicillin challenge prior to initiation of cefadroxil and cephalexin. When an oral amoxicillin challenge is not possible, use shared decision making which weighs the advantages of cheap high-bioavailable oral cephalosporins (cefadroxil, cephalexin) against the disadvantages of 2nd and 3rd generation cephalosporins and non-beta-lactams.
  - Cefazolin does not share a sidechain with any penicillins or cephalosporins available in the US and can be used in patients with a history of beta-lactam allergy regardless of symptoms.
  - There is no data about the risk of cross-reactivity between or among nafcillin, piperacillin, and cephalosporins. Use shared decision making and/or reach out to Antimicrobial Stewardship for assistance.
- **Penicillins and Cephalosporins Key Clinical Studies**
  - 252 patients with immediate (Type I) hypersensitivity to a penicillin-based antibiotic underwent cephalosporin skin and ImmunoCAP testing. 99 (39%) also reacted to a cephalosporin. 95 (38%) reacted to cephalosporin with an identical sidechain to a penicillin antibiotic (cefaclor, cephalexin, cefadroxil, cefamandole). Only 4/252 (1.5%) patients reacted to cephalosporins that have dissimilar sidechains to penicillin-based antibiotics (ceftriaxone, cefuroxime, cefotaxime).
  - 214 patients with history of delayed (Type IV) hypersensitivity, including SJS/TEN, to penicillin underwent skin testing with six beta lactams, three with similar side chains to penicillins, and three with dissimilar side chains. Cross-reactivity was found in 40 (19%) of patients; all reactions were from the three cephalosporins with the same sidechains as penicillin derivatives. Cefaclor and cephalexin have the same sidechain as ampicillin and resulted in positive skin tests in 39 and 31 patients respectively. Cefadroxil has the same sidechain as amoxicillin and resulted in positive skin tests in 17 patients.
  - Note: patient with hypersensitivity reactions to beta-lactams with dissimilar sidechains likely represent a second hypersensitivity, not cross-reactivity.

References 1. 2. 3. 4. 5. 6. 7. 8. Romano A, Valluzzi RL, Caruso C, Maggioletti M, Quaratino D, Gaeta F. Cross-Reactivity and Tolerability of Cephalosporins in Patients with IgE-Mediated Hypersensitivity to Penicillins. J Allergy Clin Immunol Pract 2018; 6(5): 1662-72. Romano A, Gaeta F, Valluzzi RL, Maggioletti M, Caruso C, Quaratino D. Cross-reactivity and tolerability of aztreonam and cephalosporins in subjects with a T cell-mediated hypersensitivity to penicillins. J Allergy Clin Immunol 2016; 138(1): 179-86. Gaeta F, Valluzzi RL, Alonzi C, Maggioletti M, Caruso C, Romano A. Tolerability of aztreonam and carbapenems in patients with IgE-mediated hypersensitivity to penicillins. J Allergy Clin Immunol 2015; 135(4): 972-6. Romano A, Gaeta F, Valluzzi RL, et al. Absence of cross-reactivity to carbapenems in patients with delayed hypersensitivity to penicillins. Allergy 2013; 68(12): 1618-21. Macy E, Crawford WW, Nguyen MT, Adams JL, McGlynn EA, McCormick TA. Population-Based Incidence of New Ampicillin, Cephalexin, Cefaclor, and Sulfonamide Antibiotic "Allergies" in Exposed Individuals with and without Preexisting Ampicillin, Cephalexin, or Cefaclor "Allergies". J Allergy Clin Immunol Pract 2022; 10(2): 550-5. Macy E, Contreras R. Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study. J Allergy Clin Immunol 2014; 133(3): 790-6. Sousa-Pinto B, Blumenthal KG, Courtney L, Mancini CM, Jeffres MN. Assessment of the Frequency of Dual Allergy to Penicillins and Cefazolin: A Systematic Review and Meta-analysis. JAMA Surg 2021; 156(4): e210021. Jeffres MN, Hall-Lipsy EA, King ST, Cleary JD. Systematic review



# Coombs and Gell's Hypersensitivity Classification



Immediate  
(allergy)

Type I

IgE mediated

Anaphylaxis  
(urticarial rash,  
pruritus, flushing,  
angioedema)

Immediate or  
Delayed

Type II

IgG mediated  
cell destruction

Hemolytic anemia,  
thrombocytopenia  
neutropenia

Delayed  
(hypersensitivity)

Type III

IgG:drug immune  
complex deposition/  
complement activation

Serum sickness,  
vasculitis, drug fever

Type IV

T cell mediated

IVa – macrophages – contact dermatitis  
IVb – eosinophils – maculopapular rash  
IVc – T cells – contact dermatitis  
IVd – neutrophils - SJS, TEN, DIHS

Rare

Ig = immunoglobulin; SJS = Stevens Johnson Syndrome; TEN = Toxic Epidermal Necrolysis; DIHS = drug-induced hypersensitivity symptoms

# ESBL – Enterobacterales Infections\* IDSA 2026 ©Dr Sumit Rai

**Interpretive Reading: Ctx~12-18, Ctx/CA~20-30, PT is S, AMS is S, Carba [Imi, Mero both are S]**

|                      | Nitro                     | Cotri                                                                                     | Cipro        | Levo         | Carba                                        | Amg               | Gent                                                                                                    | Fos                   | AMC                                                                                                                             | Dox                                                                          | P/T                                                                                                                               | Fep                                                                        |
|----------------------|---------------------------|-------------------------------------------------------------------------------------------|--------------|--------------|----------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Lower UTI / Cystitis | DOC@<br><b>Urease +ve</b> | DOC if S                                                                                  | Alt DOC if S | Alt DOC if S | Alt DOC 1hr Infus                            | Single shot Amika | <b>Only Useful in Enterobacterales and that too in Combination Therapy</b><br>Copyright of Dr Sumit Rai | CR E. coli Only       | <b>Despite showing In – Vitro Susceptibility, Amox – Clav is Not likely to work in ESBL infections. Not recommended by IDSA</b> | <b>Primarily Eliminated though Intestinal Tract. Not recommended by IDSA</b> | <b>PK/PD Posology of Extd Infusion preceded by Conc Dep Abx like Amika. 4.5gm q8hrly 4 hr EI. IDSA Not Sure About Monotherapy</b> | May Work                                                                   |
| Upper UTI / cUTI     |                           | DOC if S                                                                                  | DOC if S     | DOC if S     | 3hr Extd Infus                               | Alt in ? Combo    |                                                                                                         |                       |                                                                                                                                 |                                                                              |                                                                                                                                   |                                                                            |
| BSI                  |                           | Oral Stepdown Options from Carba, if S, Pt Stable, Source Ctrl, Intestinal Absorp is Good |              |              | Mero DOC. If Alb Levels Good: Ertapenem OPAT | Ak+PT PK/PD Dose  |                                                                                                         | CR E. coli MIC<8      |                                                                                                                                 |                                                                              |                                                                                                                                   | <b>Drug of Choice for AmpC Positive Enterobacterales: HECK – Yes Group</b> |
| Chr Bact Prost       |                           | DOC if S                                                                                  | DOC if S     | DOC if S     |                                              | No role           |                                                                                                         | Alt Rx if E.coli Only |                                                                                                                                 |                                                                              |                                                                                                                                   |                                                                            |
| SSTI, cIAI, BJI      |                           | Oral Stepdown Options from Carba, if S, Pt Stable, Source Ctrl, Intestinal Absorp is Good |              |              | High Inocul Infect                           | Ak+PT Low Inocul  |                                                                                                         |                       |                                                                                                                                 |                                                                              |                                                                                                                                   |                                                                            |

**Nitro-** 1) Avoid in Urease Pos Organisms, 2) Only Lower UTI; **Fosfo-** 1) Only Lower UTI E.coli; **Pip/Tazo-** 1) Use PK/PD Dosing's AND with Amika as Carba Sparing Option for Low Inoculum ESBL-E or High Inoculum with Drainage/Debridement [Flaw of MERINO Trial]

**Red:** Do Not Use; **Green:** Usual Drug of Choice or Good Alternative; **Yellow / Orange:** May be used on PK/PD Dosing / Clinical Judgement



# CENSUS

## Dept of Clinical Microbiology

### July 2025 to June 2026

# **Bacteriology Census Report**

## **(July 2025 – June 2026)**

*In Charge: Dr Sumit Rai, Dr Debabrata Dash, Dr Lonika Lodha*  
*Department of Clinical Microbiology*  
*AIIMS Mangalagiri*

# Executive Summary & Total Workload

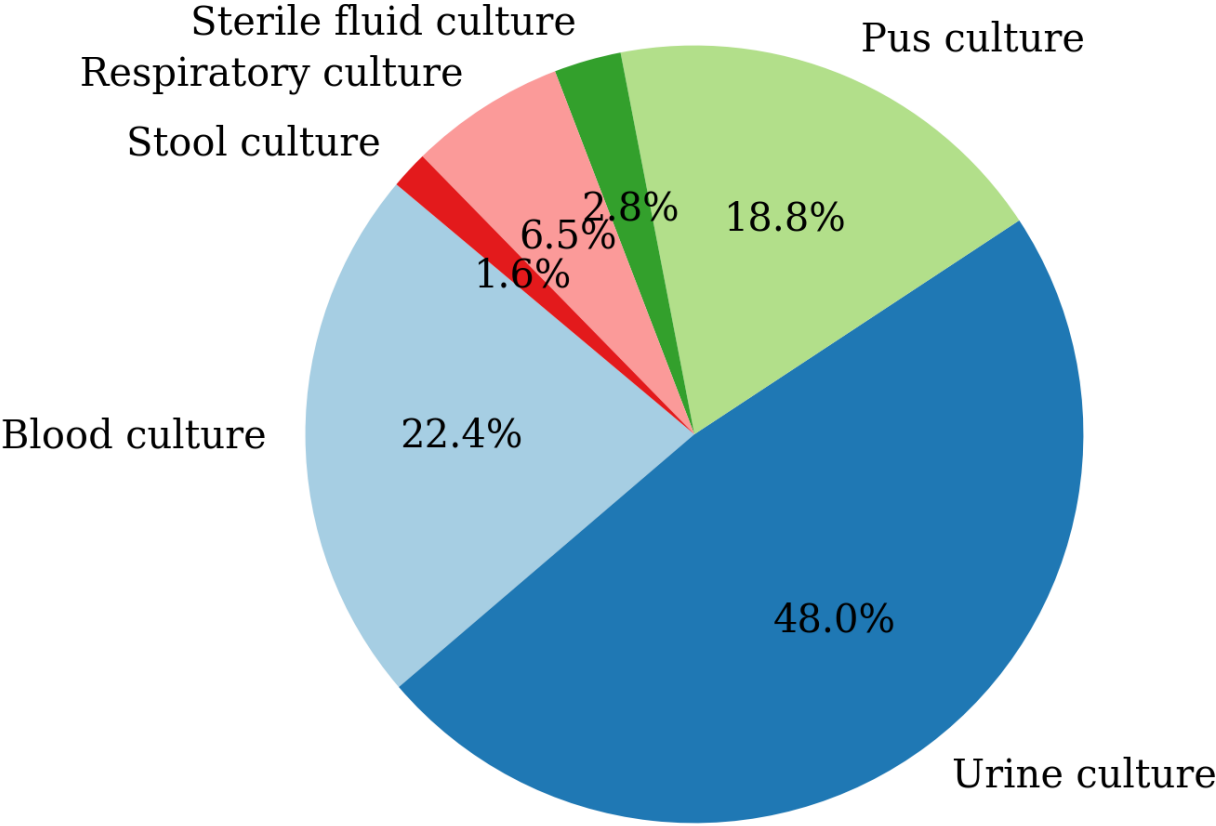
## Total Cultures Processed

| Total Culture | OPD    | IPD    | Avg / Month |
|---------------|--------|--------|-------------|
| 49,951        | 20,978 | 28,973 | 4,163       |

## Specimen-wise Distribution Breakdown

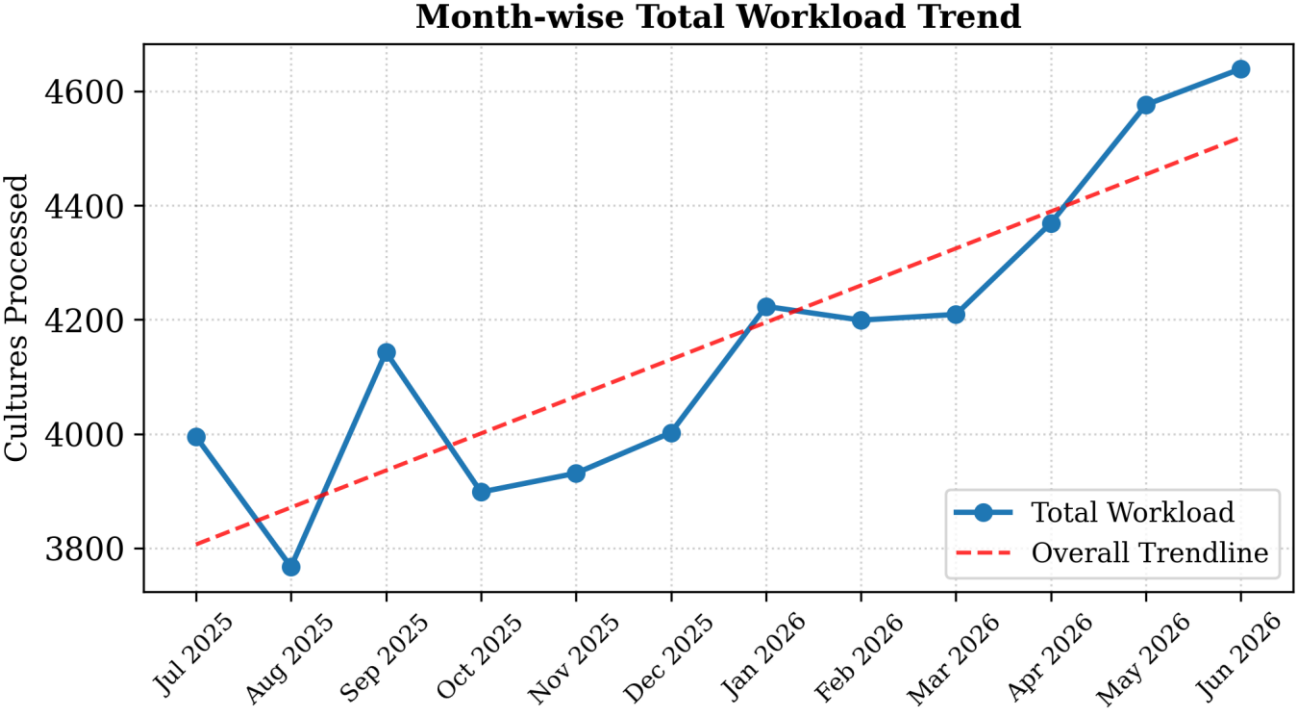
| Specimen              | OPD    | IPD    | Total  |
|-----------------------|--------|--------|--------|
| Blood culture         | 1,195  | 9,982  | 11,177 |
| Urine culture         | 16,686 | 7,294  | 23,980 |
| Pus culture           | 2,128  | 7,247  | 9,375  |
| Sterile fluid culture | 30     | 1,365  | 1,395  |
| Respiratory culture   | 743    | 2,497  | 3,240  |
| Stool culture         | 196    | 588    | 784    |
| TOTAL                 | 20,978 | 28,973 | 49,951 |

## Overall Specimen Distribution



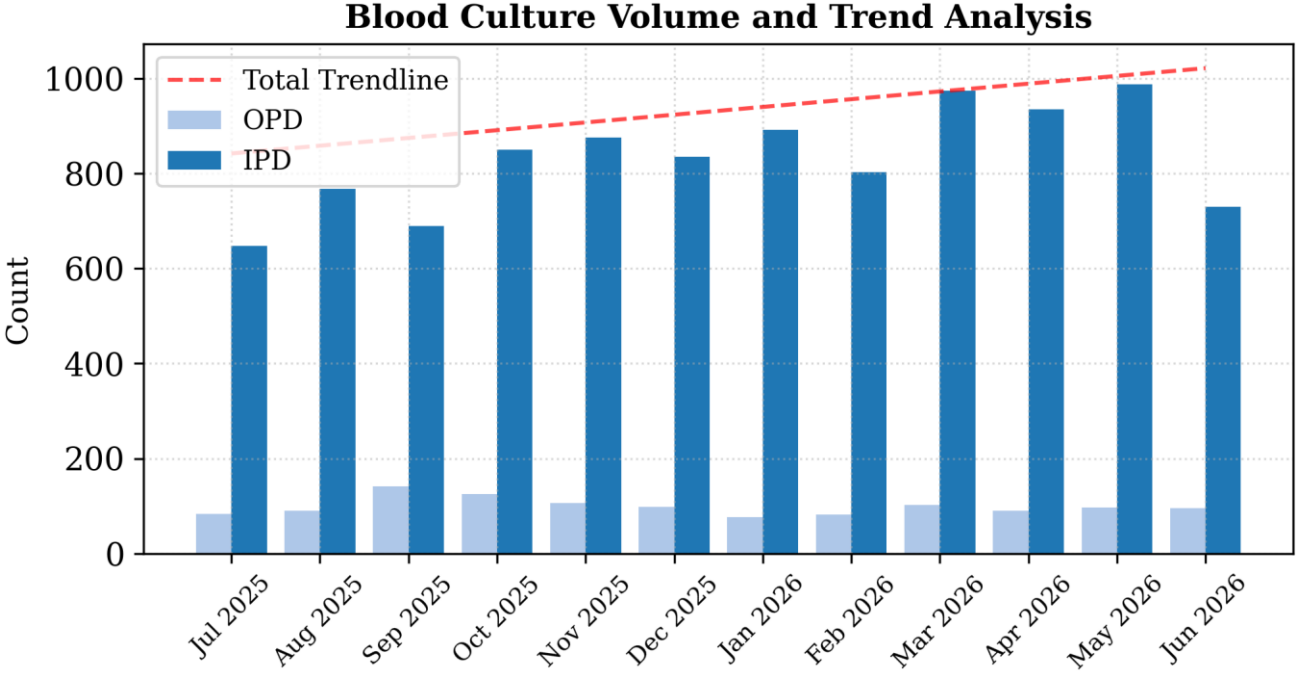
# Month-wise Overall Workload Analysis

| Month    | OPD   | IPD   | Total |
|----------|-------|-------|-------|
| Jul 2025 | 1,640 | 2,355 | 3,995 |
| Aug 2025 | 1,626 | 2,141 | 3,767 |
| Sep 2025 | 1,950 | 2,193 | 4,143 |
| Oct 2025 | 1,430 | 2,468 | 3,898 |
| Nov 2025 | 1,645 | 2,286 | 3,931 |
| Dec 2025 | 1,572 | 2,430 | 4,002 |
| Jan 2026 | 1,616 | 2,607 | 4,223 |
| Feb 2026 | 1,693 | 2,506 | 4,199 |
| Mar 2026 | 1,572 | 2,637 | 4,209 |
| Apr 2026 | 2,015 | 2,354 | 4,369 |
| May 2026 | 2,007 | 2,569 | 4,576 |
| Jun 2026 | 2,212 | 2,427 | 4,639 |



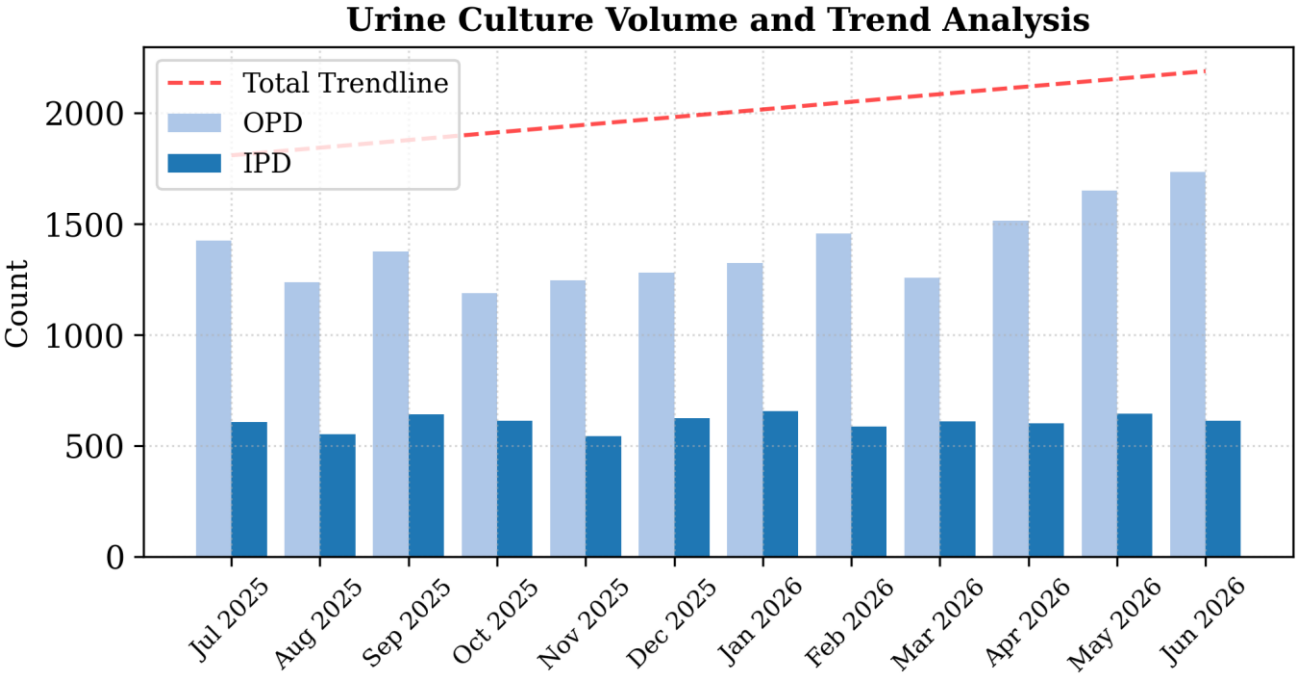
# Detailed Analysis: Blood Culture

| Month    | OPD   | IPD   | Total  |
|----------|-------|-------|--------|
| Jul 2025 | 84    | 647   | 731    |
| Aug 2025 | 91    | 768   | 859    |
| Sep 2025 | 142   | 689   | 831    |
| Oct 2025 | 126   | 850   | 976    |
| Nov 2025 | 107   | 875   | 982    |
| Dec 2025 | 99    | 835   | 934    |
| Jan 2026 | 77    | 892   | 969    |
| Feb 2026 | 82    | 802   | 884    |
| Mar 2026 | 103   | 974   | 1077   |
| Apr 2026 | 91    | 934   | 1025   |
| May 2026 | 97    | 987   | 1084   |
| Jun 2026 | 96    | 729   | 825    |
| TOTAL    | 1,195 | 9,982 | 11,177 |



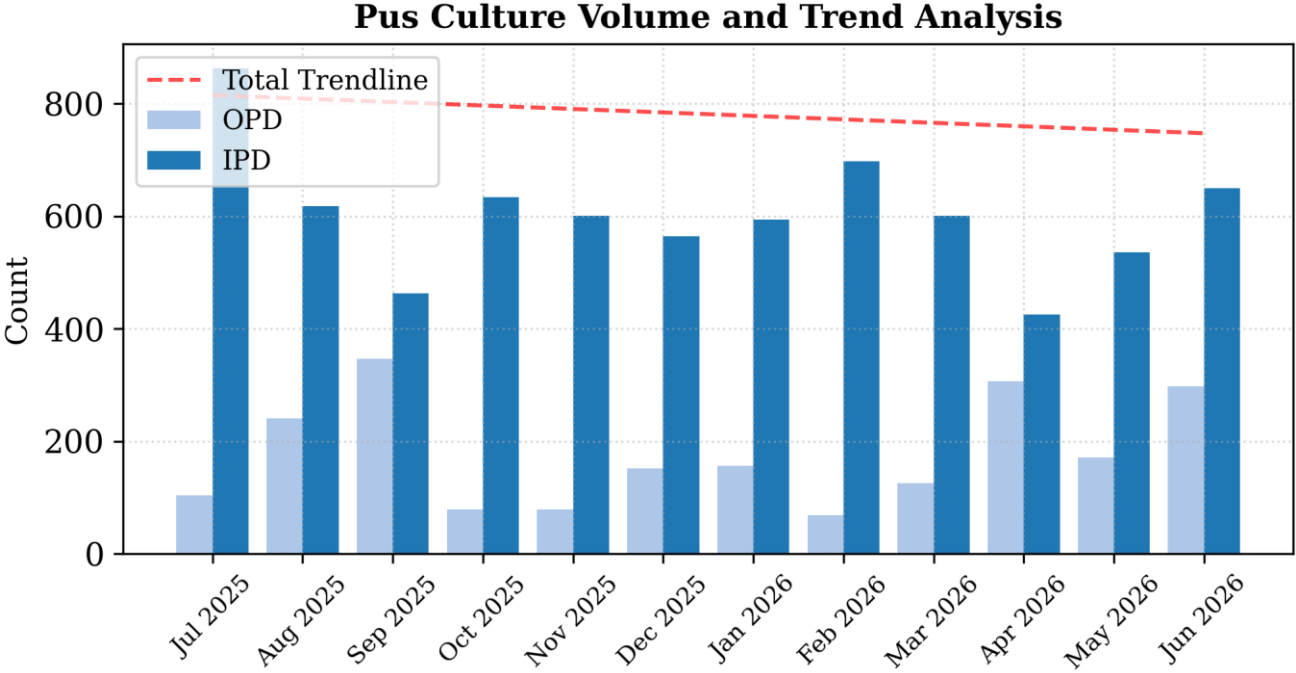
# Detailed Analysis: Urine Culture

| Month    | OPD    | IPD   | Total  |
|----------|--------|-------|--------|
| Jul 2025 | 1,424  | 606   | 2,030  |
| Aug 2025 | 1,238  | 553   | 1,791  |
| Sep 2025 | 1,377  | 643   | 2,020  |
| Oct 2025 | 1,188  | 612   | 1,800  |
| Nov 2025 | 1,245  | 544   | 1,789  |
| Dec 2025 | 1,279  | 624   | 1,903  |
| Jan 2026 | 1,324  | 656   | 1,980  |
| Feb 2026 | 1,456  | 587   | 2,043  |
| Mar 2026 | 1,256  | 609   | 1,865  |
| Apr 2026 | 1,515  | 602   | 2,117  |
| May 2026 | 1,651  | 646   | 2,297  |
| Jun 2026 | 1,733  | 612   | 2,345  |
| TOTAL    | 16,686 | 7,294 | 23,980 |



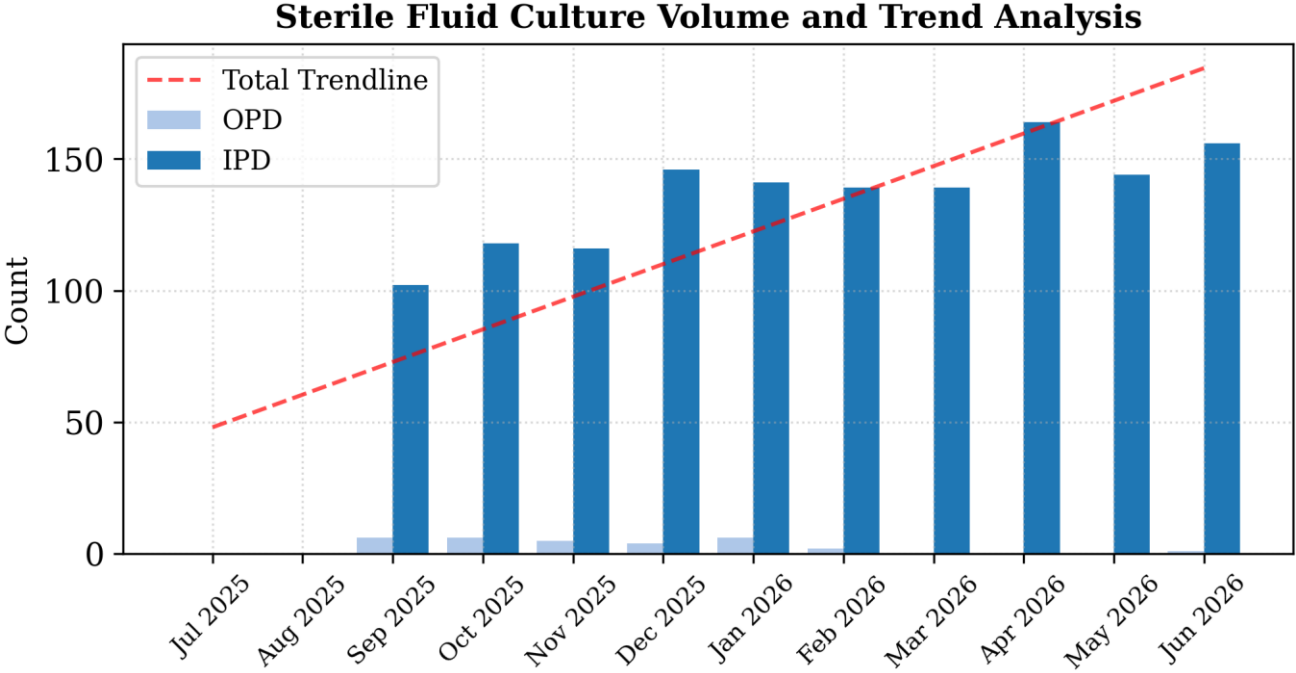
# Detailed Analysis: Pus Culture

| Month    | OPD   | IPD   | Total |
|----------|-------|-------|-------|
| Jul 2025 | 104   | 863   | 967   |
| Aug 2025 | 241   | 618   | 859   |
| Sep 2025 | 347   | 463   | 810   |
| Oct 2025 | 79    | 634   | 713   |
| Nov 2025 | 79    | 601   | 680   |
| Dec 2025 | 152   | 564   | 716   |
| Jan 2026 | 156   | 594   | 750   |
| Feb 2026 | 68    | 698   | 766   |
| Mar 2026 | 126   | 601   | 727   |
| Apr 2026 | 307   | 425   | 732   |
| May 2026 | 171   | 536   | 707   |
| Jun 2026 | 298   | 650   | 948   |
| TOTAL    | 2,128 | 7,247 | 9,375 |



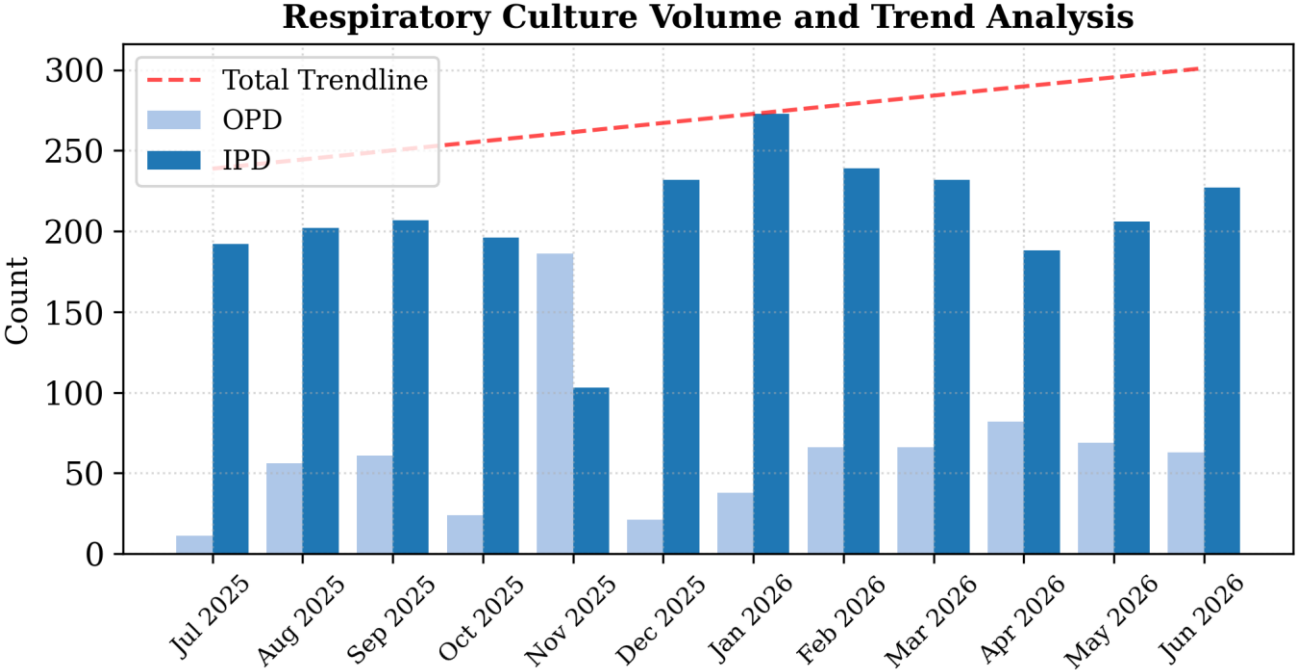
# Detailed Analysis: Sterile Fluid Culture

| Month    | OPD | IPD   | Total |
|----------|-----|-------|-------|
| Jul 2025 | 0   | 0     | 0     |
| Aug 2025 | 0   | 0     | 0     |
| Sep 2025 | 6   | 102   | 108   |
| Oct 2025 | 6   | 118   | 124   |
| Nov 2025 | 5   | 116   | 121   |
| Dec 2025 | 4   | 146   | 150   |
| Jan 2026 | 6   | 141   | 147   |
| Feb 2026 | 2   | 139   | 141   |
| Mar 2026 | 0   | 139   | 139   |
| Apr 2026 | 0   | 164   | 164   |
| May 2026 | 0   | 144   | 144   |
| Jun 2026 | 1   | 156   | 157   |
| TOTAL    | 30  | 1,365 | 1,395 |



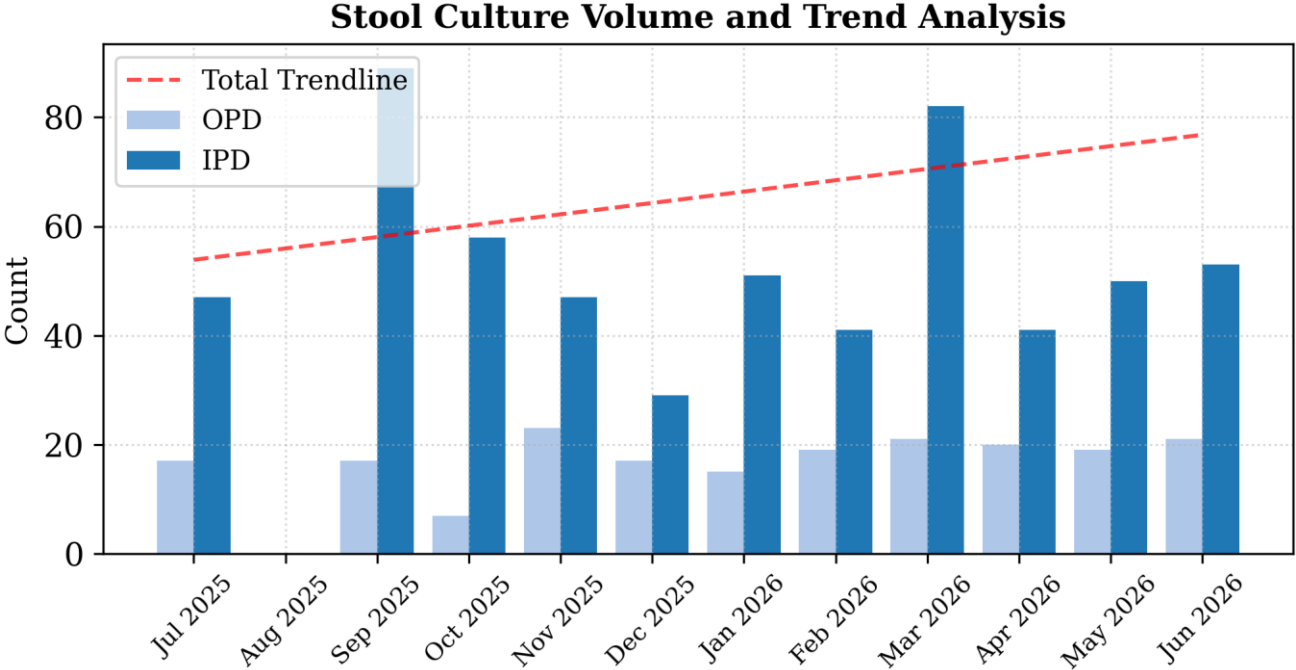
# Detailed Analysis: Respiratory Specimen Culture

| Month    | OPD | IPD   | Total |
|----------|-----|-------|-------|
| Jul 2025 | 11  | 192   | 203   |
| Aug 2025 | 56  | 202   | 258   |
| Sep 2025 | 61  | 207   | 268   |
| Oct 2025 | 24  | 196   | 220   |
| Nov 2025 | 186 | 103   | 289   |
| Dec 2025 | 21  | 232   | 253   |
| Jan 2026 | 38  | 273   | 311   |
| Feb 2026 | 66  | 239   | 305   |
| Mar 2026 | 66  | 232   | 298   |
| Apr 2026 | 82  | 188   | 270   |
| May 2026 | 69  | 206   | 275   |
| Jun 2026 | 63  | 227   | 290   |
| TOTAL    | 743 | 2,497 | 3,240 |



# Detailed Analysis: Stool Culture

| Month    | OPD | IPD | Total |
|----------|-----|-----|-------|
| Jul 2025 | 17  | 47  | 64    |
| Aug 2025 | 0   | 0   | 0     |
| Sep 2025 | 17  | 89  | 106   |
| Oct 2025 | 7   | 58  | 65    |
| Nov 2025 | 23  | 47  | 70    |
| Dec 2025 | 17  | 29  | 46    |
| Jan 2026 | 15  | 51  | 66    |
| Feb 2026 | 19  | 41  | 60    |
| Mar 2026 | 21  | 82  | 103   |
| Apr 2026 | 20  | 41  | 61    |
| May 2026 | 19  | 50  | 69    |
| Jun 2026 | 21  | 53  | 74    |
| TOTAL    | 196 | 588 | 784   |



# **Mycobacteriology Census Analysis**

Department of Clinical Microbiology

AIIMS Mangalagiri

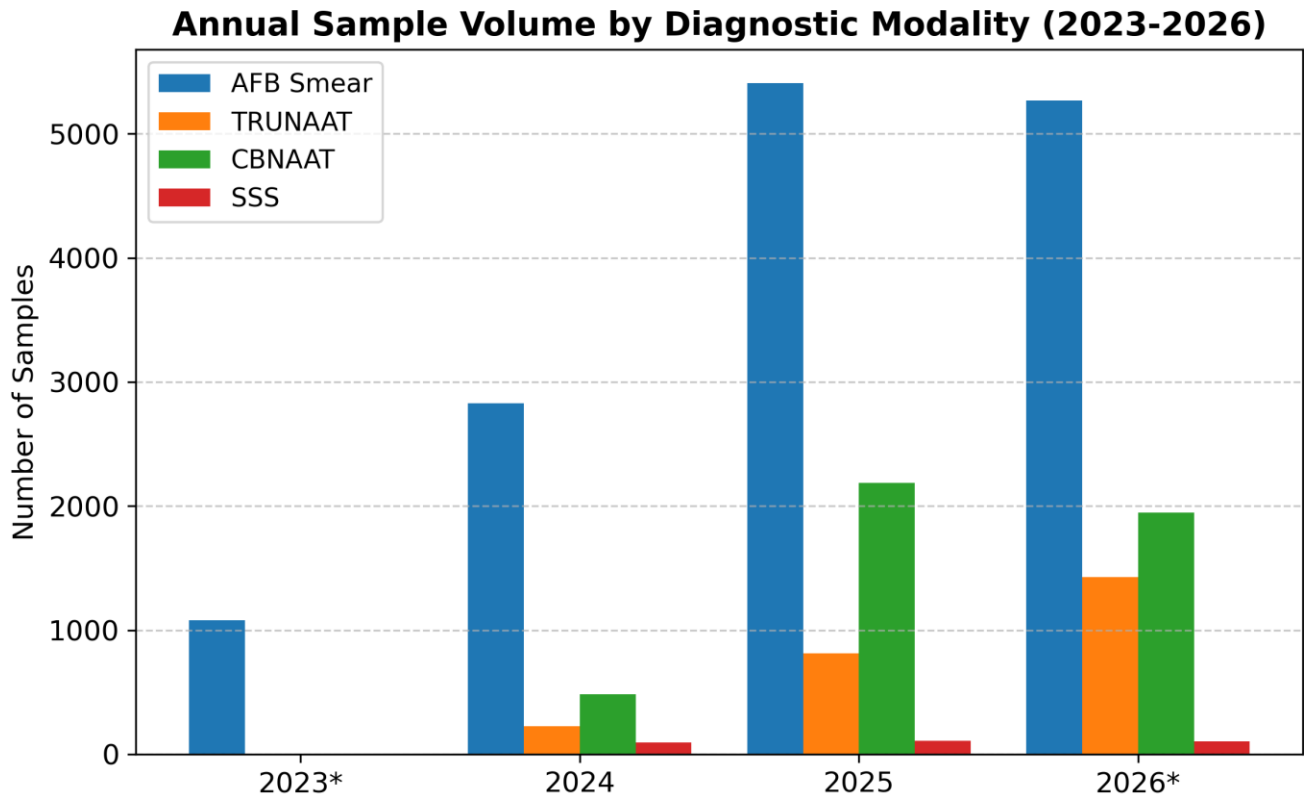
*In Charge: Dr Ramakrishna Pai J, Dr Lonika Lodha*

*Department of Clinical Microbiology*

*AIIMS Mangalagiri*

*Historical Data Dashboard (2023 - 2026)*

# Executive Summary: Diagnostic Growth



- Significant growth in diagnostic workloads from 2023 to 2026.
- AFB Smear remains the highest volume screening tool, scaling past 5,400+ annual tests.
- Molecular diagnostics (CBNAAT & TRUNAAT) show multi-fold expansion starting mid-2024.
- TRUNAAT volumes scaled rapidly to 1,426 samples by Aug 2026 alone.

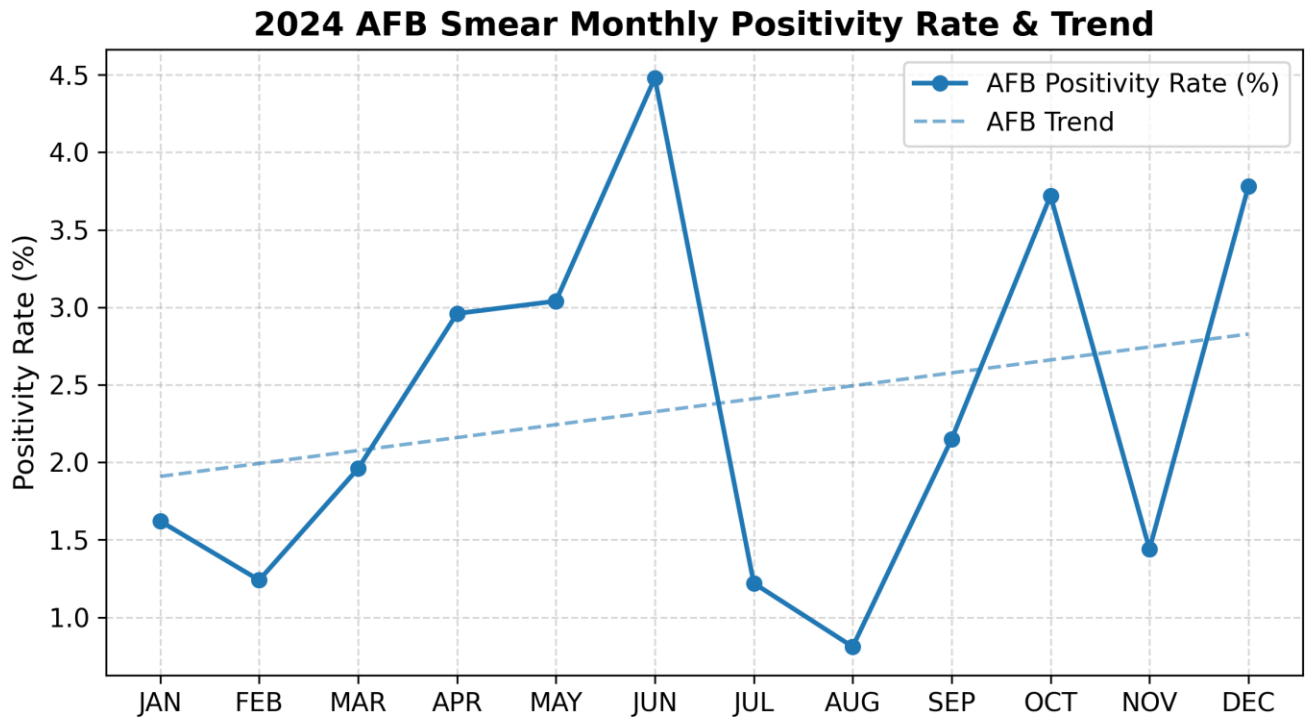
# 2023 Census Analysis (June - December)

Key Metrics Table (AFB Smear Only):

| Month     | Total AFB | Positive | Negative | Positivity Rate |
|-----------|-----------|----------|----------|-----------------|
| JUNE      | 139       | 5        | 134      | 3.6%            |
| JULY      | 126       | 2        | 124      | 1.59%           |
| AUGUST    | 136       | 4        | 132      | 2.94%           |
| SEPTEMBER | 170       | 3        | 167      | 1.76%           |
| OCTOBER   | 177       | 9        | 168      | 5.08%           |
| NOVEMBER  | 167       | 4        | 163      | 2.4%            |
| DECEMBER  | 163       | 3        | 160      | 1.84%           |
| TOTAL     | 1078      | 30       | 1048     | 2.78%           |

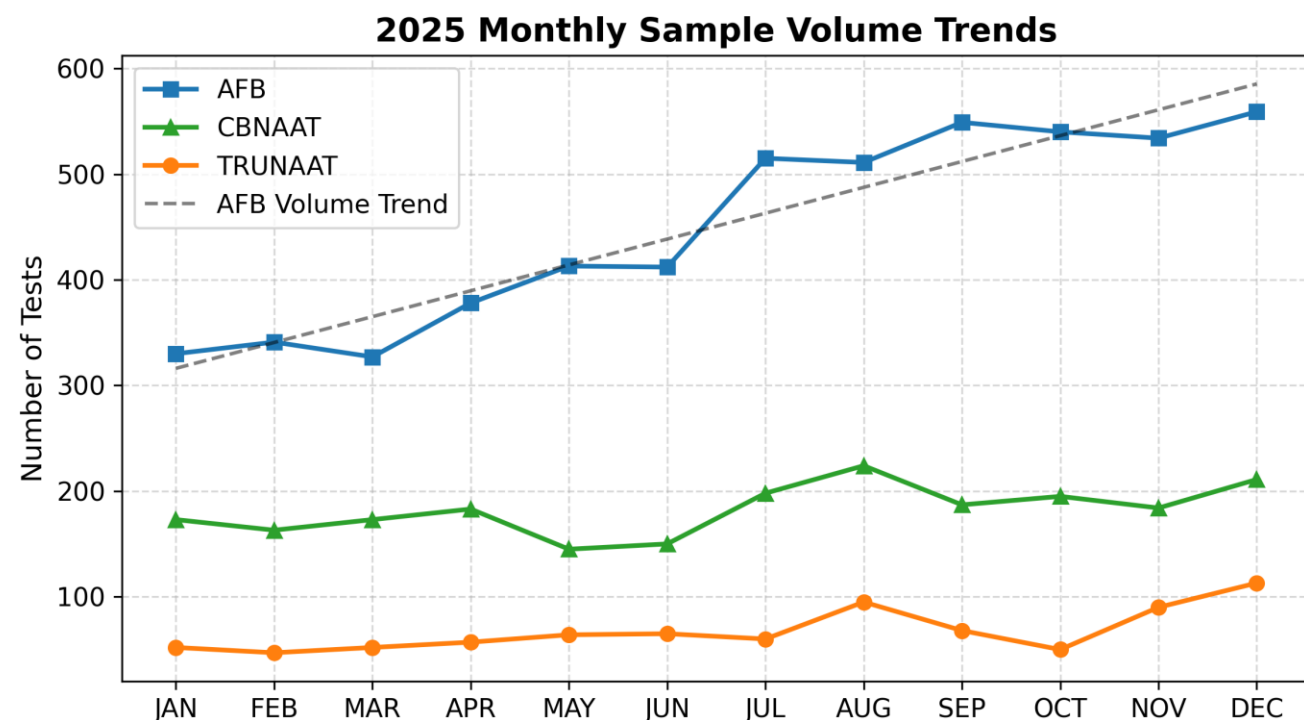
- Baseline Period: Only AFB smear data was captured in late 2023.
- Peak Positivity: Observed in October at 5.08% (9 positives out of 177 samples).
- Average Positivity Rate: Stood stable at 2.78% across the 7-month snapshot.

# 2024 Census: Molecular Rollout & Trends



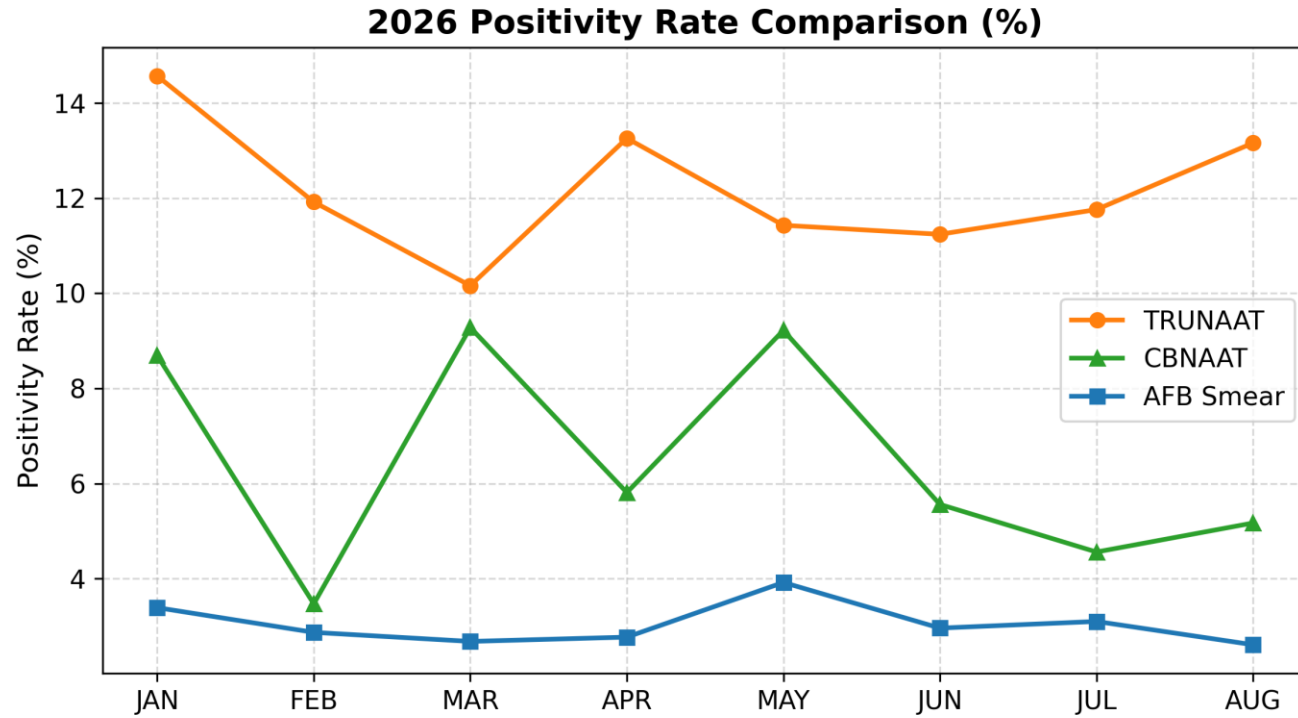
- Introduction of CBNAAT & TRUNAAT diagnostics dynamically shifted diagnostic capability.
- AFB Smear Positivity shows an upward linear trendline over the 12 months.
- CBNAAT picked up 35 positives out of 482 total tests performed.
- TRUNAAT screening commenced significantly in Q3/Q4, yielding a high yield in October (15.79%).

# 2025 Census: Accelerated Testing Volumes



- Massive volume escalation across all diagnostic testing tiers.
- AFB Smear workload grew linearly, peaking at 559 monthly tests in December.
- CBNAAT achieved a massive stable footprint, processing 2,186 total samples.
- Anomalous spike in AFB positives in April (32 positives; 8.46% positivity rate).

# 2026 Year-to-Date Performance (Jan - Aug)



- TRUNAAT consistently displays the highest positivity rate among all testing methods (~10-14.5%).
- CBNAAT yields a steady positivity rate fluctuating between 3.4% and 9.3%.
- AFB Smear provides consistent background screening data with stable ~3% positivity.
- Data indicates robust diagnostic deployment for early clinical detection.

# Serology & Immunology Census

*Annual Diagnostic Analytics Profile (July 2025 – June 2026)*

*In Charge: Dr Vasudha CL*

**AIIMS Mangalagiri**

# Executive Diagnostic Insights

**1,28,156**

Total Annual Diagnostic Workload

**38,555**

HIV Screenings (Highest Individual Volume)

**14,212**

Peak Monthly Throughput (June 2026)

- **Infectious Disease Dominance:** Screening for HIV, HCV, and HBsAg accounts for over 69% of all clinical laboratory throughput.
- **CLIA Modality Deployment:** Automated Chemiluminescence Immunoassay (CLIA) platforms were deployed in October 2025, adding 8,365 highly specific tests.
- **Autoimmune Baseline Stability:** Anti-CCP (6,111) and ANA (5,082) screenings demonstrate high, stable parameters throughout the full fiscal cycle.
- **Continuous Workload Growth:** Laboratory volume expanded linearly from 10,150 in July 2025 to 14,212 in June 2026, marking a 40% scaling efficiency.

# Monthly Throughput Data Table & Growth Trendline

| Month        | Total Census | Growth Status             |
|--------------|--------------|---------------------------|
| JULY         | 10,150       | Baseline                  |
| AUGUST       | 8,561        | -15.6% Seasonal Softening |
| SEPTEMBER    | 9,473        | +10.6% Recovery           |
| OCTOBER      | 8,629        | Consolidation Phase       |
| NOVEMBER     | 9,168        | CLIA Expansion Launch     |
| DECEMBER     | 9,922        | +8.2% Steady Rise         |
| JANUARY      | 10,503       | Exceeding 10k Mark        |
| FEBRUARY     | 11,109       | +5.7% Growth Step         |
| MARCH        | 11,529       | Stable Upward Flow        |
| APRIL        | 11,733       | Incremental Expansion     |
| MAY          | 13,167       | +12.2% Rapid Surge        |
| JUNE         | 14,212       | Annual Peak Volume        |
| TOTAL CENSUS | 1,28,156     | 100.0% Fiscal Load        |

## Mathematical Trend Analysis:

- Linear Upward Slope: Post-October volume showcases uninterrupted monthly increments.
- Q4 Acceleration: May and June account for 21.3% of the absolute annual testing volume, displaying high end-of-year outpatient healthcare demand.
- System Stability: Laboratory metrics indicate robust systemic adaptation to sustained workload spikes without performance degradation.

# Major Viral Serology Load Profile

| Parameter      | Annual Total | Monthly Peak | Peak Month |
|----------------|--------------|--------------|------------|
| HIV Rapid      | 38,555       | 4,279        | JUNE       |
| HCV Rapid      | 26,813       | 3,426        | JUNE       |
| HBsAg Rapid    | 23,362       | 2,898        | JUNE       |
| Combined Viral | 88,730       | 10,603       | JUNE       |

## Modality Proportions:

- Primary Pillar: HIV screening represents the single largest operational line item in the section.
- HCV vs HBsAg: HCV testing consistently outpaces HBsAg by an average of 14.7% monthly, suggesting heightened local screening protocols.
- Coordinated Volume Surge: All major viral indicators reached absolute geometric highs in June 2026 simultaneously.

# CLIA Modality Deployment & Integration

| CLIA Parameter | Total Post-Launch | Launch Month Peak | Stabilized Avg |
|----------------|-------------------|-------------------|----------------|
| HIV-CLIA       | 4,591             | 900 (November)    | 515 / Mo       |
| HCV-CLIA       | 1,986             | 542 (November)    | 110 / Mo       |
| HBV-CLIA       | 1,788             | 553 (November)    | 110 / Mo       |

## Automation Insights:

- Q2 Technology Transition: Official implementation in October 2025 created a massive initial verification backlog clearance in November.
- Platform Equilibrating: Reagents and testing paths settled into a highly sustainable monthly equilibrium starting Q3 (Jan-June 2026).
- Clinical Utility: CLIA provides secondary high-specificity confirmation for complex viral samples.

# Autoimmune & Rheumatology Indicators

| Marker Description             | Annual Census Volume | Monthly Consistency    |
|--------------------------------|----------------------|------------------------|
| Anti-CCP (High Specificity RA) | 6,111                | Stable (~500/mo)       |
| RA Factor (Screening)          | 7,120                | Stable (~600/mo)       |
| ANA (Antinuclear Antibody)     | 5,082                | Consistent (~420/mo)   |
| C-ANCA (Vasculitis Panel)      | 1,182                | Uniform Base (~100/mo) |
| P-ANCA (Vasculitis Panel)      | 1,186                | Uniform Base (~100/mo) |

## Chronicity Profile:

- Non-Seasonal Dynamics: Unlike vector-borne diagnostics, autoimmune tests show exceptionally low coefficient of variation across months.
- Symmetrical Tracking: C-ANCA and P-ANCA show almost zero divergence, demonstrating adherence to strict dual-ordering guidelines.
- High Diagnostic Reliance: Reflects AIIMS Mangalagiri's role as a tertiary referral hub for chronic rheumatological diseases.

# Seasonal Vector-Borne & Enteric Surges

| Disease Marker        | Annual Total | Peak Month Load | Monsoon Surge Share |
|-----------------------|--------------|-----------------|---------------------|
| Widal (Enteric Fever) | 2,328        | 362 (September) | 38% (Aug-Oct)       |
| Scrub Typhus          | 903          | 138 (October)   | 39% (Aug-Oct)       |
| Leptospirosis         | 685          | 107 (October)   | 36% (Aug-Oct)       |

## Epidemiological Trends:

- Pronounced Monsoon Spikes: Widal peaks in September immediately following heavy precipitation periods.
- Coincident Maxima: Scrub Typhus and Leptospirosis hit absolute matching peaks in October (138 and 107 cases).
- Pre-emptive Planning: These metrics provide a clear window for proactive inventory procurement of febrile antigens annually.

# Consolidated Diagnostic Category Breakdown

| Diagnostic Category       | Primary Parameters                 | Total Volume | Proportional Contribution |
|---------------------------|------------------------------------|--------------|---------------------------|
| Viral Screenings (Rapid)  | HIV, HBsAg, HCV                    | 88,730       | 69.23%                    |
| CLIA Panels               | HIV, HBV, HCV<br>Chemiluminescence | 8,365        | 6.53%                     |
| Rheumatology Markers      | RA Factor, Anti-CCP                | 13,231       | 10.32%                    |
| Autoimmune Panels         | ANA, C-ANCA, P-ANCA                | 7,450        | 5.81%                     |
| Enteric & Seasonal Fevers | Widal, Scrub Typhus, Lepto         | 3,916        | 3.06%                     |
| Other Screenings          | Mantoux, CRP, ASO, TORCH           | 2,464        | 1.92%                     |
| Total Laboratory Census   | All Diagnostic Modalities          | 1,28,156     | 100.00%                   |

# Parasitology and HIC Census Report (July 2025 – June 2026)

*In Charge: Dr A Mohan Kumar, Infection Control Officer  
Department of Clinical Microbiology  
AIIMS Mangalagiri*

# PARASITOLOGY CENSUS JULY 2025 TO JUNE 2026

| MONTH | RAPID MALARIA |     | SMEAR MALARIA |      | STOOL OVA CYST |      | STOOL OCCULT BLOOD | MISC MICRO | TOTAL |
|-------|---------------|-----|---------------|------|----------------|------|--------------------|------------|-------|
|       | OPD           | IPD | OPD           | IPD  | OPD            | IPD  |                    |            |       |
| JUL   | 82            | 80  | 73            | 151  | 62             | 110  | 149                | 5          | 712   |
| AUG   | 146           | 60  | 122           | 147  | 51             | 75   | 113                | 10         | 724   |
| SEP   | 193           | 93  | 212           | 89   | 139            | 64   | 185                | 3          | 978   |
| OCT   | 118           | 105 | 54            | 184  | 57             | 121  | 178                | 4          | 821   |
| NOV   | 103           | 89  | 35            | 146  | 63             | 98   | 174                | 0          | 708   |
| DEC   | 98            | 79  | 34            | 139  | 51             | 90   | 154                | 1          | 646   |
| JAN   | 58            | 78  | 29            | 130  | 42             | 98   | 151                | 1          | 587   |
| FEB   | 50            | 99  | 50            | 100  | 49             | 102  | 172                | 0          | 622   |
| MAR   | 60            | 74  | 28            | 105  | 41             | 131  | 204                | 0          | 643   |
| APR   | 44            | 61  | 20            | 101  | 69             | 83   | 173                | 0          | 551   |
| MAY   | 51            | 63  | 25            | 114  | 71             | 105  | 235                | 0          | 664   |
| JUN   | 43            | 66  | 36            | 91   | 57             | 121  | 219                | 0          | 633   |
| TOTAL | 1046          | 947 | 718           | 1497 | 752            | 1198 | 2107               | 24         | 8289  |

| HIC & SURVEILLANCE CENSUS JULY 2025 TO JUNE 2026 |                   |                           |                          |                               |                       |       |       |
|--------------------------------------------------|-------------------|---------------------------|--------------------------|-------------------------------|-----------------------|-------|-------|
| MONTH                                            | Dialysis<br>Water | Water<br>Surveillanc<br>e | OT & Air<br>Surveillance | Blood bank<br>quality testing | Biological Indicators |       | TOTAL |
|                                                  |                   |                           |                          |                               | ETO                   | STEAM |       |
| JUL                                              | 7                 | 1                         | 136                      | 2                             | 39                    | 103   | 288   |
| AUG                                              | 6                 | 1                         | 104                      | 4                             | 44                    | 77    | 236   |
| SEP                                              | 6                 | -                         | 28                       | 9                             | 45                    | 88    | 176   |
| OCT                                              | 6                 | -                         | 28                       | 5                             | 53                    | 95    | 187   |
| NOV                                              | 12                | -                         | 35                       | 8                             | 100                   | 48    | 203   |
| DEC                                              | 1                 | -                         | 33                       | 9                             | 42                    | 85    | 170   |
| JAN                                              | 6                 | 25                        | 35                       | 11                            | 82                    | 52    | 211   |
| FEB                                              | 6                 | 0                         | 28                       | 18                            | 87                    | 52    | 191   |
| MAR                                              | 6                 | 21                        | 28                       | 15                            | 111                   | 51    | 232   |
| APR                                              | 6                 | 2                         | 28                       | 12                            | 106                   | 52    | 206   |
| MAY                                              | 6                 | 0                         | 35                       | 14                            | 102                   | 45    | 202   |
| JUN                                              | 6                 | 0                         | 24                       | 4                             | 112                   | 55    | 201   |
| TOTAL                                            | 74                | 50                        | 542                      | 111                           | 923                   | 803   | 2503  |

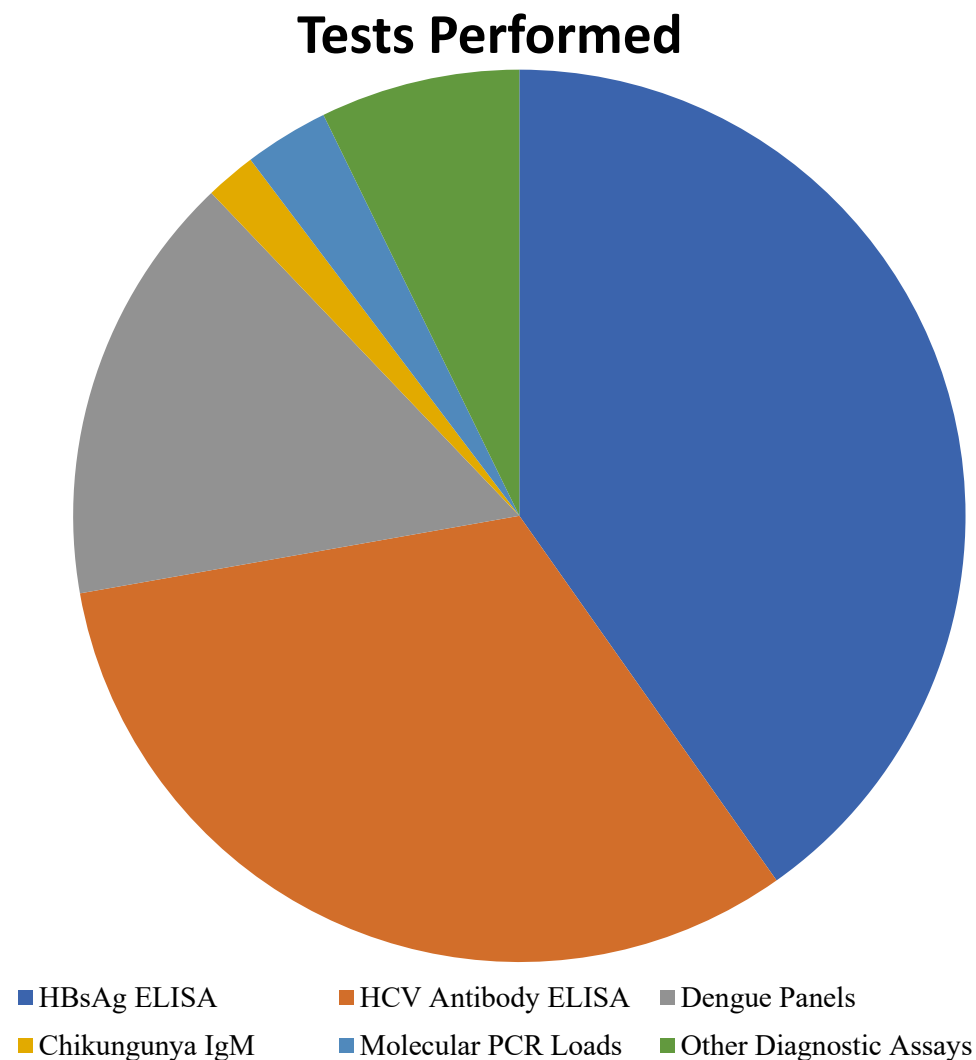
# Virology VRDL & Molecular Lab Census

*In Charge Dr Sumit Rai & Dr Priyadarshini Patro*  
*Department of Clinical Microbiology | AIIMS Mangalagiri*  
*Annual Report: July 2025 – June 2026*

# Executive Summary & Laboratory Workload

- Total Diagnostic Throughput: The VRDL & Molecular laboratory executed a grand total of 50,265 tests over the 12-month period (July 2025 – June 2026).
- Dominant Testing Modalities: Serological screening via ELISA for chronic viral pathogens (Hepatitis B and C) accounts for over 72% of the entire laboratory workload.
- Core Pillars Analyzed in this Report:
  - Hepatitis Screening Framework (ELISA & Marker Profiles)
  - Arboviral & Vector-Borne Outbreak Patterns (Dengue, Chikungunya, JE)
  - High-Complexity Quantitative Molecular Diagnostics (Viral Load PCRs)

# Laboratory Workload Composition



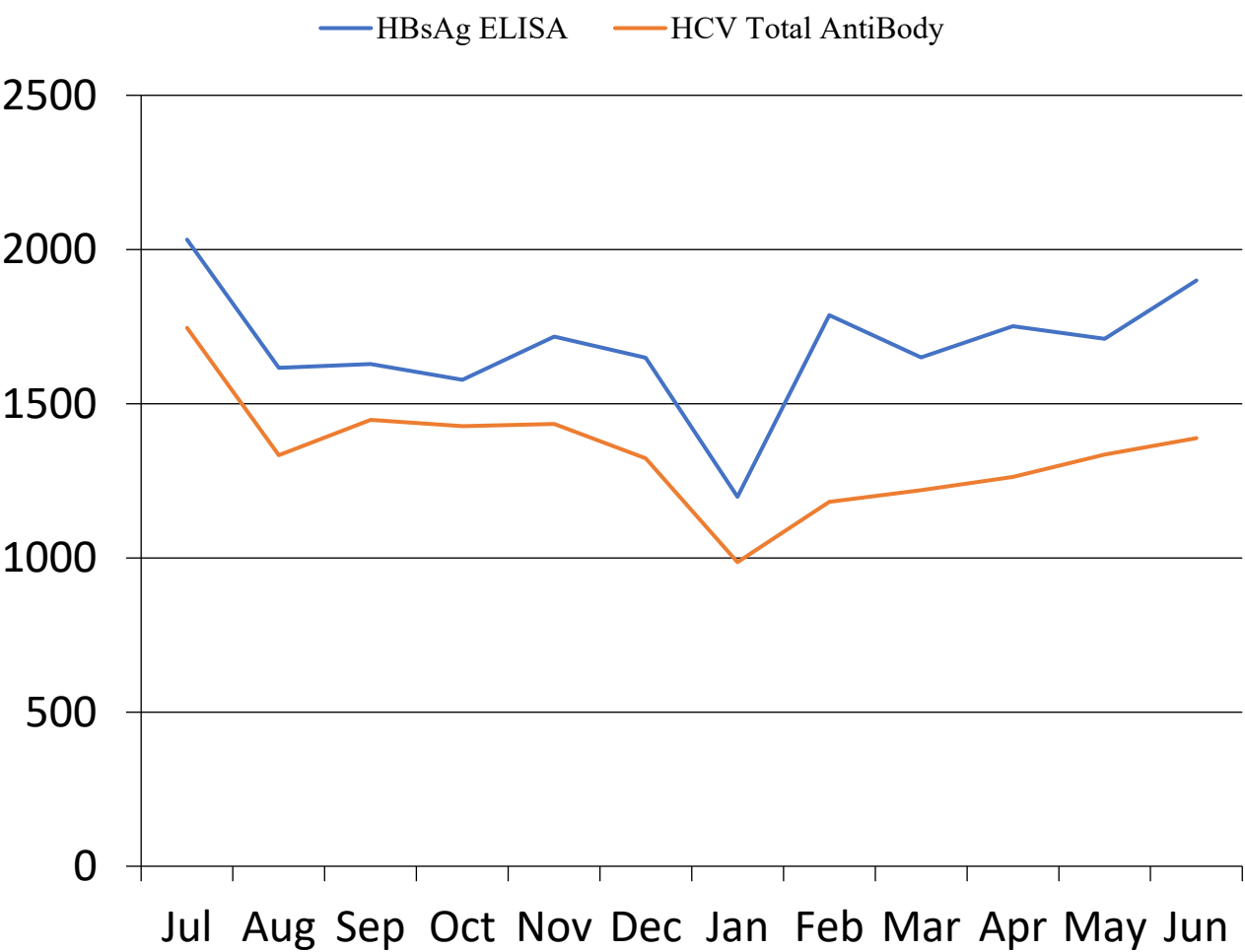
- Total Diagnostic Throughput: 50,265 tests successfully completed over the 12-month operational window.
- Hepatitis Dominance: HBsAg and HCV Antibody ELISA testing constitutes the overwhelming majority, accounting for over 72% of the absolute lab workload.
- Arboviral Response Infrastructure: Dengue validation panels (NS1, IgM, IgG) represent the primary seasonal acute screening vector with 7,869 tests.
- High-Complexity Integration: Advanced molecular workflows and real-time PCR diagnostics account for a specialized cohort of 1,537 diagnostic runs.

# Hepatitis Serology: Dominant High-Volume Columns

| Diagnostic Test Column | Peak Month | Peak Vol | Total Volume |
|------------------------|------------|----------|--------------|
| HBsAg ELISA            | July 2025  | 2,032    | 20,217       |
| HCV Total Ab ELISA     | July 2025  | 1,746    | 16,084       |
| HBeAg ELISA            | May 2026   | 88       | 665          |

- Core Screening Volume: Combined HBsAg and HCV screening constitutes 36,301 tests, proving massive community screening pipelines.
- Temporal Trends: Both major panels demonstrated initial maximum volume markers in July 2025, maintaining steady operational plateaus averaging ~1,500 tests/month for HBsAg.
- Specialized Markers: HBeAg (665) and Anti-HBc IgM (465) provide critical staging support for acute flares and active replication profiles.

# Hepatitis Screening Trends (High-Volume Vectors)



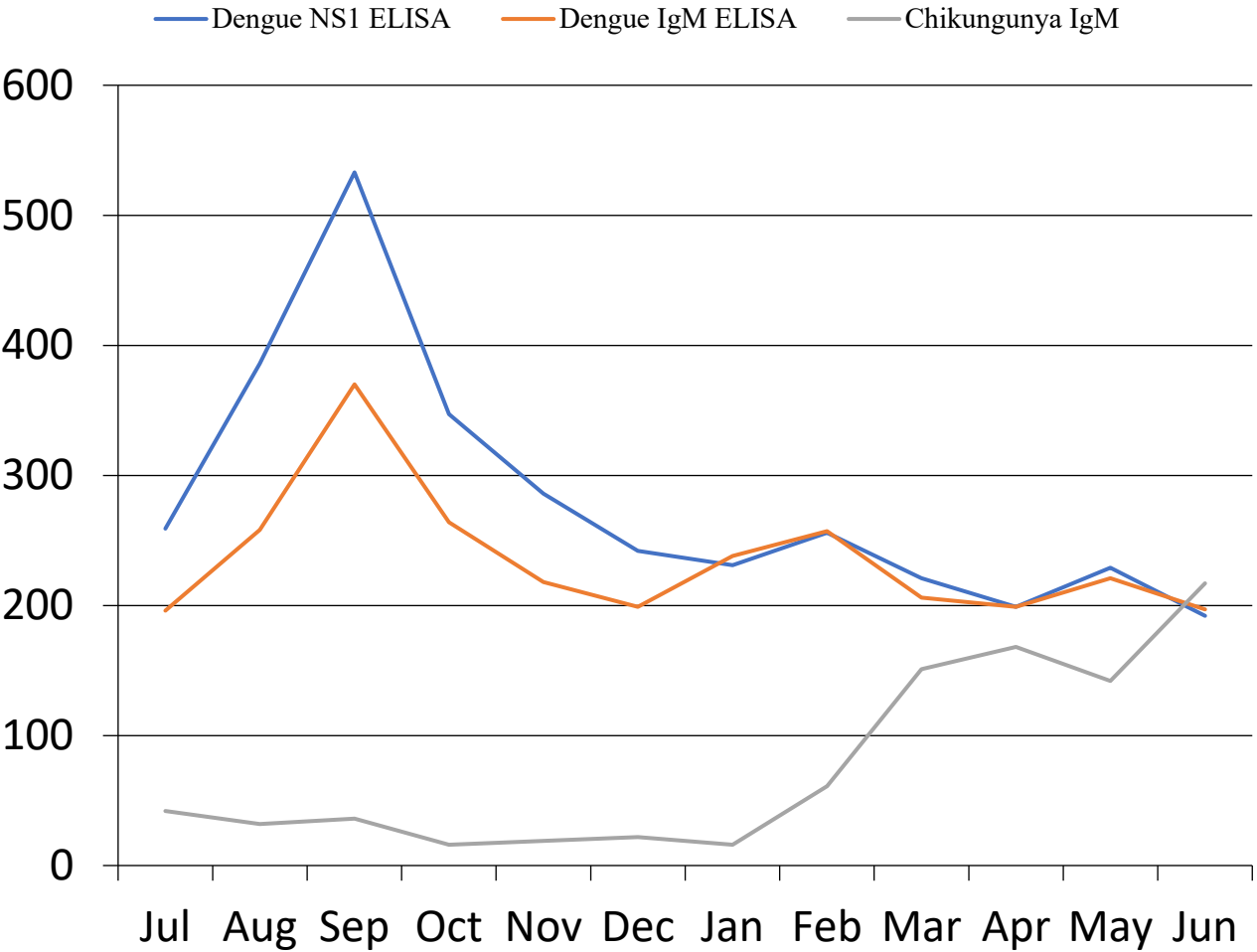
- **Stable Screening Baseline:** Hepatitis panels maintain a heavy, highly regular monthly baseline, averaging ~1,684 HBsAg and ~1,340 HCV tests per month.
- **January Dip Analysis:** A distinct, multi-test volume reduction occurs in January 2026 across both modalities (HBsAg: 1,198; HCV: 986), matching systemic logistical or holiday OPD alignment patterns.
- **Robust Resurgence Profile:** Screening peaks robustly in July 2025 and late Q2 2026, marking increased preventative hospital admission checkups.

# Arboviral Surge & Monsoon Disease Dynamics

| Arboviral Target | Sep-25<br>Peak | Jun-26<br>Vol | Annual<br>Total |
|------------------|----------------|---------------|-----------------|
| Dengue NS1 ELISA | 533            | 192           | 3,381           |
| Dengue IgM ELISA | 370            | 197           | 2,823           |
| Dengue IgG ELISA | 112            | 135           | 1,665           |
| Chikungunya IgM  | 36             | 217           | 922             |

- Distinct Seasonal Shifts:
  - Classic Monsoon Surge: Dengue parameters peaked strongly in September 2025 (NS1=533, IgM=370), mapping directly to post-rainfall vector expansion.
  - Late Spring Chikungunya Upsurge: Unlike Dengue, Chikungunya IgM witnessed an explosive expansion in late spring, peaking in June 2026 (217 tests), indicating independent transmission vector patterns.
- Neuro-Infections: Japanese Encephalitis (JE) maintained a low baseline endemicity with 17 cases reported.

# Arboviral Surge Dynamics & Outbreak Patterns



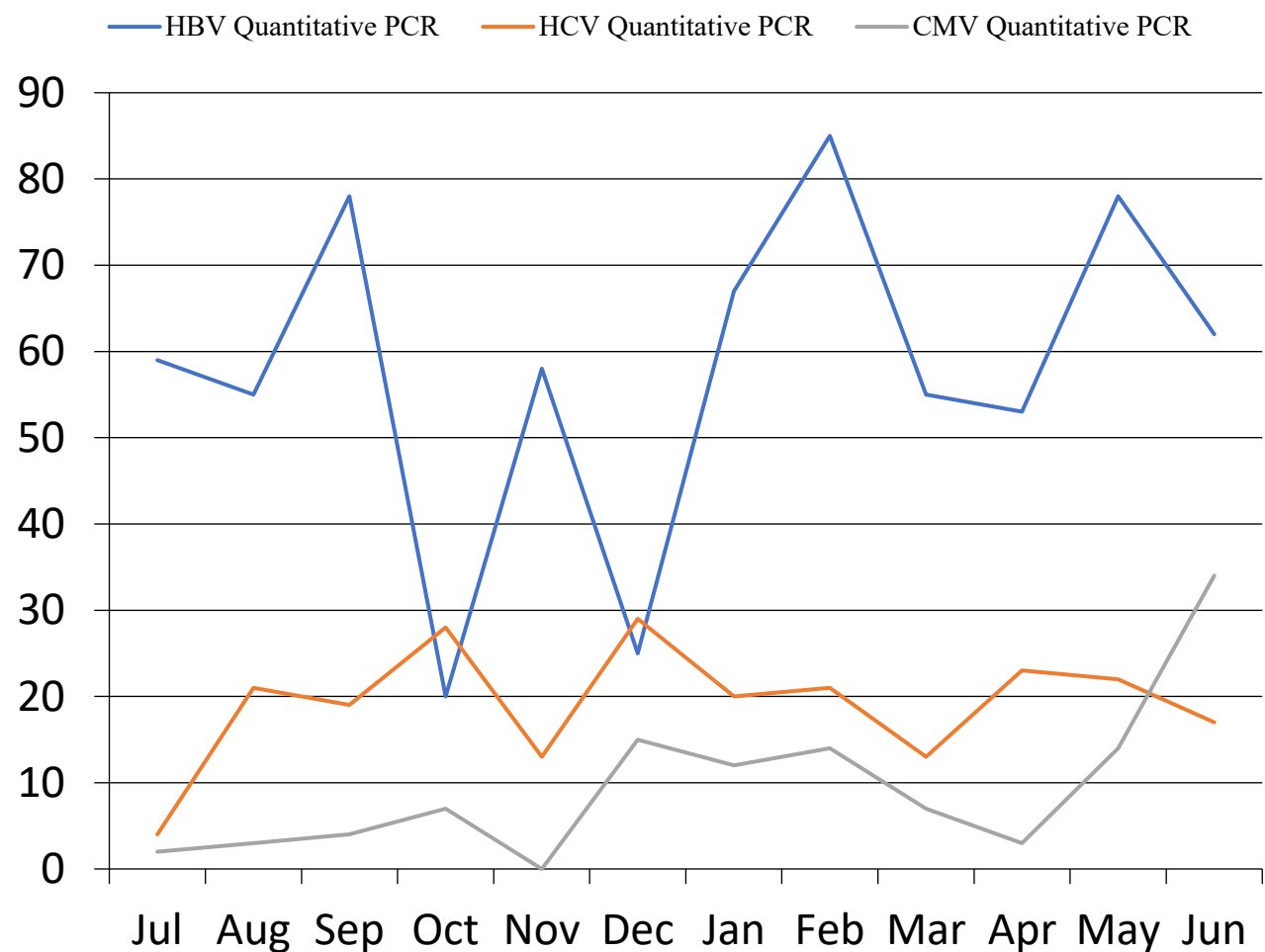
- Classic Post-Monsoon Dengue Spike: Dengue NS1 (533) and IgM (370) exhibit synchronized acute peaks during September 2025, validating an intensive seasonal vector-borne transmission window.
- Independent Chikungunya Upsurge: Chikungunya displays an opposite pattern, remaining quiescent during monsoon but scaling dramatically through Spring/Early Summer to peak in June 2026 (217 tests).
- Clinical Co-testing: Highlights critical windows where differential molecular and serological panels are crucial for proper patient management.

# Molecular Diagnostics & Real-Time Viral Loads

| Molecular PCR Column  | Monthly Avg | Peak Month | Annual Load |
|-----------------------|-------------|------------|-------------|
| HBV Viral Load qPCR   | 58          | Aug (85)   | 695         |
| HCV Viral Load qPCR   | 19          | Dec (29)   | 230         |
| CMV Load qPCR         | 10          | Jun (34)   | 115         |
| EBV Load Quantitative | 7           | Jun (22)   | 86          |

- High-Complexity Workload: Quantitative viral load testing acts as the core therapeutic monitoring baseline for immunocompromised and chronic clinic networks.
- Key Stratification Trends:
  - HBV dominance remains clear with 695 annual tests, maintaining consistent longitudinal tracking requirements.
  - CMV (115) and EBV (86) metrics exhibited marked, synchronized scale-ups in June 2026, pointing toward coordinated surveillance protocols.

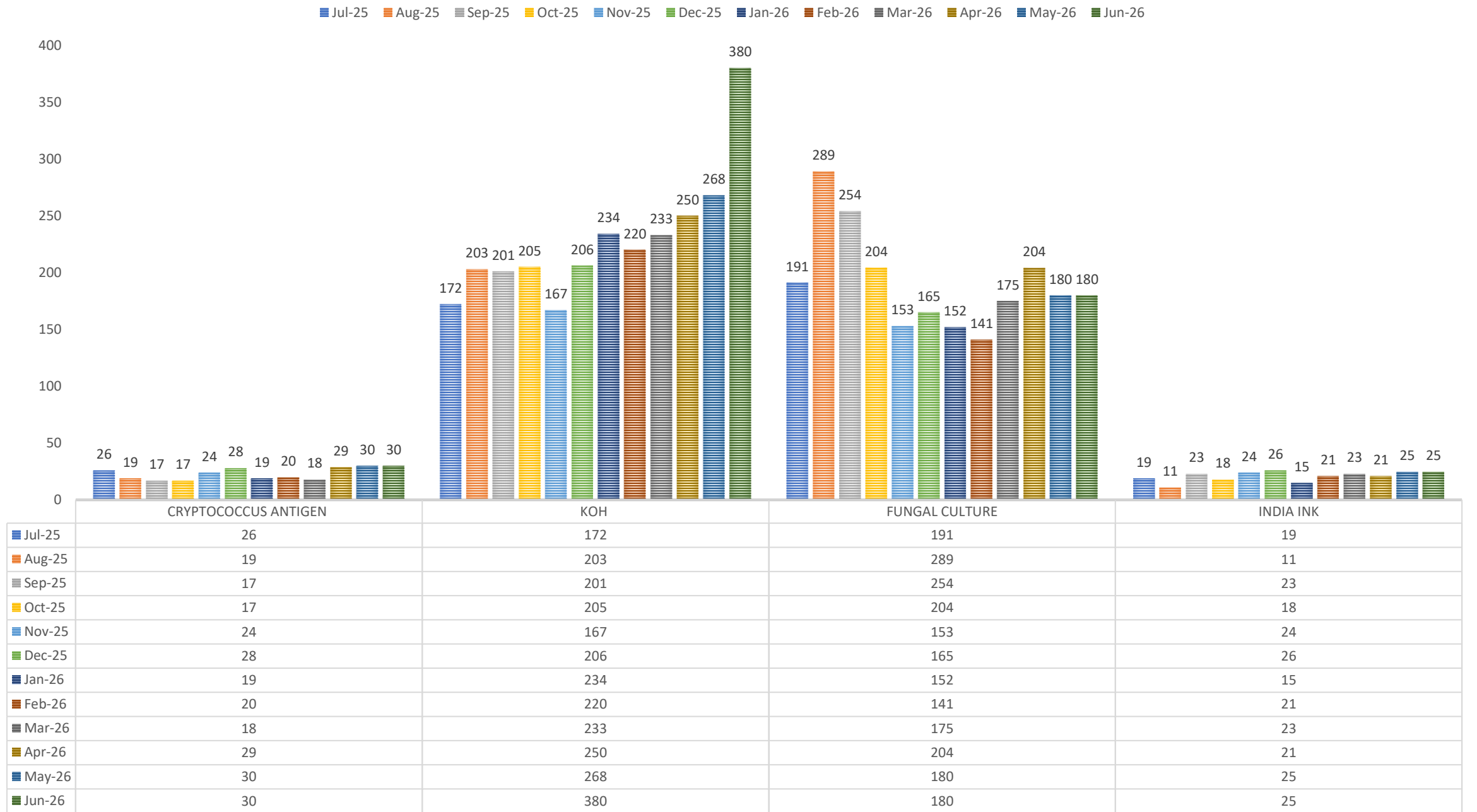
# Molecular Testing Workload Trends



- **HBV PCR Supremacy:** Quantitative Hepatitis B viral load assays represent the highest volume molecular tracker, showing an active upward trend peaking in February 2026 at 85 tests.
- **CMV Progression Window:** Cytomegalovirus viral load monitoring displays unique late-stage escalation, expanding from single digits to an annual maximum of 34 runs in June 2026.
- **Strategic Resource Value:** Data outlines steady clinical request profiles, critical for batch forecasting of real-time PCR reagent kits and automated extraction controls.

# Virology VRDL & Molecular Lab Census

*In Charge Dr Sumit Rai & Dr Priyadarshini Patro*  
*Department of Clinical Microbiology | AIIMS Mangalagiri*  
*Annual Report: July 2025 – June 2026*

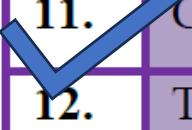


| TEST NAME<br>MONTH | KOH  | FUNGAL CULTURE | CRYPTOCOCCAL ANTIGEN (LFA) | INDIA INK | ASPERGILLUS ANTIGEN (LFA) | BETA D GLUCAN |
|--------------------|------|----------------|----------------------------|-----------|---------------------------|---------------|
| JULY 2025          | 172  | 191            | 26                         | 19        | -                         | -             |
| AUGUST 2025        | 203  | 289            | 19                         | 11        | -                         | -             |
| SEPTEMBER 2025     | 201  | 254            | 17                         | 23        | -                         | -             |
| OCTOBER 2025       | 205  | 204            | 17                         | 18        | -                         | -             |
| NOVEMBER 2025      | 167  | 153            | 24                         | 24        | -                         | -             |
| DECEMBER 2025      | 206  | 165            | 28                         | 26        | -                         | -             |
| JANUARY 2026       | 234  | 152            | 19                         | 15        | -                         | -             |
| FEBRUARY 2026      | 220  | 141            | 20                         | 21        | -                         | -             |
| MARCH 2026         | 233  | 175            | 18                         | 23        | -                         | -             |
| APRIL 2026         | 250  | 204            | 29                         | 21        | -                         | -             |
| MAY 2026           | 268  | 180            | 30                         | 25        | -                         | -             |
| JUNE 2026          | 380  | 180            | 30                         | 25        | 2                         | 1             |
| TOTAL              | 2739 | 2288           | 277                        | 251       | 2                         | 1             |



# Where is AIIMS-MG in the 42-Point IAS?

| Sr.<br>No. | Box 1: Integrated Antimicrobial Stewardship (IAS) Practice statements for each tertiary care Indian hospitals                                                                                                                             |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ✓<br>1.    | The hospital administration should ensure an actively running IAS program, either in its totalitarian or fragmented form including diagnosis, infection prevention, and antimicrobial stewardships but with the intention of integration. |
| ✓<br>2.    | The hospital should set accountability levels to educate, to advocate, to execute, and to monitor, for various defined updated IAS activities by these committees of HIC (or ISP), AMSP (or ASP), and DSP.                                |
| ✗<br>3.    | All clinical departments should have defined accountability for rational antimicrobial use by having own antimicrobial policy and its utilization check points.                                                                           |
| ✗<br>4.    | Regular educational programs should be held for prescribers and other relevant staff including patients/public on IAS Practices with examples of hospital data for the same.                                                              |
| ✗<br>5.    | The hospital should ensure a Compulsory Induction Program on diagnostic stewardship, good IPC & AMS practices for newly recruited Post Graduates, Interns, Junior Residents, Nurses, and other HCWs.                                      |

|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  6.     | The Clinical Microbiology Diagnostic Laboratory must be in the close vicinity or preferably in the same hospital premises to reduce Specimen transportation time.                                                                                                                                                                                                    |
|  7.    | The hospital should have a fully functional 24x7 Clinical Microbiology Diagnostic Laboratory with competent manpower and signatory authority with Sunday and Holiday reporting.                                                                                                                                                                                      |
|  8.    | The hospital should have guidance procedures for the right investigation, right patient and right time and must ensure the right report interpretation, right antimicrobial and right time.                                                                                                                                                                          |
|  9.    | All Clinical Diagnostic Laboratory should ensure that Critical Alerts have been displayed and a Notification is sent each time any critical result is observed.                                                                                                                                                                                                      |
|  10.   | The Clinical Microbiology Laboratory should ensure that all proper protocols of Antimicrobial Susceptibility testing are being followed as per own, CLSI, and or EUCAST guideline.                                                                                                                                                                                   |
|  11.  | Clinical Microbiology Diagnostic Laboratory should ensure the AMR data digitalization on WHONET or MS Excel.                                                                                                                                                                                                                                                         |
|  12. | The hospital should have documented SOP for Specimen Collection, Storage, Transportation and Processing Protocols and mandatory Culture Collection Protocol as the first specimen to be collected from the patient before the commencement of antimicrobials. These SOPs should be circulated to all the clinical departments involved in patient care time to time. |

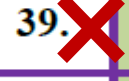


# Where is AIIMS-MG in the 42 Point IAS?

|     |                                                                                                                                                                                                                      |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13. | The Hospital should ensure that at least Automated Culture, Identification, and Susceptibility equipment are present, which can provide MIC values, with Breakpoint to MIC Quotients whenever and wherever possible. |
| 14. | The hospital should ensure proper supply chain management to avoid break in the Diagnostic Services.                                                                                                                 |
| 15. | The Laboratory must have a documented policy to communicate Preliminary Grams stain findings and relevant critical alert reports and Test Interpretation must be communicated within specified turnaround time.      |
| 16. | The Laboratory must ensure that advisory footnotes, interpretation, and knowledge dissemination on Intrinsic resistance are communicated in the report.                                                              |
| 17. | Wherever possible the Laboratory should ensure that Personalized AST Reporting including MIC values with breakpoints (R/I/S) is being performed especially in critically ill patients.                               |
| 18. | The Clinical Microbiology Diagnostic Laboratory should employ rapid diagnostic tests, molecular or phenotypic, for detecting resistance mechanisms (like CRE, MRSA, ESBL, etc) so as to provide directed treatment.  |

|       |                                                                                                                                                                           |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19. ✓ | The hospital should have a functional HICC, with full-time appointed infection control officers and infection control nurses along with their roles and responsibilities. |
| 20. ✗ | The hospital should adopt national guidelines and prepare a hospital-specific hospital infection control policy document.                                                 |
| 21. ✓ | The hospital should conduct HICC meetings regularly (e.g. Monthly/quarterly).                                                                                             |
| 22. ✓ | The hospital should conduct a hand hygiene audit on a monthly basis at least in all critical areas. The reports should be communicated to the respective departments.     |
| 23. ✓ | The hospital should conduct a biomedical waste segregation audit regularly.                                                                                               |
| 24. ✓ | The hospital should conduct care bundle audits on a monthly basis at least in all critical areas.                                                                         |
| 25. ✓ | The hospital should conduct HAI surveillance on a monthly basis at least in all critical areas along with root cause analysis and CAPA.                                   |
| 26. ✓ | The hospital should have a needle-strict injury prevention and management program through NSI surveillance.                                                               |
| 27. ✓ | The hospital should have a policy that specifies adhering to adult vaccinations by HCWs.                                                                                  |
| 28. ✗ | The hospital should provide hepatitis B vaccine to all HCWs including the temporary staff and students and check anti-HB titers subsequently.                             |
| 29. ✓ | The hospital should perform environmental disinfection according to standard CDC/NABH/Kayakalp/other guidelines regularly.                                                |
| 30. ✗ | The hospital should have an updated policy that specifies dealing with locally transmitted infections including MDRs.                                                     |



|                                                                                         |                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31.     | The hospital should set various methods of monitoring by the pharmacologist or pharmacist for ensuring rational antimicrobial use.                                                                                                                         |
| 32.    | The AMS Committee should perform antimicrobial prescription audit in all critical areas, whole hospitals preferably, and inform the report to clinicians regularly.                                                                                        |
| 33.    | Specific teams should perform prospective audits and feedbacks for specific antimicrobial agents regularly.                                                                                                                                                |
| 34.    | Preauthorization of restricted antimicrobial agents for specific infections should be done.                                                                                                                                                                |
| 35.    | The hospital should have practicing documents on PK/PD of specific antimicrobial agents.                                                                                                                                                                   |
| 36.    | The hospital should have updated facility-specific ID treatment recommendations, based on national guidelines and local antibiograms, preferably once a year.                                                                                              |
| 37.    | The hospital should have a policy that requires prescribers to document in the medical record or during order entry - dose (including loading dose), creatinine clearance, route, duration, stop date, and indication for all antimicrobial prescriptions. |
| 38.    | The hospital should have a policy that specifies IV to oral switch practices.                                                                                                                                                                              |
| 39.  | The hospital should have a policy that specifies antimicrobials timeout practices.                                                                                                                                                                         |
| 40.  | The hospital should have a policy that specifies antimicrobials ADR/SAE reporting' practices along with root cause analysis and CAPA.                                                                                                                      |
| 41.  | The hospital should have a policy that specifies OPAT practices.                                                                                                                                                                                           |
| 42.  | The hospital should track (record, review and report) on antimicrobial use on a regular basis, may be through DOT and AWaRe uses, and if required report to national or state authorities.                                                                 |



# Shortcomings from Our End

- Hospital Antibiotic Policy: Yet to Liaison with Clinical Depts
- Hospital AMS Manual
- Daily Prescription Audits
- Daily Antibiotics Consumption Audits
- Access to PACS – Recently Granted



# Absolute Requirements for Enhancing AMS

- At least 2 Pharmacists for Calculations of Antibiotic Consumption Audits
- At least 1 AMS Nursing Officer for Prescription Audits and Trainings
- Expeditious Movement of RC for BioFire Consumables
- Expeditious Movement of Consumables ALREADY under RC
- No Clinical Microbiologist have been included in the Antimicrobials Procurement Committees
- No Say / Role of Clinical Microbiologist in the Disinfectants Procurement Committees



# Pledge for Good Antimicrobial Stewardship Practices



On the occasion of **World Antimicrobial Awareness Week**, I solemnly pledge to:

- **Use Antimicrobials Responsibly** — only when truly necessary, and always guided by evidence-based practices through Clinical Diagnostics
- **Prescribe and Consume Antimicrobials Wisely** — ensuring the right drug, at the right dose, for the right duration, for the right patient and for the right site.
- **Promote Accurate Diagnosis** — supporting laboratory testing and avoiding unnecessary or empirical use of antimicrobials.
- **Educate and Advocate** — raising awareness among colleagues, patients, and communities about the dangers of misuse of Antimicrobials and AMR.
- **Support Infection Prevention & Control** — through hygiene, immunization, and sustainable practices that reduce the need for antimicrobials.
- **Collaborate Globally** — recognizing that AMR is a shared challenge requiring collective action across borders.
- **Safeguard the Future** — protecting the effectiveness of antimicrobials for generations to come.
- **Together, We Commit To Preserve The Power Of Antimicrobials, Protecting Human, Animal, And Environmental Health, And Building A Safer, Healthier Bharat: Jai Hind**

# Preventing MDR-GNB in the ICU: The Power of Multifaceted Bundles

Demonstrating that combining multiple infection prevention strategies significantly reduces multidrug-resistant bacterial acquisition

## Five Categories of ICU Interventions

**Standard Care (STD)**  
Encompasses Standard Care

**Source Control (SCT)**  
Source Control (e.g., chlorhexidine bathing)

**Environmental Cleaning (ENV)**

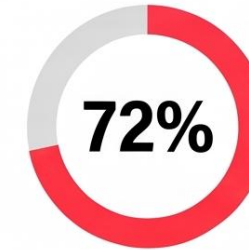
**Decolonization (DCL)**

**ASP**  
Antimicrobial Stewardship Programs

## Multifaceted Strategy Proves Most Effective

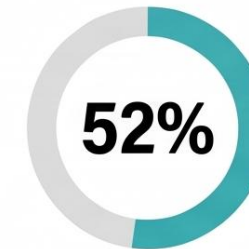
Combining STD, ENV, SCT, and ASP achieved the highest overall protection across bacteria types.

## Synergistic Impact & Reductions



### 72% Reduction in CRAB Acquisition

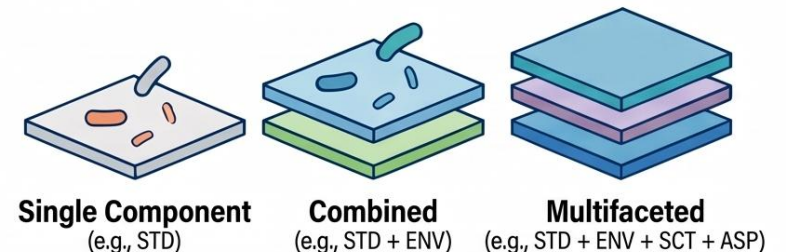
Adding Environmental Cleaning to Standard Care and ASP dramatically slashed CRAB rates.



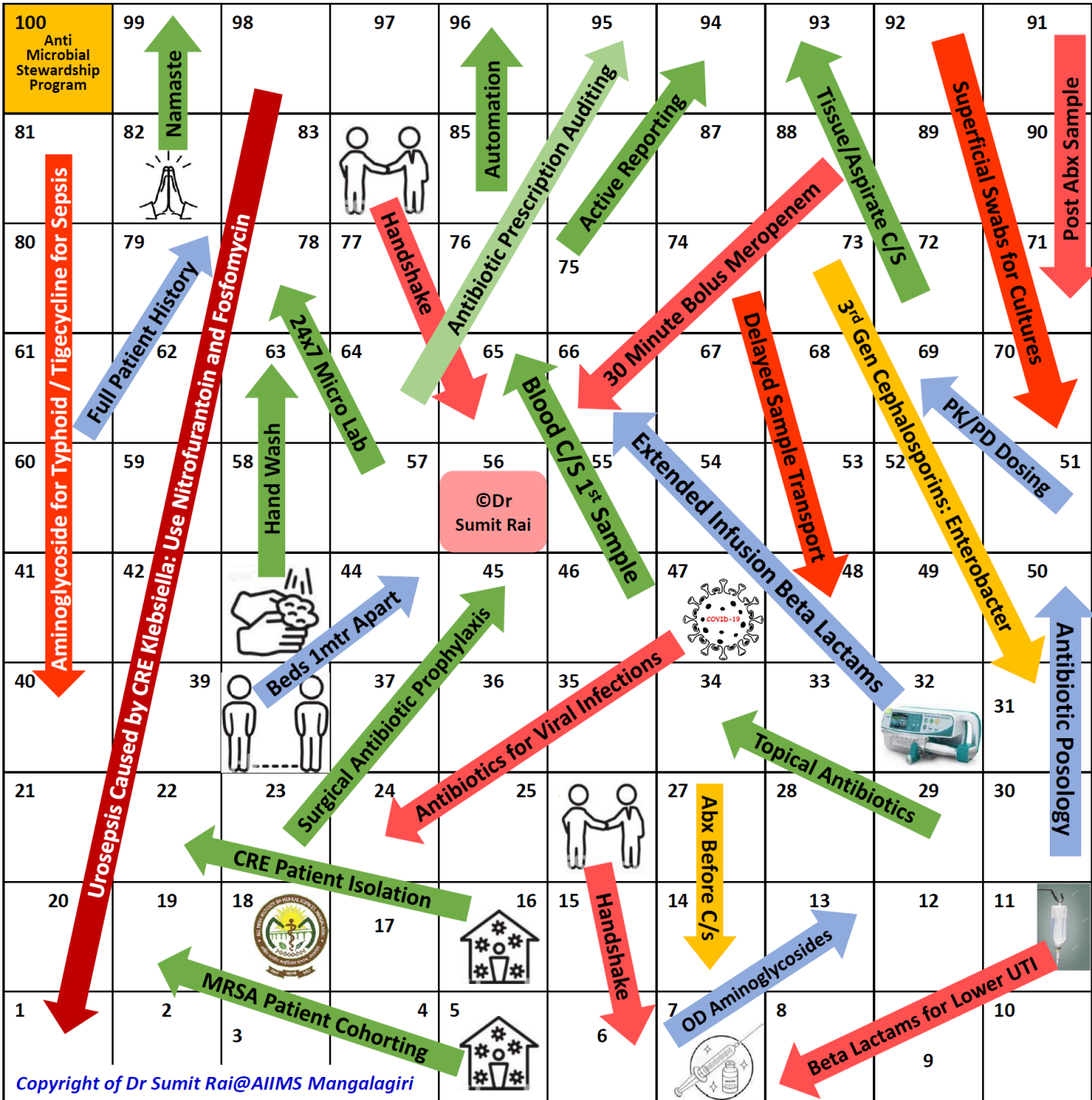
### 52% Reduction via Source Control

Adding Source Control to Standard Care and Environmental Cleaning cut CRAB.

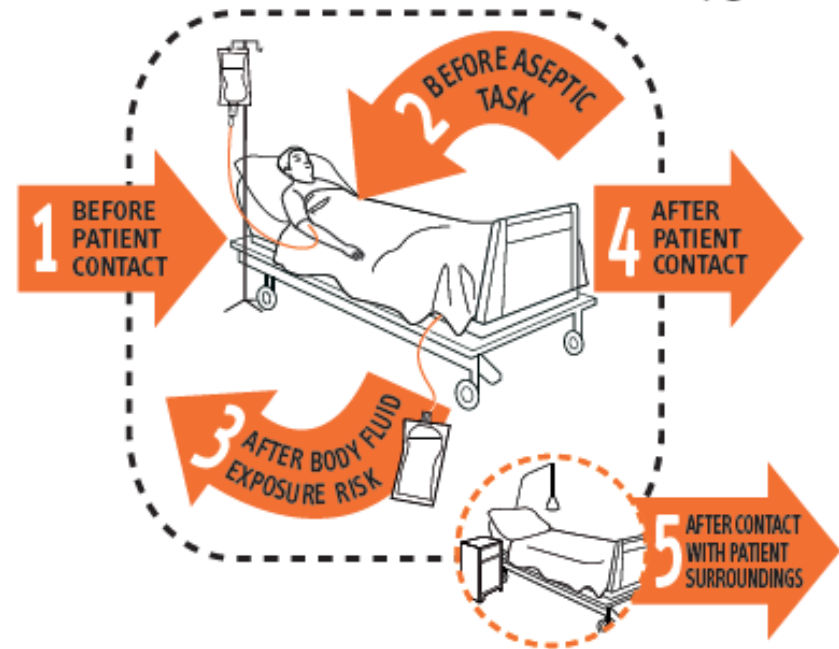
## Clear Dose-Response Relationship



Greater numbers of combined intervention components directly correlated with reduced bacterial acquisition.



## WHEN? Your 5 moments for hand hygiene



|                                           |                                                                                                                                                                                                                                                 |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 BEFORE PATIENT CONTACT                  | <b>WHEN?</b> Clean your hands before touching a patient when approaching him/her<br><b>EXAMPLES:</b> shaking hands, helping a patient to move around, clinical examination                                                                      |
| 2 BEFORE AN ASEPTIC TASK                  | <b>WHEN?</b> Clean your hands immediately before any aseptic task<br><b>EXAMPLES:</b> oral/dental care, secretion aspiration, wound dressing, catheter insertion, preparation of food, medications                                              |
| 3 AFTER BODY FLUID EXPOSURE RISK          | <b>WHEN?</b> Clean your hands immediately after an exposure risk to body fluids (and after glove removal)<br><b>EXAMPLES:</b> oral/dental care, secretion aspiration, drawing and manipulating blood, clearing up urine, faeces, handling waste |
| 4 AFTER PATIENT CONTACT                   | <b>WHEN?</b> Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side<br><b>EXAMPLES:</b> shaking hands, helping a patient to move around, clinical examination                            |
| 5 AFTER CONTACT WITH PATIENT SURROUNDINGS | <b>WHEN?</b> Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving - even if the patient has not been touched<br><b>EXAMPLES:</b> changing bed linen, perfusion speed adjustment        |



Happiness Lies in Spontaneity. The Moment is Always There. One Needs to Awaken the Awareness to Feel the Moment. It is Awareness that Drives Us into Perfection and Only Through Awareness, Teamwork is Possible, When You're Aware Of the Greater Good of the Team & the Organization  
UBUNTU - I AM, BECAUSE WE ARE





कर्मण्येवाधिकारस्ते मा फलेषु कदाचन |  
मा कर्मफलहेतुर्भूर्मा ते सङ्गोऽस्त्वकर्मणि ||

**karmaṇy-evādhikāras te mā phaleṣhu kadāchanamā  
karma-phala-hetur bhūr mā te saṅgo 'stvakarmaṇi**

*Thus spake Lord Krishna to Arjuna in The Bhagavad Gita (Chapter 2, Verse 47)*

THY RIGHT IS TO WORK ONLY,  
BUT NEVER TO ITS FRUITS;  
LET THE FRUIT OF ACTION BE NOT THY MOTIVE,  
NOR LET THY ATTACHMENT BE TO INACTION.

2.47 = 24x7



Dissociate Yourself  
With the Expectations  
and Ego [“I”] of Your  
Action. Only then,  
Failure Will Not Hurt  
You and Success Will  
Not Make You  
Arrogant.

RaiNQuote