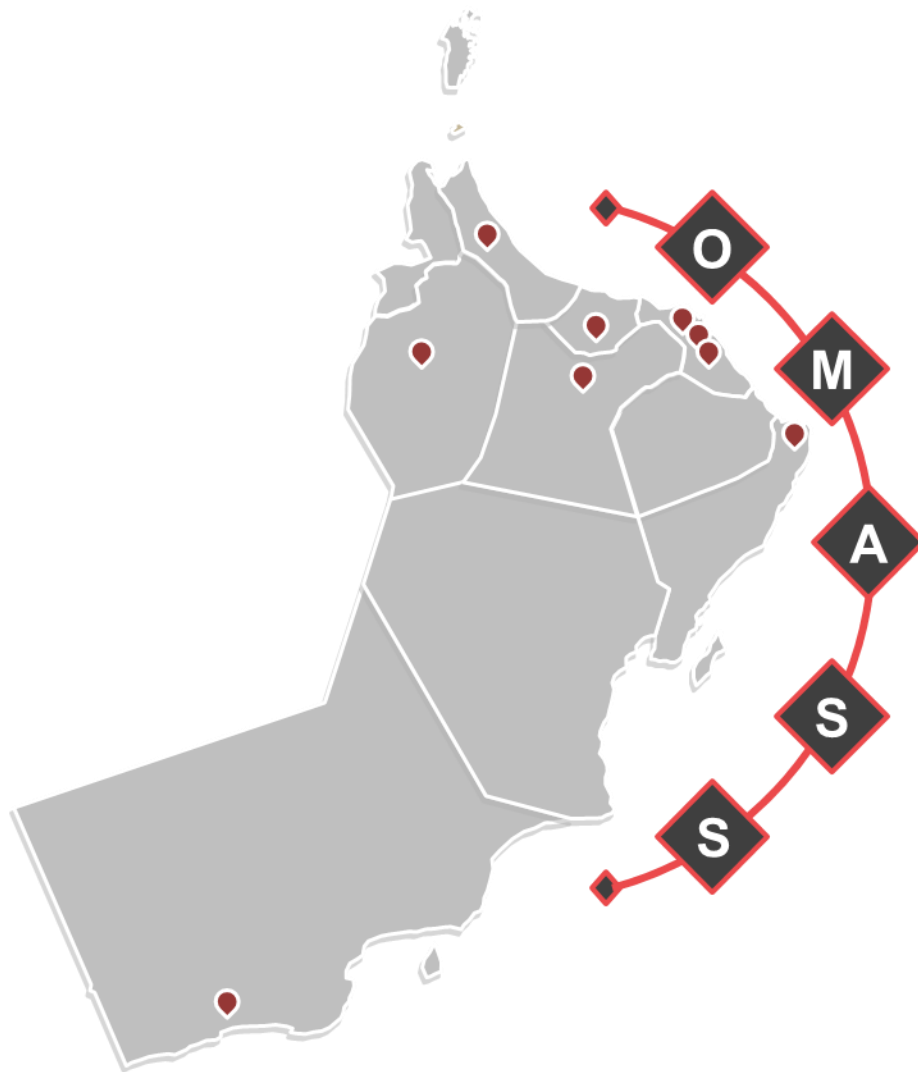




Ministry of Health
Sultanate of Oman

Oman Antimicrobial Resistance Surveillance System

Annual Report 2025



Oman antimicrobial surveillance system (OMASS) report: 2025

Center for Disease Control and Prevention, MoH, Oman 2025

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Table of Contents

	Content	Page
01	Abbreviation and Definitions	03
02	Introduction	09
03	Executive Summary	12
04	Antimicrobial Resistance Report – 2025	15
05	National Antimicrobial Susceptibility Profile – 2025	19
06	National Antimicrobial Usage Report – 2025	27
07	AWaRe Classification	46
08	Quality Assurance	50
09	Appendix	52



1. Abbreviation and Definitions

AMR	Antimicrobial resistance
AMU	Antimicrobial use
AST	Antimicrobial sensitivity testing
ATC	Anatomical therapeutic classification
CDIPC	Central department of infection prevention and control
CLSI	Clinical and Laboratory Standards Institute (Formerly NCCLS, The National Committee for Clinical Laboratory Standards)
CO	Community-onset
CPHL	Central Public Health Laboratories
CRE	Carbapenem-resistant Enterobacterales
DDD	Defined daily dose
CDCP	Center for Disease Control and Prevention
DGMS	Directorate General for Medical Store
DGPA&DC	Directorate General for Pharmaceutical Affairs & Drug Control
DGPHE	Directorate General for Private Health Establishments
DUDR	Daily usage density rate
ESBL	Extended-spectrum β -lactamase producing organism
g	Gram
GLASS	Global Antimicrobial Resistance Surveillance System
HO	Healthcare facility-onset
IPC	Infection prevention and control



IT	Information technology
LabID	Laboratory-identified
MDR	Multidrug resistant
MDRA	MDR <i>Acinetobacter</i> species
MDRE	MDR <i>Escherichia coli</i> species that were not classified as ESBL or CRE
MDRK	MDR <i>Klebsiella</i> species that were not classified as ESBL or CRE
MDRP	MDR <i>Pseudomonas</i> species
mg	Milligram
mg/mL	Milligram/milliliter
MOH	Ministry of Health
MRSA	Methicillin resistant <i>Staphylococcus</i>
MU	Million units
NHSN	National Healthcare Safety Network
OBDs	Occupied bed days
OMASS	Oman Antimicrobial Surveillance System
OPD	Outpatient
Other MDRO	Other gram-negative organisms not specifically mentioned and have been labeled as MDR by the institution's microbiologist
PCR	Polymerase chain reaction
SOP	Standard operating procedure
VRE	Vancomycin-resistant enterococci
WHO	World Health Organization
WHOCC	World Health Organization Collaboration Centre
YUDR	Yearly usage density rate



Definitions

Definitions and methods of the National Healthcare Safety Network (NHSN) of AMR, and MDROs/CDI surveillance modules, were used and/or customized to conform to the national needs and capacity as described below.

- MDRO: The term multidrug resistant organism describes a bacterial isolate that is resistant to one or more classes of antimicrobial agents.
- MDRO colonization: the presence of MDRO in body fluids or tissues (e.g., gastrointestinal tract, urine, or sputum) with growth and multiplication but without tissue invasion or damage and without clinical signs of infection.
- MDRO infection: the presence of MDRO in tissues or body fluids along with signs and symptoms of infection (either locally or systemically) or the presence of MDRO in normally sterile body sites or fluids (usually but not necessarily with symptoms of infection).
- MDRO isolate: Any specimen, obtained for clinical decision-making, testing positive for an MDRO (as defined above).
- MDRO laboratory-identified (LabID) event: All non-duplicate MDRO isolates from any specimen source.
- Community-onset (CO) AMR event: An AMR event specimen collected in an outpatient location or an inpatient location less than two calendar days after admission to the facility.
- Healthcare facility-onset (HO) AMR event: An AMR event specimen collected more than two calendar days after admission to the facility.
- MRSA: Includes *S. aureus* cultured from any specimen that tests oxacillin-resistant, cefoxitin-resistant by standard susceptibility testing methods, or by a laboratory test that is FDA-approved for MRSA detection from isolated colonies; these methods may also include a positive result by any FDA-approved test for MRSA detection such as polymerase chain reaction (PCR) or positive PBP2a from specific sources.



- VRE: Vancomycin-resistant Enterococci; *Enterococcus faecalis*, *Enterococcus faecium*, or *Enterococcus* species unspecified (only those not identified to the species level) that is resistant to vancomycin, by standard susceptibility testing methods or by results from any FDA-approved test for VRE detection from specific specimen sources.
- CRE: Any Enterobacterales testing resistant to Meropenem or Ertapenem by standard susceptibility testing methods (i.e., minimum inhibitory concentrations of ≥ 4 mcg/mL for Meropenem or ≥ 2 mcg/mL for Ertapenem) OR by production of a carbapenemase (i.e., KPC, NDM, VIM, IMP, OXA-48) demonstrated using a recognized test (e.g., polymerase chain reaction, metallo- β -lactamase test, Modified-Hodge test, Carba-NP).
- MDR Acinetobacter: Any *Acinetobacter* spp. testing non-susceptible (i.e., resistant or intermediate) to at least one agent in at least three antimicrobial classes of the following 6 antimicrobial classes:
 1. Cephalosporins (Cefotaxime, Cefepime, Ceftazidime)
 2. β -lactam/ β -lactam β -lactamase inhibitor combination (Piperacillin, Piperacillin/tazobactam)
 3. Carbapenems (Imipenem, Meropenem, Doripenem)
 4. Fluoroquinolones (Ciprofloxacin or Levofloxacin)
 5. Aminoglycosides (Gentamicin, Tobramycin, or Amikacin)
 6. Trimethoprim-sulfamethoxazole
- MDR Pseudomonas: Any *Pseudomonas* spp. testing non-susceptible (i.e., resistant or intermediate) to at least one agent in at least three antimicrobial classes of the following 5 classes:
 1. Cephalosporins (Cefepime, Ceftazidime)
 2. β -lactam/ β -lactam β -lactamase inhibitor combination (piperacillin, Piperacillin/tazobactam)
 3. Carbapenems (Imipenem, Meropenem, Doripenem)
 4. Fluoroquinolones (Ciprofloxacin or Levofloxacin)
 5. Aminoglycosides (Gentamicin, Tobramycin, or Amikacin)



- ESBL Gram negatives: any *E. coli* or *Klebsiella oxytoca* *Klebsiella pneumoniae* or *Proteus mirabilis*. non-susceptible (i.e., resistant or intermediate) to Ceftazidime, Ceftriaxone, or Cefotaxime.
- Drug-resistant *Streptococcus pneumoniae*: *S. pneumoniae* isolated from a sterile site and non-susceptible to one or more antimicrobial agent that is currently approved to treat pneumococcal infection.

The Anatomical Therapeutic Classification (ATC) and the defined daily dose (DDD) definitions and concepts, developed by the Norwegian Institute of Public Health (WHO Collaborating Centre for Drug Statistics Methodology), were used as the basic standards for collecting data about antimicrobial usage adapting following definitions:

- Antimicrobial: A drug that is classified as an anti-infective agent for systemic use within the World Health Organization Collaboration Centre for Drug Statistics Methodology's (WHOCC) ATC classification system. These include agents listed within category:
 - J01 (antibacterial)
 - J02 (antifungals)
 - J05 (antivirals)
 - J04AB02 (Rifampicin)
- Antimicrobial usage: The quantity of each antimicrobial agent used per reporting period (e.g. month) within the included wards and clinical areas.
- DDD: is the assumed average maintenance dose per day for a drug used for its main indication in adults.
 - It should be emphasized that the defined daily dose is a unit of measurement and does not necessarily reflect the recommended or prescribed daily dose.
 - Drug consumption data presented in DDDs only give a rough estimate of consumption and not an exact picture of actual use. The DDD provides a fixed unit of measurement independent of price and dosage form (e.g. tablet strength) enabling the researcher to assess trends in drug consumption and to



perform comparisons between population groups and agents, at a local, national, and international level.

- Because DDDs are based on adult dosing, this parameter is not recommended for measuring antimicrobial usage in pediatric populations, but in absence of good alternative, some programs like ours, have adopted it in order to monitor the trend using same methodology.
- Number of DDDs = total grams used/DDD value.
- The ATC classification system is available online:
http://www.whocc.no/ddd/definition_and_general_considera/
- OBDs: The total number of bed days of all admitted patients accommodated during the reporting period (e.g. month) taken from a count of the number of inpatients at about midnight each day.
- Usage density rate for inpatients: The number of DDDs used per 1,000 OBDs.
- Usage density rate for outpatients: The number of DDDs used per 1,000 outpatient visits.



2. Introduction

Antimicrobial resistance is defined as the ability of a microorganism to resist the action of one or more antimicrobial agents. The consequences can be severe and could lead to patient's death if prompt treatment with effective antimicrobials is not initiated or if the organism is resistant to all available antibiotics. The major drivers behind the occurrence and spread of AMR are the overuse of antimicrobial agents and the transmission of antimicrobial-resistant microorganisms between humans; between animals; and between humans, animals, and the environment.

Oman Antimicrobial Surveillance System is one of the core elements of the national strategic plan in combating the spread of antimicrobial resistance endorsed by the MoH, the Minister of Health in May 2016. The system is run by the Center for Disease Control and Prevention in collaboration with the Directorate General Of Information Technology & Digital Health (DGITDH) , Drug Safety Center(DSC), and Directorate General Of Medical Supplies (DGMS).The surveillance system currently involves only the MoH facilities as it is dependent on the medical electronic data system for generating the information in addition to the data provided by the Central Public Health Laboratory (CPHL). The surveillance system provides data and feedback to all involved facilities, governorates, and higher authorities including the national AMR committee, and publish annual report with information on:

1. The rates of different MDRO bacterial pathogens nationally and for individual surveillance sites
2. The data on antibiotics utilization nationally and for individual sites and governorates segregated into adult and pediatric populations for both in-patients and out-patients' services.
3. The annual national antibiogram as constructed from the enrolled laboratories and CPHL
4. Emerging antimicrobial resistant pathogens detected through the system

The Data gathered from this system is also used to prepare and submit our annual report to the Global Antimicrobial Surveillance System (GLASS) so we can compare our data with the other countries worldwide.



The MDRO surveillance component was designed as a lab-based system. This report include data collected from 10 sentinel surveillance hospitals (Royal, Khoulah, Al Nahdah, Nizwa, Rustaq, Ibri, Sohar, the Sultan Qaboos Hospital in Salalah, Ibra and Sur). The data of all isolated pathogens from the enrolled labs was extracted from Al-Shifa system (MoH, Healthcare Information System) to an Excel working data sheet provided in the hospital's electronic system and centrally at the Directorate General for Information Technology (DGIT). The data from 1st of January 2025 to 31st of December 2025 was analyzed after removing patient duplicates and counting only one positive (the most invasive if more than one type of specimen was present) for the same organism in a year's time. The multidrug resistant organisms (MDRO) described in this report have included MRSA, Carbapenem-resistant Enterobacterales (CRE), MDRA, MDRP, extended-spectrum β -lactamase (ESBL), and any other organism labeled by the microbiology lab as MDRO in the reporting system.

For the national antibiogram; AST data generated from the participating laboratories and the CPHL National laboratory-based surveillance for *Streptococcus pneumoniae*, *Salmonella spp*, *Neisseria gonorrhoeae*, and *Candida auris*. The cumulative antibiogram report presents antimicrobial susceptibility data as the percentage of isolates categorized as susceptible according to the Clinical and Laboratory Standards Institute (CLSI) guideline M39 for analysis and presentation of cumulative antimicrobial susceptibility test data.

The term Antimicrobial Usage (AMU) refers to measuring the quantity of each antimicrobial agent used per reporting period (e.g. month, year) within the included facility, wards and clinical areas. There is currently good evidence that overuse and inappropriate use of antimicrobials lead to the emergence and dissemination of resistant organisms, with studies showing that resistance rises with increased antimicrobial use (AMU) and falls after reduced use. The defined daily doses (assumed average maintenance dose per day for a drug) has been the most widely used and acceptable methods for AMU reporting and it has been adapted by our system for both the adult and pediatric population. A pre-structured Excel datasheet was filled in with the WHO DDD and WHO DDD units that corresponding to the antimicrobials used during the defined period. Using Excel math functions, the DDDs were calculated by dividing the quantity that was dispensed or administered in grams or MU by the WHO DDDs.



For the inpatient setting the usage density rate was obtained using OBDs as denominator and for the outpatient it was number of outpatient visits for the facilities and per 1000 inhabitanace nationally (please referee to definition section for more details). The AMU report currently offers data by inpatient and outpatient settings, as well as adult and pediatric categories, but does not stratify facilities by clinical areas. We had also compared the usage of this year to the previous year utilizing YUDR value for each antimicrobial to ease the follow-up process. The cost of the antimicrobials is not necessary for calculating DDDs, but can be included to indicate financial burden in future reports.

At a national level, data on AMR and AMU together contribute to policy decisions such as development or revision of antibiotic guidelines, and identify priorities for public health action, such as education campaigns or regulatory measures. Conversely, lack of surveillance can lead to misdirected and inefficient policies, wasting of limited resources, inappropriate therapy, and, ultimately, human suffering and death through the inability to provide an effective drug to patients in need.



3. Executive Summary

The Oman Antimicrobial Surveillance System (OMASS) serves as a foundational component of the national strategy to combat antimicrobial resistance (AMR). It integrates and synthesizes epidemiological data with laboratory and pharmacy information from the Ministry of Health to provide a comprehensive overview of AMR and antimicrobial use (AMU).

Through this integrated approach, OMASS generates annual reports that bring together relevant findings on AMR and AMU. The resulting dataset provides policymakers with critical evidence to guide prudent antimicrobial use practices and to support initiatives designed to prevent, limit, and control the development and spread of AMR in Oman.

Although this report encompasses all relevant AMR and AMU findings, the summary highlights the most notable changes observed during the reporting period.

For the AMR section, analyses were conducted by excluding duplicate patient entries and considering only one positive sample (selecting the most invasive if multiple types were present) per organism annually. The multidrug-resistant organisms (MDROs) addressed include MRSA, CRE, MDRA, MDRP, ESBL, and any other microorganism classified as MDRO by the microbiology laboratory within the reporting system. Incidence rates were determined per 1,000 submitted or positive samples of the same specimen type. By utilizing blood cultures as an infection proxy, the national infection rate with MDROs in 2025 (calculated as: total positive MDROs in blood cultures / total positive blood cultures × 1,000) was established at 121.9. The number of blood culture submissions rose from 92,175 to 94,303, while positive cultures decreased from 8,476 to 7,557. Consequently, the incidence of positive cultures declined from 92 to 80.1 per 1,000 submitted samples. Conversely, MDRO isolates increased from 832 to 921, resulting in an incidence rise from 9 to 9.8 per 1,000 submitted samples and a substantial increase in MDRO incidence per 1,000 positive blood cultures from 98.2 to 121.9. These findings indicate a growing prevalence of multidrug resistance among bloodstream infections in 2025.

Nationally, ESBL exhibited the highest incidence of infection among MDROs, with a rate of 49.4 per 1,000 positive blood cultures in 2025, compared to 46 per 1,000 in 2024. MRSA had the second highest incidence in 2025 at 27.3 per 1,000, up from 22.8 in 2024, followed by CRE which increased from 8.5 in 2024 to 13 per 1,000 in 2025. Bacteremic patients with CRE, VRE,



MDRPA, and MDRA demonstrated the highest mortality rates (38.8%, 53.5%, 38.5%, and 57.1%, respectively) compared to other MDROs (see Table 3).

The national antibiogram is a valuable resource for antimicrobial stewardship. It supports the development and revision of antimicrobial guidelines, informs clinical decision-making, facilitates the monitoring of emerging resistance threats, and strengthens national strategies to combat antimicrobial resistance. The key findings from the national antibiogram are summarized below.

Invasive Streptococcus pneumoniae

National invasive *Streptococcus pneumoniae* isolates remained highly susceptible to key first-line antimicrobials during 2024–2025. Susceptibility to amoxicillin, cefotaxime using non-meningitis breakpoints, vancomycin, and meropenem exceeded 99%, indicating sustained national effectiveness of these agents. (Table 1)

Ceftriaxone susceptibility using meningitis breakpoints improved slightly, from 91.4% in 2024 to 94.9% in 2025. However, reduced susceptibility to penicillin using meningitis breakpoints persisted, changing from 66.4% in 2024 to 68.4% in 2025. This finding emphasizes the need for careful antimicrobial selection in central nervous system infections.

Macrolide susceptibility remained comparatively lower. Erythromycin susceptibility improved slightly from 73.8% to 76.1%, while clindamycin susceptibility remained stable at approximately 85%. Overall, the antibiogram demonstrates stable susceptibility trends and preserved efficacy of key agents against invasive pneumococcal disease nationally.

National Salmonella Susceptibility

The national *Salmonella* susceptibility profile showed declining susceptibility to several key antimicrobials between 2024 and 2025. Ampicillin susceptibility decreased slightly from 79.3% to 73.7%. Ceftriaxone susceptibility declined from 94.9% to 89%, while ciprofloxacin susceptibility remained relatively low and decreased from 74.2% to 70.6%. (Table 2)

During 2025, 25 *Salmonella typhi* isolates were identified. Of these, 13 were multidrug-resistant and 10 were extensively drug-resistant. These findings highlight the ongoing emergence of resistant enteric fever strains and the importance of continued surveillance and antimicrobial stewardship.

National Neisseria gonorrhoeae Susceptibility

The national *Neisseria gonorrhoeae* susceptibility profile demonstrated sustained high susceptibility to ceftriaxone and azithromycin during 2024–2025. Ceftriaxone susceptibility



remained at 100% in both years, while azithromycin susceptibility improved from 95.8% in 2024 to 100% in 2025. These results support the continued effectiveness of current recommended treatment regimens. (Table 3)

In contrast, very high resistance rates were observed for ciprofloxacin and penicillin. Ciprofloxacin susceptibility declined from 1.7% in 2024 to 0% in 2025. Penicillin susceptibility remained extremely low, decreasing from 3.4% in 2024 to 2.1% in 2025. Tetracycline susceptibility also remained low, at approximately 27% in both years.

Candida auris Susceptibility

Candida auris isolates remained fully susceptible to the echinocandins caspofungin and micafungin, according to the tentative *C. auris* breakpoints published by the CDC during the past years. (Table 4)

Additional Resistance Findings

- *E. faecium* exhibited extensive resistance to multiple first-line antimicrobials, including ampicillin, penicillin, ciprofloxacin, and erythromycin, with susceptibility rates generally below 10%. Vancomycin susceptibility remained low and declined from 48.6% in 2024 to 43.1% in 2025, indicating a substantial burden of vancomycin-resistant *E. faecium*. (Table 6)
- The prevalence of MRSA in bloodstream infections increased from 32.5% in 2024 to 48.9%, indicating a substantial national rise in methicillin-resistant *Staphylococcus aureus*.
- A notable decline in carbapenem susceptibility was observed among *Klebsiella pneumoniae* strains isolated from blood cultures compared with 2024. (Table 7A)

Antimicrobial Utilization (AMU) 2025

In 2025, antimicrobial utilization patterns varied across inpatient and outpatient populations. Among adult inpatients, the Yearly Usage Density Rate (YUDR) increased substantially for several antibiotics.

The most pronounced increase was observed for sulphadiazine, which rose by **555.1%**. Clindamycin use increased by **139.29%**, while cefepime use increased by **133.3%**.

In contrast, the YUDR for **ceftazidime, vancomycin, and ciprofloxacin** continued to decline among both adult and pediatric inpatients during 2025.



Piperacillin-tazobactam use increased among adult inpatients but remained unchanged among pediatric inpatients.

National antibiotic consumption in 2025 differed according to patient group and care setting.

- **Adult inpatients:** Ceftriaxone was the most widely utilized antibiotic, followed by metronidazole, piperacillin-tazobactam, and cefuroxime. This pattern mirrored the utilization observed in 2024.
- **Pediatric inpatients:** Ceftriaxone remained the leading antibiotic, followed by amoxicillin/clavulanic acid and azithromycin.
- **Adult outpatients:** Amoxicillin remained the primary antimicrobial prescribed, followed by doxycycline and cefuroxime. This distribution was consistent with the previous year's data.
- **Pediatric outpatients:** Amoxicillin continued to be the most commonly prescribed antibiotic, followed by cefuroxime and either cephalexin or cephradine. This pattern was in line with trends observed in 2023.
- Antimicrobial costs were excluded from this report's Defined Daily Dose (DDD) calculations. Nevertheless, cost analysis may be undertaken using unit cost information available from the pharmacy department.
- With regards to AWaRe classification and AMU, the following key findings were observed:
 - National antimicrobial utilization (AMU) remained predominantly driven by WHO **Access group** antibiotics in both 2024 and 2025.
 - In 2025, Access antibiotics accounted for 78.2% of total consumption, while **Watch** and **Reserve** groups represented 21.45% and 0.35%, respectively, demonstrating continued alignment with WHO AWaRe stewardship targets.
 - Compared with 2024, overall antibiotic consumption slightly declined, with a modest reduction in Watch and Reserve group utilization.





Antimicrobial Resistance, 2024 &2025 report



4. Antimicrobial Resistance, 2024 & 2025

Table 1: Samples submitted for analysis nationally

Specimen type	2024		2025	
	Total national	Total for AMR Surveillance Sentinel Hospitals (%)	Total national	Total for AMR Surveillance Sentinel Hospitals (%)
Blood	101564	92175 (90.8)	104770	94303 (90)
Urine	137497	115837 (84.2)	145391	121686 (83.7)
Stool	5108	4344 (85)	4848	4005 (82.6)
Genital	83	83 (100)	80	78 (97.5)
CSF	2199	2172 (98.8)	2484	2456 (98.9)
Total	246451	214611 (87.1)	257573	222528 (86.4)

Table 2: Positive rates and MDRO per specimen type nationally

Source	Classification	2024	2025
All samples	Total submitted for culture	214611	222528
	Total positive cultures	78686	73601
	Positive culture incidence per 1000 submitted samples	366.6	330.7
	Total MDRO Isolates	15499	16117
	MDRO incidence per 1000 submitted samples	72.2	72.4
	MDRO incidence per 1000 positive samples	197	219
Blood samples	Total submitted for culture	92175	94303
	Total positive cultures	8476	7557
	Positive culture incidence per 1000 submitted samples	92	80.1
	Total MDRO isolates	832	921
	MDRO incidence per 1000 submitted samples	9	9.8
	MDRO incidence per 1000 positive samples	98.2	121.9
Urine sample	Total submitted for culture	115837	121686
	Total positive cultures	19444	19230
	Positive culture incidence per 1000 submitted samples	167.9	158
	Total MDRO Isolates	5389	5380
	MDRO incidence per 1000 submitted samples	46.5	44.2
	MDRO incidence per 1000 positive samples	277.2	279.8



Table 3: National MDRO data by type, origin, and mortality for 2025

Type of specimen	MDRO 2024	Source 2025				Mortality ** N (%)	Incidence per 1000 positive culture ***
		CO	HO	UK	(%)*from positive MDRO		
Total positive blood cultures: 7557	CRE	11	72	15	98 (10.6)	38 (38.8)	13.0
	MDRA	2	26	0	28 (3)	16 (57.1)	3.7
	MDRP	0	10	3	13 (1.4)	5 (38.5)	1.7
	ESBL	55	177	141	373 (40.5)	56 (15)	49.4
Blood MDRO (Total= 921)	MRSA	35	105	66	206 (22.4)	17 (8.3)	27.3
	VRE	6	33	4	43 (4.7)	23 (53.5)	5.7
	Other MDRO	48	88	24	160 (17.4)	30 (18.8)	21.2
Total positive urine cultures: 19230	CRE	114	169	113	396 (7.4)	25 (6.3)	20.6
	MDRA	13	18	6	37 (0.7)	6 (16.2)	1.9
	MDRP	20	46	24	90 (1.7)	7 (7.8)	4.7
	ESBL	2208	783	1202	4193 (77.9)	56 (1.3)	218.0
Urine MDRO (Total= 5380)	MRSA	44	12	27	83 (1.5)	2 (2.4)	4.3
	VRE	11	91	39	141 (2.6)	21 (14.9)	7.3
	Other MDRO	202	101	137	440 (8.2)	14 (3.2)	22.9

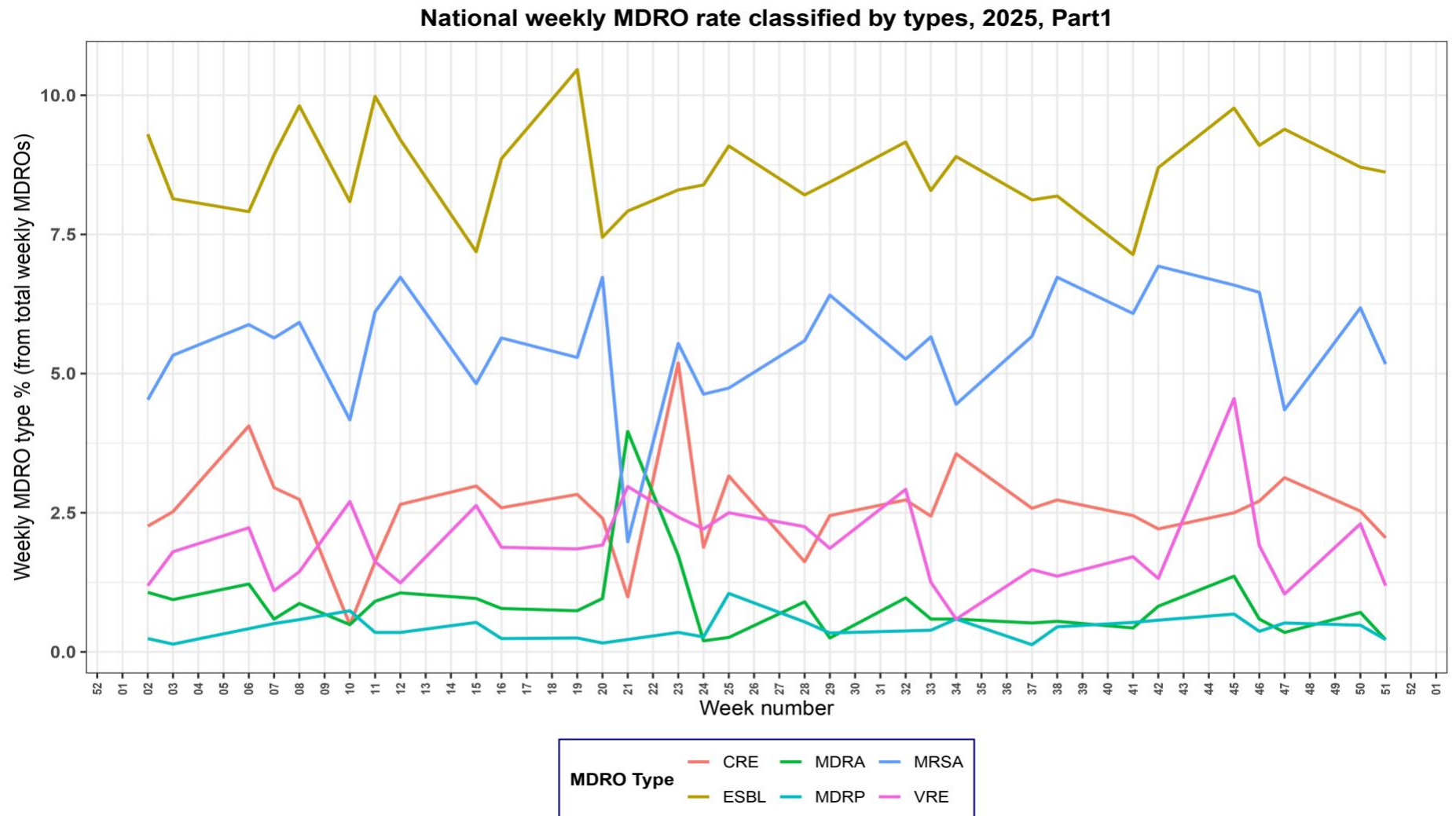
*calculated using total MDRO positive samples for same specimen type as denominator, for example: for CRE in urine samples nationally it is (396/5380) X 100 = 7.4%.

** mortality % calculated as proportion of death (discharge status) from positive MDRO cases for same organism, for e.g. CRE bacteremia is (38/98) X 100 = 38.8%. *** incidence of infection with specific MDRO type calculated per 1000 positive culture from same type of specimen: number of positive isolates of organisms/total positive samples x1000 (e.g. for CRE blood infection incidence = (98/7557) X 1000 = 13)

CO = community-onset, HO = healthcare facility-onset, UK = unknown



Figure 1: Weekly national MDRO rates by type for 2025





National Antimicrobial Susceptibility Profile, 2024 – 2025



5. National Antimicrobial Susceptibility Profile – 2024 &

To read this antibiogram:

- Each organism is presented with the susceptibility in percent to that antibiotic and the number of isolates tested for that specific antibiotic.
- Antibiotics not shown for an organism represent that susceptibility testing for that specific organism is not recommended/standardized, that complete testing data was not available, or number is too small for a valid reporting.
- The first isolate per patient per year was used for reporting sensitivity as recommended by GLASS.

Please Note: The data included in this antibiogram may not be generalized to specific patient population or location in the healthcare facility. The decisions for treatment SHOULD NOT only be based on the antibiogram data. The facility/national antibiogram in addition to considering patient clinical presentation, past history of infections, and antibiotic use are all critical for treatment decision.



Table 1: National invasive Pneumococcal susceptibility, 2024 & 2025

Antimicrobial	Percentage susceptible(N)*	
	2024	2025
Amoxicillin	99.2 (127)	100 (117)
Cefotaxime meningitis breakpoints	98.4 (128)	100 (117)
Cefotaxime non-meningitis breakpoints	100 (128)	100 (117)
Ceftriaxone meningitis breakpoints	91.4 (128)	94.9 (111)
Ceftriaxone non-meningitis breakpoints	100 (128)	99.1 (116)
Chloramphenicol	97.6 (127)	99.1 (116)
Clindamycin	85 (127)	85.5 (100)
Erythromycin	73.8 (126)	76.1 (89)
Levofloxacin	100 (127)	99.1 (116)
Meropenem	97.4 (117)	100 (117)
Penicillin meningitis breakpoints	66.4 (128)	68.4 (80)
Penicillin non-meningitis breakpoints	100 (128)	99.1 (116)
Trimethoprim-sulfamethoxazole	78 (127)	81.2 (95)
Vancomycin	100 (128)	100 (117)

*Numbers in parenthesis denote isolate tested

Table 2: National susceptibility profile for *Salmonella*, 2024 & 2025

Antimicrobial	<i>Salmonella</i> spp* Percentage susceptible (N)**	
	2024	2025
Ampicillin	79.3 (662)	73.7 (654)
Ceftriaxone	94.9 (662)	89 (654)
Chloramphenicol	91.2 (662)	89.7 (653)
Ciprofloxacin	74.2 (662)	70.6 (654)
Meropenem	-	100 (79)
Trimethoprim-sulfamethoxazole	90.2 (662)	89.4 (654)

**Numbers in parenthesis denote isolate tested. During 2025, 25 isolates of *S. typhi* (with 13 MDR and 10 XDR isolates) and one isolates of *S. paratyphi A* were detected.

Table 3: National susceptibility profile of *Neisseria gonorrhoeae*, 2024 & 2025

Antimicrobial	Percentage susceptible(N)*	
	2024	2025
Azithromycin	95.8 (24)	100 (46)
Ceftriaxone	100 (59)	100 (47)
Ciprofloxacin	1.7 (59)	0 (47)
Penicillin	3.4 (59)	2.1 (47)
Tetracycline	27.1 (59)	27.7 (47)

*Numbers in parenthesis denote isolate tested



Table 4: Antifungal Susceptibility Profile for *Candida auris*, 2024 & 2025

Antifungals	Susceptible percentage(n)*	
	2024	2025
Amphotericin	19.2 (73)	56.3 (71)
Anidulafungin	-	100 (19)
Caspofungin	95.9 (73)	98.6 (71)
Fluconazole	20.5 (73)	9.9 (71)
Micafungin	97.2 (72)	100 (71)

*Numbers in Parenthesis denote isolates tested

Table 5: Gram Positive Organism- Blood isolates, 2024 & 2025

Antimicrobial	<i>Staphylococcus aureus</i>	
	2024	2025
Amoxicillin/Clavulanic acid	61.2 (121)	47.7 (149)
Ampicillin	8.3 (72)	9.3 (86)
Cefoxitin	8.3 (12)	19.7 (71)
Cefuroxime	31.2 (16)	36.1 (61)
Ciprofloxacin	69.3 (423)	79 (442)
Clindamycin	88.3 (489)	86.2 (571)
Cloxacillin	66.3 (389)	59.5 (487)
Doxycycline	93.1 (29)	100 (23)
Erythromycin	82.4 (459)	78.8 (553)
Gentamicin	92.5 (453)	95 (479)
Levofloxacin	75.4 (138)	82.1 (156)
Linezolid	100 (383)	100 (456)
Nitrofurantoin	100 (59)	100 (52)
Oxacillin	67.5 (154)	51.1 (182)
Penicillin V	14.3 (371)	11.3 (444)
Rifampin	99.6 (277)	99.7 (293)
Teicoplanin	100 (158)	100 (142)
Tetracycline	87.5 (359)	88.8 (445)
Tigecycline	100 (139)	100 (168)
Tobramycin	93.3 (60)	94.1 (51)
Trimethoprim/Sulfamethoxazole	92.5 (504)	90.2 (573)
Vancomycin	99.8 (443)	99.8 (529)

*Most of health care facilities screen for MRSA by oxacillin and/or cefoxitin



Table 6: Gram Positive organisms- Blood isolates, 2024 & 2025

Antimicrobial	<i>Enterococcus faecalis</i>		<i>Enterococcus faecium</i>	
	2024	2025	2024	2025
Amoxicillin/Clavulanic acid	100 (55)	95.5 (44)	12.5 (16)	5 (20)
Ampicillin	100 (189)	99 (204)	8.5 (106)	8.3 (121)
Ciprofloxacin	56.7 (120)	58 (119)	7 (57)	9.1 (66)
Erythromycin	9.7 (62)	0 (45)	6.5 (31)	5.6 (36)
Gentamicin-High	70.9 (86)	72.7 (88)	66.7 (33)	62.7 (51)
Linezolid	98.6 (145)	98 (148)	96.9 (98)	95.5 (112)
Penicillin V	96.2 (53)	100 (60)	7.1 (42)	6.2 (48)
Streptomycin-High	63.9 (36)	66.7 (33)	23.8 (21)	45 (20)
Teicoplanin	100 (58)	97.8 (46)	53.6 (28)	59.3 (27)
Tetracycline	27.9 (61)	24 (50)	24.2 (33)	29.7 (37)
Tigecycline	100 (54)	100 (49)	100 (30)	97.1 (35)
Vancomycin	98.9 (183)	99 (194)	48.6 (107)	43.1 (123)

*Numbers in Parenthesis denote isolates tested

**Note if the total number of isolates tested <30 strains will not reported

Table 7 (A): Gram Negative organisms- Blood isolates, 2024 & 2025

Antimicrobial	<i>Escherichia coli</i>		<i>Klebsiella pneumoniae</i>		<i>Proteus mirabilis</i>		<i>Serratia marcescens</i>		<i>Enterobacter cloacae</i>	
	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025
Amikacin	96 (501)	95.9 (632)	79.9 (384)	71.9 (520)	87.8 (49)	87.3 (55)	96.4 (55)	98.7 (78)	99.1 (112)	96.7 (120)
Amoxicillin-clavulanic acid	55.4 (487)	52 (525)	49.7 (368)	48.1 (418)	88.7 (53)	74.5 (51)	0 (59)	0 (64)	0.9 (108)	0 (97)
Ampicillin	20.4 (452)	17.3 (509)	0 (340)	0.9 (441)	64.1 (39)	71.1 (38)	0 (47)	0 (69)	2.5 (81)	0 (79)
Cefipime**	53.8 (418)	48.6 (496)	58.4 (296)	50.5 (426)	89.1 (46)	84.3 (51)	91.9 (37)	95.7 (69)	94.9 (98)	88.8 (98)
Cefotaxime	41.2 (170)	37.4 (281)	45.7 (162)	37.3 (233)	88.9 (18)	81.2 (16)	65.6 (32)	82.1 (28)	74.2 (31)	72.3 (47)
Cefoxitin	89.6 (67)	86.2 (109)	66.7 (57)	58.8 (97)	100 (12)	92.9 (14)	0 (8)	0 (8)	5.9 (17)	0 (23)
Ceftazidime	45 (516)	42.8 (650)	51.5 (398)	44 (532)	83.9 (56)	81.4 (59)	91.8 (49)	96 (75)	86.2 (109)	78.6 (117)
Ceftriaxone	43.5 (520)	40.8 (644)	53.6 (390)	45.9 (518)	82.5 (57)	82.5 (57)	86.3 (51)	93.2 (74)	83.6 (110)	73 (122)

Cefuroxime	36 (544)	33.7 (652)	50.1 (411)	42.2 (545)	81 (58)	81 (58)	0 (59)	2.6 (78)	40 (115)	41.5 (118)
Chloramphenicol	72 (25)	75 (36)	73.9 (23)	68.6 (35)	66.7 (6)	50 (4)	0 (1)	100 (2)	60 (10)	83.3 (12)
Ciprofloxacin	45.4 (527)	37.3 (665)	53.1 (401)	46.1 (542)	56.1 (57)	60.3 (63)	86.4 (59)	97.3 (75)	88.5 (104)	84 (125)
Colistin	3.8 (26)	8.5 (82)	35.4 (48)	14.4 (125)	0 (7)	0 (7)	0 (1)	0 (7)	9.1 (11)	3.7 (27)
Doxycycline	69 (29)	66.7 (54)	62.5 (24)	60 (50)	0 (8)	0 (6)	100 (1)	100 (3)	90 (10)	84.6 (13)
Ertapenem	98.7 (373)	95.5 (374)	78 (277)	66.6 (332)	97.7 (43)	97.5 (40)	92.9 (28)	92.1 (38)	93 (86)	83.1 (77)
Gentamicin	86.9 (549)	83.8 (662)	76.9 (424)	73.6 (546)	79.3 (58)	75 (60)	96.7 (61)	97.4 (78)	98.3 (119)	96 (124)
Imipenem	98.7 (455)	97 (536)	77.6 (343)	70.1 (432)	35.9 (39)	42.9 (35)	88.9 (54)	75.5 (53)	95.5 (110)	94.5 (109)
Levofloxacin	15.1 (93)	18.5 (135)	26.1 (46)	26.9 (130)	44.4 (9)	30 (10)	100 (1)	92.3 (13)	69.2 (13)	73.9 (23)
Meropenem	98.9 (540)	97.4 (656)	78.8 (410)	72.7 (524)	100 (57)	98.3 (58)	95.1 (61)	96.2 (78)	97.5 (118)	96.8 (124)
Nitrofurantoin	95.1 (204)	95.1 (184)	31.9 (116)	19.8 (126)	0 (31)	3.4 (29)	0 (15)	10 (10)	23.7 (38)	29.7 (37)
Ofloxacin	61.3 (31)	63.2 (38)	79.2 (24)	52.9 (34)	40 (5)	50 (2)	100 (5)	100 (4)	90 (10)	71.4 (7)
Piperacillin-Tazobactam	92.8 (542)	88.7 (654)	67.2 (412)	60.7 (527)	100 (58)	98.2 (57)	92.3 (52)	91.7 (72)	87.2 (117)	78 (123)
Tetracycline	57.1 (56)	63.9 (72)	59.3 (59)	49.3 (73)	0 (12)	0 (7)	71.4 (7)	100 (3)	93.3 (15)	86.7 (15)
Tigecycline	97.6 (41)	100 (91)	63.2 (57)	71.6 (116)	0 (10)	10 (10)	100 (6)	100 (7)	100 (14)	100 (27)
Tobramycin	87.3 (63)	85.3 (75)	74.5 (55)	63 (73)	83.3 (12)	100 (8)	85.7 (7)	100 (3)	89.5 (19)	88.2 (17)
Trimethoprim/Sulfamethoxazole	53.9 (549)	52.3 (658)	58.6 (423)	55.3 (535)	53.4 (58)	61.3 (62)	98.4 (61)	100 (76)	93.3 (119)	91.3 (126)

*Numbers in Parenthesis denote isolates tested

** The rate of non-susceptibility to some broad spectrum antibiotics might be over-estimated due to the fact that these antibiotics were selectively tested for the resistant strains according to testing tiers of national guidelines.

Table 7 (B): Gram Negative organisms -Blood isolates, 2024 & 2025				
Antimicrobial	<i>Acinetobacter baumannii</i>		<i>Pseudomonas aeruginosa</i>	
	2024	2025	2024	2025
Amikacin	50 (78)	46.1 (141)	93.9 (164)	96.9 (254)
Cefepime	53.1 (64)	42.2 (116)	87.4 (167)	85.4 (261)



Cefotaxime	18.8 (32)	5.3 (38)	-	-
Ceftazidime	48.8 (82)	41.5 (142)	85.6 (202)	86.6 (321)
Ceftriaxone	37.7 (53)	29 (69)	-	-
Ciprofloxacin	50.6 (83)	40.8 (142)	88.1 (202)	88.5 (322)
Colistin	75 (20)	51.1 (45)	41.4 (29)	11.9 (42)
Gentamicin	54.2 (83)	43.7 (142)	92.6 (122)	89.3 (112)
Imipenem	54.2 (59)	47.6 (103)	79.2 (144)	76.1 (251)
Levofloxacin	60.7 (28)	49.1 (55)	79.6 (98)	82.5 (137)
Meropenem	51.2 (82)	43.4 (145)	82.6 (195)	79.6 (324)
Piperacillin/Tazobactam	47.6 (82)	39.2 (143)	83.6 (201)	84.5 (322)
Trimethoprim/Sulfamethoxazole	64.6 (82)	48.6 (144)	-	-

*Numbers in Parenthesis denote isolates tested

Table 8: Gram Positive Organisms – Urine isolates, 2024 & 2025

Antimicrobial	<i>Enterococcus faecalis</i>		<i>Enterococcus faecium</i>		<i>Staphylococcus aureus</i>	
	2024	2025	2024	2025	2024	2025
Amoxicillin	100 (145)	100 (146)	6.2 (32)	5.7 (35)	15 (20)	31.2 (32)
Amoxicillin/Clavulanic acid	97.3 (225)	97.4 (265)	19.5 (41)	8.8 (80)	65.4 (52)	60.2 (83)
Ampicillin	98.4 (1036)	98.6 (919)	7.1 (252)	6.7 (313)	27.5 (51)	11.9 (59)
Ciprofloxacin	69.1 (1010)	64.8 (918)	5.6 (250)	5.4 (312)	75.3 (235)	73.8 (221)
Clindamycin	-	-	-	-	88.1 (177)	89.1 (192)
Cloxacillin	-	-	-	-	70.8 (178)	73.1 (216)
Doxycycline	60 (35)	60 (45)	9.5 (21)	19.4 (36)	100 (27)	100 (60)
Erythromycin	19.3 (539)	15.8 (400)	5.3 (131)	6.2 (113)	86.5 (178)	83.1 (189)
Gentamicin	90 (30)	62.5 (8)	-	-	96.8 (251)	96.3 (270)
Gentamicin-High	82.6 (213)	80.7 (187)	53.8 (39)	63.9 (72)	-	-
Levofloxacin	76.1 (180)	76 (154)	5.4 (74)	7.3 (109)	85.5 (76)	75 (92)
Linezolid	98.4 (702)	98 (504)	95 (222)	95.7 (280)	99.4 (172)	100 (176)
Nitrofurantoin	97.5 (771)	98.7 (676)	29.6 (196)	18.6 (237)	99.5 (187)	98.9 (179)
Penicillin V	95.4 (216)	98.7 (151)	4.3 (70)	5 (101)	20.3 (172)	17.1 (199)
Streptomycin-High	81.2 (266)	76.5 (298)	46.7 (60)	21.1 (71)	-	-
Teicoplanin	100 (506)	100 (335)	46.6 (118)	59.5 (79)	99.3 (152)	100 (134)
Tetracycline	25 (696)	24.8 (521)	21.4 (196)	28.6 (203)	89.3 (206)	89.4 (218)



Tigecycline	99.4 (508)	100 (349)	99.2 (125)	100 (111)	100 (152)	100 (135)
Tobramycin	-	-	-	-	98.1 (53)	90.5 (63)
Trimethoprim/Sulfamethoxazole	-	-	-	-	94.9 (277)	94.8 (289)
Vancomycin	99.3 (1005)	99.6 (894)	46.4 (252)	47.9 (317)	99.5 (220)	100 (242)



Table 9: Gram Negative Organisms – Urine isolates, 2024 & 2025

Antimicrobial	<i>Escherichia coli</i>		<i>Klebsiella pneumoniae</i>		<i>Proteus mirabilis</i>		<i>Acinetobacter baumannii</i>		<i>Pseudomonas aeruginosa</i>	
	2024	2025	2024	2025	2024	2025	2024	2025	2024	2025
Amikacin	96.7 (7366)	96.2 (6726)	87.4 (2242)	85.7 (2084)	90.3 (236)	90.9 (252)	70.8 (315)	68.3 (243)	93.8 (1004)	93.1 (1055)
Amoxicillin	26.9 (160)	26.7 (105)	2.6 (39)	0 (26)	-	-	-	-	-	-
Amoxicillin/Clavulanic acid	62.1 (8762)	59.6 (7540)	64.5 (2660)	61.2 (2341)	79.5 (283)	83.1 (302)	4.8 (21)	13.3 (30)	-	-
Ampicillin	27 (6310)	26.5 (4174)	2.5 (1854)	0.8 (1448)	64.7 (207)	66.3 (169)	3.8 (26)	14.3 (28)	-	-
Cefepime	66.7 (6323)	62.1 (5428)	68.6 (1861)	64.3 (1713)	91.7 (205)	92.4 (223)	65.8 (231)	61.4 (189)	85.7 (782)	83.3 (922)
Cefotaxime	55.9 (1675)	52.5 (2001)	60.2 (691)	55.6 (737)	87.2 (47)	89 (73)	16 (100)	29.5 (105)	-	-
Cefoxitin	79.7 (438)	84 (731)	61.6 (263)	71.4 (276)	87.5 (16)	100 (29)	-	-	-	-
Ceftazidime	58.5 (8065)	58 (7233)	63.3 (2444)	60.4 (2247)	87.5 (256)	92.7 (289)	63.8 (315)	61.1 (239)	86.5 (1048)	84.8 (1079)
Ceftriaxone	55.8 (7811)	54.2 (6815)	64.9 (2344)	60.3 (2133)	85.1 (248)	90 (261)	43.1 (167)	31.6 (158)	-	-
Cefuroxime	52.1 (7936)	48.3 (6391)	60.7 (2339)	55 (2015)	82.7 (254)	87.4 (262)	-	-	-	-
Cephalothin	25.2 (107)	25 (104)	48.7 (39)	34.4 (64)	-	-	-	-	-	-
Chloramphenicol	63 (27)	72.9 (48)	25 (56)	28.6 (42)	-	-	-	-	-	-
Ciprofloxacin	49.2	41.5	61.6 (2519)	56 (2287)	64.1 (270)	66.9 (293)	60.8 (319)	54.5 (246)	85.1	84.3



	(8402)	(7305)							(1055)	(1062)
Colistin	9.4 (53)	2.3 (564)	22.2 (81)	6.5 (262)	-	-	73.6 (53)	41.8 (55)	4.7 (274)	5.1 (274)
Doxycycline	58.3 (36)	59.9 (307)	29 (62)	56.4 (149)	-	-	66.7 (6)	58.3 (24)	-	-
Ertapenem	98.9 (5603)	98.2 (4159)	86.2 (1623)	81.9 (1327)	95.9 (171)	100 (161)	-	-	-	-
Gentamicin	89.4 (8792)	88.8 (7536)	87.3 (2669)	84.8 (2367)	83.4 (283)	80.1 (297)	69.5 (318)	65.7 (245)	89.6 (714)	87 (655)
Imipenem	98.8 (5855)	97.7 (4639)	84.4 (1787)	79.4 (1539)	36.6 (145)	22.4 (134)	67.3 (208)	63.4 (134)	85.8 (649)	78.8 (721)
Levofloxacin	0.9 (325)	34.8 (532)	4.4 (114)	39 (246)	-	-	50 (46)	50 (24)	70.3 (182)	72.8 (283)
Meropenem	99.2 (7907)	99 (6885)	88.4 (2397)	85.9 (2173)	96.3 (245)	100 (267)	67.5 (317)	63 (238)	84.7 (1023)	84.6 (1056)
Nalidixic acid	44.6 (729)	48.1 (160)	62.1 (243)	58.9 (107)	-	-	-	-	-	-
Nitrofurantoin	96 (7742)	94.7 (7195)	48.2 (2332)	40.7 (2210)	4.8 (252)	3.1 (292)	0 (28)	0 (49)	-	-
Ofloxacin	74.5 (993)	74.9 (622)	80.1 (287)	76 (217)	-	-	-	-	84.2 (95)	76.9 (108)
Piperacillin/Tazobactam	93 (7368)	92.4 (6299)	77.6 (2191)	74 (1976)	97.8 (232)	99.2 (242)	63.7 (300)	56.2 (240)	87.2 (995)	82.6 (1050)
Tetracycline	57.4 (784)	55.7 (736)	67.5 (342)	60.3 (312)	0 (22)	3.2 (31)	64 (50)	64.7 (51)	-	-
Tigecycline	98.3 (178)	99.6 (809)	75.6 (127)	87.5 (321)	0 (3)	3.7 (27)	-	-	-	-
Tobramycin	92.6 (1523)	92.3 (1120)	83.6 (531)	84 (437)	68.2 (22)	86.7 (30)	83.8 (37)	74.1 (27)	92.3 (142)	87.1 (85)



Trimethoprim/Sulfamethoxazole	63.6 (8722)	63.5 (7547)	72.6 (2645)	70.1 (2354)	64.4 (281)	60.3 (305)	79.7 (311)	72.5 (247)	-	-
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*Numbers in Parenthesis denote isolates tested





National Antimicrobial Usage Surveillance Report, 2024 - 2025



6. National Antimicrobial Usage Surveillance Report – 2025

Table 1: The National Adult Inpatient AMU for 2025

Antibiotic	DDD Dispensed		YUDR		
	2025	2024	2025	2024	***% of difference
AMIKACIN	1869.90	2376.64	1.50	1.97	-23.86
AMOXICILLIN	7921.33	8484.33	6.35	7.02	-9.54
AMOXICILLIN & CLAVULANIC A	33153.65	31806.78	26.59	26.32	1.03
AMPICILLIN	7289.80	6350.44	5.85	5.26	11.22
AZITHROMYCIN	4749.83	4183.00	3.81	3.46	10.12
BENZATHINE BENZYL PENICILLIN	580.42	427.70	0.47	0.35	34.29
CEFAZOLIN SODIUM	27756.53	25758.83	22.26	21.32	4.41
CEFIPIME	354.53	140.25	0.28	0.12	133.33
CEFOTAXIME	1095.44	1061.00	0.88	0.88	0.00
CEFTAZIDIME	7577.41	7039.15	6.08	5.83	4.29
CEFTRIAXON	73520.99	69149.76	58.96	57.23	3.02
CEFUROXIME	44728.37	44883.12	35.87	37.14	-3.42
CEPHALEXIN OR CEPHRADINE	42.38	79.88	0.03	0.07	-57.14
CIPROFLOXACIN	2925.15	2784.02	2.35	2.30	2.17
CLARITHROMYCIN	25764.54	23417.99	20.66	19.38	6.60
CLINDAMYIN	9196.02	3723.85	7.37	3.08	139.29
CLOXACILLIN	258.55	211.63	0.21	0.18	16.67
CO-TRIMOXAZOLE	5616.01	4490.05	4.50	3.72	20.97
COLISTIN	3629.40	4678.44	2.91	3.87	-24.81
DOXYCYCLINE	16498.00	11813.00	13.23	9.78	35.28
ERTAPENEM	27.50	38.00	0.02	0.03	-33.33
ERYTHROMYCIN	3225.90	3212.75	2.59	2.66	-2.63
FLUCLOXACILLIN	14889.13	14687.60	11.94	12.16	-1.81
GENTAMICIN	5411.80	6339.74	4.34	5.25	-17.33
IMIPENEM	-	0.25	-	0.00	-
LEVOFLOXACIN	6384.92	6325.79	5.12	5.24	-2.29
LINEZOLID	389.00	472.50	0.31	0.39	-20.51
MEROPENEM	24398.21	27178.64	19.56	22.49	-13.03
METRONIDAZOLE	45315.96	45146.14	36.34	37.36	-2.73
MOXIFLOXACIN	579.00	1142.00	0.46	0.95	-51.58
NALIDIXIC ACID	0.25	8.75	0.00	0.01	-100.00
NITROFURANTOIN	662.00	596.50	0.53	0.49	8.16
OFLOXACIN	-	3.00	-	0.00	-
PHENOXYMETHYLPENICILLIN	174.13	230.13	0.14	0.19	-26.32



PIPERACILLIN & TAZOBACTAM	45487.81	39960.02	36.48	33.07	10.31
RIFAMPICIN	1670.50	2407.75	1.34	1.99	-32.66
RIFAXIMIN	5133.25	8773.42	4.12	7.26	-43.25
SULPHADIAZINE	573.33	79.17	0.46	0.07	557.14
TEICoplanin	60.50	44.50	0.05	0.04	25.00
TIGECYCLINE	2558.00	3387.70	2.05	2.80	-26.79
VANCOMYCIN	9153.07	9214.78	7.34	7.63	-3.80

*DDD = defined daily doses, **YUDR = yearly usage density rate. *** % of reduction or increase in YUDR of antibiotics, minus sign (-) mean reduction, positive sign (+) mean increase by using this formula (YUDR2025-YUDR2024/YUDR2024x 100). Calculations are based on total OBD of 1247068 in 2025

Table 2: The National Pediatric Inpatient AMU for 2025

Antibiotic	DDD Dispensed		YUDR		
	2025	2024	2025	2024	***% of difference
AMIKACIN	346.03	458.18	0.29	0.38	-23.68
AMOXICILLIN	798.77	1052.45	0.68	0.87	-21.84
AMOXICILLIN & CLAVULANIC A	4808.10	4098.44	4.08	3.40	20.00
AMPICILLIN	2015.21	2261.17	1.71	1.87	-8.56
AZITHROMYCIN	3693.15	4264.42	3.13	3.54	-11.58
BENZATHINE BENZYL PENICILLIN	271.48	269.76	0.23	0.22	4.55
CEFAZOLIN SODIUM	3491.33	3487.99	2.96	2.89	2.42
CEFIPIME	43.67	23.59	0.04	0.02	100.00
CEFOTAXIME	1582.63	1841.25	1.34	1.53	-12.42
CEFTAZIDIME	590.35	512.31	0.50	0.42	19.05
CEFTRIAXON	12522.30	11611.60	10.62	9.63	10.28
CEFUROXIME	2867.42	4052.42	2.43	3.36	-27.68
CEPHALEXIN OR CEPHRADINE	314.96	175.44	0.27	0.15	80.00
CIPROFLOXACIN	547.15	614.63	0.46	0.51	-9.80
CLARITHROMYCIN	913.19	1008.39	0.77	0.84	-8.33
CLINDAMYCIN	659.63	823.45	0.56	0.68	-17.65
CLOXACILLIN	4.18	14.30	0.00	0.01	-100.00
CO-TRIMOXAZOLE	842.99	934.34	0.72	0.77	-6.49
COLISTIN	60.19	115.39	0.05	0.10	-50.00
DOXYCYCLINE	135.40	135.71	0.11	0.11	0.00
ERYTHROMYCIN	26.00	43.35	0.02	0.04	-50.00
FLUCLOXACILLIN	1987.98	2182.99	1.69	1.81	-6.63
GENTAMICIN	1363.76	1534.61	1.16	1.27	-8.66
LEVOFLOXACIN	107.17	100.46	0.09	0.08	12.50
LINEZOLID	2.94	12.86	0.00	0.01	-100.00
MEROPENEM	1293.08	1611.31	1.10	1.34	-17.91
METRONIDAZOLE	2302.50	2058.84	1.95	1.71	14.04
MOXIFLOXACIN	1.00	-	0.00	-	-



NITROFURANTOIN	128.90	127.00	0.11	0.11	0.00
PHENOXYMETHYLPENICILLIN	24.45	29.56	0.02	0.02	0.00
PIPERACILLIN & TAZOBACTAM	2060.49	2471.72	1.75	2.05	-14.63
RIFAMPICIN	38.02	54.50	0.03	0.05	-40.00
STREPTOMYCIN	-	2.80	-	0.00	-
SULPHADIAZINE	8.00	103.33	0.01	0.09	-88.89
TEICOPLANIN	-	6.00	-	0.00	-
TIGECYCLINE	9.50	29.68	0.01	0.02	-50.00
VANCOMYCIN	1074.83	1145.47	0.91	0.95	-4.21

DDD = defined daily doses, **YUDR = yearly usage density rate. *** % of reduction or increase in YUDR of antibiotics, minus sign (-) mean reduction, positive sign (+) mean increase by using this formula $(YUDR_{2025} - YUDR_{2024} / YUDR_{2024} \times 100)$. Calculations are based on total OBD of 1178732 in 2025



Table 3: The National Adult Outpatient AMU- 2025

Antibiotic	DDD Dispensed		Rate per 1000 inhabitants (2025)		Rate per 1000 outpatient visits			
			YUDR	DUDR	DUDR 2025	YUDR		
	2025	2024				2025	2024	***% of difference
AMIKACIN	98.00	167.00	0.05090	0.00014	0.00002	0.00884	0.01601	-44.78
AMOXICILLIN	3051772.30	3407921.30	1584.99868	4.34246	0.75379	275.13398	326.67616	-15.78
AMOXICILLIN & CLAVULANIC A	535.67	547.33	0.27821	0.00076	0.00013	0.04829	0.05247	-7.97
AMPICILLIN	144.04	160.67	0.07481	0.00020	0.00004	0.01299	0.01540	-15.65
AZITHROMYCIN	66820.50	58807.67	34.70456	0.09508	0.01650	6.02423	5.63718	6.87
BENZATHINE BENZYL PENICILLIN	340.92	294.33	0.17706	0.00049	0.00008	0.03074	0.02821	8.97
CEFAZOLIN SODIUM	286.00	300.00	0.14854	0.00041	0.00007	0.02578	0.02876	-10.36
CEFIPIME	42.75	49.25	0.02220	0.00006	0.00001	0.00385	0.00472	-18.43
CEFOTAXIME	1.25	4.00	0.00065	0.00000	0.00000	0.00011	0.00038	-71.05
CEFTAZIDIME	560.75	550.75	0.29124	0.00080	0.00014	0.05055	0.05279	-4.24
CEFTRIAXON	2252.63	2427.00	1.16995	0.00321	0.00056	0.20309	0.23265	-12.71
CEFUROXIME	1047326.55	1056187.60	543.94989	1.49027	0.25869	94.42222	101.24392	-6.74
CEPHALEXIN OR CEPHRADINE	160978.75	141554.75	83.60752	0.22906	0.03976	14.51312	13.56914	6.96
CIPROFLOXACIN	269964.58	278962.75	140.21147	0.38414	0.06668	24.33878	26.74078	-8.98
CLARITHROMYCIN	201774.00	212646.05	104.79534	0.28711	0.04984	18.19103	20.38380	-10.76
CLINDAMYCIN	11970.42	11163.46	6.21707	0.01703	0.00296	1.07920	1.07011	0.85
CLOXACILLIN	141548.28	155448.68	73.51591	0.20141	0.03496	12.76135	14.90098	-14.36
CO-TRIMOXAZOLE	63261.50	56613.89	32.85612	0.09002	0.01563	5.70337	5.42689	5.09
COLISTIN	271.00	76.78	0.14075	0.00039	0.00007	0.02443	0.00736	231.93
DOXYCYCLINE	1601563.95	1493751.00	831.80411	2.27892	0.39559	144.38976	143.18783	0.84
ERTAPENEM	24.00	4.00	0.01246	0.00003	0.00001	0.00216	0.00038	468.42
ERYTHROMYCIN	136776.75	177121.50	71.03773	0.19462	0.03378	12.33117	16.97849	-27.37
FLUCLOXACILLIN	230.63	45.63	0.11978	0.00033	0.00006	0.02079	0.00437	375.74
GENTAMICIN	5346.08	5556.00	2.77659	0.00761	0.00132	0.48198	0.53259	-9.50
LEVOFLOXACIN	29453.00	19372.00	15.29700	0.04191	0.00727	2.65535	1.85696	42.99



LINEZOLID	2802.00	2447.50	1.45527	0.00399	0.00069	0.25262	0.23461	7.68
MEROPENEM	418.17	369.50	0.21718	0.00060	0.00010	0.03770	0.03542	6.44
METRONIDAZOLE	327804.87	335399.80	170.25198	0.46644	0.08097	29.55340	32.15072	-8.08
MOXIFLOXACIN	8281.00	9193.00	4.30090	0.01178	0.00205	0.74658	0.88122	-15.28
NALIDIXIC ACID	534.75	606.63	0.27773	0.00076	0.00013	0.04821	0.05815	-17.09
NITROFURANTOIN	67009.60	50269.50	34.80277	0.09535	0.01655	6.04128	4.81873	25.37
PHENOXYMETHYLPENICILLIN	12406.63	12936.38	6.44363	0.01765	0.00306	1.11853	1.24005	-9.80
PIPERACILLIN & TAZOBACTA	114.00	185.29	0.05921	0.00016	0.00003	0.01028	0.01776	-42.12
RIFAMPICIN	64297.89	53879.23	33.39439	0.09149	0.01588	5.79681	5.16475	12.24
RIFAXIMIN	2599.67	2388.83	1.35019	0.00370	0.00064	0.23437	0.22899	2.35
SODIUM FUSIDATE	132.83	565.33	0.06899	0.00019	0.00003	0.01198	0.05419	-77.89
STREPTOMYCIN	-	71.00	-	-	-	-	0.00681	-
SULPHADIAZINE	1858.33	664.17	0.96516	0.00264	0.00046	0.16754	0.06367	163.14
TIGECYCLINE	28.00	20.00	0.01454	0.00004	0.00001	0.00252	0.00192	31.25
VANCOMYCIN	1114.50	1096.75	0.57884	0.00159	0.00028	0.10048	0.10513	-4.42

*DDD = defined daily doses, **YUDR = yearly usage density rate, ***DUDR = daily usage density rate. . *** % of reduction or increase in YUDR of antibiotics, minus sign (-) mean reduction, positive sign (+) mean increase by using this formula $(YUDR_{2025} - YUDR_{2024} / YUDR_{2024} \times 100)$.

Calculations are based on total outpatient visits (OPV) of 11091950 in 2025. Adult Omani population (> 14 years) for 2025= 1925410



Table 4: The National Pediatric Outpatient AMU- 2025

Antibiotic	DDD Dispensed		Rate per 1000 inhabitants(2025)		Rate per 1000 outpatient visits			
			YUDR	DUDR	DUDR 2025	YUDR		
	2025	2024				2025	2024	***% of difference
AMIKACIN	3.50	2.500	0.00314	0.00001	0.00000	0.00070	0.00050	40.00
AMOXICILLIN	2282128.79	2241785.035	2048.70176	5.61288	1.25570	458.33178	447.17218	2.50
AMOXICILLIN & CLAVULANIC A	66.33	46.667	0.05955	0.00016	0.00004	0.01332	0.00931	43.07
AMPICILLIN	52.42	72.417	0.04706	0.00013	0.00003	0.01053	0.01445	-27.13
AZITHROMYCIN	14880.00	15900.107	13.35800	0.03660	0.00819	2.98843	3.17162	-5.78
BENZATHINE BENZYL PENICILLIN	13.08	18.250	0.01175	0.00003	0.00001	0.00263	0.00364	-27.75
CEFAZOLIN SODIUM	7.33	29.333	0.00658	0.00002	0.00000	0.00147	0.00585	-74.87
CEFIPIME	20.25	6.250	0.01818	0.00005	0.00001	0.00407	0.00125	225.60
CEFOTAXIME	3.38	2.875	0.00303	0.00001	0.00000	0.00068	0.00057	19.30
CEFTAZIDIME	52.00	41.500	0.04668	0.00013	0.00003	0.01044	0.00828	26.09
CEFTRIAXON	346.13	172.500	0.31072	0.00085	0.00019	0.06951	0.03441	102.01
CEFUROXIME	93468.75	130280.000	83.90832	0.22989	0.05143	18.77181	25.98714	-27.77
CEPHALEXIN OR CEPHRADINE	93427.14	63108.250	83.87096	0.22978	0.05141	18.76346	12.58830	49.05
CIPROFLOXACIN	6574.00	7171.250	5.90158	0.01617	0.00362	1.32029	1.43046	-7.70
CLARITHROMYCIN	5571.50	6077.500	5.00162	0.01370	0.00307	1.11895	1.21229	-7.70
CLINDAMYCIN	1122.33	1114.438	1.00754	0.00276	0.00062	0.22540	0.22230	1.39
CLOXACILLIN	9559.25	10896.213	8.58148	0.02351	0.00526	1.91983	2.17348	-11.67
CO-TRIMOXAZOLE	9259.20	9308.455	8.31212	0.02277	0.00509	1.85957	1.85677	0.15
COLISTIN	76.00	155.556	0.06823	0.00019	0.00004	0.01526	0.03103	-50.82
DOXYCYCLINE	48657.00	42046.000	43.68013	0.11967	0.02677	9.77204	8.38698	16.51
ERYTHROMYCIN	9738.75	11807.750	8.74262	0.02395	0.00536	1.95588	2.35531	-16.96
FLUCLOXACILLIN	1.00	0.375	0.00090	0.00000	0.00000	0.00020	0.00007	185.71
GENTAMICIN	1524.42	3259.000	1.36849	0.00375	0.00084	0.30616	0.65008	-52.90



LEVOFLOXACIN	740.00	46.000	0.66431	0.00182	0.00041	0.14862	0.00918	1518.95
LINEZOLID	264.50	276.000	0.23745	0.00065	0.00015	0.05312	0.05505	-3.51
MEROPENEM	11.00	0.167	0.00987	0.00003	0.00001	0.00221	0.00003	7266.67
METRONIDAZOLE	11314.03	11076.767	10.15678	0.02783	0.00623	2.27226	2.20950	2.84
MOXIFLOXACIN	49.00	-	0.04399	0.00012	0.00003	0.00984	-	-
NALIDIXIC ACID	1.63	4.500	0.00146	0.00000	0.00000	0.00033	0.00090	-63.33
NITROFURANTOIN	2557.75	2858.200	2.29613	0.00629	0.00141	0.51369	0.57013	-9.90
PHENOXYMETHYLPENICILLIN	2723.38	4160.000	2.44482	0.00670	0.00150	0.54695	0.82980	-34.09
PIPERACILLIN & TAZOBACTAM	1.00	0.857	0.00090	0.00000	0.00000	0.00020	0.00017	17.65
RIFAMPICIN	1722.91	1382.955	1.54668	0.00424	0.00095	0.34602	0.27586	25.43
SODIUM FUSIDATE	-	12.333	-	-	-	-	0.00246	-
SULPHADIAZINE	66.67	774.167	0.05985	0.00016	0.00004	0.01339	0.15442	-91.33
VANCOMYCIN	82.00	63.250	0.07361	0.00020	0.00005	0.01647	0.01262	30.51

*DDD = defined daily doses, **YUDR = yearly usage density rate, ***DUDR = daily usage density rate. *** % of reduction or increase in YUDR of antibiotics, minus sign (-) mean reduction, positive sign (+) mean increase by using this formula $(YUDR_{2025} - YUDR_{2024} / YUDR_{2024} \times 100)$.

Calculations are based on total OPV of 4979207 nationally in 2024. Pediatric Omani population (≤ 14 years) for 2025= 1113939



Figure 1: The hospitals contribution to the national inpatient AMU in Adults for 2025

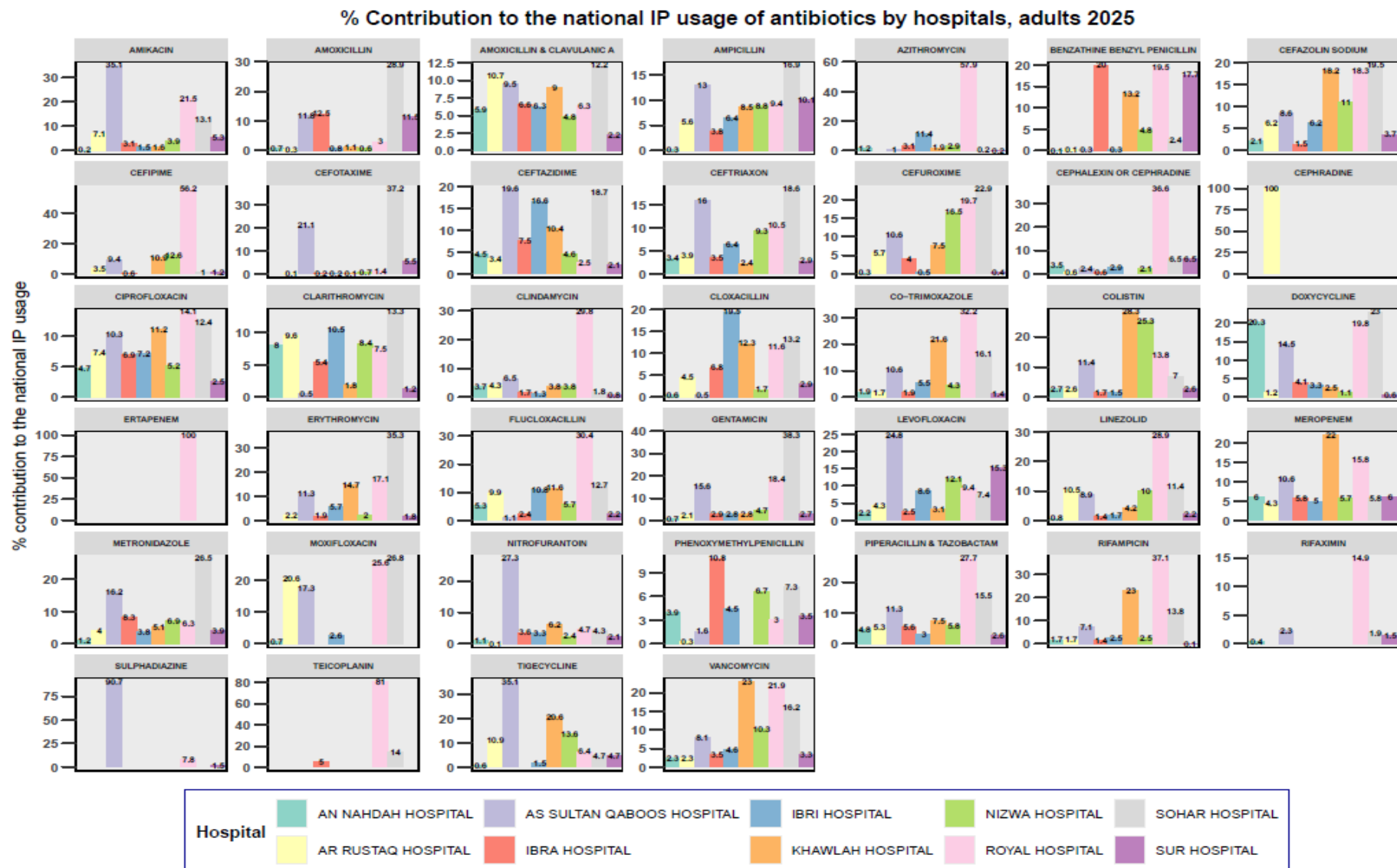


Figure 2: The hospitals contribution to the pediatric inpatient AMU for 2025

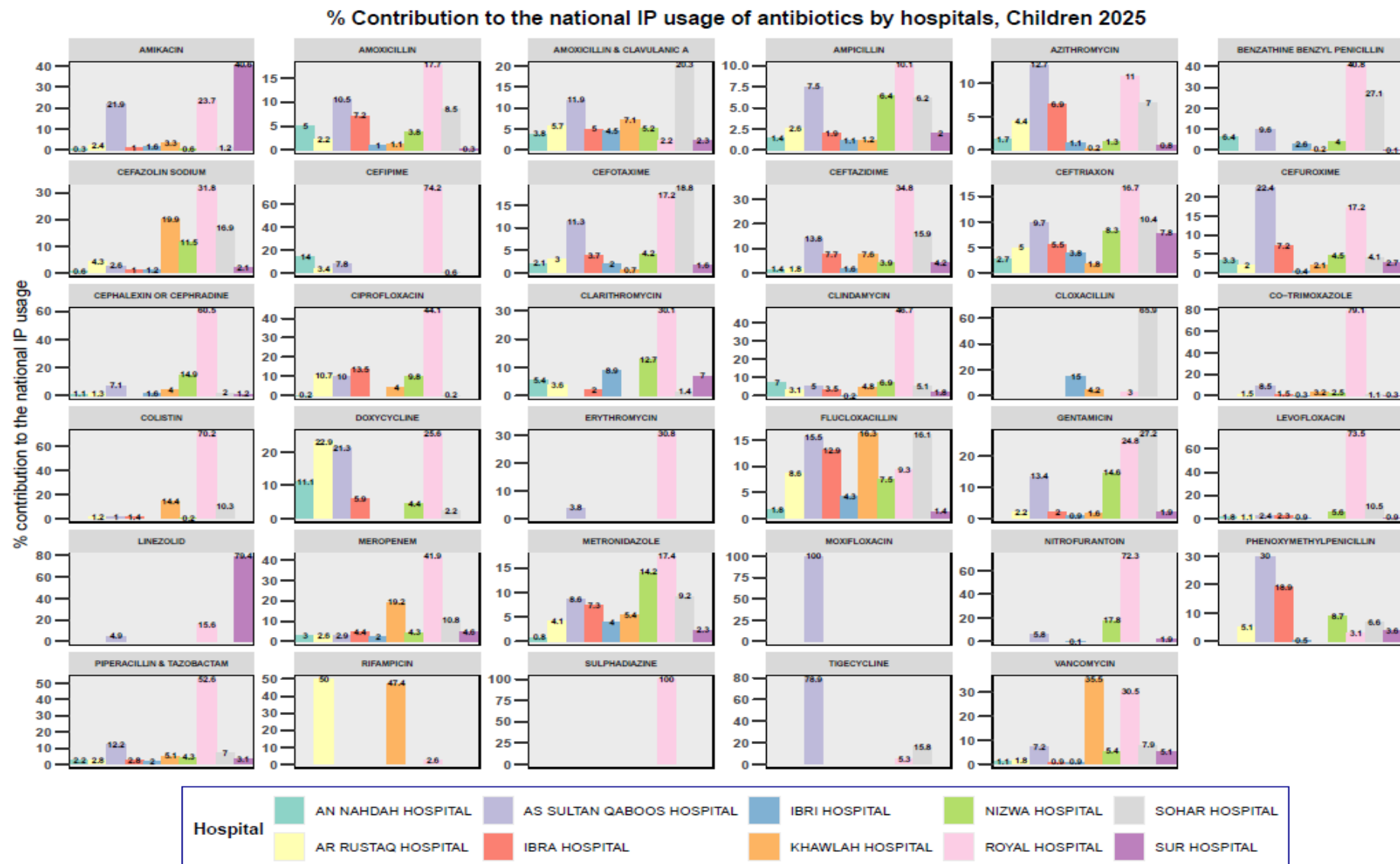


Figure 3: The hospitals contribution to the outpatient adult AMU for 2025

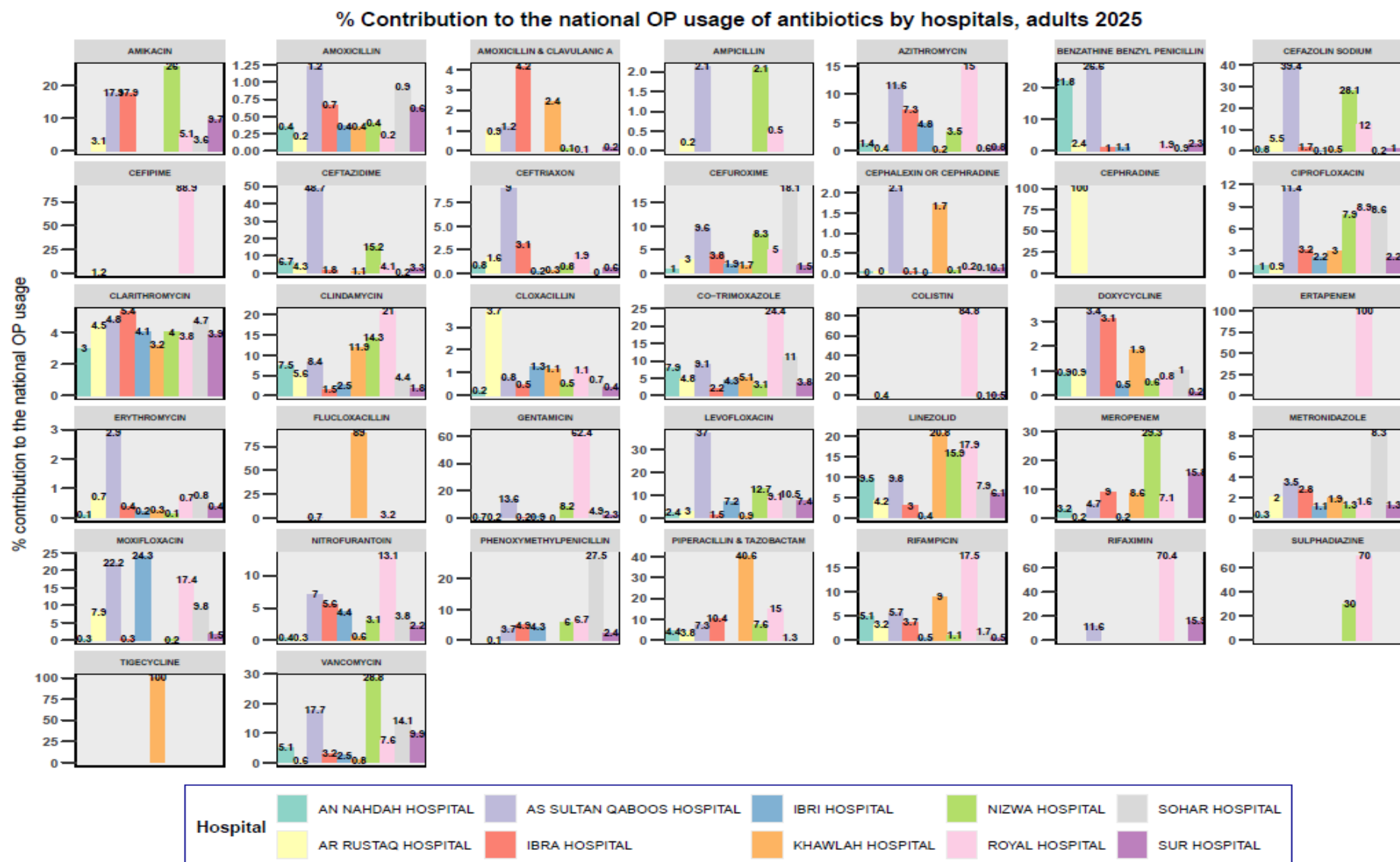


Figure 4: The hospitals contribution to the pediatric outpatient AMU for 2025

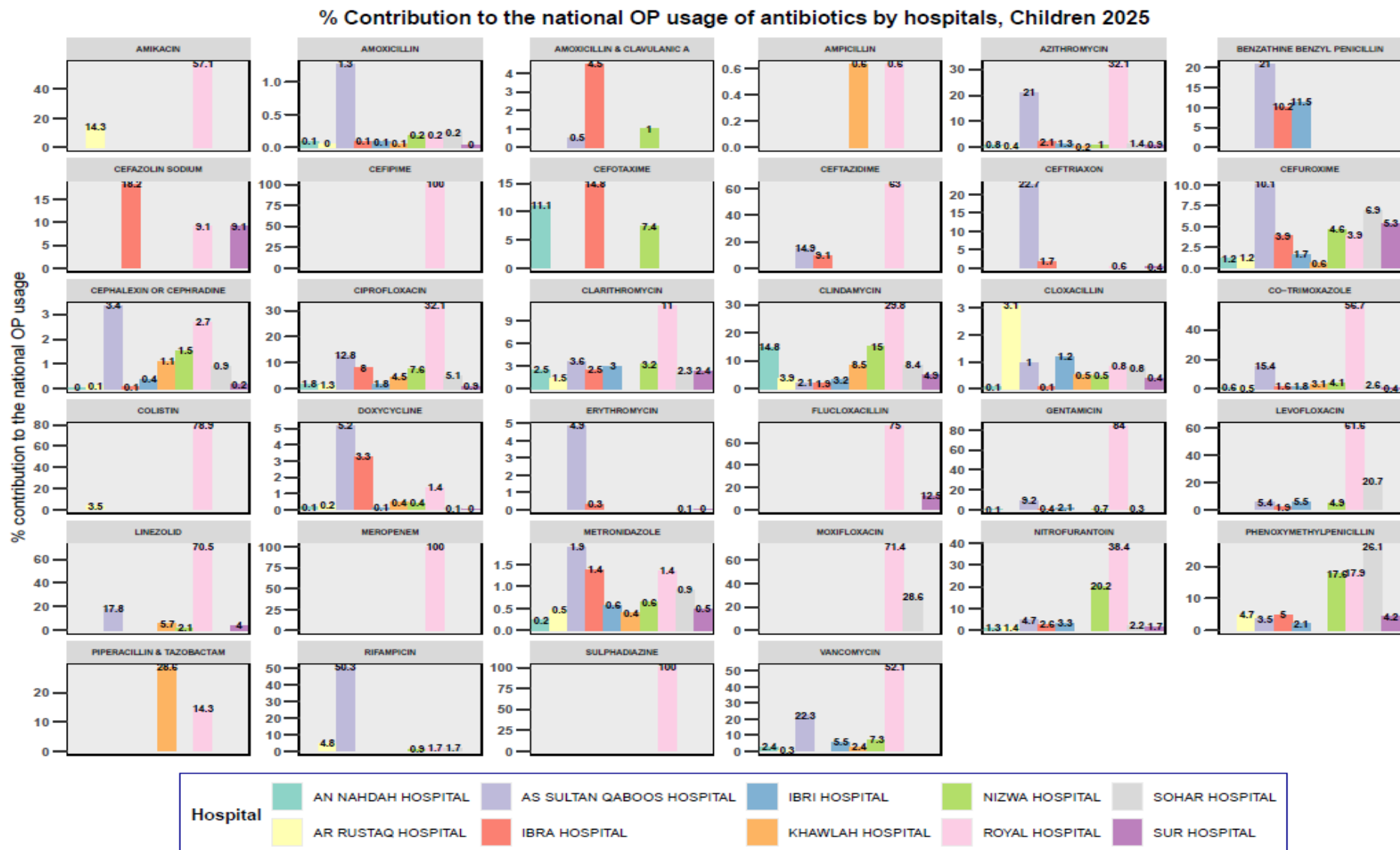


Figure 5: Defined daily doses per 1000 Omani population – adult inpatients, 2025



Figure 6: Defined daily doses per 1000 Omani population – pediatric inpatients, 2025

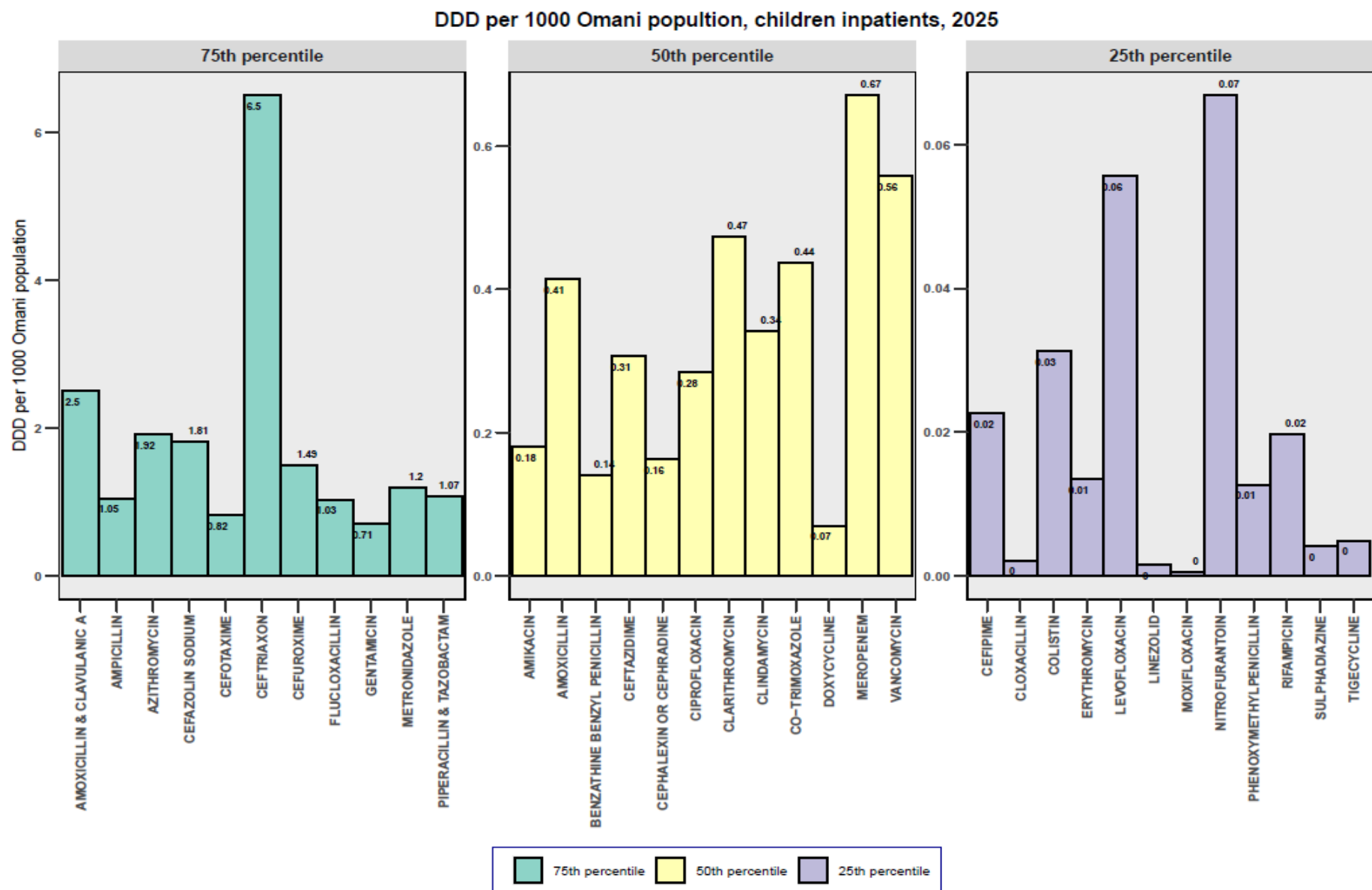


Figure 7: Defined daily doses per 1000 Omani population – adult outpatients, 2025

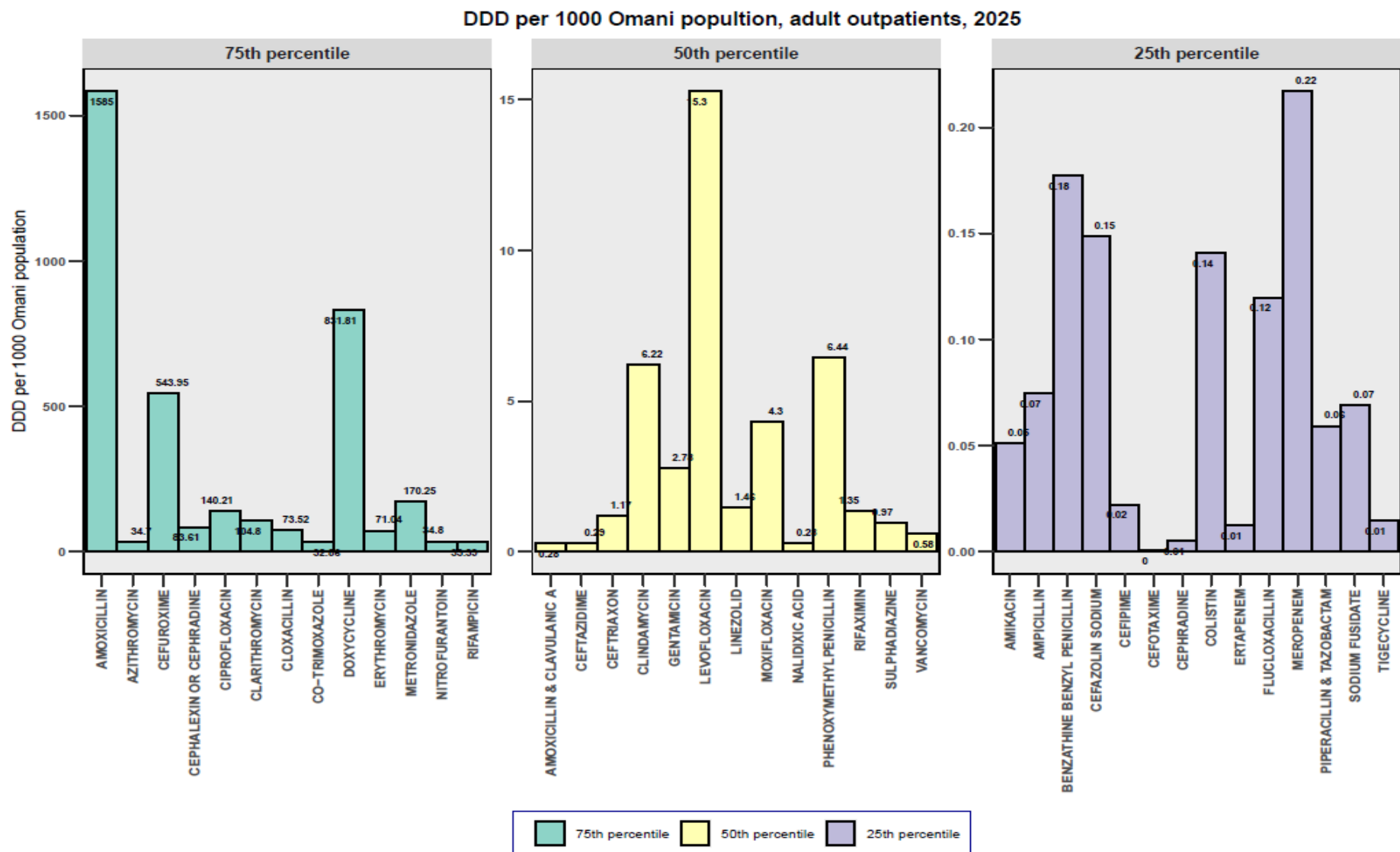
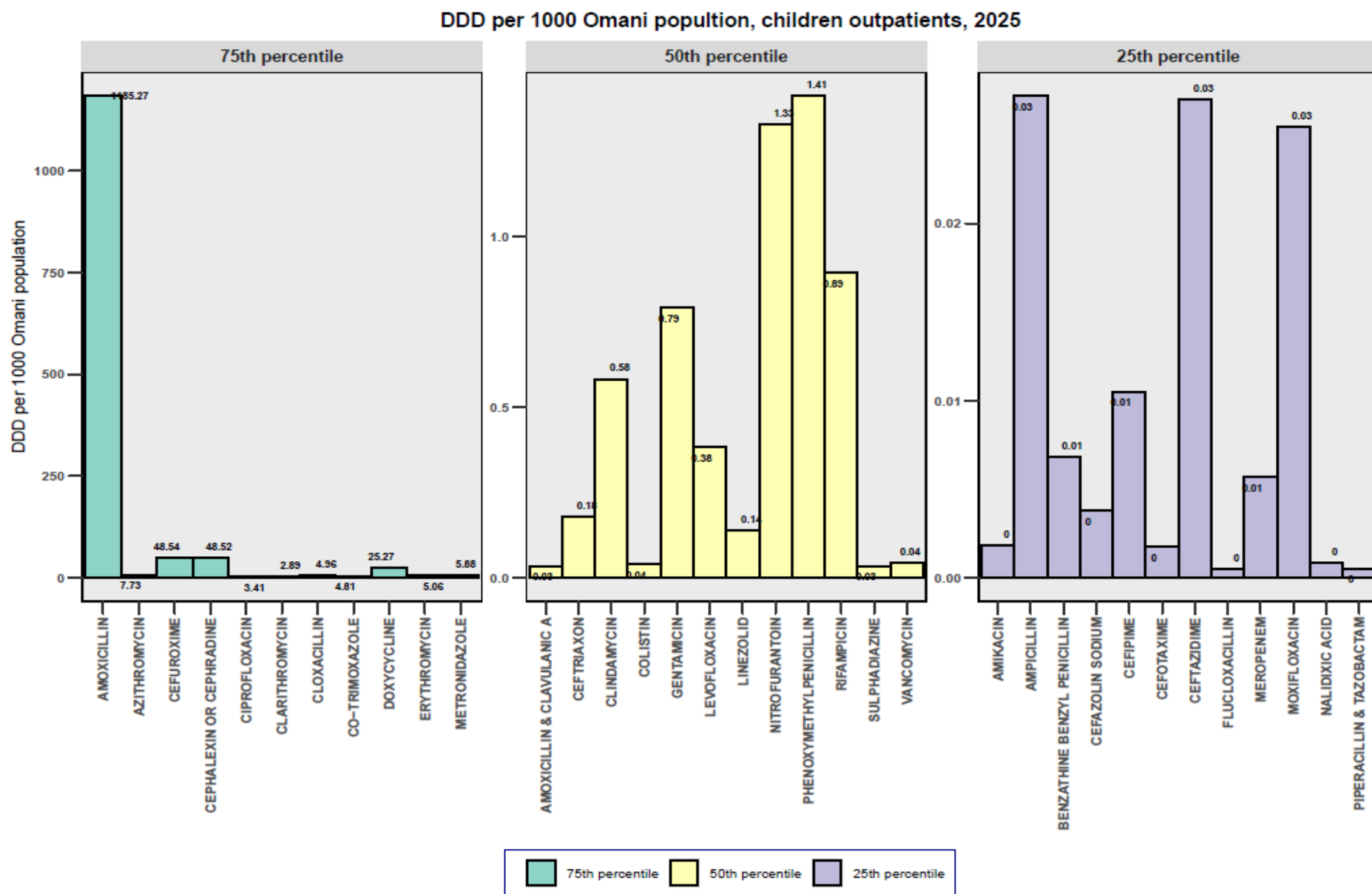
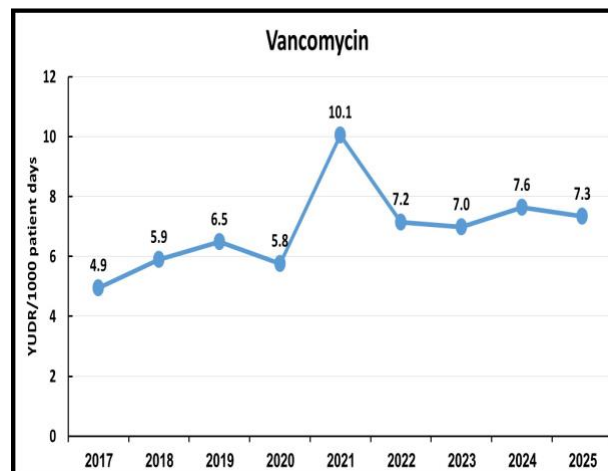
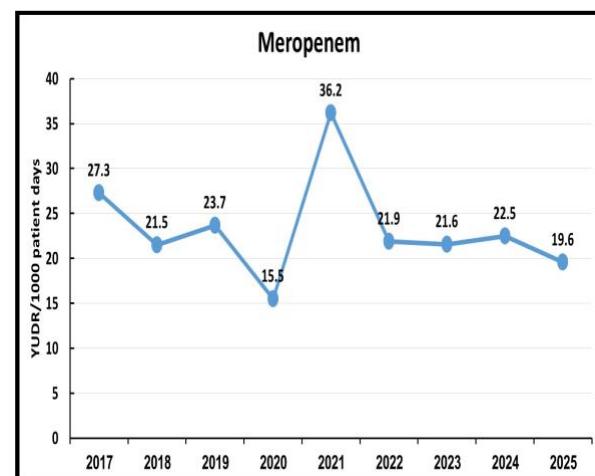
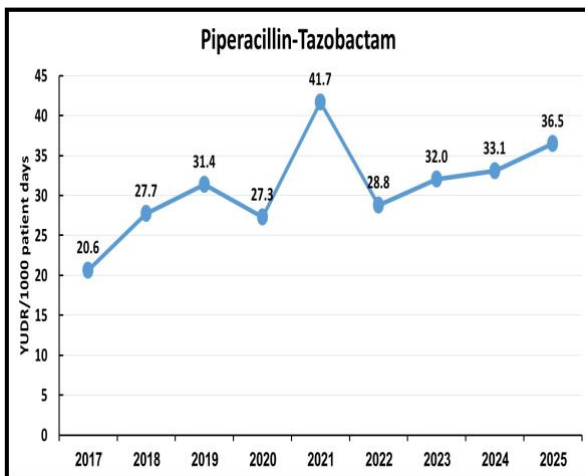
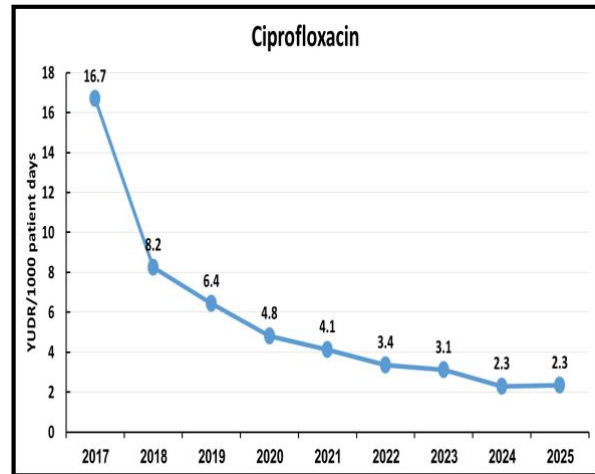
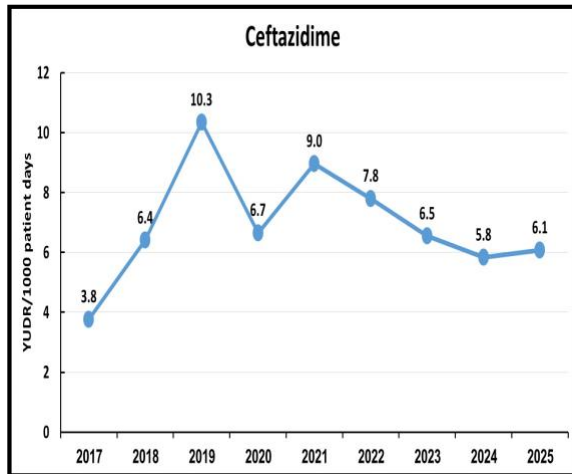


Figure 8: Defined daily doses per 1000 Omani population – pediatric outpatients, 2025

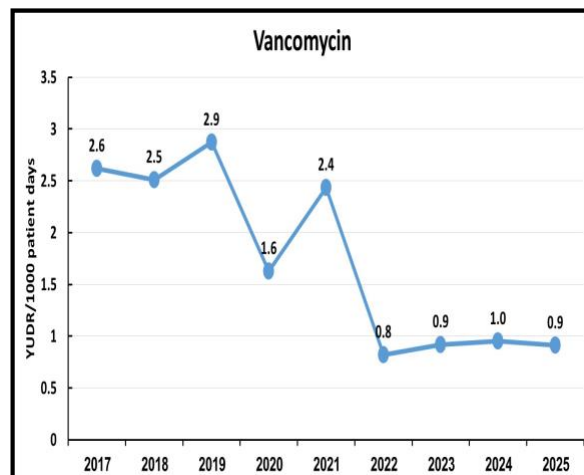
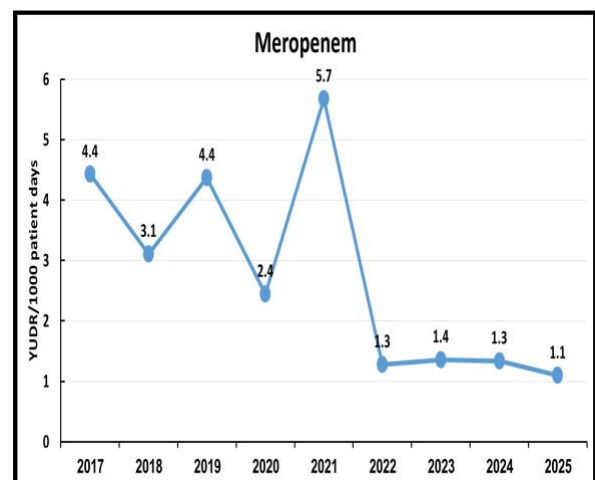
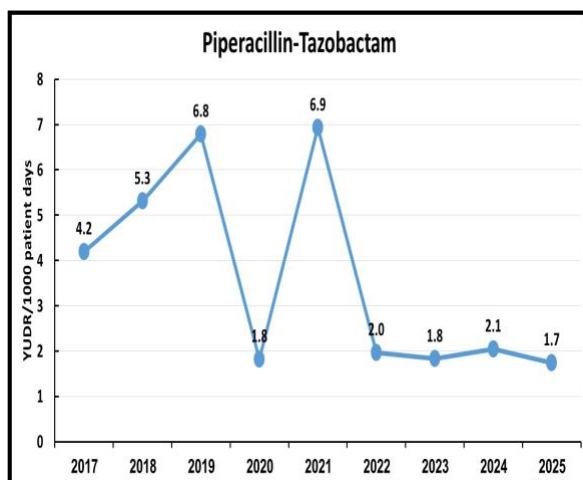
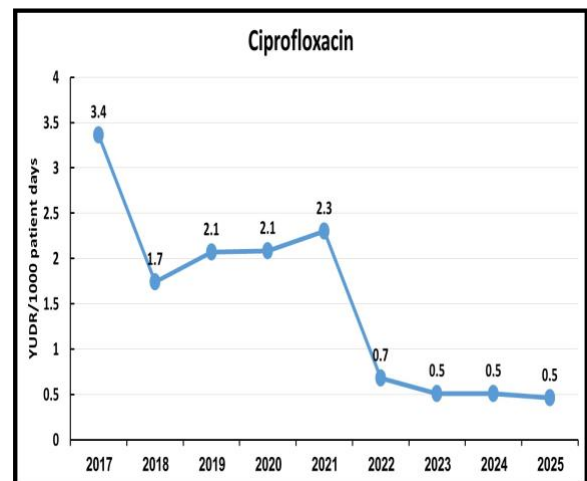
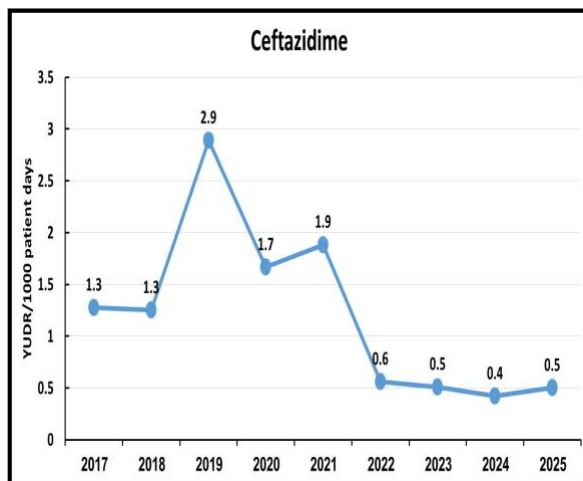


Yearly Usage Density Rate 2017-2025:

Adult Inpatient:



Pediatric Inpatient:



AWaRe Classification

The **AWaRe** classification, developed by the World Health Organization (WHO), organizes antibiotics into three categories to guide stewardship efforts and improve access to appropriate treatments while controlling resistance.

1. **Access group:**
 - Includes first-line antibiotics for the most common and serious infections.
 - These antibiotics should be widely available, affordable, and of good quality.
 - Examples: Amoxicillin, cefazolin.
2. **Watch group:**
 - Includes antibiotics with higher resistance potential.
 - Should be prescribed sparingly to avoid resistance.
 - Examples: Ciprofloxacin, ceftriaxone.
3. **Reserve group:**
 - Antibiotics of last resort for treatment of multi-drug-resistant infections.
 - Reserved for specific cases to preserve their efficacy.
 - Examples: Colistin, linezolid.

In Oman, institutions should:

- use AWaRe to prioritize access and control measures for antibiotics.
- **Monitoring Prescriptions:** By categorizing antibiotics into these groups, AWaRe helps monitor and evaluate prescribing practices.
- **Promoting Rational Use:** Ensures that the most appropriate antibiotics are used for common infections and that high-risk antibiotics are preserved for critical situations.

In MOH facilities, the Aware classification has been integrated into the AlShifa laboratory information system and the pharmacy prescription page. This will facilitate to raise awareness among the HCW and also allow for better monitoring of prescriptions according to AwaRe classification.

Table (5-9) shows the **national antibiotic consumption in Oman** for the years **2024 and 2025**. The National antimicrobial utilization (AMU) remained predominantly driven by WHO Access group antibiotics in both 2024 and 2025. In 2025, Access antibiotics accounted for 78.2% of total consumption, while Watch and Reserve groups represented 21.45% and 0.35%, respectively, demonstrating continued alignment with WHO AWaRe stewardship targets. Compared with 2024, overall antibiotic consumption slightly declined, with a modest reduction in Watch and Reserve group utilization.



Among adults, Access antibiotics represented approximately 73% of total consumption in both years, while Watch antibiotics accounted for around 27%. Reserve antibiotic use remained low (<0.5%), indicating controlled use of last-resort agents in the adult population.

Paediatric antibiotic consumption demonstrated the highest reliance on Access antibiotics, increasing from 92.24% in 2024 to 93.91% in 2025. Watch antibiotic use declined from 7.68% to 6.03%, while Reserve antibiotic consumption remained minimal (<0.1%), reflecting strong stewardship practices in paediatric care.

In inpatient settings, Watch antibiotics constituted the largest proportion of antibiotic consumption, accounting for 53.02% in 2025, compared with 40.35% for Access antibiotics. Reserve antibiotic use declined from 7.95% in 2024 to 6.63% in 2025, suggesting improved stewardship and optimization of broad-spectrum and reserve agents in hospitalized patients.

In outpatient settings, Access antibiotics remained the predominant class, comprising approximately 80% of total antibiotic consumption in both years. Watch antibiotic utilization declined slightly from 20.23% in 2024 to 19.89% in 2025, while Reserve antibiotic use remained negligible.



Table 5. The National AMU for 2025, AWaRe Classification

AWaRe group	2025		2024	
	Total DDDs	% of total DDDs	Total DDDs	% of total DDDs
Access	8106352.20	78.20	8246319.81	77.91
Watch	2223831.97	21.45	2297432.67	21.71
Reserve	36210.99	0.35	40832.27	0.39
Total	10366395.16	100.00	10584584.75	100.00

Table 6. The National Adult AMU for 2025

AWaRe group	2025		2024	
	Total DDDs	% of total DDDs	Total DDDs	% of total DDDs
Access	5624364.91	72.82	5836011.68	73.21
Watch	2064510.36	26.73	2096726.97	26.30
Reserve	34493.78	0.45	38631.31	0.48
Total	7723369.05	100.00	7971369.96	100.00

Table 7. The National Pediatric AMU for 2025

AWaRe group	2025		2024	
	Total DDDs	% of total DDDs	Total DDDs	% of total DDDs
Access	2481987.29	93.91	2410308.13	92.24
Watch	159321.61	6.03	200705.7	7.68
Reserve	1717.21	0.06	2200.96	0.08
Total	2643026.11	100.00	2613214.79	100.00

Table 8. The National Inpatient AMU for 2025

AWaRe group	2025		2024	
	Total DDDs	% of total DDDs	Total DDDs	% of total DDDs
Access	196712.61	40.35	182358.72	38.69
Watch	258509.27	53.02	251533.21	53.36
Reserve	32340.32	6.63	37486.77	7.95
Total	487562.2	100.00	471378.7	100.00

Table 9. The National Outpatient AMU for 2025

AWaRe group	2025		2024	
	Total DDDs	% of total DDDs	Total DDDs	% of total DDDs
Access	7909639.59	80.07	8063961.09	79.74
Watch	1965322.70	19.89	2045899.46	20.23
Reserve	3870.67	0.04	3345.5	0.03
Total	9878832.96	100.00	10113206.05	100.00



8. Quality assurance

Laboratory surveillance procedures and quality audit:

- The CPHL has the overall responsibility to standardize testing methods (identification and AST) as well as performing the regular quality audit for accurate and smooth running of the service throughout the healthcare facility laboratories that take part in the surveillance project.
- Participating healthcare facility laboratories should follow the guidelines defined by the CPHL as follows:
 - Disk diffusion methods will be the commonly used procedure; however, certain laboratories have access to automated methods. All MoH laboratories are following the CLSI guidelines for interpretation of the results.
- AST results are reported through Al-Shifa system.
- Those strains meeting the MDROs definition will be further analyzed as per the national AST guidelines/SOPs.

Referral of strains to CPHL:

As part of AMR surveillance, certain strains should be sent to the CPHL according to the following criteria:

- Difficult to identify strains or resistant organisms
- Confirmation of unusual resistant pattern
- All VRE strains
- All *Streptococcus pneumoniae* from sterile sites
- All *Gonorrhea* strains
- All *Salmonella spp.* /*Shigella spp.*
- 20 % of MRSA, CRE, ESBL, MDRA, and PDR
- All *Candida.auris* isolates



CPHL monitoring and evaluations procedures:

The following indicators is used for regular monitoring and evaluation of the laboratory aspects of the AMR surveillance:

- 1) Priority pathogens: Number reported and included in the AMR, verified by lab reporting on the target organism.
- 2) Priority pathogens and combination with first line drugs.
- 3) MDROs referral to CPHL for confirmation as per the decided percentage. This can be verified from the reported MDROs in Al-Shifa and what percentage was actually submitted to CPHL.



9. Appendix

Annex 1: Population registered nationally for 2025

Age Group	Omani		Expatriate		Total	
	N	%	N	%	N	%
0-04	336128	11.06%	66827	2.88%	402955	7.52%
05-09	405875	13.35%	78673	3.39%	484548	9.04%
10-14	371936	12.24%	67687	2.92%	439623	8.20%
15-19	280171	9.22%	52081	2.24%	332252	6.20%
20-24	221603	7.29%	152418	6.57%	374021	6.98%
25-29	216984	7.14%	328340	14.15%	545324	10.17%
30-34	243181	8.00%	356982	15.39%	600163	11.20%
35-39	238512	7.85%	411302	17.73%	649814	12.12%
40-44	207577	6.83%	331065	14.27%	538642	10.05%
45-49	156724	5.16%	210427	9.07%	367151	6.85%
50-54	101523	3.34%	123958	5.34%	225481	4.21%
55-59	70745	2.33%	72369	3.12%	143114	2.67%
60-64	59200	1.95%	34329	1.48%	93529	1.75%
65-69	48553	1.60%	18751	0.81%	67304	1.26%
70-74	32291	1.06%	8262	0.36%	40553	0.76%
75-79	21993	0.72%	3873	0.17%	25866	0.48%
80+	26353	0.87%	2864	0.12%	29217	0.55%
Total	3039349	100.00%	2320208	100.00%	5359557	100.00%



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