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Pattern of Antimicrobial Utilisation at the Outpatient Department of Base Hospital Karawanella, Sri Lanka, 2025: A Descriptive Drug Utilisation Study

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Abstract:

- ***Background:***

Antimicrobial resistance (AMR) is a leading global health threat, and rational antimicrobial use at the primary and secondary healthcare level is central to Sri Lanka's National Action Plan for combating AMR. Facility-level data describing how antimicrobials are actually used, benchmarked against the World Health Organization (WHO) Access, Watch, Reserve (AWaRe) classification, remain scarce for secondary-care hospitals in Sri Lanka.

- ***Objectives:***

To describe the monthly pattern of antimicrobial dispensing at the outpatient department (OPD) of Base Hospital Karawanella during 2025 and to classify consumption according to the WHO AWaRe framework.

- ***Methods*:**

This was a retrospective, descriptive drug utilisation study using the OPD pharmacy's "countable drugs" dispensing register for January-December 2025 (14 antimicrobial agents in 26 formulations). Each antimicrobial was classified by WHO AWaRe category and by pharmacological class and route of administration. Descriptive statistics summarised total and monthly dispensing volume, proportional AWaRe distribution, and the ranking of agents by volume.

- ***Results:***

A total of 667,807 antimicrobial units were dispensed over the year (monthly range 43,784-81,284). Access-group agents accounted for 93.9% of total volume (95.4% of the Access-plus-Watch antibacterial subset) - well above the WHO target of ≥60% Access consumption - while Watch-group agents comprised 4.6% and agents outside the antibacterial AWaRe scope (an antiviral and a topical antifungal) comprised 1.5%. Amoxicillin, cephalexin and flucloxacillin together made up 93.0% of all antimicrobial dispensing. Watch-group volume, driven almost entirely by oral ciprofloxacin (which was not dispensed at all until August), rose sharply in the last quarter of the year, from a January-September monthly average of 1,497 units to 4,249-6,319 units per month in October-December.

- ***Conclusion:***

OPD antimicrobial prescribing at Base Hospital Karawanella is strongly Access-dominant and consistent with WHO and national AMR-containment targets, reflecting broadly rational empirical prescribing centred on amoxicillin, cephalexin and flucloxacillin. However, the marked, late-year rise in Watch-group ciprofloxacin dispensing - which could reflect either a genuine prescribing shift or a supply/formulary event - warrants stewardship review and verification against pharmacy procurement records. Routine AWaRe-based drug utilisation audit and denominator (OPD-attendance) data collection are recommended to sustain and monitor this performance over time.

Keywords: *Antimicrobial Resistance; AWaRe Classification; Antimicrobial Utilisation; Drug Utilisation Review; Antimicrobial Stewardship; Sri Lanka; Outpatient Prescribing.*

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I. INTRODUCTION

Antimicrobial resistance (AMR) is now recognised as one of the foremost threats to global public health and development. A comprehensive global burden analysis estimated that bacterial AMR was directly responsible for 1.27 million deaths in 2019 and was associated with 4.95 million deaths worldwide, a toll comparable to or exceeding that of many major infectious diseases.[1] The problem is compounded in low- and middle-income countries (LMICs), where diagnostic capacity is limited, over-the-counter antibiotic access is common, and infectious disease burden remains high, creating strong selective pressure for resistant organisms to emerge and spread.[1,2]

In response to this threat, the World Health Assembly endorsed the WHO Global Action Plan on Antimicrobial Resistance (GAP-AMR) in May 2015, which set out five strategic objectives: improving awareness and understanding of AMR; strengthening surveillance and research; reducing the incidence of infection; optimising the use of antimicrobial agents; and ensuring sustainable investment in new medicines, diagnostics and vaccines.[2] Member states were urged to develop national action plans aligned with these objectives within a One Health framework spanning human health, animal health, agriculture and the environment.[2]

A central tool for pursuing the fourth GAP-AMR objective - optimising antimicrobial use - is the WHO Access, Watch, Reserve (AWaRe) classification, first introduced in 2017 and periodically updated (most recently in 2023), which groups antibiotics into three categories according to their spectrum of activity and their potential to select for resistance.[3,4] Access antibiotics are narrow-spectrum agents with a low resistance-selection potential that should be readily available as first-line empirical options for common infections; Watch antibiotics have a higher resistance potential and are recommended for more restricted use or for specific indications; and Reserve antibiotics are last-resort agents to be preserved for confirmed or strongly suspected multidrug-resistant infections.[3,4] The WHO's 13th General Programme of Work (2019-2023) set a country-level target that at least 60% of total antibiotic consumption should come from the Access group, a benchmark now widely used to monitor and compare antimicrobial stewardship performance across health systems.[4,5]

Sri Lanka developed its first National Strategic Plan for Combating Antimicrobial Resistance (NSP-AMR 2017-2022), coordinated through a National Focal Point for AMR under the Deputy Director General (Laboratory Services), Ministry of Health, together with a multisectoral National Advisory Committee spanning human health, animal health, fisheries, agriculture and environment sectors under a One Health approach.[6,7] Following an end-term review conducted in 2023, this was succeeded by the National Strategic Plan / National Action Plan for Combating Antimicrobial Resistance 2023-2028 (NAP-AMR 2023-2028), accompanied by a costed two-year operational plan, which places renewed emphasis on strengthening AMR surveillance, laboratory capacity, antimicrobial stewardship, infection prevention and control, and evidence-based policy.[6,8] Sri Lanka's own national surveillance data illustrate why this focus is needed: resistance to third-generation cephalosporins among key Enterobacteriaceae isolates has been reported in the range of 50-57%, and a substantial share of the national health budget - reported at approximately 12.7% - is spent on antimicrobial medicines.[9,10]

Alongside surveillance and stewardship structures, Sri Lanka's broader medicines governance framework is also relevant to antimicrobial use at facility level. The National Medicinal Drug Policy sets out objectives for rational medicine selection, generic prescribing and essential-medicines availability,[11] and the Sri Lanka College of Microbiologists, in collaboration with the Ministry of Health, has developed and disseminated national antibiotic treatment guidelines for common infections including urinary tract infection, central nervous system infection, infective endocarditis, surgical prophylaxis and infectious diarrhoea.[12] Nevertheless, dispensing of antibiotics without a prescription - although legally prohibited in Sri Lanka since 1986 - remains common in practice: a simulated-client study of 242 community pharmacies found that 61% dispensed an antibiotic without a prescription, with ciprofloxacin being the most readily supplied agent (70% of requests).[13] This demand-side pressure for antibiotics, particularly for Watch-group fluoroquinolones and macrolides, forms an important part of the context in which hospital OPD prescribing patterns should be interpreted.

Most antimicrobial consumption in any health system occurs not in hospital wards but in outpatient and primary/secondary care settings, where the majority of prescriptions are written empirically, without microbiological confirmation, for common infections such as upper respiratory tract infection, urinary tract infection, and skin and soft-tissue infection. Facility-level, AWaRe-based description of this outpatient prescribing volume is therefore a foundational - and in Sri Lanka still uncommon - form of antimicrobial stewardship surveillance recommended under NAP-AMR 2023-2028's antimicrobial-use-optimisation objective.

Base Hospital Karawanella is a secondary-care government hospital serving the Ruwanwella Divisional Secretariat area of Kegalle District, Sabaragamuwa Province, functioning under the Ruwanwella Medical Officer of Health (MOH) area and the Kegalle Regional Director of Health Services (RDHS).[14] As the principal secondary-care referral point for this predominantly semi-rural, agricultural catchment area, describing its OPD antimicrobial dispensing pattern in detail - by volume, by agent and by WHO aware category - provides a baseline against which future stewardship interventions and national benchmarks can be compared.

- *Objectives*

The general objective of this study was to describe the pattern of antimicrobial utilisation at the OPD of Base Hospital Karawanella during 2025.

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- *The Specific Objectives were:*

✓ To quantify the total and monthly volume of antimicrobial agents dispensed at the OPD in 2025.
✓ To classify antimicrobial consumption according to the WHO AWaRe framework and to compare the Access-group proportion against the WHO 60% target.
✓ To describe the temporal (monthly) pattern of total and agent-specific antimicrobial dispensing over the year.
✓ To discuss the findings in relation to WHO AWaRe targets, Sri Lanka's AMR policy framework, and local antimicrobial stewardship practice.

II. METHODOLOGY

➢ *Study Design*

This was a retrospective, descriptive drug utilisation study based on routinely collected, aggregate secondary data from the OPD pharmacy dispensing register.

➢ *Study Setting and Period*

The study was conducted at Base Hospital Karawanella, a secondary-care government hospital in the Ruwanwella Divisional Secretariat area, Kegalle District, Sabaragamuwa Province, Sri Lanka. The study period was the full calendar year 2025 (January-December).

➢ *Data Source*

Antimicrobial dispensing data were obtained from the hospital OPD pharmacy's "Countable Drugs Dispensed" register for 2025, comprising an annual summary (drug-wise monthly and annual totals) and a monthly detailed breakdown, recording the quantity of each tracked ("countable") drug item dispensed to OPD patients each month, in dispensing units (tablets, capsules, millilitres of syrup, grams of cream/ointment, or drops, as applicable to each formulation).

➢ *Data Extraction, Cleaning and Classification*

All 27 line items recorded in the pharmacy register were reviewed. Twenty-six formulations, representing 14 distinct antimicrobial active agents (antibacterial, antiviral or antifungal), were retained for analysis. One item - permethrin cream, a topical antiparasitic scabicide with no antibacterial, antiviral or antifungal activity - was excluded from the antimicrobial-utilisation analysis, since its inclusion would not be consistent with an AMR-focused drug-utilisation review; it is reported separately for completeness (Table 1, footnote).

Each retained antimicrobial agent was assigned to a WHO AWaRe category (Access or Watch; no Reserve-group agent was present in the dataset) using the 2023 WHO AWaRe classification of antibiotics.[3] Agents falling outside the antibacterial AWaRe scope - the antiviral aciclovir and the topical antifungal clotrimazole - were labelled "Not AWaRe-classified" and reported as a separate category rather than forced into an Access/Watch label. Route of administration (systemic versus topical/ophthalmic) was also recorded for each item, since the AWaRe framework and consumption targets are formally intended to apply to systemically absorbed antibacterial agents, and topical formulations were therefore also analysed separately as a sensitivity check.

Where a monthly cell for a given drug item was blank (as distinct from an explicit zero), this was interpreted as no quantity dispensed and recorded as zero for the purpose of monthly and annual summation; this affected a small number of low-volume items only (clotrimazole vaginal insert, mupirocin ointment and phenoxymethylpenicillin), for which certain months had no register entry, plausibly reflecting stock-outs, temporary discontinuation, or the item not yet being stocked in that month. The internally recomputed 12-month sum for total antimicrobial dispensing (667,863 units across all 27 original items, or 667,807 units for the 26-item antimicrobial subset) differed by 3,142 units (0.47%) from the annual total value stored in the source register (664,721 units), a small discrepancy attributable to a stale cached total in the original spreadsheet; the recomputed, internally consistent monthly figures were used throughout this analysis and are recommended for any future reporting from this register.

➢ *Outcome Measures*

- Total and monthly antimicrobial units dispensed, overall and by individual agent.
- Proportion of total antimicrobial volume in the Access, Watch and Not-AWaRe-classified categories, compared against the WHO ≥60% Access target.
- Ranking of antimicrobial agents by total annual volume dispensed.
- Monthly trend and range of total and AWaRe-category-specific antimicrobial dispensing.

➢ *Statistical Analysis*

Descriptive statistics only were used: totals, percentages, monthly ranges and ranked distributions. All analyses were performed in Python 3 using the pandas library, and figures were produced with matplotlib.

➢ *Ethical Considerations*

This study used only aggregate, facility-level administrative data with no patient-identifiable information, consistent with a routine drug-utilisation review. Nonetheless, prior to any external publication or dissemination, administrative clearance from Base Hospital Karawanella, and, where applicable, ethical review board approval, should be obtained.

III. RESULTS

➢ *Overall Volume and Composition of Antimicrobial Dispensing*

A total of 667,807 units of 14 antimicrobial agents (26 formulations) were dispensed at the Base Hospital Karawanella OPD during 2025, at an average of 55,651 units per month. Table 1 summarises the annual volume, pharmacological class and WHO AWaRe category of each agent.

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Table 1 Annual Antimicrobial Dispensing at the OPD of Base Hospital Karawanella, by Agent and WHO AWaRe Category, 2025

Generic agent	Pharmacological class	AWaRe category	Total units dispensed	% of total
Amoxicillin	Penicillin	Access	384,994	57.65
Cephalexin	1st-gen. cephalosporin	Access	144,562	21.65
Flucloxacillin	Anti-staphylococcal penicillin	Access	91,614	13.72
Erythromycin	Macrolide	Watch	22,958	3.44
Aciclovir	Antiviral (nucleoside analogue)	Not AWaRe-classified	9,465	1.42
Ciprofloxacin (oral)	Fluoroquinolone	Watch	6,539	0.98
Framycetin (topical)	Aminoglycoside	Access	3,020	0.45
Phenoxymethylpenicillin	Penicillin	Access	2,995	0.45
Ciprofloxacin (topical/ophthalmic)	Fluoroquinolone	Watch	790	0.12
Clotrimazole (topical)	Antifungal (imidazole)	Not AWaRe-classified	662	0.10
Fusidic acid (topical)	Steroid antibacterial	Watch	159	0.02
Gentamicin (topical)	Aminoglycoside	Access	31	<0.01
Metronidazole (topical gel)	Nitroimidazole	Access	17	<0.01
Mupirocin (topical)	Topical antibacterial	Access	1	<0.01

Note: Permethrin cream (56 units dispensed in 2025) is a topical antiparasitic scabicide with no antibacterial, antiviral or antifungal activity and is therefore excluded from the antimicrobial totals above and from all subsequent analysis.

Amoxicillin, cephalexin and flucloxacillin - all three Access-group agents - together accounted for 93.0% of total antimicrobial volume, reflecting their central role as first-line empirical options for common respiratory, urinary and skin/soft-tissue infections seen in OPD practice. Figure 1 shows the ranked distribution of the eight most-dispensed agents.

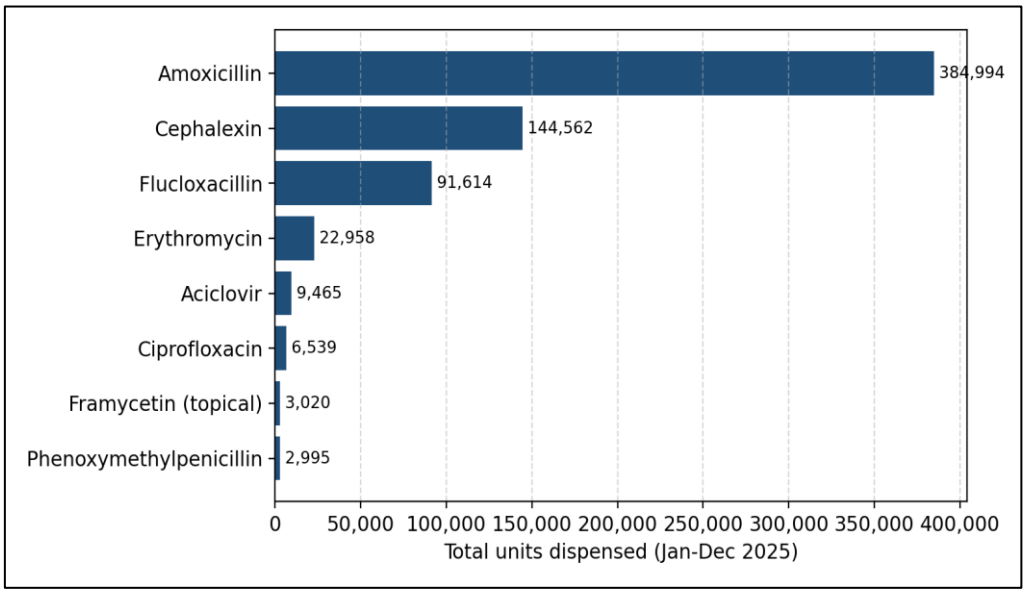

Fig 1 Top Eight Antimicrobial Agents Dispensed at the OPD, Base Hospital Karawanella, 2025 (total units, Jan-Dec)

➢ *WHO AWaRe Classification and the 60% Access Target*

Overall, Access-group antimicrobials accounted for 93.9% of total antimicrobial volume dispensed (627,234 of 667,807 units), Watch-group agents for 4.6% (30,446 units), and agents outside the antibacterial AWaRe scope (aciclovir and topical clotrimazole) for 1.5% (10,127 units). Restricting the denominator to antibacterial agents only (Access + Watch, excluding the antiviral and antifungal items), the Access-group proportion was 95.4%. Both figures substantially exceed the WHO 13th General Programme of Work target of at least 60% Access-group consumption at country level.[4,5] Table 2 and Figure 2 present the monthly breakdown.

Table 2 Monthly Antimicrobial Dispensing by WHO AWaRe Category, Base Hospital Karawanella OPD, 2025 (units)

Month	Access	Watch	Not AWaRe-classified	Total
Jan	53,603	873	937	55,413
Feb	62,743	1,828	1,645	66,216
Mar	53,387	1,297	1,057	55,741
Apr	43,103	737	436	44,276

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May	78,606	2,160	516	81,282
Jun	52,146	2,091	792	55,029
Jul	45,362	1,639	505	47,506
Aug	46,051	1,723	390	48,164
Sep	41,090	2,125	569	43,784
Oct	58,402	4,249	955	63,606
Nov	46,153	6,319	655	53,127
Dec	46,588	5,405	1,670	53,663
Total	627,234	30,446	10,127	667,807
% of annual total	93.92%	4.56%	1.52%	100%

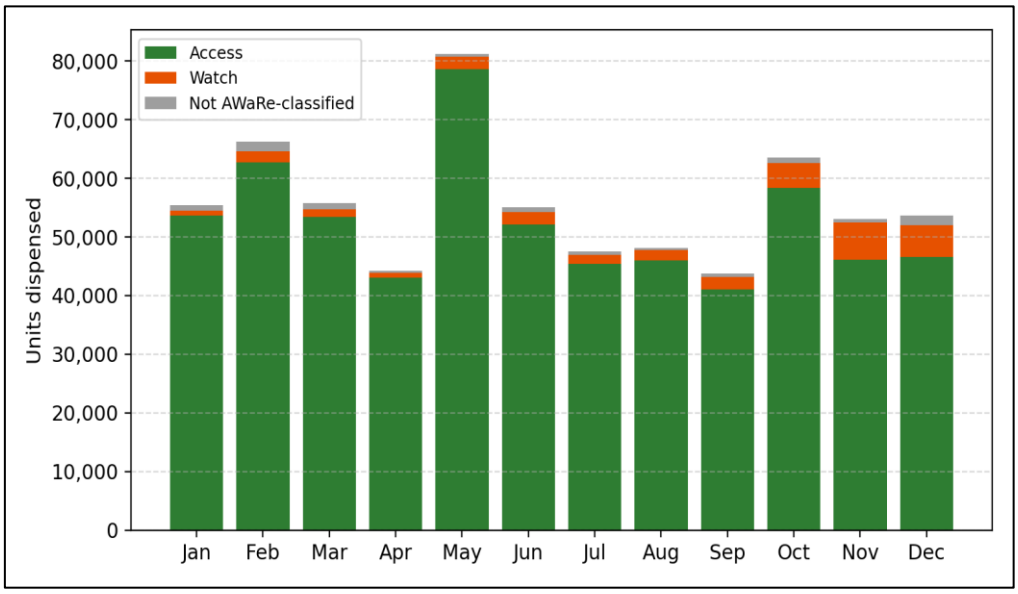

Fig 2 Monthly Antimicrobial Dispensing by WHO AWaRe Category, Base Hospital Karawanella OPD, 2025

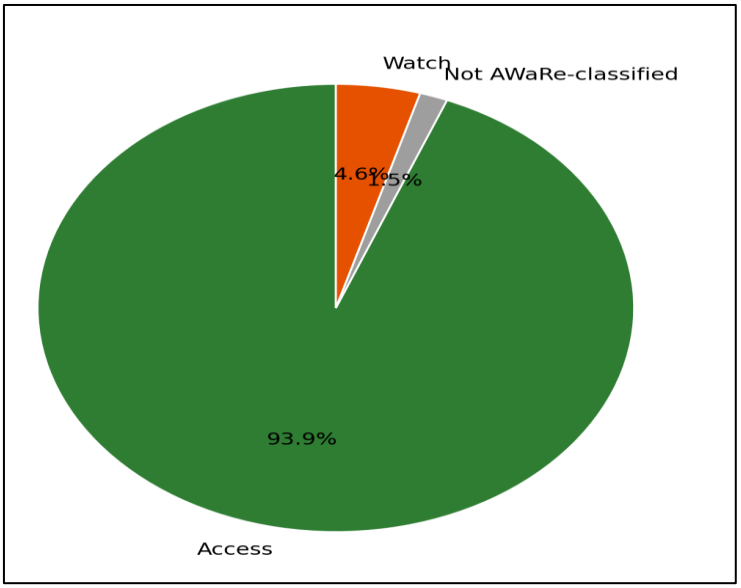

Fig 3 Overall Share of Antimicrobial Dispensing by WHO AWaRe Category, 2025

Although the Access-group share remained above 88% in every individual month, Watch-group volume rose markedly in the final quarter of the year, from a January-September monthly average of 1,497 units to 4,249, 6,319 and 5,405 units in October, November and December respectively. This rise was driven almost entirely by oral ciprofloxacin, which recorded zero dispensing from January through July, before rising abruptly to 24 units in August, 631 in September, 1,598 in October, 1,927 in November and 2,359 units in December (Figure 4). Erythromycin, the other principal Watch-group agent, also showed higher dispensing in the last quarter (2,364-3,772 units per month) compared with the January-September range (600-1,995 units per month).

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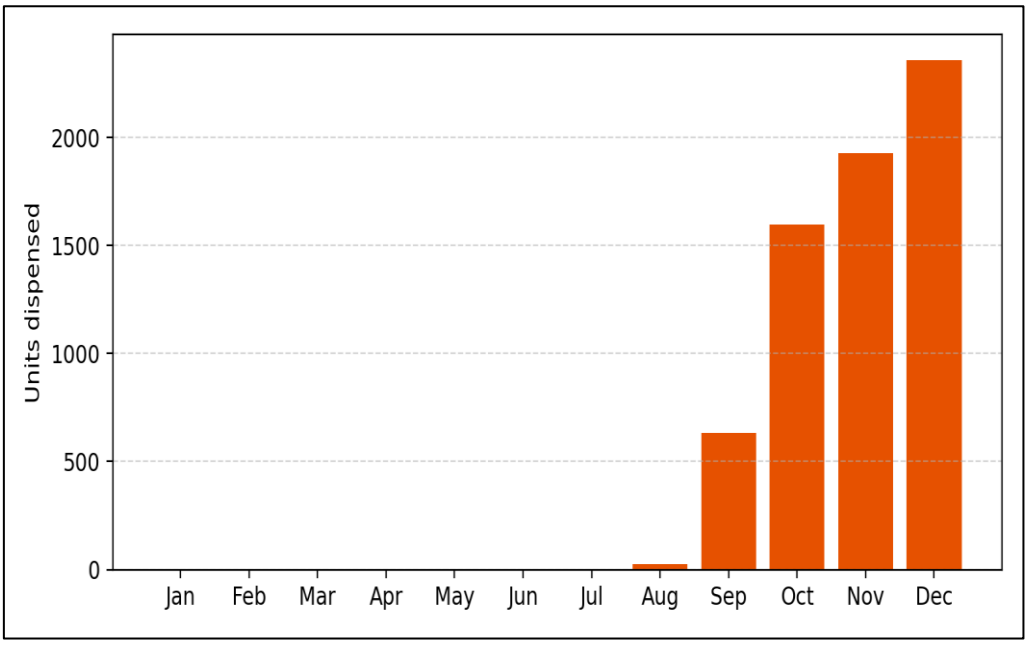

Fig 4 Monthly Dispensing of Oral Ciprofloxacin (Watch Group), Base Hospital Karawanella OPD, 2025

➢ *Temporal Pattern of Total Antimicrobial Dispensing*

Total monthly antimicrobial dispensing ranged from a low of 43,784 units in September to a high of 81,282 units in May - an approximately 1.9-fold difference between the lowest and highest months (Figure 5). No single, consistent seasonal pattern was evident across the year; May stood out as a marked single-month peak, driven predominantly by a large rise in amoxicillin dispensing that month (36,978 units of Amoxicillin-250 mg alone, more than double most other months' figures for this item), while April and September were the lowest-volume months across nearly all agents.

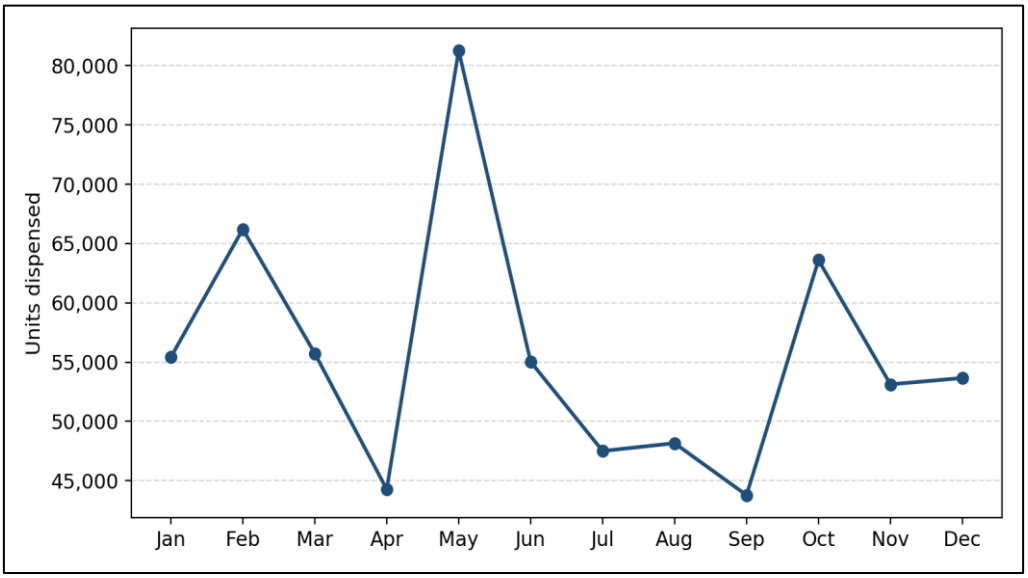

Fig 5 Monthly Total Antimicrobial Units Dispensed at OPD, Base Hospital Karawanella, 2025

IV. DISCUSSIONS

This study provides, to our knowledge, the first WHO AWaRe-based description of outpatient antimicrobial dispensing at Base Hospital Karawanella.

➢ *A Strongly Access-Dominant Prescribing Pattern*

The headline finding - that 93.9% of total antimicrobial volume (95.4% of the antibacterial-only subset) fell within the WHO Access category - substantially exceeds the WHO's global 60% target and compares favourably with reported Access-group proportions in several higher-income health systems that have invested heavily in stewardship programmes (for example, Access-group shares of around 64-70% have been reported for national antibiotic consumption in England).[5] This pattern is consistent with, and supportive of, the antimicrobial-use-optimisation objective of Sri Lanka's NAP-AMR 2023-2028,[6,8] and suggests that empirical prescribing at this OPD is, in volume terms, well aligned with WHO stewardship guidance for

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common infections, most of which recommend Access agents such as amoxicillin, cephalexin/cefalexin and flucloxacillin as first-line choices for the respiratory, urinary and skin/soft-tissue infections that dominate everyday OPD practice.[3,4]

- *The Late-Year Rise in Watch-Group (Ciprofloxacin) Use*

The near-total absence of oral ciprofloxacin dispensing for the first seven months of 2025, followed by a steep and sustained rise from August onward, is a striking and clinically important pattern that merits cautious interpretation. Two, non-mutually-exclusive explanations are plausible. First, this could represent a genuine shift in empirical prescribing - for example, increased suspicion of urinary tract or gastrointestinal infection, or a response to observed or perceived resistance to Access-group agents - which would be consistent with broader concerns about rising fluoroquinolone use and resistance, and would merit close antimicrobial stewardship attention given ciprofloxacin's association with collateral resistance selection and its documented over-the-counter overuse in the Sri Lankan community setting.[13] Second, and perhaps more parsimonious given the abrupt step-change from exactly zero to non-zero, the pattern may equally reflect a supply-side or formulary event - namely, that ciprofloxacin tablets were simply not stocked, or were out of stock, at the OPD dispensary before August 2025, and that the subsequent rise reflects the item becoming available for dispensing rather than a genuine change in the underlying clinical demand or prescribing behaviour. Distinguishing between these explanations was not possible from the dispensing register alone; we recommend that hospital pharmacy/procurement records and prescriber-level data be reviewed to clarify the driver of this trend before any stewardship conclusions or interventions are finalised.

- *Dominance of Amoxicillin, Cephalexin and Flucloxacillin*

The overwhelming share of volume attributable to amoxicillin (57.7%), cephalexin (21.7%) and flucloxacillin (13.7%) mirrors the expected OPD case-mix of upper respiratory tract infection, urinary tract infection, and skin and soft-tissue infection, and is broadly consistent with community antibiotic demand patterns documented elsewhere in Sri Lanka, where amoxicillin and erythromycin were among the antibiotics most frequently sought - and most readily dispensed without prescription - in community pharmacies.[13] It is also consistent with the national picture described by a country-wide survey of antibacterial consumption in Sri Lanka, which similarly identified penicillins (notably amoxicillin) and first-generation cephalosporins as the leading classes of antibacterial consumed.[18] The pronounced single-month peak in amoxicillin dispensing in May 2025 (accounting for the year's highest total-antimicrobial month) is noteworthy and would benefit from correlation with local OPD attendance figures, which were not available for this analysis, to determine whether it reflects a genuine surge in attendance for infections such as upper respiratory tract infection, or a bulk procurement/stocking event.

- *Policy Implications*

These findings have several direct implications for antimicrobial stewardship practice at Base Hospital Karawanella and, potentially, comparable secondary-care facilities in Sri Lanka. The consistently high Access-group share is a genuine achievement that should be maintained and formally monitored, ideally through a standing local audit-and-feedback mechanism as encouraged under NAP-AMR 2023-2028.[6,8] The unexplained, abrupt rise in Watch-group ciprofloxacin dispensing illustrates the practical value of routine AWaRe-based monitoring: without it, such shifts could otherwise go unnoticed until they are reflected, with a lag, in local antimicrobial resistance surveillance data. Adoption of the WHO AWaRe Antibiotic Book as a point-of-prescribing reference for common OPD infections,[15] alongside the existing Sri Lanka College of Microbiologists antibiotic guidelines,[12] would further support Access-first empirical prescribing while flagging situations that genuinely warrant a Watch-group agent. More broadly, these results underscore the value of routine, dedicated antimicrobial-use surveillance at facility level (ideally using WHO Anatomical Therapeutic Chemical/Defined Daily Dose, ATC/DDD, methodology once OPD attendance denominators are available) as a standing complement to Sri Lanka's national AMR containment efforts.

V. LIMITATIONS

- This was a descriptive, aggregate-data study of dispensing volumes; it cannot establish the clinical indication, appropriateness, or diagnosis associated with any individual prescription.
- The dispensing register captured only “countable drugs” dispensed through the OPD pharmacy; it is likely to exclude some antimicrobial formulations (for example, doxycycline, co-amoxiclav, or injectable agents), ward/inpatient antimicrobial use, and any antimicrobials issued through other stores, so that total facility-level antimicrobial exposure may be under- or mis-estimated.
- No OPD attendance or catchment-population denominator data were available, so results are reported as absolute dispensing volumes rather than as standardised rates (e.g., WHO ATC/DDD per 1,000 OPD attendances or per 1,000 inhabitant-days), limiting comparability with other facilities or with national/international benchmarks.
- A small number of blank monthly cells for low-volume items were treated as zero dispensing; if any of these instead represented missing or unrecorded data rather than true non-dispensing, the totals for those specific items (clotrimazole vaginal insert, mupirocin, phenoxymethylpenicillin) could be marginally under-estimated.
- This is a single-facility, single-year study; findings may not generalise to other hospitals, catchment areas, or years, particularly given the apparent supply-related step-change identified in ciprofloxacin availability.
- No microbiological, antibiogram, or clinical-indication data were available to assess the clinical appropriateness of individual prescriptions; the AWaRe classification describes stewardship-relevant volume patterns but does

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not, by itself, establish whether individual prescriptions were clinically indicated.

VI. CONCLUSION AND RECOMMENDATIONS

Antimicrobial dispensing at the OPD of Base Hospital Karawanella in 2025 was dominated by Access-group agents (93.9% of total volume), comfortably exceeding the WHO's 60% Access-consumption target and reflecting a broadly rational, stewardship-consistent empirical prescribing pattern centred on amoxicillin, cephalexin and flucloxacillin. However, a marked and unexplained late-year rise in Watch-group ciprofloxacin dispensing highlights the value of routine, AWaRe-based monitoring for detecting shifts in prescribing or supply that might otherwise go unnoticed.

➢ *Based on These Findings, the Following Actions are Recommended:*

- Institutionalise a routine, monthly WHO AWaRe-based drug utilisation audit-and-feedback mechanism at Base Hospital Karawanella, reporting the Access/Watch/Reserve proportion to prescribers and pharmacy staff as a standing stewardship indicator, in line with NAP-AMR 2023-2028.
- Investigate the cause of the August-December 2025 rise in ciprofloxacin dispensing by cross-checking pharmacy procurement and stock records against prescribing patterns, to distinguish a supply-side explanation from a genuine change in clinical demand, and respond with either supply-chain correction or targeted stewardship action as appropriate.
- Collect and routinely record OPD attendance figures to enable calculation of standardised antimicrobial consumption metrics (WHO ATC/DDD per 1,000 OPD attendances), allowing meaningful year-on-year and inter-facility comparison.
- Extend the scope of the “countable drugs” dispensing register, or establish a parallel pharmacy record, to capture all antimicrobial formulations dispensed at the facility (including any not currently tracked, such as doxycycline or co-amoxiclav) and, where feasible, inpatient/ward antimicrobial use, to obtain a complete facility-level antimicrobial-use picture.
- Repeat this analysis prospectively over multiple years to monitor trends in Access-group performance and to detect any recurrence of abrupt shifts such as the 2025 ciprofloxacin rise.
- Continue to align local antimicrobial stewardship activities with the WHO AWaRe Antibiotic Book and with Sri Lanka's National Action Plan for Combating Antimicrobial Resistance 2023-2028.

DECLARATIONS

➢ *Funding*
This study received no specific external funding.

➢ *Conflicts of Interest*
The author(s) declare no conflicts of interest.

➢ *Data Availability*
The de-identified, aggregate monthly datasets analysed in this study are available from the corresponding author on reasonable request.

➢ *Acknowledgements*
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