MAKERERE UNIVERSITY

IDI INFECTIOUS DISEASES INSTITUTE

Technical Brief
April 2025

Antibiotic Prescribing Patterns in People with HIV: Key Findings from an Urban HIV Outpatient Clinic in Uganda.

Team meeting led by the third reviewer to resolve discrepancies from the initial independent file reviews.

Background

Antimicrobial resistance (AMR) is a pressing public health challenge with significant implications for treatment outcomes, healthcare costs, and efforts to control infectious diseases.

In 2019, bacterial antimicrobial resistance (AMR) was linked to 4.95 million deaths globally, highlighting the critical need for strategic interventions.[1] Antibiotic misuse and overuse are key contributors to AMR[2], with low and middle-income countries (LMCIs) such as Uganda being among the most affected.

Problem statement/ Challenge

Promoting the optimal use of antibiotics was one of the objectives of Uganda's Antimicrobial Resistance National Action Plan (2018-2023)[3]. Despite the existence of a national action plan for AMR, antibiotic misuse remains widespread in Uganda[4 5], with some studies finding it as high as every 7 out of 10 antibiotic prescriptions[5]. However, it remains unclear if it is also high in persons with HIV (PWH).

The World Health Organisation (WHO), through its global research agenda for antimicrobial resistance in human health (2024) prioritises studying antimicrobial use in PWH as one of the key populations[6]. Persons with HIV with a weakened immunity may be at an increased risk of infections and, therefore more antibiotic prescriptions.

Technical Approach

The Centres for Antimicrobial Optimisation Network (CAMO-Net), through its Ugandan hub, evaluated the appropriateness of antibiotic prescriptions at the Infectious Diseases Institute (IDI), an outpatient HIV care and treatment clinic in Kampala, Uganda. The IDI HIV clinic is a tertiary health facility that also receives referrals of people with HIV (PWH) who require specialised care. Antibiotic prescriptions from January 2016 to December 2022 were reviewed.

[1] World Health Organisation. Antimicrobial resistance. https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance.
[2] World Health Organisation. Global Action Plan on Antimicrobial Resistance. https://www.emro.who.int/health-topics/drug-resistance/global-action-plan.html
[3] Government of Uganda. Antimicrobial Resistance National Action Plan 2018-2023
[4] Kiggundu R et al. Point Prevalence Survey of Antibiotic Use across 13 Hospitals in Uganda.2022. https://doi.org/10.3390/antibiotics11020199
[5] Nantongo H et al. An Evaluation of Antibiotic Prescription Rationality at Lower Primary Healthcare Facilities in Three Districts of South-Western Uganda. 2022. https://doi.org/10.2147/JMDH.S384297
[6] World Health Organisation. Global research agenda for antimicrobial resistance in human health. 2024. https://www.who.int/publications/i/item/9789240102309

camo-net

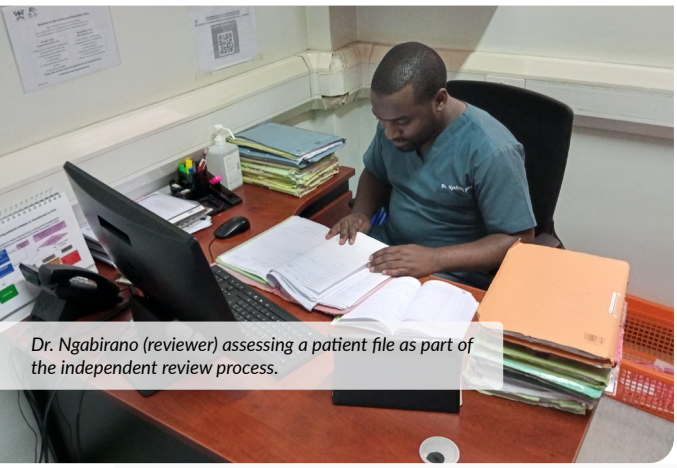
Funded by: wellcome

Medical records selection and prescription reviews

Participants were randomly selected from various points of care at IDI, except for those requiring urgent or priority medical care, who were all included. For each selected participant, a single antibiotic prescription date was randomly chosen for assessing prescription appropriateness.

We created and digitalised a data abstraction tool using an online web application called REDCap (Research Electronic Data Capture). We collected patient data from both the patient files and Electronic Medical Records – acting as complementary data sources.

Two reviewers independently assessed for the appropriateness of each antibiotic prescription, with a third reviewer acting as a tie-breaker in case of discrepancies.



Dr. Ngabirano (reviewer) assessing a patient file as part of the independent review process.

Assessment of the appropriateness of an antibiotic prescription.

We used the Ministry of Health Uganda Clinical Guidelines (UCG) of 2016 as the reference to determine the appropriateness of prescriptions. Additionally, we also used the Practical Guidelines for Dispensing at Higher Level Health Centres 2015 (PGDHC) when a diagnosis of 'respiratory tract infection' or 'upper respiratory tract infection' was documented, as these terms are not broadly categorised in the UCG 2016." The UCG 2016 was not renewed during the study period and was therefore valid.

Every antibiotic prescription was initially assessed for the presence of a written diagnosis (**figure 1**). In the absence of a documented diagnosis, the prescription was automatically considered inappropriate/irrational. Diagnoses were reviewed for comfirmed or suspected bacterial infections and the prescription was classified as innnapropriate if the illness was not bacterial.

Thereafter, every diagnosis was assessed against the UCG 2016 recommendation (or, where required, the PGDHC) for the class of drug. Any prescribed class other than the one recommended by the UCG 2016 or PGDHC was also deemed inappropriate/irrational by default. The prescriptions were further assessed for the dose, frequency, duration, and if they accounted for any significant drug-drug interactions between ART and antibiotics.

A prescription was considered appropriate if they met all the above criteria and inappropriate if it didn't meet any of the criteria. If a prescription had more than one antibiotic, each antibiotic was first assessed independently for appropriateness and then also in combination.

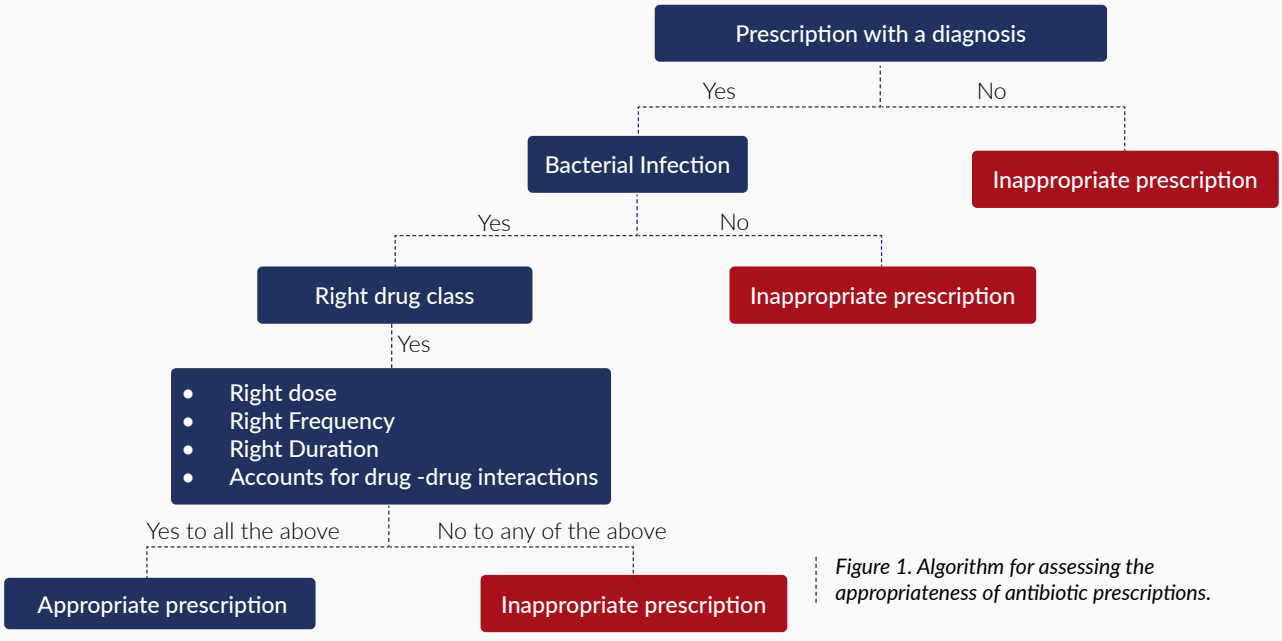


Figure 1. Algorithm for assessing the appropriateness of antibiotic prescriptions.

Results

Study Population Overview

We reviewed 1,367 patients' medical records. The majority of the patients were female 944 (70%) and had been on antiretroviral (ARV) drugs for at least 10 years 942 (70%). In total, there were 1823 antibiotic prescriptions. In 44.3% of cases (605 out of 1367), investigations were carried out to confirm a bacterial infection or rule out other potential disease causes before prescribing antibiotics.

These included laboratory tests such as malaria, blood counts, urinalysis, syphilis testing, culture and sensitivity tests – occasionally - and radiological imaging, e.g., ultrasound scans, X-rays, or CT scans.

Appropriateness of antibiotic prescriptions.

The proportion of appropriate antibiotic prescriptions was remarkably low. Only 12% (218/1822) of the prescriptions were appropriate – corresponding to 1 in 10 prescriptions.

The misuse of antibiotics was mainly due to two factors: prescriptions made without a proper diagnosis and non-compliance with national guidelines. Nearly half of the inappropriate antibiotic prescriptions [49% (841/1726)] were due to prescriptions made without a diagnosis.

The different reasons for inappropriate antibiotic prescriptions are summarised in (**Figure 2**).

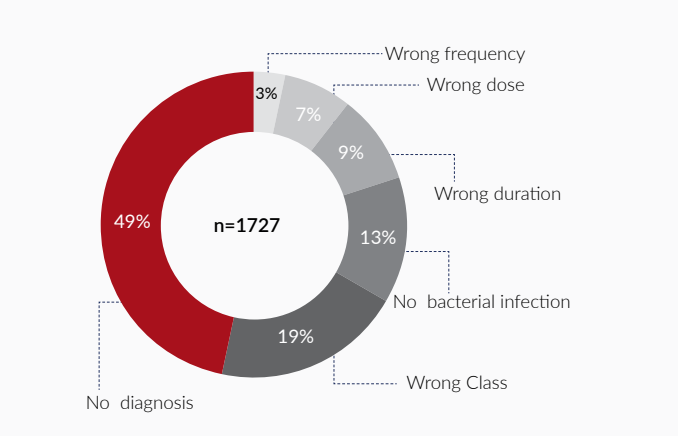


Figure 2: A pie chart showing the reasons for inappropriate antibiotic prescriptions.

Trends of appropriateness of antibiotic prescriptions.

The proportion of appropriate antibiotic prescriptions varied over the years, peaking in 2019 (15.2%) and sharply dropping in 2020 (6.4%) with some recovery by 2022 (9.7%) (**Figure 3**). The improvement in appropriate antibiotic prescriptions observed in 2018 & 2019 is likely due to the periodic interventions implemented by the Antimicrobial Stewardship (AMS) Committee in May & November 2018.

These interventions included training and sharing a hard copy of the UCG 2016 with prescribers, and having them sign commitment letters to being good antibiotic stewards. The steep decline in appropriate prescriptions seen in 2020 is probably due to the disruptions caused by the COVID-19 pandemic on the ongoing AMS practices.

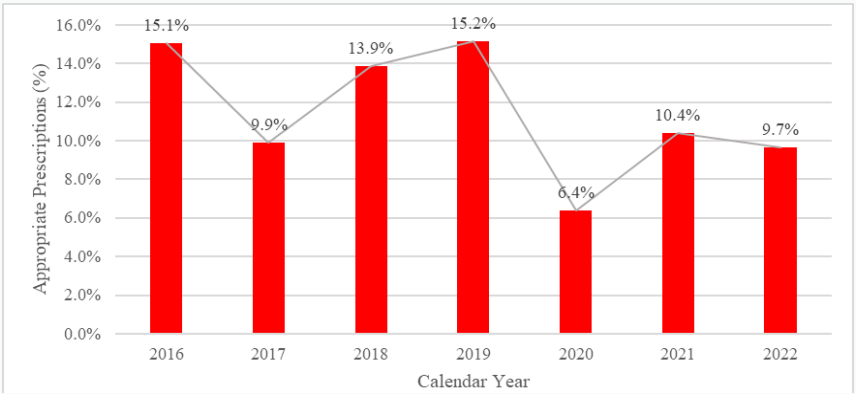


Figure 3. A graph showing the trend of antibiotic prescriptions during the study period.

Prescription by AWaRe classification.

The adherence of antibiotic prescriptions to the WHO AWaRe classification was notable. The majority (59.5%) of prescriptions were of antibiotics in the Access group, which aligns approximately with the WHO's recommendation that a minimum of 60% of all antibiotic prescriptions should come from this category.

The rest of the prescriptions were from the Watch group (37.4%) & Unclassified (3.1%). No Reserve group antibiotic prescriptions were assessed in our review.

Challenges faced

National guidelines can be difficult to apply in tertiary facilities:

Tertiary facilities like IDI serve a unique patient population. They often receive patients with a history of prior antibiotic treatment from other health facilities. The specific treatment considerations in such situations are not catered for in the national guidelines, which are generally designed for broader use.

Difficulty in aligning broad prescriber clinical diagnoses with the specific diagnoses in the guidelines:

Prescribers often documented broad diagnoses—such as "respiratory tract infections" or "Upper respiratory tract infections"—while national guidelines reference more specific conditions like laryngitis or pharyngitis. This mismatch made it challenging for reviewers to assess adherence to the clinical guidelines, and the decision was left to their discretion.

Similar challenges were faced in determining whether or not an infection was bacterial. This, however, was mitigated by having two independent reviewers (medical doctors) for each prescription and a tie-breaker (a physician) in case of a discrepancy.

Lessons Learned

01 *Adherence to the national guidelines is low:*

Despite the availability of national clinical guidelines, adherence to their recommendations was low, highlighting the need for further investigation into the factors influencing compliance.

One of the reasons in this review could have been the availability of alternatives. The national guidelines usually recommend one antibiotic per diagnosis, therefore restricting the use of other available alternatives. This poses a challenge when the recommended drug is out of stock and alternative options are available.

02 *Even modest AMS interventions can improve prescribing practices:*

The actions taken by the AMS committee in 2018, though not as frequently as recommended, contributed to a noticeable increase in appropriate antibiotic prescriptions. This demonstrated that even small targeted interventions can positively influence prescription practices.

03 *Proper documentation of prescriptions can improve antibiotic use:*

Incomplete or missing prescription details contributed significantly to irrational antibiotic prescriptions, highlighting the need for proper documentation.

04 *Fragility of AMS programmes in the face of health system disruptions:*

We observed antibiotic misuse to be at its peak during the COVID-19 pandemic. This highlights the vulnerability of AMS practices to public health emergencies and the need to be more alert about AMS during similar situations, and also to tailor interventions.

Recommendations

- *Strengthen the AMS committees to promote appropriate antibiotic use.*

Antimicrobial stewardship committees should be strengthened to regularly guide the proper use of antibiotics, support adherence to antimicrobial treatment guidelines, and initiate necessary interventions to promote AMS – irrespective of the scale of the intervention. This could for example be by building capacity through training, using AMS tools to aid with daily prescription, or regularly reporting about it in health facility meetings.

- *Prioritise and strengthen AMS interventions for persons with HIV:*

Although AMS programmes are essential across all populations, PWH require a more focused and intensified approach due to the significantly high rates of antibiotic misuse observed in this group, and the background of having an immunocompromised status which predisposes them to suffer the consequences of antibiotic misuse more.

Acknowledgments

We thank the IDI Prevention, Care, and Treatment Department for providing access to their files, which were essential for our analysis.

Authors

This publication was written by Dr. Brian Otaalo, Dr. Derek Ngabirano, Dr. Reuben Kiggundu & Dr. Barbara Castelnuovo. For more information, please get in touch with camonet@idi.co.ug

About CAMO-Net

The Centres for Antimicrobial Optimisation Network (CAMO-Net) is a global research partnership. Our aim is to address antimicrobial resistance and support antimicrobial optimisation for use in humans. This research is underpinned by the values of equity, local leadership, co-production of activities, knowledge mobilisation, mutual cross-regional learning, training, capacity and capabilities strengthening, and output sharing. The vision of CAMO-Net is a world where the appropriate, evidence-based use of antimicrobials is commonplace, supported by equitable availability and accessibility.

MAKERERE UNIVERSITY | IDI INFECTIOUS DISEASES INSTITUTE

camo-net

Funded by: wellcome