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Determinants of inappropriate antibiotic prescribing in primary healthcare facilities in the Golfe District, Togo, 2024

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Abstract

Introduction: Inappropriate prescribing of antibiotics is one of the main drivers of antimicrobial resistance (AMR). Due to the lack of national data, this study described the determinants of inappropriate antibiotic prescribing to promote better optimisation of antibiotic prescribing and combat antibacterial resistance.

Methods: A cross-sectional study with a mixed approach was conducted in December 2024 in primary health care facilities in the Golfe district. After the day of consultation, data were collected from patient health records and in-depth interviews with health professionals were conducted. Quantitative data were analyzed using SPSS 25 software, and qualitative data were analysed using NVivo QRS 14.

Results: Of 640 antibiotic prescriptions, 84.4% were inappropriate, with 53.3% in the " Access" class. Patients with pharyngitis (aOR: 0.04; 95%CI:0.01- 0.181) and pneumonia (aOR: 0.003; 95%CI: 0.001- 0.041) had lower odds of receiving an inappropriate antibiotic prescription. Female sex (aOR: 2.07; 95%CI: 1.21- 3.54), uncomplicated malaria (aOR: 89.19; 95%CI: 12.17- 653.72), and the prescription of at least two antibiotics (aOR: 8.48; 95% CI:2.81–25.59) increased the odds of inappropriate antibiotic prescribing. The socioeconomic status of patients, the lack of training of prescribers and the absence of an antibiotic prescription guide were reported as contributory factors during our individual interviews.

Conclusions: The percentage of inappropriate prescription of antibiotics is high in the district. Strategies for continuing education of health professionals, the development of clear guidelines for the prescription of antibiotics, as well as patient awareness, need to be implemented to strengthen antimicrobial stewardship.

Keywords: Antibiotics, prescription, AWaRe, primary health care, Togo

Citation

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Introduction

Inappropriate prescribing of antibiotics is leading to a global increase in antimicrobial resistance (AMR) in humans, animals, and the environment [1–3]. This is a particular problem in primary care, where viruses cause most infections [4]. More than 90% of human antibiotic prescriptions are in primary care, and about half of this use is inappropriate in some way [5].

Globally, widespread misuse of antimicrobial agents in healthcare and agriculture is responsible for 700,000 deaths annually [6]. In 2019, an estimated 1.27 million deaths (95% CI: 0.911 – 1.71) were attributable to bacterial AMR, with one in five deaths occurring in children under five years of age [7]. AMR could cause more than 10 million deaths annually by 2050 [6]. Africa, particularly Western Saharan Africa, is the most affected region, with a mortality rate attributable to bacterial resistance of 27.3 deaths per 100,000 (20.9 – 35.3) in 2019.

The AWaRe (Essential Accessibility, Selective Use, and Last Resort) classification of antibiotics was developed by the World Health Organization (WHO) as a tool to support antibiotic prescribing, monitoring, and stewardship for policymakers, researchers, and healthcare providers at local, national, and global levels [8]. The objective of the AWaRe classification is that at least 60% of total antibiotic consumption should come from "Access" antibiotics in each country [8].

Togo continues to face barriers to implementing appropriate antibiotic use [9]. Although the country has a national essential medicines prescription list based on the WHO list, there is a lack of specific measures to promote the proper use of antimicrobials across all sectors [9]. We found no data on antibiotic prescribing in primary health care facilities according to the WHO AWaRe classification, nor on the underlying reasons for inappropriate antibiotic medication by health care providers. This justifies our research to promote better optimization of antibacterial agents prescribing in human health and combat bacterial resistance.

This study determined the frequency of antibiotic prescribing according to the WHO AWaRe classification in district primary health care facilities; identified the determinants of inappropriate antibiotic prescribing in district primary health care facilities; and identified improvement solutions to optimize the prescribing of antibacterial agents in human health and combat antibacterial resistance.

Methods

Study setting

The study took place in primary health care facilities in the Golfe district of Togo. Data was collected in December 2024. The Golfe District covers an area of 245.38 km2 with a population of 1,366,433 in 2021. Primary care facilities are defined in the context of our study as public health centers with which patients have their first contact and where all care is provided by health professionals. These 24 centers correspond to type I hospitals (without a laboratory service) and type II hospitals (with a basic or minimal laboratory service).

Study design

This was a cross-sectional study with a mixed data collection approach (quantitative and qualitative). For the quantitative approach, we conducted an analytical study of inappropriate antibiotic prescribing through patient prescriptions in health centers. For the qualitative approach, we had in-depth interviews with the key informants of antibacterial management in the district.

Study population

The study population comprised all prescription documents used in health centres (medical prescriptions, prescription books, and health insurance reimbursement forms) containing at least one antibiotic. The statistical unit here is the medical prescription. The inclusion criteria were: i) prescription records collected from the patient after consultation at the general medicine department; ii) antibiotic prescriptions made on the day of data collection; iii) antibiotic prescriptions from patients who consented to participate in the study. Prescriptions with illegible writing were not included.

For the qualitative approach, the study population consisted of various stakeholders involved in prescribing antibiotics in primary health centers (general practitioners, medical assistants, nurses); those responsible for ordering medicines; drug dispensers; and a person responsible for the supply and monitoring of drug consumption at the district level. Health providers with less than three months of experience at the study site were not included.

Sample size

The sample size was calculated using the WHO recommendations to include a minimum of 600 consultations when reviewing prescribing practices in health facilities [10]. For the qualitative study, twelve in-depth interviews were conducted, stratified by gender, age, profession and number of years of experience.

Sampling technique

Simple random sampling was used to select twenty-one primary health centers in the Golfe district. These centers are called "medico-social centers" (CMS). In each selected

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health center, an exhaustive sampling of all prescriptions meeting the inclusion criteria was carried out.

Data collection

A pre-test of the collection tools was carried out before the start of the survey. The data collected were related to patient characteristics including patient sociodemographic data (sex, age, education level, profession, health insurance); clinical data (history, clinical signs, laboratory examination, clinical diagnosis, number of clinical diagnoses made, number and type of laboratory examination) and therapeutic data (number of drugs prescribed, number of antibiotics prescribed, presence of fixed combination of antibiotics). Finally, provider-related factors include the prescriber profile, and the number of antibiotics prescribed. The dependent variable was inappropriate antibiotic prescription, defined by five items: i) incorrect decision to implement antibiotic therapy indicated for the diagnosed or suspected pathology; ii) inappropriate choice of antibiotic; iii) inappropriate dosage; iv) inappropriate route of administration; v) inappropriate duration of treatment. This variable was coded as YES or NO, depending on compliance or not with the WHO AWaRe guide on antibiotic prescribing.

This simple and practical guide explains how to use antibiotics globally. It provides concise, evidence-based recommendations on antibiotic choice, dosage, route of administration, and duration of treatment for more than 30 of the most common clinical infections in children and adults, both in primary care and in hospital settings [11]. The information in this guide is consistent with the recommendations in the WHO Model Lists of Essential Medicines [12], including for children, and with the WHO AWaRe (Access – Watch – Reserve) classification of antibiotics. Primary health care in Togo is based on both the clinic and the laboratory [13,14]. One to two days of prospective data collection per health center were carried out and data were collected through prescription materials and reported on a questionnaire developed using Kobocollect software. A total of 640 prescriptions were collected in primary health centers.

Data management

The investigators were trained to administer the questionnaire in compliance with ethical standards. The quality of the collected data was examined daily. Then the data were extracted from the Kobocollect software to SPSS version 25 software. The variables were recorded. The dependent variable was scored so that each correct answer to a question was scored one, and an incorrect answer was scored zero. A score of 5/5 qualified the prescription as appropriate; otherwise, it was qualified as inappropriate.

Statistical analysis

Data was analyzed using SPSS version 25 software. Descriptive statistics were performed, and results were presented in the form of tables of numbers and proportions for qualitative variables. Quantitative variables were presented with the mean and its standard deviation. Univariate logistic regression was performed to identify factors associated with inappropriate antibiotic prescribing at a p-value of <0.2, which were included in a multivariate logistic regression with variables that were significant in an ascending stepwise fashion for the final model selection. We presented the odds ratio (OR) estimates with their 95% confidence interval (CI). The significance test p<0.05 was used to identify significantly associated factors in the final model. For the qualitative part, participant recordings were transcribed verbatim into French. A thematic content analysis was conducted using Nvivo 14 software based on the modified Theoretical Domains Framework (TDF), which influences antibiotic prescribing behaviour in primary health care centers [15].

Ethical considerations

Before the start of the study, approval was obtained from the Togolese Committee for Bioethics and Health Research (No. 044/2024/CBRS of November 4, 2024) as well as various administrative authorizations. Ethical considerations were respected throughout the study. We sought participants' consent to record and take notes on all discussions. Participants were assured confidentiality, anonymization of data, and privacy throughout the quantitative survey and qualitative interviews.

Results

The median age was 17 years (interquartile range [IQR]: 4–31). There was a slight female predominance at 50.5% (323/640). In addition, 58.9% of patients were unemployed, and 86.3% had no health insurance. The three main clinical diagnoses made were uncomplicated malaria at 27.1%, bronchitis/rhinobronchitis/rhinitis at 17.6%, and infectious syndrome at 13.0%. The "Access" class of antibiotics was the most prescribed at 53.3%. The mean number of antibiotics prescribed was 1.2 ± 0.48, and amoxicillin + clavulanic acid and ceftriaxone were prescribed in 23.0% of cases. Only 6.3% (40/640) of prescribers were physicians. Inappropriate prescription was noted in 84.4% of cases (Table 1).

In the multivariate model, females were 2.07 times more likely to receive an inappropriate antibiotic prescription than males (95%CI:1.21- 3.54]). Patients with pharyngitis (aOR: 0.04; 95%CI: 0.01- 0.181) and community-acquired pneumonia (aOR: 0.003; 95%CI: 0.001- 0.041) were less likely to receive an inappropriate antibiotic prescription. Conversely, those with a cough were 27.27 times more likely to receive an inappropriate antibiotic prescription

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Table 1. Sociodemographic, clinical and therapeutic characteristics of patients receiving antibiotic therapy

Characteristics	Number (N=640)	Percentage (%)
The median age and interquartile range (IQR)	17 years (IQR 4–31)	
Sex		
Female	323	50.5
Male	317	49.5
Employment status		
Employed	263	41.09
Unemployed	377	58.9
Health insurance		
No	552	86.3
Yes	88	13.8
Clinical diagnosis		
Uncomplicated malaria	253	27.1
Rhinitis / Rhinobronchitis / Bronchitis	164	17.6
Infectious syndrome	121	13.0
Other clinical diagnoses*	356	46.7
Prescriber profile		
Paramedical professionals (physician assistants, nurses)	600	93.8
Doctors	40	6.3
Class of AWaRe antibiotics prescribed		
Access	417	53.3
Monitoring	366	46.7
Prescription of antibiotics		
Inappropriate	540	84.4
Appropriate	100	15.6
Average number of antibiotics prescribed	1.22 ± 0.48	
Name of prescribed medications		
Amoxicillin + clavulanic acid	180	23.0
Ceftriaxone	180	23.0
Amoxicillin	85	10.9
Others**	338	43.1

Other clinical diagnoses * = acute otitis media, pharyngitis, acute sinusitis, oral and dental infection, conjunctivitis, community-acquired pneumonia, acute infectious diarrhoea/ gastroenteritis, impetigo/ erysipelas/ cellulitis, burn-related infections, wound and bite-related infections, urogenital chlamydial infection, gonococcal infection, trichomoniasis, lower urinary tract infections, influenza-like illness. **Others****: Gentamicin, Metronidazole, Ciprofloxacin, Ofloxacin + ornidazole, Cotrimoxazole, Azithromycin, Erythromycin, Clarithromycin, Amoxicillin, Flucloxacillin, Doxycycline.

than those without a cough (95%CI: 8.29 – 89.72). Furthermore, patients diagnosed with uncomplicated malaria were (OR: 89.19; 95%CI: 12.17 – 653.72) at greater risk of receiving an inappropriate prescription than other patients. Prescribing at least two antibiotics increased the risk of inappropriate antibiotic prescribing by a factor of 8.48 (95% CI: 2.81–25.59) compared to patients receiving only one antibiotic (Table 2).

Factors related to health professionals:

Severity of cases

The number of antibiotics prescribed may depend on the patient's condition; it is higher when the patient's condition is severe. The presence of comorbidities in some patients influences the antibiotic prescription. In case of fever, antibiotics are prescribed to provide rapid relief. Broad-spectrum antibiotics, such as ceftriaxone, are prescribed to ensure complete coverage of the condition.

Patient's economic status

The patient's socioeconomic status plays a key role in prescribing antibiotics. If the patient is deemed able to pay for the prescription, regardless of the amount, the number of antibiotics prescribed is no longer counted. However, due to financial constraints, caregivers may also prescribe broad-spectrum antibiotics until the patient is financially ready to undergo in-depth testing.

"This is particularly important. We treat patients according to their financial situation. Before administering treatment, we ask them if they can pay for the prescription; if that's not possible, we look at the reimbursement terms. Failing that, if things don't work out, we can at least provide them with initial care while they wait for some money. (Nurse)

Patient's age

The patient's age can influence the number of antibiotics to prescribe during treatment. Older people have needs that leave doctors indifferent. Depending on the presence of bacteria in the office, doctors prescribe more antibiotics to younger patients, as they believe their immune system cannot defend itself, unlike adults, for whom they prescribe fewer. A medical assistant explains:

"If you want to know the dosage based on the child's weight, the duration of treatment, especially for children, we sometimes tell the mother: 'We have to take it, we'll see if it's not enough for 7 or 10 days, we have to buy more.' This often bothers me, because you need a precise guide to antibiotics during the consultation." (Medical assistant)

Health system factors:

Lack of training in the appropriate prescribing of antibiotics

The healthcare workers who participated in the study reported receiving general training on prescribing during their studies. They received no specific training on prescribing antibiotics during their practice. They generally prescribe antibiotics based on their experience and the availability of antibiotics in internal pharmacies.

"Staff are not fully familiar with which antibiotics to prescribe or not. This is due to a lack of training time to get used to this prescribing. Peripheral staff need to be informed much more regularly. Even at the university

Table 2. Determinants of inappropriate antibiotic prescribing in patients receiving antibiotic therapy

Variables	Inappropriate prescription		cOR [95% CI]	P	aOR [95% CI]	p
	Yes	No				
Sex						
Female	286 (53.0%)	37 (37.0%)	1.92 [1.24; 2.98]	0.004	2.07 [1.21; 3.54]	0.008
Male	254 (47.0%)	63 (63.0%)	1		1	
Cough						
No	301 (55.7%)	90 (90.0%)	1		1	
Yes	239 (44.3%)	10 (10.0%)	7.15 [3.64; 14.04]	< 0.001	27.27 [8.29; 89.72]	< 0.001
Pharyngitis						
No	535 (99.1%)	89 (89.0%)	1		1	
Yes	5 (0.9%)	11 (11.0%)	0.076 [0.03; 0.22]	< 0.001	0.04 [0.01; 0.181]	< 0.001
Community pneumonia						
No	538 (99.6%)	96 (96.0%)	1		1	
Yes	2 (0.4%)	4 (4.0%)	0.09 [0.02; 0.49]	0.006	0.003 [0.001; 0.041]	< 0.001
Uncomplicated malaria						
No	288 (53.3%)	99 (99.0%)	1		1	
Yes	252 (46.7%)	1 (1.0%)	86.63 [11.96; 625.57]	< 0.001	89.19 [12.17; 653.72]	< 0.001
Number of antibiotics prescribed						
1	421 (78.0%)	96 (96.0%)	1		1	
≥ 2	119 (22.0%)	4 (4.0%)	6.78 [2.45; 18.83]	< 0.001	8.48 [2.81; 25.59]	< 0.001

hospital, this is not particularly pleasant to see. We need to integrate the whole person working at the pyramid level." (Physician)

Lack of therapeutic guides on the rational prescription of antibiotics

The flowchart has been revised since November 2015, and the National List of Essential Medicines (LNME) is the two guides available to healthcare facilities for prescribing antibiotics. This guide is associated with the performance of paraclinical tests. The decision on the quantity of antibiotics to prescribe is therefore determined based on the results of the RDT. Most are unaware of the existence of the WHO AWaRe guide. There is a lack of therapeutic booklets in healthcare facilities. As for CRP, it is much more likely to be associated with an inflammatory process. This is illustrated by a quote from a nurse who told us:

"On a scale of 1 to 10, I can say 8; at least 70 to 80% of patients who are present with a fever receive antibiotics". (Nurse)

Lack of a suitable laboratory/insufficient technical platform

Due to a lack of laboratories that allow for in-depth analyses, caregivers may prescribe multiple antibiotics. Centers with approved laboratories are unable to perform antibiograms. To compensate for this lack, they rely on their instinct or experience to prescribe antibiotics. A healthcare facility manager told us,

"When we are at a level where the technical platform is insufficient, we cannot do a CBC or CRP. When we observe a fever of 40°C or 41°C, whatever the problem, we include the antibiotic in the treatment. If the person has malaria or a cold with a temperature of 40°C or 41° C, at our level, we try to give them antibiotic treatment. We find that it is not effective, but it is the technical platform that guides us. Normally, it is not antibiotics that lower the fever, but we tell ourselves that we must cover the ground. (Nurse)

Health insurance

The number of antibiotics prescribed per prescription when the patient is covered by health insurance remains far too high. In the case of private insurance, the number of antibiotics is even higher. Doctors prescribe what they believe will relieve the patient's ailments. However, in the case of public insurance, such as INAM (National Institute of Health Insurance) and AMU (Universal Health Insurance), the number of antibiotics depends on the antibiotics included in the basket.

Patient-related factors

Self-medication by patients

According to healthcare professionals, self-medication is the main cause of antibiotic resistance during care. Many patients obtain medications illicitly by following inappropriate treatments. The indications, dosage, duration, and dose are rarely respected. They only consult the center if the illness worsens. This leads caregivers to prescribe broad-spectrum antibiotics, including expensive newer-generation antibiotics such as Rocephin. This is illustrated by the following quote from an assistant pharmacist:

"During this holiday season, people are sick and stay home. They prefer to stock up on 'abbitiké' at home. Injuries are common among good ladies, and it's when they take, they take…, sometimes even when they come, they forget what product they are taking, especially since the product does not have a scientific name. When they come, they forget. These are all problems." (Medication Consumption Monitoring Officer).

Discussion

The Access class antibiotics were the most frequently prescribed. There was a high level of inappropriate antibiotic prescriptions. The three main clinical diagnoses were: uncomplicated malaria, bronchitis, rhinobronchitis, rhinitis, and infectious syndrome. Amoxicillin + clavulanic acid and ceftriaxone were prescribed in 23.0% of cases. Only 6.3% of prescribers were physicians. Pharyngitis and community-acquired pneumonia were associated with inappropriate antibiotic prescribing. Patients prescribed two or more antibiotics were 8.4 times more likely to receive an inappropriate prescription than those prescribed only one antibiotic. The patient's economic situation, the lack of staff training in the appropriate prescription of antibiotics, and the absence of therapeutic guidelines for prescribing antibiotics are also determinants of inappropriate antibiotic prescribing. Our results highlight the need to improve antibiotic prescribing practices. Continuing education for healthcare professionals on the rational use of antibiotics is essential to improve the quality of care. Finally, for optimal management of antibacterial agents, a multisectoral approach (human, animal, plant, and environmental health) must be adopted, involving coordinated efforts between different stakeholders.

In our study, female sex was associated with inappropriate antibiotic prescribing. The WHO highlighted in 2024 that women are 27% more likely to receive antibiotics during their lifetime than men [16]. Reducing this therapeutic disparity between the sexes requires increased awareness of best medical practices for antibiotic prescribing based on clinical and paraclinical diagnosis.

The high proportion of inappropriate prescriptions observed in our study is consistent with a trend already described in several African countries, albeit with varying degrees of intensity. For example, O'Awuor et al. in 2018 [17] in Mali reported an even higher proportion, while in 2019, Yehualaw et al. in Ethiopia [18] found a significantly lower frequency. Nuwematsiko et al. (2022) in Uganda [19] reported a rate that is still lower than our observations. These differences between countries can be explained, on the one hand, by the lack of functional laboratories depending on the context, which leads prescribers to systematically resort to antibiotics as a precaution, which is consistent with the obstacles identified during our qualitative interviews. On the other hand, the training and supervision of prescribers vary considerably from one country to another. In our country, most prescriptions are written by paramedical professionals (medical assistants, nurses), often without specific continuing education in antibiotic therapy, which encourages inappropriate prescribing, as has also been observed in Uganda.

Regarding antibiotic classes, the predominance of the 'Access' category in our context is comparable to the results reported in Tanzania by Khalfan et al. [20] and in Zambia by Mudenda et al. in 2023 [21], although the proportions differ. These variations suggest that, although international recommendations are well known, their application remains inconsistent across countries.

The vulnerability of children under five to inappropriate prescribing, noted by Means et al. in Uganda [22], is consistent with our findings. This trend can be explained by the persistent perception of immune fragility in young children, which leads to more frequent use of antibiotics.

The association between certain respiratory infections and inappropriate antibiotic prescribing confirms a widely documented problem. Chem ED et al. [23] in Cameroon showed that respiratory infections accounted for a significant proportion of diagnoses in primary care, while Koh et al. in Singapore in 2021 [24] highlighted an increased likelihood of inappropriate prescriptions for gastrointestinal conditions. These findings reinforce the idea that many viral or benign infections continue to be treated with antibiotics, reflecting an urgent need for awareness-raising and training among prescribers.

The association between uncomplicated malaria and inappropriate antibiotic prescribing has already been noted in other contexts. JML Tiama et al. in Mali, 2024 [25] observed a significant relationship in primary care centres, with a high risk of inappropriate prescribing. This finding is consistent with qualitative observations indicating that prescribers often perceive fever as an indicator justifying antibiotic use, even though national malaria control protocols do not recommend this. This practice, which has also been described in other African countries, contributes to increased bacterial resistance and additional treatment costs.

The important role of paramedical prescribers in primary care is also well documented. Tiama et al. [25] reported a significant proportion of nurses among prescribers, and Chem ED et al. in Cameroon in 2015 showed that non-doctors mainly made inappropriate prescriptions. However, Bedekelabou et al. (Togo and Côte d'Ivoire) in 2021 [26] emphasized that even doctors recognized inappropriate practices, indicating that the problem goes beyond professional status alone.

Economic factors also play a major role. Samuel Afari-Asiedu et al. 2018 [27] showed that the high cost of antibiotics influenced their inappropriate use, and Asante

KP et al. [28] in 2019 confirmed that the patient's financial capacity determined the choice of treatment. These observations are consistent with those made in several low- and middle-income countries, where self-medication is common. The work of Afari-Asiedu et al. (2018) [27] and other authors[29–31] has highlighted the impact of economic constraints, limited access to healthcare, and convenience on the spread of these practices.

The lack of specific training in antibiotic therapy among paramedical staff is another key factor. Asante KP et al. [28] noted a lack of knowledge about the rational use of antibiotics, particularly among lower-level managers. Continuing education and peer learning initiatives, such as those recommended in Uganda and Niger [29], appear essential to improving practices.

Finally, the lack of up-to-date treatment guidelines and functional laboratories is a structural limitation. Most prescribers are unaware of the WHO AWaRe guidelines, and existing national documents are often outdated. As shown by Asante KP et al.[28], prescriptions are frequently based on an empirical approach due to the lack of a microbiological assay to support diagnosis. This situation encourages the use of broad-spectrum antibiotics from the start of treatment, a practice also observed in Ugandan and Nigerien health centres [29].

Limitations of the study

Data collection through questionnaires may result in underestimation or overestimation of data due to the inevitable subjectivity of respondents. Similarly, selection, information, and desirability biases may exist during data collection. These biases were minimised by conducting random sampling of optimally sized centers, as well as ensuring representativeness and diversification of the population in the qualitative study. Training of medical investigators and standardization of data collection tools. Social desirability bias may have been minimized by respondents' understanding of the anonymous nature of the responses, but it may persist in some information.

Conclusion

The frequency of inappropriate antibiotic prescribing is high in the district. The "Access" class was the most frequently prescribed case. Pharyngitis, community-acquired pneumonia, cough, uncomplicated malaria, the patient's economic situation, patient self-medication, the lack of treatment guides and training for healthcare providers in antibiotic prescribing, as well as insufficient technical equipment (appropriate laboratory) were identified as determining factors for inappropriate antibiotic prescribing. Urgent multidisciplinary interventions must be implemented to improve appropriate prescribing practices and reduce the risk of antibiotic resistance.

What is already known about this topic

- Inappropriate antibiotic prescribing is a particular problem in general practice, where viruses cause most infections. More than 90% of antibiotic prescriptions in humans are given in general practice, and about half of these antibiotics are inappropriate in some way.
- WHO has developed the WHO AWaRe (Access, Watch, Reserve) book on antibiotics, which is aimed at health care providers of all income levels and promotes the use of "Access" antibiotics, the reduction of overuse of oral antibiotics, and, where appropriate, encourages symptomatic care without antibiotic treatment.

What This Study Adds

- Evidence on barriers to implementing appropriate antibiotic use in Togo. Evidence on the extent of inappropriate antibiotic prescribing in primary health centres across the country
- Identified the levers to be activated to promote better optimisation of the prescription of antibacterial agents in human health and combat bacterial resistance.

Conflict of Interest

The authors of this work declare no competing interests.

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Authors' contributions

Protocol design and layout: KGA, AYA, YB Protocol review: YIC, SSD, KED Data acquisition: KGA, KEA, EGA, YVA Data analysis and interpretation: KGA, YB, OT Supervision of data collection and analysis of results: KED, YIC Writing the article: KGA, AYA, KEA, OT,

EGA, YVA Supervision of the writing of the manuscript and final validation of the version to be published: YIC, SSD, KED.

References

[1] Organisation mondiale de la Santé (Bureau régional pour l'Europe). Interventions de gestion des antimicrobiens : un guide pratique [Antimicrobial stewardship interventions: a practical guide] [Internet]. Copenhague (Danemark): Organisation mondiale de la Santé; 2022 Apr 12 [cited 2026 Apr 1]. 61 p. Available from:https://www.who.int/europe/fr/publications/i/item/9789289056267 French

[2] Organisation mondiale de la Santé. Usage rationnel des médicaments par les prescripteurs et les patients [Rational use of medications by prescribers and patients] [Internet]. Genève (Suisse): Organisation mondiale de la Santé; 2004 Dec 16 [cited 2026 Apr 1]. 6 p. Available from:urlhttps://apps.who.int/gb/ebwha/pdf_files/EB115/B115_40-fr.pdf French

[3] Organisation mondiale de la Santé. Les orientations de l'OMS sur les activités intégrées de gestion des antimicrobiens [WHO policy guidance on integrated antimicrobial stewardship activities] [Internet]. Genève (Suisse): Organisation mondiale de la Santé; 2021 [cited 2026 Apr 1]. 41 p. Available from:https://iris.who.int/handle/10665/342428 French

[4] Llor C, Bjerrum L. Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. Therapeutic Advances in Drug Safety [Internet]. 2014 Dec [cited 2026 Apr 1];5(6):229–41.doi:10.1177/2042098614554919

[5] Zanichelli V, Sharland M, Cappello B, Moja L, Getahun H, Pessoa-Silva C, Sati H, Van Weezenbeek C, Balkhy H, Simão M, Gandra S, Huttner B. The WHO AWaRe (Access, Watch, Reserve) antibiotic book and prevention of antimicrobial resistance. Bull World Health Org [Internet]. 2023 Apr 1 [cited 2026 Apr 1];101(04):290–6. doi:10.2471/BLT.22.288614

[6] Fong IW. Antimicrobial Resistance: A Crisis in the Making. In: New Antimicrobials: For the Present and the Future [Internet]. Cham: Springer International Publishing; 2023 May [cited 2026 Apr 1]. p. 1–21.doi:10.1007/978-3-031-26078-0$_1$

[7] Murray CJL, Ikuta KS, Sharara F, Swetschinski L, Robles Aguilar G, Gray A, Han C, Bisignano C, Rao P, Wool E, Johnson SC, Browne AJ, Chipeta MG, Fell F, Hackett S, Haines-Woodhouse G, Kashef Hamadani BH, Kumaran EAP, McManigal B, Achalapong S, Agarwal R, Akech S, Albertson S, Amuasi J, Andrews J, Aravkin A, Ashley E, Babin FX, Bailey F, Baker S, Basnyat B, Bekker A, Bender R, Berkley JA, Bethou A, Bielicki J, Boonkasidecha S, Bukosia J, Carvalheiro C, Castañeda-Orjuela C, Chansamouth V, Chaurasia S, Chiurchiù S, Chowdhury F, Clotaire Donatien R, Cook AJ, Cooper B, Cressey TR, Criollo-Mora E, Cunningham M, Darboe S, Day NPJ, De Luca M, Dokova K, Dramowski A, Dunachie SJ, Duong Bich T, Eckmanns T, Eibach D, Emami A, Feasey N, Fisher-Pearson N, Forrest K, Garcia C, Garrett D, Gastmeier P, Giref AZ, Greer RC, Gupta V, Haller S, Haselbeck A, Hay SI, Holm M, Hopkins S, Hsia Y, Iregbu KC, Jacobs J, Jarovsky D, Javanmardi F, Jenney AWJ, Khorana M, Khusuwan S, Kissoon N, Kobeissi E, Kostyanev T, Krapp F, Krumkamp R, Kumar A, Kyu HH, Lim C, Lim K, Limmathurotsakul D, Loftus MJ, Lunn M, Ma J, Manoharan A, Marks F, May J, Mayxay M, Mturi N, Munera-Huertas T, Musicha P, Musila LA, Mussi-Pinhata MM, Naidu RN, Nakamura T, Nanavati R, Nangia S, Newton P, Ngoun C, Novotney A, Nwakanma D, Obiero CW, Ochoa TJ, Olivas-Martinez A, Olliaro P, Ooko E, Ortiz-Brizuela E, Ounchanum P, Pak GD, Paredes JL, Peleg AY, Perrone C, Phe T, Phommasone K, Plakkal N, Ponce-de-Leon A, Raad M, Ramdin T, Rattanavong S, Riddell A, Roberts T, Robotham JV, Roca A, Rosenthal VD, Rudd KE, Russell N, Sader HS, Saengchan W, Schnall J, Scott JAG, Seekaew S, Sharland M, Shivamallappa M, Sifuentes-Osornio J, Simpson AJ, Steenkeste N, Stewardson AJ, Stoeva T, Tasak N, Thaiprakong A, Thwaites G, Tigoi C, Turner C, Turner P, Van Doorn HR, Velaphi S, Vongpradith A, Vongsouvath M, Vu H, Walsh T, Walson JL, Waner S, Wangrangsimakul T, Wannapinij P, Wozniak T, Young Sharma TEMW, Yu KC, Zheng P, Sartorius B, Lopez AD, Stergachis A, Moore C, Dolecek C, Naghavi M. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. The Lancet [Internet]. 2022 Feb [cited 2026 Apr 1];399(10325):629–55.doi:10.1016/S0140-6736(21)02724-0

[8] World Health Organization. AWaRe classification of antibiotics for evaluation and monitoring of use, 2023 [Internet]. Geneva (Switzerland): World Health Organization; 2023 Jul 26 [cited 2026 Apr 1]. Available from:https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2023.04

[9] Ministère de la Santé, de l'Hygiène Publique et de l'Accès Universel aux Soins (Togo). Plan d'action national de lutte contre la résistance aux antimicrobiens au Togo 2019-2023 [National Action Plan to Combat Antimicrobial Resistance in Togo 2019-2023] [Internet]. Lomé (Togo): Ministère de la Santé, de l'Hygiène Publique et de l'Accès Universel aux Soins; 2018 Dec [cited 2026 Apr 1]. 66 p. Available from:https://cdn.who.int/media/docs/default-source/antimicrobial-resistance/amr-spc-npm/nap-library/togo-nap-amr-2019-2023.pdf?sfvrsn=b35a6caa_3&download=true

[10] Organisation mondiale de la Santé. Comment étudier l'utilisation des médicaments dans les services de santé : Quelques indicateurs de l'utilisation des médicaments [How to study medication use in healthcare services: Some indicators of medication use] [Internet]. Genève (Suisse): Organisation mondiale de la Santé; 1993 [cited 2026 Apr 1]. 95 p. Available from:https://iris.who.int/server/api/core/bitstreams/ee277935-8ca9-472f-94e3-0e53eb002909/content French

[11] Web Annex. Infographics. In: The WHO AWaRe (Access, Watch, Reserve) antibiotic book [Internet]. Geneva (Switzerland): World Health Organization; 2022 [cited 2026 Apr 1]. 154 p. Available from:https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2022.02

[12] World Health Organization. World Health Organization Model List of Essential Medicines – 23rd List, 2023. In: The

selection and use of essential medicines 2023: Executive summary of the report of the 24th WHO Expert Committee on the Selection and Use of Essential Medicines, 24 – 28 April 2023 [Internet]. Geneva (Switzerland): World Health Organization; 2023 [cited 2026 Apr 1]. 67 p. Available from:https://iris.who.int/server/api/core/bitstreams/289a875c-cc89-4914-90ad-eb3c578ebaf6/content

[13] Ministère de la santé, de l'Hygiène Publique et de l'Accès Universel aux Soins (Togo). Togo: Liste Nationale des Médicaments Essentiels sous DCI pour les Adultes 2021 [Togo: National List of Essential Medicines by INN for Adults 2021] [Internet]. 2024 [cited 2026 Apr 1]. 28 p. Available from:https://www.who.int/publications/m/item/togo-liste-nationale-des-m-dicaments-essentiels-sous-dci-pour-les-adultes-2021-(french) French

[14] Ministère de la santé, de l'Hygiène Publique et de l'Accès Universel aux Soins. Liste nationale des médicaments essentiels sous dci pour les enfants (<14 ans) [National list of essential medicines by INN for children (<14 years)] [Internet]. 2021 [cited 2026 Apr 1]. 49 p. Available from:https://cdn.who.int/media/docs/default-source/essential-medicines/national-essential-medicines-lists-(neml)/afro_neml/togo-neml_2021_infant.pdf?sfvrsn=196a098b_1

[15] Talkhan H, Stewart D, McIntosh T, Ziglam H, Abdulrouf PV, Al-Hail M, Diab M, Cunningham S. Exploring determinants of antimicrobial prescribing behaviour using the Theoretical Domains Framework. Res Social Adm Pharm [Internet]. 2024 Apr [cited 2026 Apr 1];20(4):401-410.doi:10.1016/j.sapharm.2023.12.009

[16] World Health Organization. WHO releases guidance on gender inequalities and antimicrobial resistance [Internet]. Genève (Switzerland): World Health Organization; 2024 Sep 16 [cited 2026 Apr 1]; [about 3 screens]. Available from:https://www.who.int/news/item/16-09-2024-who-releases-guidance-on-gender-inequalities-and-antimicrobial-resistance

[17] Awuor AO, Ogwel B, Powell H, Verani JR, Sow SO, Hossain MJ, Ochieng JB, Juma J, Jamka LP, Roose A, Doh S, Deichsel EL, Onwuchekwa U, Keita AM, Antonio M, Jones JCM, Zaman SMA, Badji H, Kasumba IN, Nasrin D, Platts-Mills JA, Houpt ER, Berendes DM, Sugerman CE, Widdowson MA, Tennant SM, Mintz ED, Omore R, Kotloff KL. Antibiotic-Prescribing Practices for Management of Childhood Diarrhea in 3 Sub-Saharan African Countries: Findings From the Vaccine Impact on Diarrhea in Africa (VIDA) Study, 2015–2018. Clin Infect Dis [Internet]. 2023 Apr 19 [cited 2026 Apr 1];76(Supplement$_1$) : *S*3240.*doi* : 10.1093/*cid*/*ciac*980

[18] Yehualaw A, Taferre C, Bantie AT, Demsie DG. Appropriateness and Pattern of Antibiotic Prescription in Pediatric Patients at Adigart General Hospital, Tigray, Ethiopia. Biomed Res Int [Internet]. 2021 Apr 10 [cited 2026 Apr 1];2021:6640892.doi:10.1155/2021/6640892

[19] Nuwematsiko R, Kitutu FE, Wafula ST, Nabbanja C, Ssempera H, Nambatya W, Buregyeya E. High prevalence of inappropriate antibiotic prescriptions in selected health care facilities in Uganda [Internet]. 2024 May [cited 2026 Apr 1]. Available from:https://www.researchsquare.com/article/rs-4442318/v1doi:10.21203/rs.3.rs-4442318/v1

[20] Khalfan MA, Sasi PG, Mugusi SF. The prevalence and pattern of antibiotic prescription among insured patients in Dar es Salaam Tanzania. Pan Afr Med J [Internet]. 2021 Nov 5 [cited 2026 Apr 1];40:140.doi:10.11604/pamj.2021.40.140.29584

[21] Mudenda S, Daka V, Matafwali SK. World Health Organization AWaRe framework for antibiotic stewardship: Where are we now and where do we need to go? An expert viewpoint. Antimicrob Steward Healthc Epidemiol [Internet]. 2023 Apr 26 [cited 2026 Apr 1];3(1):e84.doi:10.1017/ash.2023.164

[22] Means AR, Weaver MR, Burnett SM, Mbonye MK, Naikoba S, McClelland RS. Correlates of Inappropriate Prescribing of Antibiotics to Patients with Malaria in Uganda. PLoS One [Internet]. 2014 Feb 28 [cited 2026 Apr 1];9(2):e90179.doi:10.1371/journal.pone.0090179

[23] Chem ED, Anong DN, Akoachere JFKT. Prescribing patterns and associated factors of antibiotic prescription in primary health care facilities of Kumbo East and Kumbo West Health Districts, North West Cameroon. PLoS ONE [Internet]. 2018 Mar 5 [cited 2026 Apr 1];13(3):e0193353.doi:10.1371/journal.pone.0193353

[24] Koh SWC, Lee VME, Low SH, Tan WZ, Valderas JM, Loh VWK, Sundram M, Hsu LY. Prescribing Antibiotics in Public Primary Care Clinics in Singapore: A Retrospective Cohort Study. Antibiotics [Internet]. 2023 Apr 16 [cited 2026 Apr 1];12(4):762.doi:10.3390/antibiotics12040762

[25] Tiama JML, Sangho O, Sogodogo A, Sylla AK, Diarra B, Diarra AS, Diarra S, Thera JP. Facteurs influençant la prescription inappropriée d'antibiotiques dans les centres de santé communautaire à Bamako en 2024 [Factors influencing inappropriate antibiotic prescribing in community health centers in Bamako in 2024]. Medecine d'Afrique Francophone [Internet]. 2025 Jul [cited 2026 Apr 1];72(7). Available from:https://www.researchgate.net/publication/395395785_Facteurs_influencant_la_prescription_inappropriee_d'antibiotiques_dans_les_centres_de_sante_communautaire_a_Bamako_en_2024

[26] Bedekelabou AP, Oyetola DW, Coulibaly ZL, Akinsola O, Bada-Alambedji R. First assessment of the knowledge, attitudes, and practices of health actors in Togo and Ivory Coast in regard to antibiotic resistance. Int J One Health [Internet]. 2022 Nov 7 [cited 2026 Apr 1];108–23.doi:10.14202/IJOH.2022.108-123

[27] Afari-Asiedu S, Oppong FB, Tostmann A, Ali Abdulai M, Boamah-Kaali E, Gyaase S, Agyei O, Kinsman J, Hulscher M, Wertheim HFL, Asante KP. Determinants of Inappropriate Antibiotics Use in Rural Central Ghana Using a Mixed Methods Approach. Front Public Health [Internet]. 2020 Mar 24 [cited 2026 Apr 1];8:90.doi:10.3389/fpubh.2020.00090

[28] On behalf of the Ghana Antimicrobial Resistance Working Group, Asante KP, Boamah EA, Abdulai MA, Buabeng KO,

Mahama E, Dzabeng F, Gavor E, Annan EA, Owusu-Agyei S, Gyansa-Lutterodt M. Knowledge of antibiotic resistance and antibiotic prescription practices among prescribers in the Brong Ahafo Region of Ghana; a cross-sectional study. BMC Health Serv Res [Internet]. 2017 Dec [cited 2026 Apr 1];17(1):422.doi:10.1186/s12913-017-2365-2

[29] Mambula G, Nanjebe D, Munene A, Guindo O, Salifou A, Mamaty AA, Rattigan S, Ellis S, Khavessian N, Van Der Pluijm RW, Marquer C, Adehossi IA, Langendorf C. Practices and challenges related to antibiotic use in paediatric treatment in hospitals and health centres in Niger and Uganda: a mixed methods study. Antimicrob Resist Infect Control [Internet]. 2023 Jul 11 [cited 2026 Apr 1];12(1):67.doi:10.1186/s13756-023-01271-7

[30] Do NTT, Vu HTL, Nguyen CTK, Punpuing S, Khan WA, Gyapong M, Asante KP, Munguambe K, Gómez-Olivé FX, John-Langba J, Tran TK, Sunpuwan M, Sevene E, Nguyen HH, Ho PD, Matin MA, Ahmed S, Karim MM, Cambaco O, Afari-Asiedu S, Boamah-Kaali E, Abdulai MA, Williams J, Asiamah S, Amankwah G, Agyekum MP, Wagner F, Ariana P, Sigauque B, Tollman S, Van Doorn HR, Sankoh O, Kinsman J, Wertheim HFL. Community-based antibiotic access and use in six low-income and middle-income countries: a mixed-method approach. The Lancet Global Health [Internet]. 2021 May [cited 2026 Apr 1];9(5):e610–9.doi:10.1016/S2214-109X(21)00024-3

[31] Elong Ekambi GA, Okalla Ebongue C, Penda IC, Nnanga Nga E, Mpondo Mpondo E, Eboumbou Moukoko CE. Knowledge, practices and attitudes on antibiotics use in Cameroon: Self-medication and prescription survey among children, adolescents and adults in private pharmacies. PLoS ONE [Internet]. 2019 Feb 28 [cited 2026 Apr 1];14(2):e0212875.doi:10.1371/journal.pone.0212875