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REVIEW

Update on *Helicobacter pylori* infection: the state of antimicrobial resistance in Africa

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Introduction

Helicobacter pylori (*H. pylori*) is a Gram-negative, microaerophilic bacterium that colonises the gastric epithelium and chronically infects more than half of the global population.[1,2] Africa reports some of the highest prevalence rates (often exceeding 80%), with rates ranging from 25% to 50% in high-income countries.[3,4] This disparity partly reflects differences in socio-economic conditions and sanitation infrastructure.[5]

While most *H. pylori* infections are asymptomatic, a subset of patients develop peptic ulcer disease, gastritis, or duodenitis (10–20%), distal gastric adenocarcinoma (1–2%), and gastric mucosa-associated lymphoid tissue lymphoma (< 1%).[1,6] *H. pylori* is the only bacterium classified as a carcinogen and is also implicated in extra-gastric manifestations, such as iron deficiency anaemia and primary immune thrombocytopaenia.[7]

The 2015 Kyoto global consensus on *H. pylori* gastritis classifies *H. pylori* infection as an infectious disease and recommends eradication for all infected individuals, including asymptomatic patients, to prevent gastritis, peptic ulcer disease, and gastric cancer.[8] However, implementing these recommendations is especially challenging in Africa, due to high prevalence, resource limitations, drug availability, and the so-called "African enigma".[2,9]

Sub-Saharan Africa faces key challenges, such as:

- High infection prevalence and limited resources raise questions about the feasibility of treating all infected individuals.
- Routine antimicrobial susceptibility testing (AST), though ideal, is often impractical in many regions.
- Essential drug unavailability in several African countries, including bismuth.
- Low gastric cancer incidence despite high *H. pylori* prevalence (the so-called "African enigma"), complicating risk assessment.

Among these, antimicrobial resistance (AMR) represents the most urgent threat, driven by empirical antibiotic use, lack of prescription regulation, and limited AST infrastructure.[2]

Current recommended treatment

International guidelines, primarily the 2021 Maastricht VI/Florence consensus report, define first-line therapy strategies, with the Egyptian guideline serving as the main African reference.[2,10]

First-line therapy

Clarithromycin triple therapy (CTT) is no longer recommended in regions where clarithromycin resistance exceeds 15%, as eradication rates drop below 80%.[10] Therefore, current first-line options include:

- Bismuth quadruple therapy (BQT): proton pump inhibitor (PPI), bismuth, tetracycline, and metronidazole; preferred empirically where AST is unavailable.
- Non-bismuth quadruple (concomitant) therapy (NBQT): PPI, amoxicillin, clarithromycin, and metronidazole for 14 days if AST is not feasible.
- CTT: reserved for settings with confirmed low resistance (< 15%).

A meta-analysis showed that BQT achieved an eradication rate of 85%, compared with 73% for CTT.[3] In Africa, the pooled BQT eradication is approximately 79%, varying regionally (Ethiopia 90%, Nigeria 87%, Tanzania 69%, Ivory Coast 22%).[3] Variability is influenced by diagnostic methods, local resistance, adherence, and regimen selection.

Second- and third-line therapy

The choice of second-line therapy depends on prior regimens, drug availability, and known resistance patterns.[10] Fluoroquinolones or high-dose PPI-amoxicillin may be used if BQT fails, while rifabutin-containing regimens serve as third-line rescue therapy.

A recent multicentre trial (2026) compared vonoprazan–amoxicillin dual therapy and rifabutin-based triple therapy with classical BQT for rescue treatment.[16] Rifabutin-based triple therapy achieved high eradication rates with fewer adverse effects and was non-inferior to BQT. Vonoprazan–amoxicillin performed sub-optimally, particularly in patients with amoxicillin resistance, smokers, or body mass index (BMI) ≥ 25 kg/m^2. Rifabutin use in Africa requires caution due to its role in treating rifampicin-resistant tuberculosis and *Mycobacterium avium* complex, especially in human immunodeficiency (HIV)-prevalent populations.[2,11]

For most therapies, a 14-day treatment course is the standard of care, achieving superior eradication compared with 7–10-day regimens.[10] AST-guided therapy is recommended for higher clinical success and cost-effectiveness, though implementation is limited in Africa.

Antimicrobial resistance in Africa

AMR is the primary driver of treatment failure. Clarithromycin resistance alone increases failure risk sevenfold, prompting the World Health Organization (WHO) to list clarithromycin-resistant *H. pylori* as a high-priority pathogen.[2,12,13] Global resistance rates have been steadily rising, with clarithromycin, metronidazole, and tetracycline nearly doubling between 2010 and 2015.[13] Recent data in 2024 show that pooled primary clarithromycin resistance exceeds 15% in all regions, with Africa likely mirroring or exceeding these trends.[14]

An African meta-analysis reported alarming resistance rates: metronidazole 75.8%, amoxicillin 72.6%, tetracycline 48.7%, clarithromycin 29.2%, and levofloxacin 17.4%.[15] Differences across studies are influenced by methodology and country representation.[13-15] The factors driving resistance in Africa include:

- Empirical treatment without AST.
- Limited epidemiological surveillance.
- Scarcity of alternative therapies.
- Inconsistent follow-up and adherence.

These constraints underscore the urgent need for regional resistance registries and standardised AST protocols.[2,11,12]

Strategic management of *H. pylori* in Africa

Effectively managing *H. pylori* in Africa requires a multipronged approach.

Antimicrobial stewardship: "5D-strategy"

Diagnosis: Identify resistance using culture, polymerase chain reaction (PCR), or next-generation sequencing (NGS); COVID-19 PCR infrastructure could be repurposed.

Drug selection: Minimise antibiotic use with BQT preferred when available; otherwise, use clarithromycin-based regimens. Levofloxacin is suitable for second-line therapy.

Dosage: Amoxicillin is time-dependent; metronidazole requires an adequate total daily dose.

Duration and discontinuation: 14-day regimens with post-therapy testing (stool antigen or urea breath test [UBT]) are essential.

Targeted contact tracing

Mass screening is impractical. Screening symptomatic household contacts using stool antigen or UBTs can reduce disease transmission.[2]

Elevating H. pylori on the public health agenda

This strategy includes prioritising H. pylori alongside HIV, tuberculosis, and malaria. Organised groups are necessary, such as the African Helicobacter and Microbiota Study Group, which consolidate research, improve AST access, and provide regional guidelines.[9]

Conclusion

H. pylori infection affects over 70% of Africans and is the only known bacterial carcinogen. Rising AMR renders empirical therapy increasingly ineffective, emphasising the need for AST-guided treatment and context-specific strategies. Africa must prioritise *H. pylori* as a public health concern, develop regional resistance surveillance, and optimise therapeutic resources to curb AMR and improve patient outcomes.

Conflict of interest

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