

Evidence gaps in Antimicrobial resistance (AMR) One Health data in Africa: a systematic review

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I. INTRODUCTION

- The global problem of antimicrobial resistance (AMR) is a typical One Health issue and needs a One Health solution.
- For successful planning and implementation of the current preventive global action plans, there is a dire need of good epidemiological data.
- There are well-established surveillance systems in high-income countries and gaps in data availability from the African continent have been generally pointed out, but not studied in depth.

Our objective is to study the patterns of availability of one health data on AMR and antibiotic consumption (ABC) in Africa based on published research articles.

II. METHODS AND RESULTS

A systematic literature search was carried out in PubMed and Web of Science for studies published from Jan 1, 2012 to Dec 31, 2021, to locate all research articles providing data related to AMR/ABC in Africa from an One Health perspective. Inclusion criteria were data from sub-Saharan Africa providing resistance data at least for two of the dimensions - human, animal and environment. The main outcomes were general characteristics of data availability including geographical coverage, systems coverage, sample size, and type of data.

Findings: Of 5887 screened studies, 1625 (28%) provided any AMR/ABC data; upon screening, 107 studies provided One Health data on AMR/ABC.

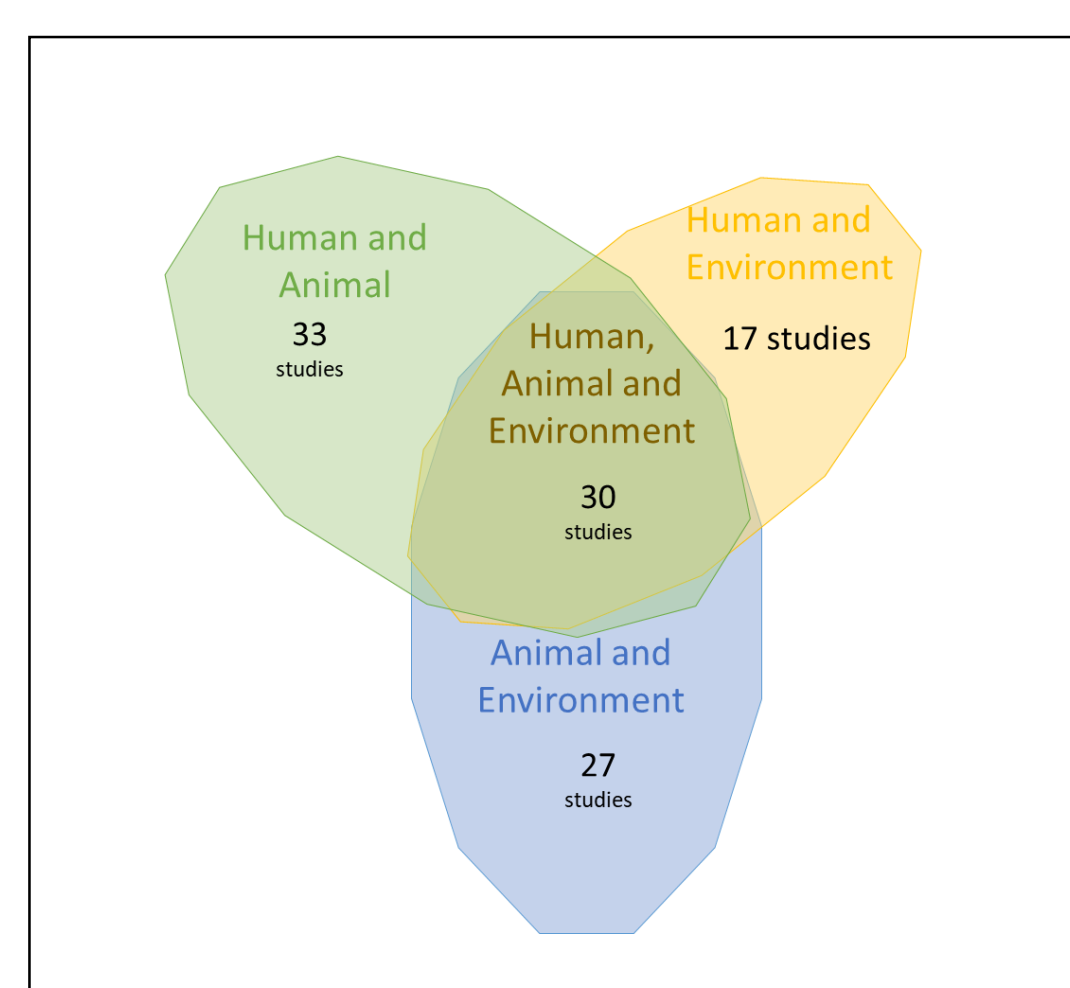


Figure 1: One health data availability according to the three sectors (N=107)

❖ Majority of the studies were from:

- South Africa (16, 17%),
- Nigeria (15, 16%),
- Egypt (12, 12%),
- Ethiopia (11, 11%), and
- Ghana (9, 9%)

❖ Only 7 (10%) of the 71 studies reporting data coverage involved rural data.

❖ Colonisation was frequently studied among both humans (41, 63%) and animals (41, 58%).

❖ Few studies were funded by national programs (6/51, 11.8%) or local institutions (5/51, 9.8%) themselves.

❖ The most reported pathogens were *Escherichia coli* (42, 24%), *Salmonella* spp. (29, 17%), *Staphylococcus* spp. (18, 10%).

❖ The common antibiotic resistances reported were against penicillins (62, 16%), aminoglycosides (51, 13%), quinolones (44, 11%), third generation cephalosporins (41, 10%), tetracyclines (40, 10%) and sulfanomides (33, 8%).

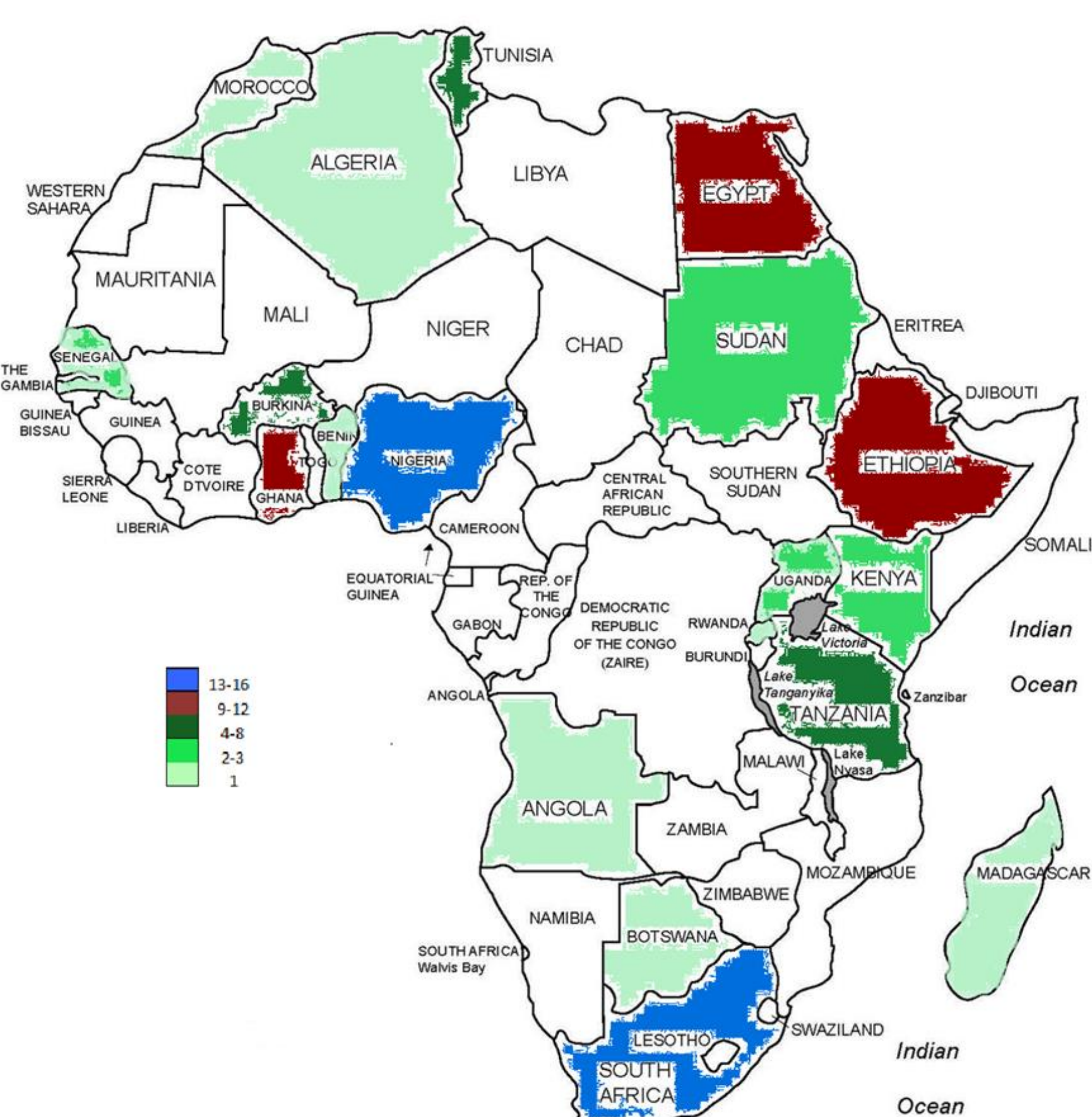


Figure 2: One health data availability (number of studies) among African countries (N=107)

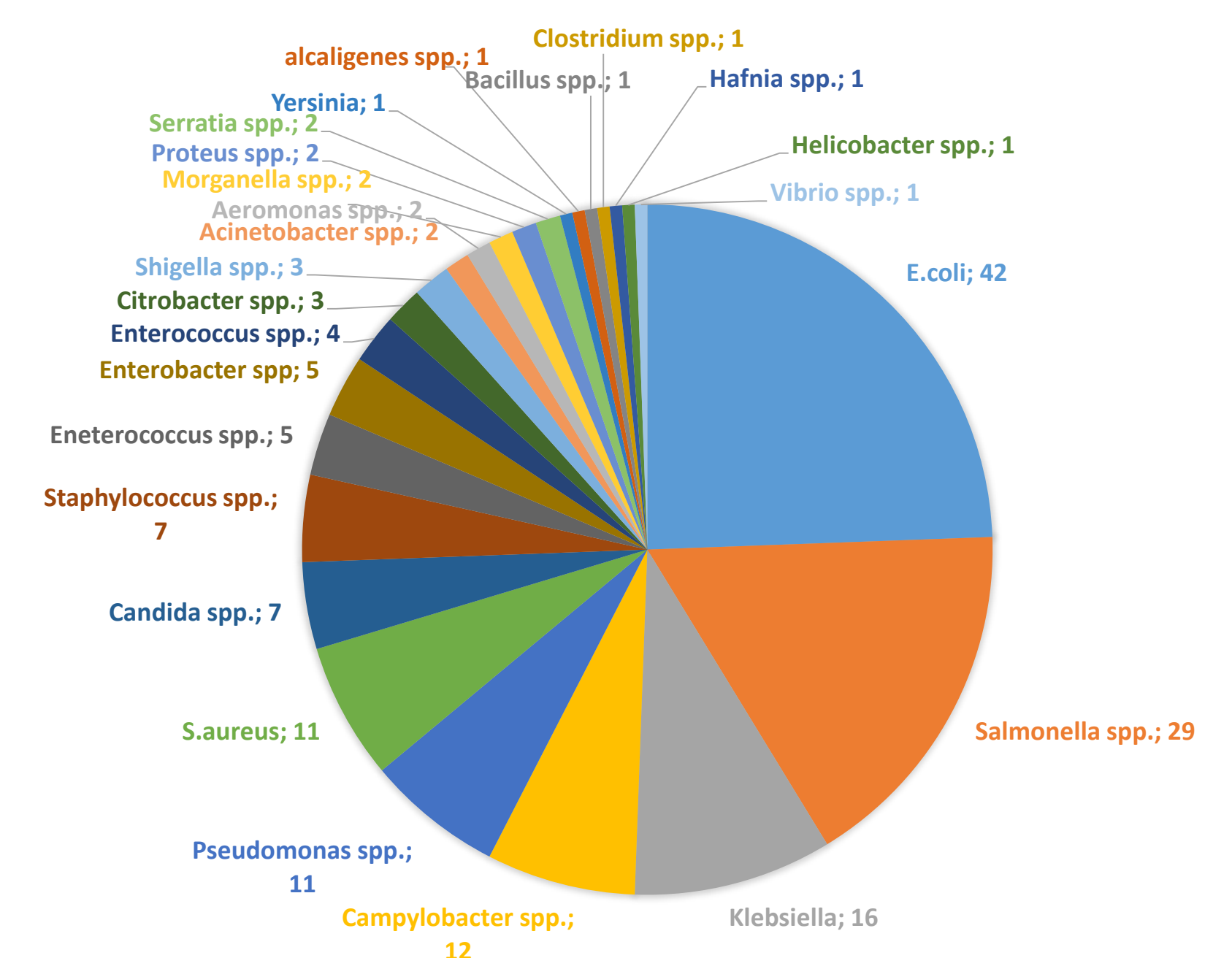


Figure 3: Frequently studied bacterial species reported in the African One health studies (N=107)

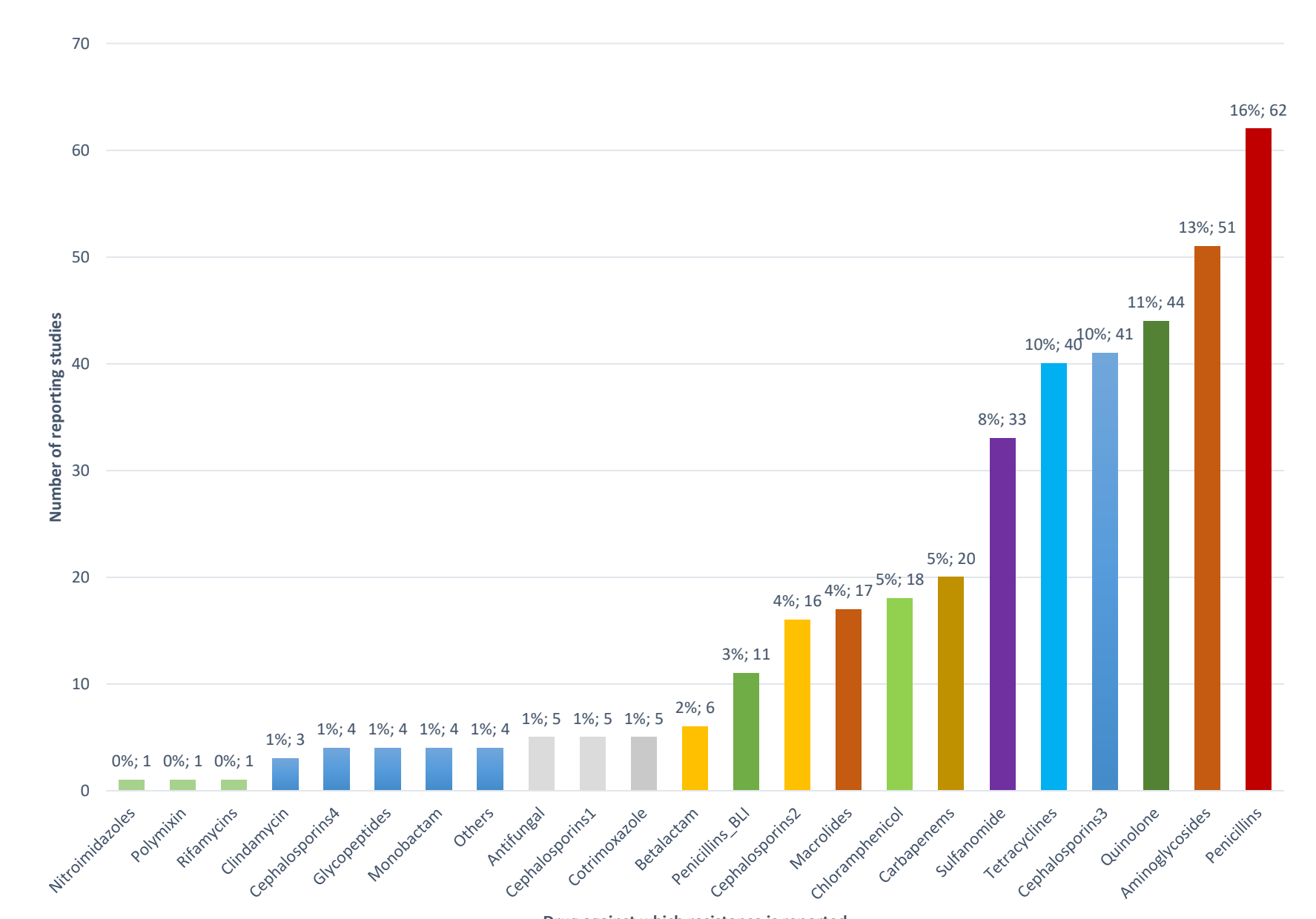


Figure 4: Frequently reported antibiotic resistances found in the African One health studies (N=107)

III. CONCLUSION

- ✓ Our results point to a significant gap in one health data availability in Africa, especially the lack of rural data and infection data, an important component of epidemiological data.
- ✓ There is a lack of surveillance based data, which helps understand changing epidemiological scenarios, with most foreign-funded studies targeting molecular level transmission among one health scenarios.

- ✓ Our study underlines the importance to collect epidemiological data on one health AMR data with
 - complete representation including both urban and rural areas and
 - the aim to inform the local action plans to successfully control the development and spread of antimicrobial resistance and its consequences.

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