Antibiotic use in intensive farming and resulting resistance in the environment: potential public health implications in Mozambique

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Presentation layout

- Introduction
- AMR in Mozambique
- Antibiotics in Agriculture
- Conclusion
Introduction

801 590 km²
Introduction

The country has a population of over 29.5 million people, with 45% of the population being younger than 15 years old.

Mozambique has 1,914,498 cattle; 3,457,162 goats and sheep; 1,595,238 pigs; 147,097 rabbits; and 18,004,442 poultry (primarily chickens, as well as ducks, geese, turkeys, and guinea fowl).
Introduction

Waterborne diseases represent the main cause of hospitalization and mortality in Mozambique due to:

- Poor water supply systems, weak sanitation and drainage systems, and lack of personal hygiene;
- A shortage of potable water, as improved water sources are limited to urban areas;
- The sale of home-bottled water (the reuse of bottles, which are often collected in garbage containers);
- Proximity of people to animals;
- Climate change;
- Unhygienic food preparation and consumption practices.
Introduction
Introduction
Milk processing using water from Supply wells
Sale of animals in markets and use of antibiotics
Sanitation and drainage systems

Water from Supply Wells

The most contaminated water samples were those from a well supply. Aerobic mesophiles and fecal enterococci were found in the 12 water samples (100%) (Table 4). Fecal coliforms and *E. coli* were found in 83% of the samples. *Aeromonas* spp. (33.3%) and *Klebsiella* spp. (25%) (Table 2) were also found in all samples.
Introduction

- AMR remain a Global public health concern
  - **700,000** people die each year due to AMR
- Without immediate action
  - 10 million global deaths by 2050
  - $100 trillion lost in the global economy by 2050

National Action Plan for Antimicrobial Resistance

Approved - Dec. 2018

6 Strategic objectives

1. Increasing awareness and knowledge on AMR
2. Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures
3. Strengthen the knowledge and evidence base through One Health surveillance and research
4. Improve access to antimicrobials to treat infection
5. Optimise the use of antimicrobial medicines
6. Promote rational Use of antibiotics and Antimicrobial stewardship
Mozambique Member of GLASS

Since February 27, 2018
Some Studies results in Mozambique

- Molecular characterization of diarrheagenic *Escherichia coli* isolates from children with diarrhea: A cross-sectional study in four provinces of Mozambique;
- AMR in Bacterial Meningitis, <5 years old in Mozambique;
- *Klebsiella* spp. cause severe and fatal disease in Mozambican children: antimicrobial resistance profile and molecular characterization;
- Molecular Characterization of *Staphylococcus aureus* Isolated from Raw Milk Samples of Dairy Cows in Manhiça District, Southern Mozambique
- Antibiotics resistance in El Tor Vibrio cholerae 01 isolated during cholera outbreaks in Mozambique from 2012 to 2015;
- Gut carriage of antimicrobial resistance genes among young children in urban Maputo, Mozambique: Associations with enteric pathogen carriage and environmental risk factors.
Antibiotics in Agriculture

The antibiotics are used in livestock farming, where can be used for disease treatment of animals, and in sub-therapeutic levels in concentrated animal feed for growth promotion, improved feed conversion efficiency, and for the prevention of diseases;
Antibiotics in Agriculture

The choice of antibiotics and the antimicrobial consumption is influenced by:

- Food animal species, regional production patterns and types of production system;
- Intensive or extensive farming;
- Purpose of farming (commercial or industrial or domestic);
- Lack of clear legislative framework or policies on the use of antibiotics, as well as the size and socioeconomic status of the population, and the farmers in particular.
Antimicrobial Resistance of *Campylobacter* spp. Isolates from Broiler Chicken Meat Supply Chain in Maputo, Mozambique

Joao Joao Matsimbe 1, Agnaldo Joaquim Manhiça 2, Cristiano Joao Macuamule 1

Susceptibility of 24 *Campylobacter* isolates from broiler chicken carcasses from supermarkets, informal markets, and a slaughterhouse in Maputo, Mozambique, to 13 antibiotics.
Results

The results of the study showed that the isolates were resistant to at least six antibiotics in four classes:

**Supermarkets:**
- Isolates were resistant to: Tetracycline, doxycycline, erythromycin, streptomycin, and cotrimoxazole (100%);
- Penicillin (87.5%); and Gentamycin and sulfamethoxazole (75%)
Results

**Informal markets**
Isolates were resistant to:
Tetracycline (100%);
Doxycycline and penicillin (87.5%); and
Erythromycin (75%).

**Slaughterhouse**
Isolates were resistant to:
Tetracycline, doxycycline, penicillin, and colistin (100%);
Erythromycin (87.5%); and
Streptomycin (75%).
Results

Overall, isolates from **supermarkets** showed higher resistance profiles (37.9%) than those from **informal markets** (31.5%) and **slaughterhouses** (30.6%); however, the difference was not significant ($p > 0.05$).
Conclusions

Antibiotics, naturally or semi-synthetically or synthetically produced substances, are very vital in the agricultural, veterinary, and clinical settings.

Necessary for prophylactic and therapeutic purposes in the lives of humans and animals, to prevent and treat diseases.

Antibiotic pollution: growth promoters in feed and water consumed by livestock over an extended period.
Thank You!