Tropentag, September 20-22, 2023, hybrid conference

"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Practices and drivers for antibiotic use in Kenyan small-holder dairy farms

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Abstract

Understanding antibiotic use is critical for developing effective interventions, particularly in light of the global actions to reduce antibiotics in food-producing animals. In low and middle-income countries (LMICs), farmers mostly self-diagnose and administer antibiotics without proper guidance from a veterinarian potentially resulting to misuse or overuse. Irrational antibiotic use is a major driver of antimicrobial resistance (AMR) globally, transferrable to humans through the food chain. AMR is one of the biggest threats to human health, and it has been estimated that by 2050, up to 10 million people could die annually due to AMR infections if appropriate measures are not taken to address the issue.

Using a standardised questionnaire, AMUSE version 2, this study investigated the patterns and drivers of antibiotic use in 165 smallholder dairy farms in Machakos, Makueni and Narok Counties in Kenya. We used a causal diagram framework to inform logistic regression models to explore the drivers of antibiotic use in the selected farms.

Antibiotic use was reported in 92.7 % of farms and nearly all of them administered antibiotics primarily for prophylactic purposes. Oxytetracycline, penicillin, and streptomycin were the most used antibiotics to treat mastitis and diarrhea, the most reported bacterial infections. Regression analysis indicated a positive association between the frequency of antibiotic use at the farm level and both disease incidence (measured as the number of new cases in the previous year) and herd size. Conversely, farms that provided cattle with appropriate housing were less likely to use antibiotics, and there was no difference in antibiotic use between those who consulted with veterinarians or sourced antibiotics directly from animal health providers.

Our study highlights the complexities around understanding the interplay between practices and drivers of antibiotic use and underscores the necessity to enhance education regarding the appropriate usage of antibiotics among dairy farmers, encourage the adoption of proper cattle herd management practices which may reduce the disease burden, and reinforce veterinary services to promote the prudent use of antimicrobials.

Keywords: Antibiotic use, dairy farms, antimicrobial resistance

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