**Title**: Quantitative assessment of ESBL-producing *E. coli* contamination, transmission dynamics, and evolution in broiler farms in the presence of on-farm intervention measures.

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**Abstract**: AMR, or antimicrobial resistance, is a critical global health concern, where microorganisms develop resistance to antimicrobial agents, posing a significant threat to public health. In this context, the ENVIRE research project started under the European transnational program “One Health interventions to prevent or reduce the development and transmission of antimicrobial resistance” (JPIAMR-ACTION), aims to tackle AMR in broiler chickens and its transmission to humans. Led by Germany, this consortium involves partners from across Europe and the Mediterranean, including France, Lithuania, Poland, and Tunisia.

One of the key aspects of ENVIRE is the development of a Quantitative Microbial Risk Assessment (QMRA) model to evaluate the effectiveness of intervention measures in reducing human exposure to AMR bacteria through foodborne, occupational, and environmental pathways. The QMRA model is grounded upon existing literature studies and fed by the experimental data generated by the participating countries in the ENVIRE consortium. The objective is to identify specific interventions with the greatest potential to combat AMR in chickens and farm environments across Europe and Tunisia.

The presentation will highlight the farm module, which corresponds to the exposure assessment component within the general QMRA framework (Codex Alimentarius Commission, 1999). The farm module is based on a S-I (Susceptible-Infected) model (Becker et al., 2022) and assumes two possible ways of flock contamination: 1) the presence of infected broilers in the flock and 2) external contamination during flock depopulation (thinning). The transmission dynamics of ESBL-producing   
*E. coli* between the broilers’ gut and the farm environment are modeled through the ingestion and excretion of contaminated feces (Dame-korevaar et al., 2019). The module also implements the evolution of the bacteria both inside the broilers’ gut and within the farm environment. Finally, it simulates the flock prevalence and concentration of ESBL *E. coli* in the barn environment at the end of the broiler harvesting step. In the second phase of this study the baseline scenario of the farm module is tested against various intervention strategies (phages, antibiotic-free raising, vaccination, etc.) using experimental data from different partners of the ENVIRE project. This underscores ENVIRE's innovative approach to tackling this critical global health challenge.

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