ACRONYM: **AWARE-WWTP**

Title: **Antibiotic Resistance in Wastewater: Transmission Risks for Employees and Residents around Waste Water Treatment Plants**

Keywords: **Occupational Health, Wastewater Treatment Plants, Epidemiology, Quantitative Modelling, Metagenomics, Airborne Transmission**

Consortium composition:

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Abstract:

The rise of antibiotic resistant infections is an imminent global public health threat, and mitigation measures are required to minimize the risks of transmission and human exposure. Municipal wastewater treatment plants (WWTPs) are known hotspots for the dissemination of clinically relevant resistant bacteria of human origin to the environment, and simultaneously represent targets for intervention and mitigation strategies. While aerosolized bacteria are found within WWTP, it is largely unknown whether WWTP workers are at risk of elevated resistance carriage.

In order to study the occupational and environmental transmission of antibiotic resistance due to human exposure to WWTP-borne bacteria, we will assess carriage of extended-spectrum beta-lactamase (ESBL) and carbapenemase-producing Enterobacteriaceae and resistance genes in WWTP workers, in residents in the proximity of treatment plants, and in water and air samples – both in countries with low and high antimicrobial resistance (AMR). Based on microbial cultivation as well as on high-throughput sequencing data and quantitative real-time polymerase chain reaction (qPCR), exposure through ingestion and inhalation will be modelled, and airborne exposure will be derived from geospatial analyses.

Further, we will analyse treatment efficiencies of different WWTP processes in terms of AMR reduction, and therewith identify science-based critical control points for interventions. The focus of this transnational collaboration combining complementary and synergistic European research strengths, is to tackle the increasingly relevant public health threats from antibiotic resistance in WWTP by identifying transmission routes, means of exposure, and proposing risk reduction measures.