ACRONYM: **MODERN**

Title: **Understanding and modelling reservoirs, vehicles and transmission of ESBL-producing Enterobacteriaceae in the community and long term care facilities**

Keywords: **Extended-spectrum beta-lactamases, transmission, long-term care facilities, food, wastewater, mathematical models, and molecular epidemiology**

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Abstract:

The continuing spread of extended-spectrum beta-lactamase-producing Enterobacteriaceae (ESBL-PE) is among the most important problems in antimicrobial resistance. It is also a good model to investigate the epidemiological complexity of resistance in Enterobacteriaceae. Available data on the transmission determinants of ESBL-PE in community settings are scarce, methodologically limited and mostly based on single centre studies. A comprehensive investigation using present typing and modelling techniques is warranted to develop a sound quantitative understanding of the interactions involved.

A consortium of investigators with diverse expertise from countries with high and low endemicity of ESBL-EP has been created. Transmission and persistence of ESBL-PE within households and long-term care facilities will be studied. Individual and group-level determinants for transmission and persistence will be quantified, together with other ecological variables including environmental, food and wastewater contamination. Advanced molecular typing techniques and state of the art analytical methods will be used.

Data generated in this project will directly inform a suite of mathematical models which, in addition to encapsulating current understanding of the processes, will be used to explore the potential effectiveness of different interventions to control ESBL-PE spread.

The expected outputs are a comprehensive characterisation of ESBL-PE transmission considering bacterial clones and mobile genetic elements, as well as individual and ecologic-level factors in different settings, to inform public health authorities about interventions that shouldbe prioritised to control transmission of these organisms.