

The role of food systems in the emergence, selection, dissemination and ultimately transmission of antimicrobial resistance (AMR) has received much less attention than selection and transmission within human clinical settings. However, over the last decade there has been an increased emphasis on this topic with several international institutions and reports highlighting concerns around the impact that food and food-related sources have on the global burden posed by resistant microorganisms. It is generally acknowledged that the major risk factor for selection of AMR in food systems is related to high antimicrobial use on farms. In line with this, policy objectives are focusing on reducing antimicrobial use in the food animal sector. As an example, the European Green Deal Farm to Fork Strategy sets a 2030 target to reduce the sales of antimicrobials for farmed animals and in aquaculture by 50%, and it must be stressed that in the period 2011-2018 the sales of antimicrobials in the EU declined by 34.6% (EMA, 2020). However, reduction of antimicrobial use alone may not be sufficient to fully control AMR due to other factors and sources influencing the occurrence and environmental persistence and dissemination of resistant bacteria and resistance genes at farms, slaughterhouses and food production and processing facilities. In order to understand and control AMR in food systems a coordinated approach towards surveillance and risk assessment is required. Currently, surveillance efforts are focused on a small number of zoonotic pathogens and/or indicators from animal faeces or food, prioritised based on their threat level or the genes they often harbor conferring resistance to last resort antimicrobials. Apart from this monitoring activities undertaken by Public Health authorities, activities within research projects in academia are also providing valuable data in terms of occurrence and features of resistant microorganisms from faeces, soil, water and food, among other sources, but also mainly targeting the same high priority bacterial groups and resistance genes and following a wide range of non-standardized methodologies. The rapid development and improvement in the last couple of decades of next-generation sequencing (NGS) technologies (whole genome sequencing (WGS) and metagenomics) has further provided new means to comprehensively characterise, even in an untargeted manner, resistant bacteria and the associated repertoire of antimicrobial resistance genes. Indeed, the European Food Safety Authority has recently published a scientific opinion with a detailed SWOT analysis (strengths, weaknesses, opportunities and threats) of WGS and metagenomics for different uses, including AMR surveillance and risk assessment, and concluded that it would be appropriate to follow a gradual approach to the integration of WGS within harmonised AMR monitoring efforts and that metagenomics has the potential to be used within risk assessment schemes, especially in relation to AMR, offering some extra opportunities but also some limitations in comparison to WGS. The seminar/event will critically address these issues. First, some general information on AMR and the mechanisms behind it will be provided. Then, the current situation in the EU regarding AMR in food production systems will be discussed and the factors influencing AMR transmission in them will be appraised. Finally, recent advances obtained through the application of WGS and metagenomics for the monitoring and risk assessment of AMR in food settings will be presented.