# Use of a health plan on high welfare pig and broiler farms

## Introduction

The HealthyLivestock project aims to tackle antimicrobial resistance by reducing the need to use antimicrobials in animals through the improvement of their health and welfare. A reduced need to use will lead to less usage, hence less exposure of micro-organisms to antimicrobials, and thus less emergence and spread of resistance genes and resistant bacteria to other animals and people.

One of the ways towards this goal is the improvement of biosecurity on modern, intensive pig and broiler farms. Reducing the risk for the introduction and spread of micro-organisms on farms, in particular pathogenic micro-organisms that cause animal diseases, will support the health of the animals.

For that purpose, we developed a tool to assess existing risks, to make farm specific herd health plans for mitigating these risks, and to monitor the effects of risk mitigation measures. We looked at input parameters to assess the risk for the introduction of pathogens on farms, the spread of pathogens over the farm and the exposure of susceptible animals. Output parameters, in particular animal specific biomarkers, were used for monitoring the impact of risk mitigation interventions. The output parameters can also be used for an early detection of breaches of the risk mitigation measures.

Two BiosEcurity risk Analysis Tools (BEATs), one for pig farms and one for broiler farms, were developed, using a Microsoft Excel format for easy comparison. The biomarkers we used comprised direct and indirect signs of infectious diseases, such as clinical symptoms and results of lab analysis for bacteriology, virology, serology, and the presence of stress indicators. The final version of the BEATs was further refined in a re-iterative consultation process with private veterinary practitioners, official veterinarians and farmers.

## Biosecurity Risk Analysis Tool

The BEAT is based on two earlier developed conceptual approaches: the one of Biocheck.Ugent and the FAO 3zone-biosecurity model. Biocheck.Ugent focuses at risks of pathogens entering or escaping from the farm (external biosecurity) and for their spread over the farm (internal biosecurity). The FAO 3zone-biosecurity identifies different zones on and around the farm (i.e. outside the farm, working zone, animal houses) and their interfaces. Based on the outcome of the risk assessment, farm specific animal health plans are drawn, tailored to the specific situation on the farm. For each zone and its connections with neighbouring zones, risks are identified, and goals are set. With the help of an easy-to-use Excel scoring system, a tailor-made farm health plan is drafted. The draft plan is proposed to the farmer and his/her veterinarian. Farm health plans comprise advises for (re-)definition of the 3 farm zones, hygienic measures per zone, hygienic measures for going from one zone to another, and implementation of biosecurity protocols.

## Monitoring biosecurity risk mitigation in broiler farms

The protocol to test and evaluate the working of the farm health plans involved the following variables: - health, welfare and productivity, - biomarker levels, implementation of agreed management practices, - antimicrobial usage, -farm economics, - antibiotic residue in drinking water, manure and meat, - farmer's

and veterinarian's opinion. A minimum of three visits are planned on each farm. One at the start to collect historical data, a second one, after 6 months to collect data on productivity, biomarkers and health plan compliance, and a third one, after 12 months, to collect data on antimicrobial usage, farm economics, biomarkers and antimicrobial residues farm economy, health plan compliance and the farmer's and veterinarian's opinion.

The selected biomarkers are: footpad lesions and manure levels of campylobacter (samples taken just before first thinning round). Farm antimicrobial usage is calculated according to the DDDvet methodology. Pre- and post-intervention economic and productivity data of farms are calculated as well as pre- and post-intervention farmers' and veterinarians' opinions are collected by use of questionnaires.

**Monitoring biosecurity risk mitigation in pig farms**

For the pig farms a comparable protocol as the poultry protocol was developed, though with different selected biomarkers. For the pig farms the selected biomarkers are: clinical symptoms for respiratory tract infections, PCR and serology tests for PRRS in pigs with symptoms of respiratory disease, faeces score for the evaluation of enteric diseases in sows, piglets, weaners and fatteners, E. coli faeces scores, skin and pluck lesions, haptoglobin levels in weaners, cortisol analysis in pig hair, dehydroepiandrosterone in pig hair, bacterial load on pen surfaces, mortality rates of all categories of pigs. Farm antimicrobial usage is calculated according to the DDDvet methodology. Pre and post intervention farm economic and productivity data as well as farmers' and veterinarians' opinions are collected.

**Next steps**

The development and implementation of health plans on high welfare pig and broiler farms is well under way on poultry farms in Greece and Cyprus, and on pig farms in Italy. However, because of the Covid-19 pandemic, a number of farm visitations had to be postponed. Results are expected to be reported in quarter 1 and 2 of 2022.