



## **Deliverable D-JRP21-WP2.1**

### **Workpackage 2**

Responsible Partner: BfR

Contributing partners: APHA, AGES, WBVR/UU, SVA, IZSAM, IZSLER, PIWET, VFL, NDRVMI, VRI



## GENERAL INFORMATION

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Leader	Task lead: Elke Burow (BfR)
Other contributors	Christopher Prigge, Richard Smith, Marina Meester, Chris Kollas; task participants from: AGES, APHA, WBVR/UU, SVA, BfR, IZSAM, IZSLER, PIWET, VFL, NDRVMI, VRI
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# BIOPIGEE

## Development of a biosecurity protocol

### D-JRP21-WP2.1

#### Participating countries

Austria (AGES), United Kingdom (APHA), Sweden (SVA), Germany (BfR), Bulgaria (NDRVMI), The Netherlands (WBVR/UU), Italy (IZSLER), Poland (PIWET), Czech Republic (VRI), Estonia (VFL)

#### Background

*Salmonella* and hepatitis E virus (HEV) are zoonotic pathogens that can lead to subclinical infections in pigs, and cause gastrointestinal infections in humans through the food chain. Biosecurity protocols are important tools to identify optimal and suboptimal practices on pig farms that are related to the introduction and transmission of infectious pathogens and can thereby help to control the occurrence and spread of *Salmonella* and HEV.

#### Aim and objective

The aim was to identify biosecurity measures that are relevant for *Salmonella* and HEV occurrence and their spread within pig production, and to develop a biosecurity protocol tailored to assess the presence of the identified practices on pig farms in order to determine best practice with regards to these pathogens.

To achieve this, former biosecurity protocols and published literature on biosecurity effectiveness were reviewed, along with the collection of expert opinion, to help to design a questionnaire to be used to assess biosecurity practice in pig farms as part of the BIOPIGEE project.

#### Protocol development based on literature and expert information

Due to the practical consideration of the amount of time needed to complete the questionnaire, the BIOPIGEE group decided to include a maximum of 60 questions and taking an hour to complete, addressing primary and secondary biosecurity (EMA/EFSA/RONAFA 2017, doi: 10.2903/j.efsa.2017.4666). The measures had to be those that were able to be changed on a farm, and up to 40 questions on bioeconomy and farm characteristics were also assessed as potentially being important to collect. The team agreed to use mainly closed answer options for the questions and an electronic tool was selected as preferable to administer the questionnaire.

We reviewed eight existing biosecurity protocols and questionnaires developed for the use for pig farms and 54 (26 finally relevant) peer-reviewed articles on the effectiveness of biosecurity measures for *Salmonella* and HEV prevalence in pig production. In total, 286 biosecurity measures were identified and these applied to different production stages and farming systems (indoor/ outdoor production, conventional/ organic etc).

Comparisons were made between those measures included in the protocols and the published evidence of an effect on *Salmonella* or HEV prevalence and spread in pig farming. In addition, *Salmonella* and HEV experts from BIOPIGEE partner countries were invited to indicate their opinion and to score the relevance of the 286 biosecurity measures.

From the 286 listed biosecurity measures, 63 were identified as proven to be effective in published studies or assessed by experts as being highly relevant for at least one of the pathogens and which addressed primary or secondary biosecurity that could be changed on a farm. In a final step, similar



measures were merged and all measures were sorted for their relevance for indoor and alternative outdoor farm situations.

### **Resulting questionnaire**

Finally, 56 measures relevant for indoor and 55 for outdoor farm situations were selected and reworded into questions. These were joined to 10 questions on farm characteristics and 23 on farm performance and costs which were also added. Answer options were mainly categorical and some questions were provided with a scale of numerical responses. To complete the questionnaire, it was necessary to answer all questions. A list of specific terms used in the biosecurity questionnaire was produced to aid those completing the questionnaire.

### **Translation and transfer of questions into an electronic tool**

The questionnaire was produced in English and then translated to 7 partner countries' languages and was transferred into an electronic tool which offered offline-use at farms with problematic internet connection.

### **Conclusion**

The developed BIOPIGEE biosecurity protocol for primary pig production includes measures found to be effective from previous research, and those highly ranked by experts, to limit occurrence and spread of *Salmonella* and HEV. The questionnaire allows for the assessment of the biosecurity status in different pig production systems and countries in a condensed form. Research within the BIOPIGEE project may refine and reduce the number of measures that are required to be assessed.

*A publication of the protocol and questionnaire as well as of results from the application of the questionnaire is intended.*

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