BETTER

World Animal Biosecurity Association

# FIRST CONFERENCE ON ANIMAL BIOSECURITY

June 5th & 6th 2025

## ORAL & POSTER COMMUNICATIONS

cost EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

Funded by the European Union

# ORAL COMMUNICATIONS

# POSTER COMMUNICATIONS

## ORAL COMMUNICATIONS

### ID 5
# SCIENCE-BASED BIOSECURITY PREVENTS PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS INFECTION AND IMPROVES PRODUCTIVITY IN BREEDING HERDS

**Scott Dee**
*Emeritus Director, Pipestone Research*

## Introduction
Porcine reproductive and respiratory syndrome virus (PRRSV) is a globally significant pathogen of pigs. Preventing PRRSV introduction to breeding herds is critical for disease control and elimination.

## Objectives
To evaluate the impact of science-based biosecurity on PRRSV incidence risk and productivity in breeding herds.

## Material and Methods
A retrospective cohort study was conducted for 3 years across breeding herds from a swine production system. During the project, 69 herds/321,013 sows participated in year 1, 76 herds/381,404 sows in year 2, and 75 herds/384,207 sows in year 3. Two cohorts of herds, differing in their level of biosecurity were identified and classified as Next Generation Biosecurity (NGB) COMPLETE or NGB INCOMPLETE. The difference in the proportion of PRRSV positive herds (# new PRRSV infections/# breeding herds) was analyzed by Chi square, the cumulative PRRSV incidence risk across all herds was calculated, and the association between the level of biosecurity (COMPLETE vs INCOMPLETE) and disease burden was tested by Chi square. Differences in key performance indicators between NGB COMPLETE HERDS and INCOMPLETE herds were analyzed by T test. Swine density within 8.3 km of participating herds was calculated.

## Results
The proportion of positive herds was 6/69 (8.7%, year 1), 7/76 (9.2% year 2), and 11/75 (14.6% year 3) ($p = 0.77$), with a cumulative 3-year PRRSV incidence risk of 8.0%. Significantly lower ($p < 0.0001$) PRRSV incidence risk was associated with NGB COMPLETE herds. NGB COMPLETE herds had higher total born piglets/farrowing ($p = 0.047$), and pigs weaned/female ($p = 0.021$), lower preweaning mortality ($p = 0.013$) and shorter weaning to first service interval ($p = 0.007$), and an increase of 0.91 pigs weaned/mated female/year ($p = 0.15$). Area density was not different ($p = 1.0$) between COMPLETE and INCOMPLETE herds. (1,2)

## Conclusions
Application of science-based biosecurity resulted in sustainable PRRS control in a large swine production system.

## ID 21

# ENHANCING U.S. SWINE FARM PREPAREDNESS FOR INFECTIOUS FOREIGN ANIMAL DISEASES WITH RAPID ACCESS TO BIOSECURITY INFORMATION

**Gustavo Machado**
*Department of Population Health and Pathobiology, College of Veterinary Medicine, North Carolina State University*

### Introduction
The U.S. launched the Secure Pork Supply (SPS) Plan for Continuity of Business, a voluntary program providing foreign animal disease (FAD) guidance and setting biosecurity standards to maintain business continuity amid FAD outbreaks. The role of biosecurity in disease prevention is well recognized, yet the U.S. swine industry lacks knowledge of individual farm biosecurity plans and the efficacy of existing measures.

### Objectives
We describe a multi-sector initiative that formed the Rapid Access Biosecurity (RAB) app™ consortium with the swine industry, government, and academia.

### Material and Methods
We (i) summarized 7,625 farms using RABapp™, (ii) mapped U.S. commercial swine coverage and areas of limited biosecurity, and (iii) examined associations between biosecurity and occurrences of porcine reproductive and respiratory syndrome virus (PRRSV) and porcine epidemic diarrhea virus (PEDV).

### Results
RABapp™, used in 31 states, covers ~47% of U.S. commercial swine. Of 307 Agricultural Statistics Districts with swine, 78% (238) had <50% of those animals in RABapp™.We used a mixed-effects logistic regression model, accounting for production company and farm type (breeding vs. non-breeding). Requiring footwear/clothing changes, having multiple carcass disposal locations, hosting other businesses, and greater distance to swine farms reduced infection odds. Rendering carcasses, manure pit storage or land application, multiple perimeter buffer areas, and a larger animal housing area increased risk.

### Conclusions
This study leveraged RABapp™ to assess U.S. swine farm biosecurity, revealing gaps in SPS plan adoption that create vulnerable regions. Some biosecurity practices (e.g., footwear changes) lowered PRRSV/PEDV risk, while certain disposal and manure practices increased it.Targeted biosecurity measures and broader RABapp™ adoption can bolster industry resilience against foreign animal diseases.

### Financial support and Acknowledgements
This work was also supported by the Foundation for Food \\& Agriculture Research (FFAR) award number FF-NIA21-0000000064.

### Keywords
Swine biosecurity • Perimeter buffer areas • SPS biosecurity plans • Swine biosecurity desert

ORAL COMMUNICATIONS

ID 29

# THREE-SCALE SELECTION MODEL: A NOVEL APPROACH FOR CATEGORIZING FARM BIOSECURITY LEVELS

**Elena Mitrevska;** Miroslav Kjosevski
*Department of Animal Hygiene and Environmental Protection, Faculty of Veterinary Medicine, SS. Cyril and Methodius University in Skopje*

## Introduction

Biosecurity assessments on farms are most valuable when considered in a broader context, including disease prevention strategies, national or regional policies, etc. A key approach to driving progress is categorizing farms based on their implemented biosecurity practices. Currently, applied categorization methods face challenges such as the lack of universality, flexibility and miscategorization.

## Objectives

This study aimed to develop and test a dynamic and modifiable three-scale selection model (3-SSM), using scores obtained from biosecurity assessments, as a novel approach to farm categorization.

## Material and Methods

The proposed 3-SSM categorizes farms into three categories (poor/medium/good) through a three-step process based on: overall biosecurity farms score distribution, key biosecurity topics and specific biosecurity measures identified by experts. Data from 723 previously assessed dairy farms (Biocheck.UGent™) were used to simulate categorization using the 3-SSM and to analyze factors influencing the categorization process. Using the same scores from the assessed farms, the results from 3-SSM were compared with two existing models: Model B, based on average distribution, and Model D, using K-means clustering.

## Results

Due to the second and third scale selection process in the 3-SSM, 48% of the farms ultimately categorized as “poor” were initially classified in the other categories. 3-SSM demonstrated differences in scores between the categories: “poor” (43.44±10.55), “medium” (50.06±3.38), and “good” (61.81±5.71), $p<0.01$. Farms categorized as “poor” in 3-SSM had higher average total biosecurity scores compared to those categorized as “poor” in Model B (29.73±4.76) and Model D (34.35± 8.44). Conversely, the “good” farms in 3-SSM had lower scores than the farms in the same category in Model B, 64.21±5.79, $p<0.01$.

## Conclusions

This study highlights the importance and differences in interpreting farm biosecurity levels due to the selected categorization model. The presented 3-SSM provides a flexible and adaptable categorization tailored to epidemiological and management needs, reducing the risk of omitting critical biosecurity issues.

## Keywords

farm biosecurity • categorization • assessment

## ID 34

# TESTING THE EFFECTIVENESS OF CLEANING AND DISINFECTION PROCEDURE IN LIVESTOCK TRANSPORT TRUCKS: A PILOT STUDY

**Laura Courtens;** Evelien Biebaut, Ilias Chantziaras, Filip Van Immerseel, Jeroen Dewulf
*University of Ghent*

### Introduction
Transport vehicles are a potential source of infection for livestock animals. To prevent mechanical transmission, these vehicles should be cleaned and disinfected (C&D) after every transport.

### Objectives
This study evaluates the effectiveness of C&D performed by the driver at Belgian pig and poultry slaughterhouses.

### Material and Methods
Six poultry and six pig trucks were tested before and after C&D. In each truck 8 swabs were taken before and after the C&D procedure: three animal contact places, three outside the truck and two from the cabin. Total aerobic count (TAC) and gram-negative bacterial count (GNBC) were determined.

### Results
C&D reduced TAC on all locations of pig trucks, except for the cabin and its stair. The mean GNBC was reduced on all locations, except for the stair to the cabin. The highest mean TAC reduction of 2,37 ± 1,01 log CFU/mL was observed within the loading bridge, resulting in a mean TAC of 3,90 ± 0,69 log CFU/mL and GNBC of 3,13 ± 0,41 log CFU/mL after the C&D. Poultry drivers reduced TAC and GNBC on all locations, except for the underside of the truck. The floor was the only location C&D efficiently reduced mean TAC by 2,62 ± 1,32 log CFU/mL. The mean bacterial load after C&D was 3,94 ± 1,20 log CFU/mL TAC and 2,65 ± 1,64 log CFU/mL GNBC.

### Conclusions
The mean TAC and GNBC of the loading bridge and the floor of the trucks remained > 3,90 and 2,65 log CFU/mL respectively. Further contamination was observed in the cabin and its stairs of the pig trucks and the underside of the poultry trucks. None of the drivers performed C&D on these locations. The high mean GNBC after C&D indicates residual faecal contamination. Results demonstrate that C&D by Belgian pig and poultry drivers at slaughterhouses insufficiently reduces bacterial load, facilitating mechanical transmission of bacteria.

### Financial support and Acknowledgements
This work was funded by the European Union under the Horizon Europe grant 101083923 (BIOSECURE). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

### Keywords
livestock transport • biosecurity • mechanical transmission • bacterial load reduction

ID 48

# UNDERSTANDING SALMONELLA DUBLIN AND SALMONELLA SPP. DETECTION IN A DAIRY CALF MOVEMENT SYSTEM TO INFORM BIOSECURITY AND PATHOGEN SURVEILLANCE STRATEGIES

**Sara C Sequeira;** Alejandra Arevalo-Mayorga; Samantha R Locke; Greg Habing; Andréia G Arruda
*Department of Veterinary Preventive Medicine, College of Veterinary Medicine, The Ohio State University, Columbus, Ohio, United States*

## Introduction

Movement of live cattle is a known risk for pathogen spread and spill-over. Understanding movement patterns, particularly in high-risk comingling facilities, is essential for targeted biosecurity implementation and pathogen surveillance.

## Objectives

This study investigated calf movement patterns and its relationship with Salmonella spp. (including S. Dublin) detection within a Midwestern livestock dealer facility, a critical yet underexplored component of the United States (US) dairy-cattle supply chain.

## Material and Methods

From May to October 2023, records of 1,184 calf movements were analyzed alongside laboratory detection of Salmonella spp. and S. Dublin from environmental samples, using culture and Polymerase Chain Reaction methods, respectively. Network metrics, including number of incoming sources, density and source stability (Jaccard-Similarity-Indexes, JSIs), were assessed. Mixed-effects logistic regression models were used to evaluate the influence of movement patterns on pen-level pathogen detection.

## Results

Results revealed a high number of sources and animals in the facility, with fluctuating connectivity over time. The overwhelming prevalence of informal, hand-written records highlighted gaps in data standardization in these settings. Weekly movement networks showed variability in source stability, with lower JSIs values preceding increased S. Dublin detection. Novel weekly calf sources appeared to impact S. Dublin detection ($p=0.04$). Despite a high detection in environmental Salmonella spp. in late summer, S. Dublin detection decreased over time ($p<0.01$).

## Conclusions

Findings from this study underscored the role of livestock dealer networks in pathogen circulation and reinforced the need for targeted biosecurity protocols at such facilities. These results support the urgent need for standardized record-keeping systems in the US. Strengthening external biosecurity, through intra- and interstate movement tracking would benefit movement tracking and environmental surveillance which are vital for mitigating S. Dublin risks, a pathogen of critical concern for public and animal health.

## Financial support and Acknowledgements

This research study was supported by the Agriculture and Food Research Initiative (AFRI) of the National Institute of Food and Agriculture (NIFA-USDA); Competitive Grant no. [2022-68015-36628].

## Keywords

calf movements • biosecurity • S. Dublin • sorting facility • market chains

Continue –>

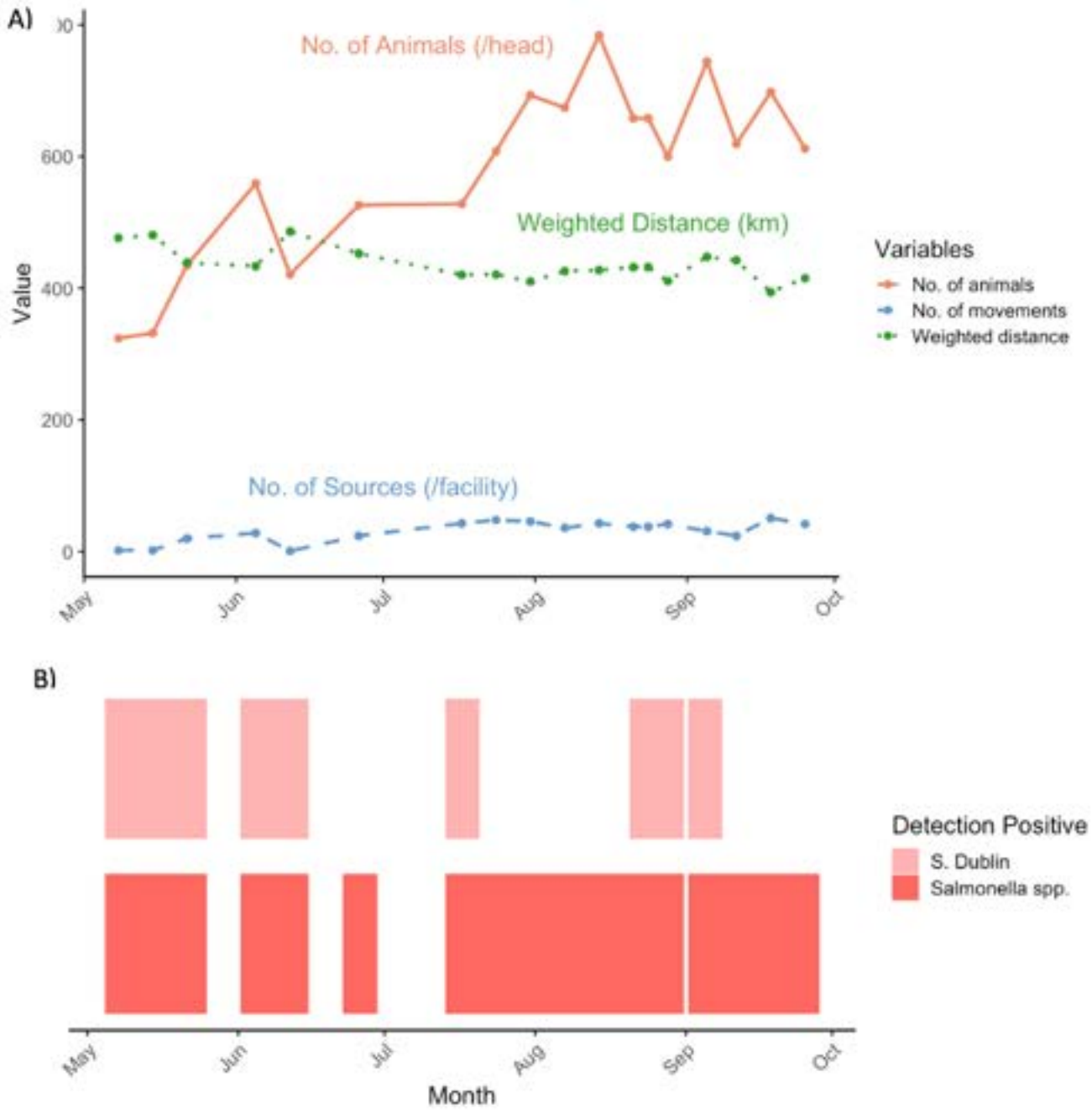



Figure 1. Figure A) displays how the number of animals, average weighted distance and number of sources of calves varied across the period of study (May to October 2023); Figure B) shows, for the same period and corresponding weeks, positive detections for *Salmonella* spp and *S.* Dublin, respectively by laboratory culture and PCR methods.

ID 57

# FARMR!SK, A NEW TOOL FOR RISK-BASED BIOSECURITY ADVICE

**Natalia Ciria Artiga;** Alberto Allepuz Palau; Giovanna Ciaravino; Teresa Imperial Esteban; Fernando Duarte Godoy
*Department of Animal Health and Anatomy, Universitat Autònoma de Barcelona (UAB), Bellaterra, Barcelona. Spain*

## Introduction

Effective biosecurity measures are crucial for preventing disease introduction in cattle farms. However, implementation remains challenging due to farmers' uncertainty about measure effectiveness, inconsistent recommendations from veterinarians, and the limitations of one-size-fits-all biosecurity approaches that fail to address farm-specific circumstances.

## Objectives

To develop and implement a quantitative risk assessment (QRA) model than enables to prioritize which biosecurity measures have a greater impact on reducing the probability of introduction of pathogens providing tailored-farm recommendations.

## Material and Methods

The QRA was run independently for each possible introduction pathway of infectious bovine rhinotracheitis, bovine viral diarrhoea and tuberculosis introduction in dairy farms considering the different steps needed for the pathogen to be introduced and their associated probabilities. The model integrates farm-specific biosecurity data with pathogen-specific parameters from the PARAMETRA database (Antonopoulos, 2024). To identify the most effective measures to reduce risk, the model simulates the implementation of new biosecurity measures using "what-if" scenarios. Field visits were conducted to cattle farms from northeastern Spain and Andorra between 2024 and 2025 and results reports (Figure 1) were discussed with farm advisors and vets to identify their main vulnerabilities and possible improvements.

## Results

The risk assessment showed that the probability of disease introduction, the main routes of introduction and the effectiveness of different biosecurity measures varied considerably between farms (Table 1). Providing boots for drivers and restricting vehicle access to the farm perimeter were the most recommended measures for farms where vehicle visits were the primary source of risk; whereas a comprehensive quarantine was most effective when cattle purchases were the primary risk pathway (e.g., Dairy 4). Results evidenced the importance of tailored-farm recommendations.

## Conclusions

FarmR!sk provides a systematic, quantitative assessment of the risk of pathogen introduction and delivers user-friendly, farm-specific biosecurity recommendations. By facilitating discussions about biosecurity on farms, this tool helps bridge the gap between scientific evidence and practical implementation.

## Financial support and Acknowledgements

This research project was funded by BIOSECURE Horizon Europe project (www.better-biosecurity.eu) and BioRisk (supported by MCIN/AEI/10.13039/501100011033, ref. PID2020-118302RB-I00)

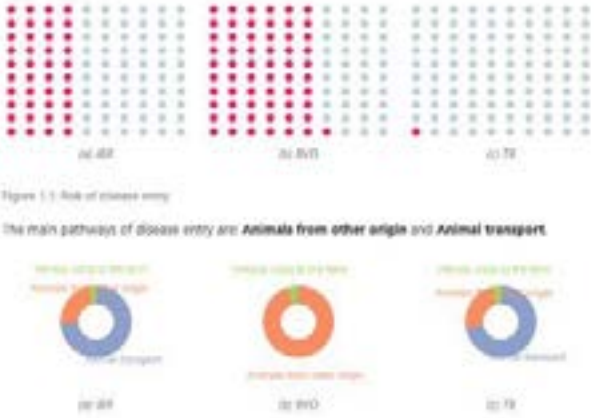
## Keywords

Quantitative risk analysis • Cattle Biosecurity • Biosecurity assessment

Continue –>

## Dairy 4 FarmRisk report (screenshots)

### Risk analysis results



### Infectious Bovine Rhinotracheitis (IBR)

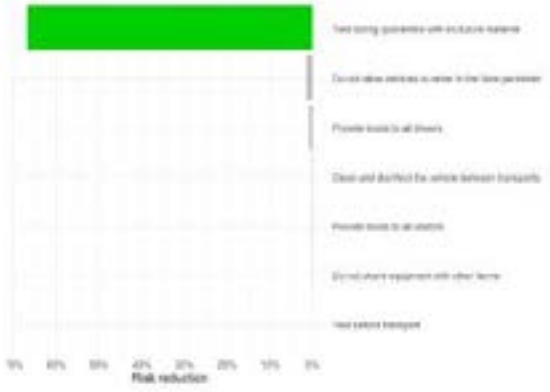
Current risk

Annual risk of IBR entry in the farm: **39.6%** (27.3-49.6%)

By pathway:

- Animal transport: **30%** (17.4-45.4%)
- Animals from other origin: **9.01%** (7.84-10.5%)
- Vehicle visits to the farm: **1.21%** (0.602-2.08%)
- People visits to the farm: **0.021%** (0.00746-0.0475%)
- Neighbouring farms: **0.00395%** (0.00021-0.0134%)

Risk reduction of biosecurity measures



IBR relative risk reduction median

| Farm | No sharing sites | Test before transport | Screening herds sharing sites | Own vehicle | No shared transport | Vehicle disinfection | Comprehensive quarantine | No vehicle entry | Boots for drivers | Boots for visitors | No shared equipment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dairy 1 | | -1.80% | | -11.40% | -3.80% | -7.30% | -19.80% | -42.80% | -37.60% | -0.86% | -2% |
| Dairy 2 | -1.10% | | -0.29% | -10.40% | -5.80% | | -19.40% | -29.70% | -42.10% | -1% | -2.70% |
| Dairy 3 | | | | | | | | -65.40% | -29.40% | | -7.10% |
| Dairy 4 | | 0.04% | | | | -0.21% | -66.80% | -1.40% | -0.72% | -0.18% | -0.09% |
| Dairy 5 | | | | | | | | -80.60% | -17.10% | | -0.96% |

ID 60

# BITESIZE BIOSECURITY: DEVELOPING LIVESTOCK FARMER-FRIENDLY BIOSECURITY MATERIALS AND TOOLS, INCLUDING THE USE OF ARTIFICIAL INTELLIGENCE (AI)

**Kate Lamont**, Andrew Duncan, Sandy Carmichael, Maria Rodrigues da Costa, Suhaib Ahmed, Lorna Pate, Ian Hutchinson, Lynsey Melville
*SRUC, Scotland's Rural College , Moredun Research Institute*

## Introduction

Previous research has found that a combination of factors has contributed to the low uptake of biosecurity measures among farmers. Farmers have been found to be dismissive of measures associated with biosecurity and their understanding of the word "biosecurity" varies. Furthermore, it has been suggested that farmers may be more receptive to biosecurity information and more likely to adopt on-farm behavioural changes when communication is framed positively. Effective methods for communicating biosecurity messages to farmers, such as direct interaction and/or collaboration, and the use of audio-visual media and support materials which can be personalised have been recommended in a recent output of the BETTER COST Action.

## Objectives

To break down complex biosecurity guidance into "bite-sized" and relatable insights for farmers in a user-friendly format.To promote biosecurity discussions and decisions to improve animal health and support farm management.

## Material and Methods

Discussion/Decision support tools (DSTs) are becoming more widely used throughout farming. These tools can help farmers make decisions about animal health and farm management, whilst promoting discussions with vets and advisors. However, in contexts such as biosecurity which feature "lack of awareness, complex guidelines, confusing terminology", it can be challenging to take this complexity into account when designing DSTs. We use video, animiation and leverage Artificial Intelligence (AI), particularly Large Language Models (LLMs), to enhance DSTs by summarising expert advice into "user-friendly and accessible" information. A multi-disciplinary team are working to build a web-application called "Bitesize Biosecurity".

## Results

We have engaged with farmers in the design process to ensure acceptability and accessibility, and have produced a suite of biosecurity communication materials.

## Conclusions

The development process and components of the not-for-profit app will be outlined at the conference, including feedback from farmers. It will focus on Johne's Disease (paratuberculosis), Porcine Reproductive and Respiratory Syndrome, Sheep Scab and Fluke and will include messages summarised using AI.

## Financial support and Acknowledgements

Scottish Government's Strategic Research Programme and SEFARI Gateway's Innovative and Knowledge Exchange Fund.

## Keywords

Discussion support • Decision support • Behaviour change • Artificial intelligence (Large Language Model) • Biosecurity information • Farmer friendly • Bitesize Biosecurity • Porcine Reproductive and Respiratory Syndrome • Sheep Scab • Fluke • Paratuberculosis • Video • Animation • Multi-disciplinary

ID 80

# CHALLENGES FOR THE IMPLEMENTATION OF BIOSECURITY PRACTICES IN EXTENSIVE AND ALTERNATIVE PRODUCTION SYSTEMS WITH OUTDOOR ACCESS IN SPAIN

**Teresa Imperial-Esteban;** Gerard Martín-Valls; Giovanna Ciaravino; Alberto Allepuz
*Departament de Sanitat i Anatomia Animals, Facultat de Veterinària, Universitat Autònoma de Barcelona, Spain*

## Introduction

Pig and ruminant farms with outdoor access (e.g. extensive systems, organic farms) have strengths, such as promoting circular economies and increased animal welfare potential, and weaknesses, such as challenges in implementing some biosecurity measures due to lack of efficiency or feasibility.

## Objectives

The study aimed to identify challenges and potential solutions for biosecurity implementation in Spanish outdoor pig and ruminant farms.

## Material and Methods

During 2024, 21 pig farms, 20 goat farms and 10 cattle farms with outdoor access across Spain were visited to assess biosecurity. Besides, challenges and solutions implemented by the farmers were identified and classified based on the pathway of transmission (e.g., indirect contact with wildlife), and context. If the observed solution increased the risk of infection, it was also recorded (figure 1).

## Results

Several challenges were observed both for pigs and ruminants. A relevant example was the impossibility of building efficient fences to prevent the entrance of terrestrial wildlife due to the extension of pasture areas. Solutions included the presence of internal areas with fencing used in case of health emergencies, or protection of resources (fencing the food and water storage facilities). Regarding ruminants, different farms shared pastures for economic viability. Solutions included common health policy and avoiding males grazing in these pastures to prevent sexually transmitted diseases and reduce direct contact between animals of different herds. Finally, the use of rodenticides was reported to be a challenge as piglets and goats roam freely and could access the poison. The solution was to use traps and cats to control rodents, but cats could increase the risk of some pathogens.

## Conclusions

Considering farming' context is crucial for identifying feasible biosecurity measures to be implemented. Outdoor systems need adapted biosecurity assessment methodologies and legislation. Further research is needed to assess the efficacy of the observed solutions.

## Financial support and Acknowledgements

The present work received funding from two projects, the European partnership of health and welfare (EUPAHW, HORIZON-CL6-2023-FARM2FORK-01-2) and the project Enhanced and Cost-Effective Biosecurity in Livestock Production (BIOSECURE: Project ID 101083923, Programme HORIZON)

## Keywords

Outdoor systems • Extensive • Challenges • Innovative solutions • Biosecurity

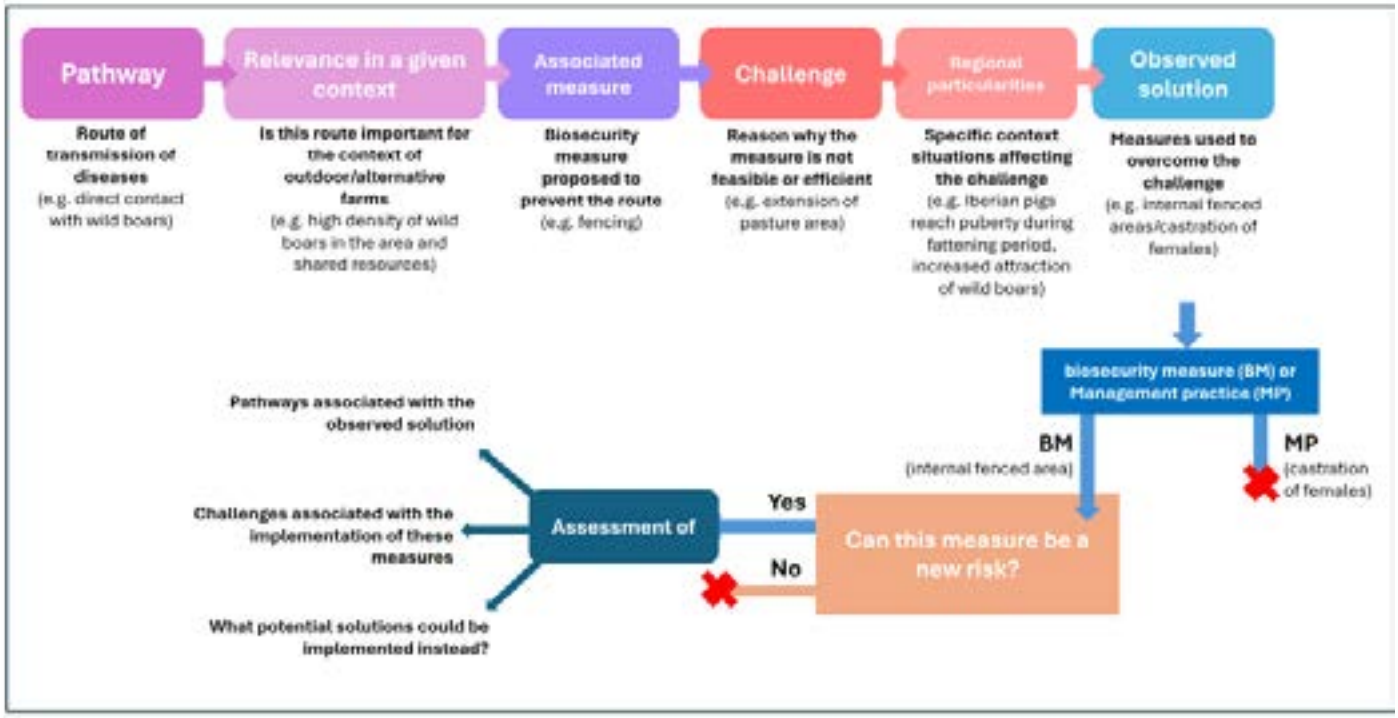
Continue –>

## ORAL COMMUNICATIONS

**Table 1. Examples of challenges and solutions identified in the present work**

| Pathway (species) | Relevance in a given context | Associated measures | Challenge | Regional context | Observed solution |
|---|---|---|---|---|---|
| Indirect contact with other livestock (same farm, both pigs and ruminants) | Lands in extensive pastures are used by different batches and species from the same farm | Segregation of species | Segregation of species or batches per land jeopardizes the economic sustainability of a system | Iberian pigs consume acorns in autumn, ruminants graze in spring and summer the same lands | Rotation of land once the whole cycle is completed (lands rest one year) |
| Indirect contact with wildlife (both pigs and ruminants) | Use of natural sources of water shared by livestock and wildlife | Use of controlled water sources | In extensive areas, it is not possible to bring water from other sources, need to use natural rivulets or other sources. Also, beverage areas can be used by wildlife. | Not applicable | 1)Use of water probes (phreatic source) and store water that can be treated before consumption. 2)Use of fences to prevent livestock using water from natural sources, and treat it before its use for livestock. |
| Indirect contact with other livestock (other farms, both ruminants and pigs) | Animals are transported to pastures at certain moments of the year or for replacements) | Cleaning and disinfection of trucks | Absence of proper areas for cleaning and disinfection | Not applicable | Use of own trucks and self-replacements |
| Indirect contact with other livestock and wildlife (pigs and ruminants) | Surfaces may get contaminated by external vehicles, fomites and other animals | Cleaning and disinfection of surfaces | Impossibility of using disinfectants | Organic farming systems and natural parks do not allow use of disinfectants | Not observed |

**Figure 1. Flow chart of the identification and classification of challenges and solutions**



ID 81

# ENHANCING BIOSECURITY TO MITIGATE ANTIMICROBIAL RESISTANCE: INSIGHTS FROM ICARS-SUPPORTED PROJECTS IN LOW AND MIDDLE-INCOME COUNTRIES

**Claudia Cobo-Angel**[1]; Rodolophe Mader[1]; Sunday Ochai; Mabel Ortiz de Leo[2]; Anders Dalsgaard; Kristina Osbjer[1]; Erica Carman Westwood[1]; Ahmad Wesal Zaman[1]

*1. International Centre for Antimicrobial Resistance Solutions (ICARS), Copenhagen, Denmark; 2. International Centre for Antimicrobial Resistance Solutions (ICARS), Copenhagen, Denmark; Department of Veterinary and Animal Sciences, University of Copenhagen, Frederiksberg, Denmark*

## Introduction

Antimicrobial resistance (AMR) is a global challenge requiring a coordinated One Health approach. The International Centre for Antimicrobial Resistance Solutions (ICARS) partners with governments and research institutions in low and middle-income countries (LMICs) to test evidence-based AMR mitigation interventions. ICARS currently supports 55 projects across 24 countries, with biosecurity being a key focus in several projects.

## Objectives

We aimed to review ICARS-supported animal health projects to document the biosecurity assessment methodologies, implementation processes, and challenges encountered.

## Material and Methods

We reviewed all 13 ICARS-supported animal health projects from 11 countries, selecting those where biosecurity was a core intervention. In all cases, biosecurity was selected as a key intervention to tackle AMR through a consultative process involving multiple stakeholders, including governments, academia, various organizations, and farmers.

## Results

Five ICARS-supported animal health projects incorporated biosecurity as part of their tested interventions, four in poultry (Georgia, Tanzania, Zimbabwe, and Zambia) and one in pigs (Colombia).

To assess biosecurity practices, the U. Ghent Biocheck assessment tool was adapted in two projects (Georgia and Tanzania), while customized assessment tools based on literature reviews and expert input were developed for the remaining three projects (Zimbabwe, Colombia, and Zambia). In Colombia, farms were divided into gold, silver, or bronze level using a scoring system based on biosecurity compliance, motivating farmers to continuously improve their practices. Challenges included the lack of standardized tools for small and medium-scale farms in LMICs and the absence of economic assessments that show the return of investment of different biosecurity improvements to guide farmers in selecting biosecurity measures and incentivize their continued participation in the interventions.

## Conclusions

Biosecurity has been recognized as a key AMR intervention in various LMICs. However, to improve its effectiveness and sustainability, additional implementation studies, including economic and behavioral sciences, are needed to guide farmers in selecting the most efficient biosecurity measures in resource-limited settings.

## Keywords

Implementation research • Low and middle income countries • AMR mitigation

ID 86

# LATENT CLASS ANALYSIS OF BIOSECURITY PRACTICES IN SPANISH PIG FARMS: IDENTIFYING PATTERNS FOR TARGETED IMPROVEMENT

**Hernan Botero**[1]; Paula Rebollo[2]; Celia Martinez[3]; Natalia Yeste[4]; Alberto Allepuz[5]; Enric Mateu[5]; Antonio Bulnes[6]
*1. Researcher; 2. PhD Researcher; 3. Biotechnician; 4. Responsable Poyectos I+D; 5. Associate Professor; 6. Coordinador*

## Introduction

Biosecurity measures are essential for preventing disease introduction and spread within pig farms. Understanding implementation patterns across production types can guide targeted improvement strategies.

## Objectives

To identify distinct patterns of internal and external biosecurity practices across a production system owned by one of the biggest pig companies in Northeast Spain using latent class analysis (LCA) and to develop production-specific biosecurity recommendations.

## Material and Methods

Data from 209 Spanish pig farms, including multipliers, breeding units, nurseries, gilt-adaptation units, and fattening-to-finish units were collected using the Biocheck. UGhent questionnaire. A latent class analysis was performed employing Gaussian mixture models to group farms into distinct clusters, where farms within each cluster share similar biosecurity implementation patterns.

## Results

The LCA identified several distinct biosecurity classes within each production type. Multipliers showed variations in quarantine management and transport biosecurity. Breeding units demonstrated distinct patterns in visitor management and disease control measures. Nurseries exhibited differences in cleaning protocols and facility separation. Gilt-adaptation units varied in animal movement management and environmental control. Fattening-to-finish units displayed heterogeneity in feed/water management and transport biosecurity.

## Conclusions

Our findings reveal considerable heterogeneity in biosecurity implementation across pig production in Northeast Spain. In multipliers and breeding units, quarantine facilities and visitor control protocols require improvement, with two clusters showing deficiencies in farm-visit hygiene. For nurseries, cleaning protocols and compartmentalization need enhancement, especially where verification systems were inconsistent. Gilt-adaptation and fattening units would benefit from improved transport biosecurity and environmental control, with some clusters showing inadequate vehicle disinfection and rodent control. Recommended interventions include: structured visitor hygiene protocols for multipliers; regular cleaning verification for nurseries; enhanced facility separation for gilt-adaptation units; and strengthened transport biosecurity for fattening units. These tailored approaches optimize resource allocation and disease prevention more effectively than general guidelines.

## Keywords

Biosecurity • Latent class analysis • Swine production • Disease prevention • Farm classification • Gaussian mixture models • Spain

## ID 7
# HYGIENE PERFORMACE RATING AT FARM LEVEL - A NOVEL TOOL FOR QUATIFYING BIOSECURITY

**Gunvor Elise Nagel-Alne**[1]; Thorbjørn Refsum[1]; Sigrun Johanne Hauge[1]; Ole-Johan Røtterud[2]; Ann-Katrin Llarena[3]; Janne Holthe[1]

*1. Animalia, Lørenveien 38 0585 Oslo Norway; 2. Ole-Johan Røtterud, retired; 3. NMBU, Elizabeth Stephansens v. 15, 1433 Ås Norway*

## Introduction
Preventing pathogens from entering the premises of food producing animals is one of the main biosecurity measure at farm level. However, pathogens can enter via air, water supplies, equipment outside the premises, feed, personnel, insects, and rodents. This study presents a comprehensive protocol, the Hygiene Performance Rating-Farm (HPR-F), targeted at identifying practices that could hamper the biosecurity level in conventional broiler production.

## Objectives
The main objectives of this study were (1) to develop the HPR-F protocol and test it on a selected number of farms, and (2) to compare the HPR-F results to the broiler farms' Campylobacter-status to identify risk factors for Campylobacter colonisations in broiler flocks.

## Material and Methods
The HPR-F protocol was developed by Animalia in 2019 and addresses factors with impact on hygienic performance and biosecurity of broiler production at farm level. The factors were divided into 13 areas to investigate. There are 170 questions to be answered in the protocol. 30 conventional broiler farms were included in the study belonging in Mid-Norway. The Campylobacter-status was based on information from the National Action Plan against Campylobacter.

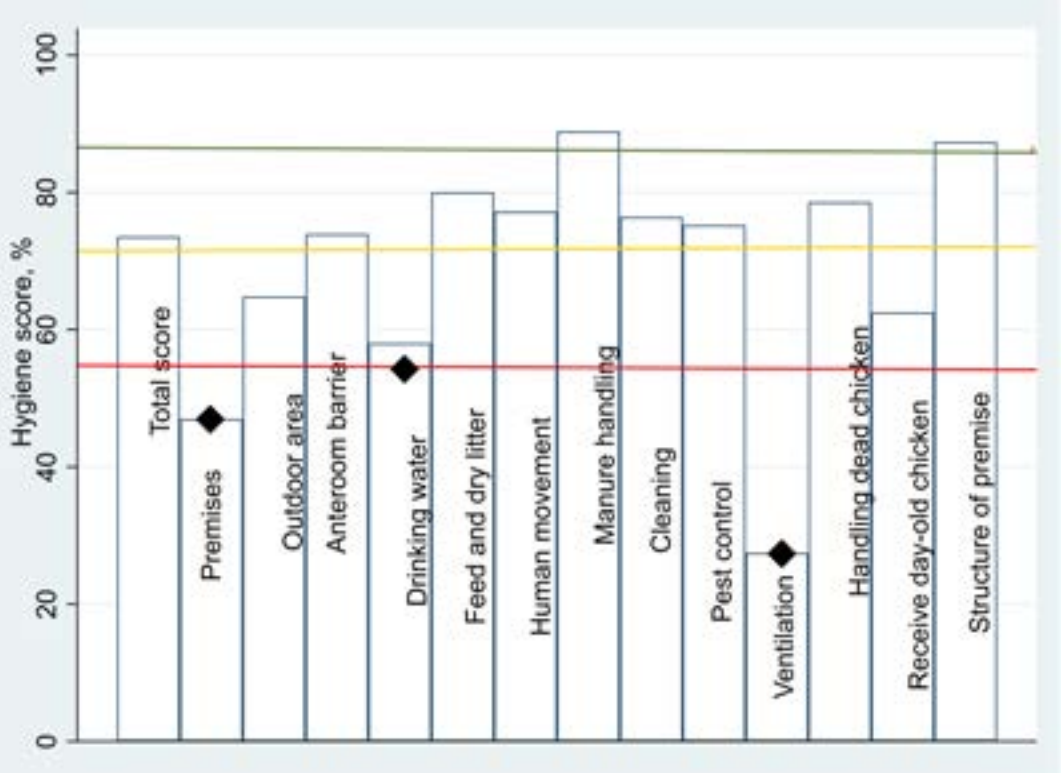
## Results
The statistical analyses were conducted in STATA/BE 17.0 using logistic regression where the outcome variables was Campylobacter-status (0,1) and explanatory variables were the mean hygiene score of the 13 categories in the HPR-F protocol. The distribution of hygiene score showed that the mean total hygiene score was 81.9% with a range from 69.2% to 92.2%. The mean overall hygiene score was 80.5% and 83.6% for the Campylobacter-cases and -controls, respectively.

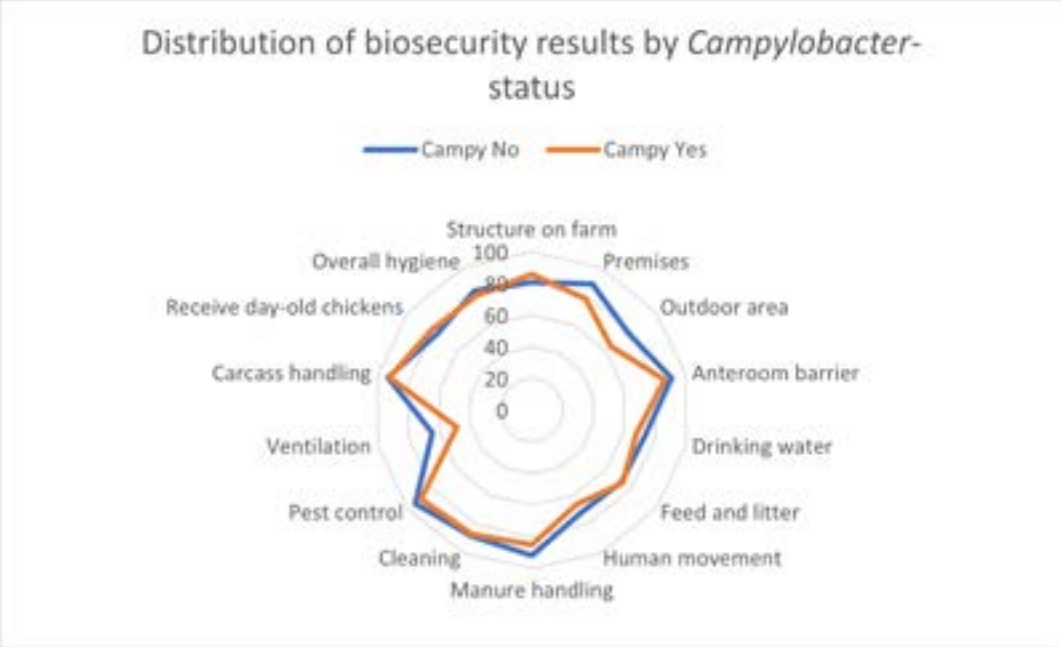
## Conclusions
The conducted research showed that the HPR-F protocol is an innovative tool that allows the study of biosecurity measures in a detailed, quantitative manner. We believe that the HPR-F protocol is a useful tool that can easily be adapted and help to point out areas of improvement when it comes to biosecurity at farm level.

## Financial support and Acknowledgements
The work was supported by the Norwegian Research Council, grant no 296327.

## Keywords
Hygiene performance rating • Quatitative tool • Farm level

Continue –>


Hygiene score, %
0
20
40
60
80
100
Total score
Premises
Outdoor area
Anteroom barrier
Drinking water
Feed and dry litter
Human movement
Manure handling
Cleaning
Pest control
Ventilation
Handling dead chicken
Receive day-old chicken
Structure of premise


Distribution of biosecurity results by *Campylobacter*-status
Campy No
Campy Yes
Structure on farm
Premises
Outdoor area
Anteroom barrier
Drinking water
Feed and litter
Human movement
Manure handling
Cleaning
Pest control
Ventilation
Carcass handling
Receive day-old chickens
Overall hygiene
100
80
60
40
20
0

## ID 8
# FACTORS INFLUENCING IMPLEMENTATION OF BIOSECURITY BY FRENCH PIG BREEDERS

**Correge Isabelle**
*IFIP*

### Introduction
Despite mandatory training courses, audits and the many support services offered to breeders, compliance with biosecurity measures is not always achieved.

### Objectives
The aim is to have a better understanding of the obstacles and expectations to improve biosecurity compliance.

### Material and Methods
317 pig breeders (including 77 outdoor farms) voluntarily responded to an online survey on obstacles and the difficulties for implementing biosecurity. The survey had 18 closed questions.

### Results
The ASF risk perception depends on the type of farm: 87% of the indoor breeders believe that the risk to have ASF in wild boars in France within a year is high, against 53% for outside breeders. For 40% of the breeders, to have ASF in France would improve their biosecurity compliance. Breeders are sufficiently informed about ASF (78%) and biosecurity (97%). Nevertheless, some breeders expect other types of support or advice. In terms of motivation, some perceive biosecurity as a constraint imposed by French regulations. Others consider that some measures are not adapted to their farm or are not convinced of their usefulness. 35% of breeders said that if they were convinced of the usefulness of a measure, they would apply it.

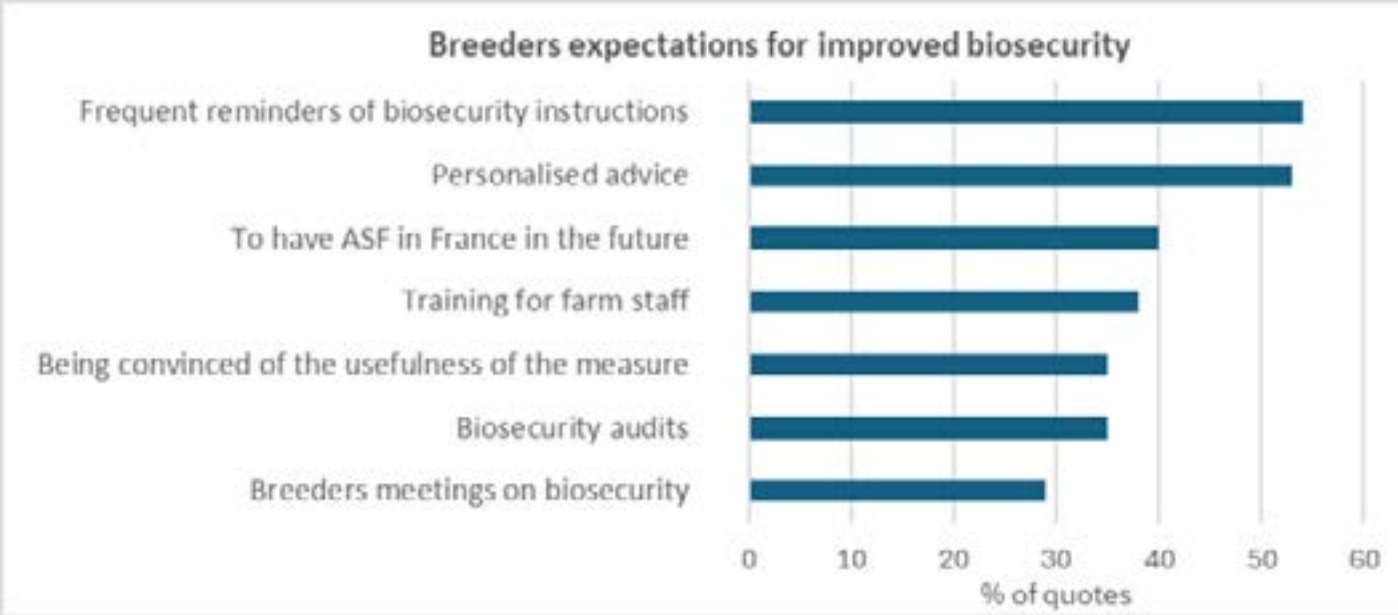
Building structures and farm organisation are obstacles to the implementation of biosecurity for 29% of the breeders. Working time and organisational constraints are obstacles for 17% of the breeders, and the cost of measures for 15% of breeders. Not being convinced of the usefulness of the measure is an obstacle for 7% of them (fig). The biosecurity measures for which breeders cited the most difficulty were the farm areas (internal and external), the vehicles routes around the farm and the fences. The biosecurity measures for which the fewest difficulty cited were quarantine, loading bay and cleaning-disinfection.

### Conclusions
Understanding the obstacles and expectations of breeders regarding biosecurity makes it possible to adapt their support.

### Keywords
Biosecurity • Pig • Breeders • Compliance

Continue –>

## POSTER COMMUNICATIONS



## ID 9
# ASSESSMENT OF BIOSECURITY MEASURES IMPLEMENTED AT CONVENTIONAL BROILER FARMS IN PAKISTAN

**Qamer Mahmood;** Jeroen Dewulf; Ilias Chantziaras
*Ghent University*

### Introduction
Biosecurity is essential for preventing disease outbreaks, minimizing economic losses, and ensuring sustainable poultry production. Pakistan's rapidly expanding broiler industry faces increased disease risks due to inadequate on-farm biosecurity. Biosecurity implementation remains poorly quantified, necessitating an objective assessment to guide interventions.

### Objectives
This study quantified biosecurity implementation in conventional broiler farms in Pakistan using the standardized Biocheck. UGent scoring tool.

### Material and Methods
A structured questionnaire assessed implementation across 100 farms, evaluating 79 measures categorized into 11 sections: (1) Purchase of one-day-old chicks, (2) Depopulation of broilers, (3) Feed and water, (4) Removal of manure and carcasses, (5) Visitors and farmworkers, (6) Material supply, (7) Infrastructure and biological vectors, (8) Farm location, (9) Disease management, (10) Cleaning and disinfection, and (11) Measures between compartments.

### Results
Biosecurity practices varied across farms, with internal biosecurity (mean: 55, range: 34–83) generally stronger than external biosecurity (mean: 44, range: 27–76). External biosecurity areas like 'Location of the farm' and 'Infrastructure and biological vectors' scored high, while 'Removal of manure and carcasses' had the lowest scores. Internal biosecurity showed strong disease management (76%) but weaknesses in cleaning and disinfection (47%) and compartmental biosecurity (41%). Pakistan's overall biosecurity score (49%) was higher than Bangladesh's (46%), but lower than Vietnam's (62%), the Philippines' (71%), and the global average (73%), with significant gaps in depopulation and manure removal. Biosecurity scores were positively associated with the farm manager's experience ($p < 0.001$) and the number of workers at farm ($p < 0.001$), indicating that farms with more experienced personnel and larger teams tend to implement stronger biosecurity measures. A negative correlation ($p < 0.05$) was found between antimicrobial usage (AMU) and biosecurity scores, suggesting higher biosecurity scores are associated with lower AMU.

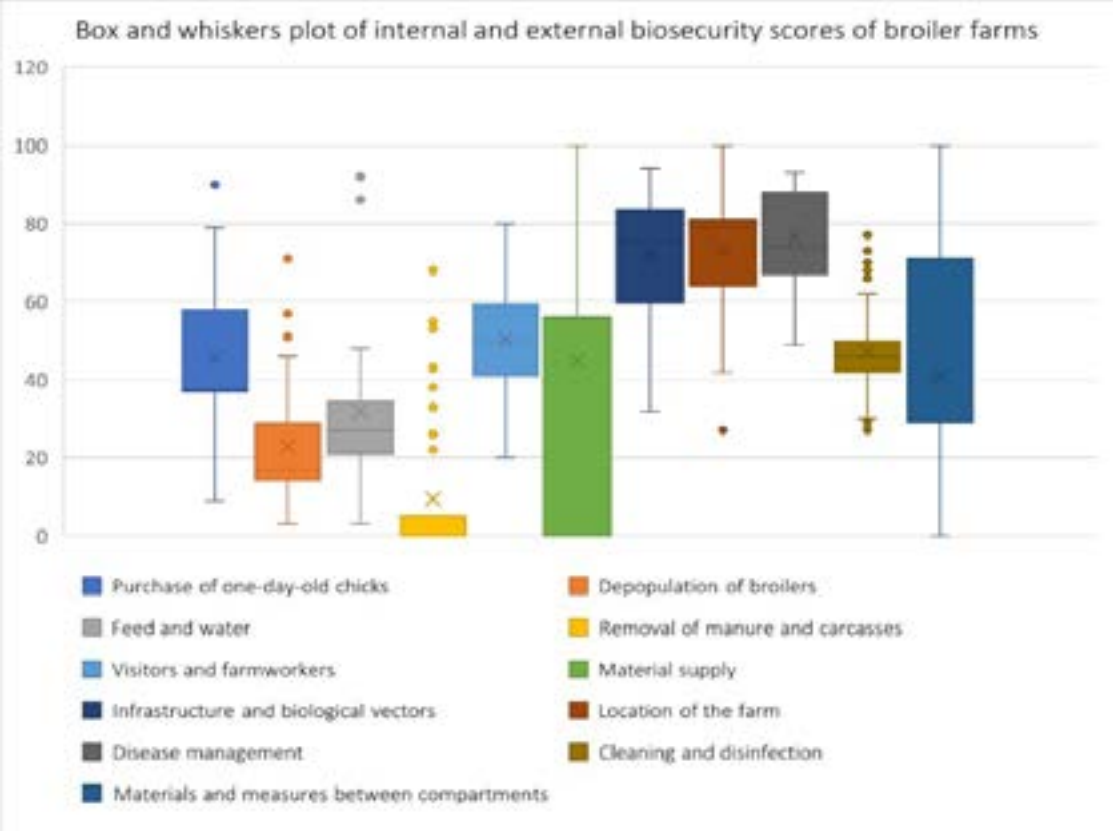
### Conclusions
These findings highlight the need for targeted interventions to align Pakistan's broiler biosecurity with global standards, enhancing productivity, disease control, and antimicrobial stewardship.

### Financial support and Acknowledgements
The data collection for this research was funded by the Research Foundation – Flanders (Fonds Wetenschappelijk Onderzoek), grant number: V411023N.

### Keywords
Biocheck.ugent • biosecurity • broilers • disease prevention • Pakistan • poultry

Continue –>

## **POSTER** COMMUNICATIONS




Comparison of biosecurity scores from Pakistan with other South(east) Asian countries including Bangladesh (Ibrahim et al., 2023), Philippines (Tanquilut et al., 2020), and Vietnam (Cuc et al., 2020), as well as global scores (Biocheck.ugent, 2025).

| Biosecurity categories | Pakistan (n = 100) (min-max) | Bangladesh (n = 94) | Philippines (n = 397) | Vietnam (n = 35) | Global (n = 8019) |
|---|---|---|---|---|---|
| ***External biosecurity*** | | | | | |
| A. Purchase of one-day-old chicks | 46% (9-90) | 27% | 78% | 84% | 68% |
| B. Depopulation of broilers | 23% (3-72) | 27% | 56% | 75% | 66% |
| C. Feed and water | 32% (3-92) | 27% | 66% | 30% | 63% |
| D. Removal of manure and carcasses | 9% (0-68) | 18% | 59% | 19% | 69% |
| E. Visitors and farmworkers | 50% (20-80) | 48% | 69% | 58% | 77% |
| F. Material supply | 45% (0-100) | 56% | 89% | 88% | 70% |
| G. Infrastructure and biological vectors | 72% (32-94) | 60% | 72% | 61% | 83% |
| H. Location of the farm | 73% (27-100) | 43% | 65% | 57% | 68% |
| ***Subtotal external biosecurity*** | ***44% (27-76)*** | ***39%*** | ***69%*** | ***60%*** | ***71%*** |
| ***Internal biosecurity*** | | | | | |
| I. Disease management | 76% (49-93) | 72% | 68% | 83% | 80% |
| J. Cleaning and disinfection | 47% (27-77) | 60% | 74% | 51% | 72% |
| K. Materials and measures between compartments | 41% (0-100) | 49% | 43% | 95% | 75% |
| ***Subtotal internal biosecurity*** | ***55% (34-83)*** | ***61%*** | ***77%*** | ***65%*** | ***75%*** |
| ***Overall biosecurity*** | ***49% (30-75)*** | ***46%*** | ***71%*** | ***62%*** | ***73%*** |

## ID 10
# HOW CAN WE ASSESS BIOSECURITY MEASURES SPECIFIC TO FREE-RANGE POULTRY? INSIGHTS FROM A SCOPING REVIEW

**Mattias Delpont**
*IHAP, Université de Toulouse, INRAE, ENVT, Toulouse, France*

### Introduction
In poultry farms, the assessment of biosecurity is usually based on checklists calibrated for production systems which do not grant access to an outdoor range. However, using an outdoor range may increase the risk of contamination by certain pathogens (e.g., telluric pathogens or those transmitted by wild birds). Therefore, in free-range systems, biosecurity assessment should specifically cover sets of practices related to the outdoor range.

### Objectives
In this scoping review, we aimed at (1) reporting and categorizing which specific biosecurity practices could be assessed in free-range poultry farms in high-income countries based on published protocols, and (2) describe the context in which these studies were carried out.

### Material and Methods
A systematic search was conducted on four databases and reports were screened according to PRISMA-ScR guidelines. After screening 481 studies, 15 studies were retained for the extraction of contextual data and the list of biosecurity measures specific to free-range poultry systems.

### Results
Studies relied on the assessment of a very heterogeneous number of biosecurity measures and a total of 52 unique biosecurity measures were identified and subsequently organized in 8 categories and 23 subcategories. Most measures were related to the presence of other species on the outdoor range – mainly wild birds (involving attraction, interaction and direct observation), followed by effective range use by poultry. However, some aspects of biosecurity were seldom or superficially addressed, like the access to the range by workers and equipment, the range properties or wild birds scaring.

### Conclusions
The proposed list and classification of biosecurity measures should provide additional insights on how assessment of biosecurity could be adapted and performed in free-range poultry production systems.

### Financial support and Acknowledgements
This work has received fundings from The European Partnership on Animal Health and Welfare (The European Partnership on Animal Health and Welfare is co-funded by the European Union's Horizon Europe Project 101136346 EUPAHW).

### Keywords
Outdoor • Prevention • Assessment • Checklist • Pasture

## ID 11
# A 360° VIRTUAL POULTRY FARM TOUR TO TRAIN ON BIOSECURITY

**Pauline Petit**
*IHAP, Université de Toulouse, INRAE, ENVT, Toulouse, France*

### Introduction
Breaches in on-farm biosecurity may stem from a lack of understanding of the core concepts of biosecurity, such as the separation of zones and the movements of people, animals, products and equipment. Training students on biosecurity requires to make them understand these concepts and most importantly to have them picture how these can be applied to "real-life" poultry farm management routines and farm site layouts.

### Objectives
To that purpose, we developed a virtual poultry farm tour (from sequences shot with a 360° camera) focusing on biosecurity management and tested it on 160 French veterinary students (using virtual reality goggles).

### Material and Methods
The training consisted in a 30-minute virtual tour completed with a 60-minute group discussion to comment and further develop the biosecurity aspects included in the activity. The virtual tour consisted in a series of short 360° videos in which the farm manager explains the basics of farm management, in relation with biosecurity measures, close to each concerned part of the farm site (farm gates, parking, shed whereabouts, bedding storage, anteroom, carcass storage, poultry shed and outdoor run). Some multiple-choice questions or other short interactive activities were inserted at specific stages to stimulate the participants and test their knowledge. In order to ascertain the relevancy of the training, all participants filled an anonymous standardized questionnaire.

### Results
The students felt that the training was relevant, stimulating, and playful (more than "classical" classroom exercises). The possibility to walk in the farm using virtual reality goggles was, in their view, a great asset.

### Conclusions
While this training may not be suited for some farmers or farm workers (they would not necessarily require to link a farm "spatial" layout and basic biosecurity practices), this training could be used in different fields of agricultural education, prior to visiting poultry farms.

### Keywords
virtual reality • 3D • education • farm visit

## ID 12

# BIOSECURITY IN BUFFALO FARM AND DYNAMIC OF CORRELATION WITH ANIMAL WELFARE AND ANTIMICROBIAL USE EVALUATED BY CLASSYFARM SYSTEM

**Domenico Vecchio**[1]; Federico Scali[2]; Antonio Maisano[2]; Francesca Fusi[2]; Valentina Lorenzi[2]; Chiara Denise Ambra[1]; Giovanni Loris Alborali[2]; Sara Gabriele[2]; Mario Orrico[3]; Esterina De Carlo[1]; Luigi Bertocchi[2]

*1. Istituto Zooprofilattico Sperimentale del Mezzogiorno, Portici, Italy; 2. Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, Brescia, Italy; 3. Istituto Zooprofilattico Sperimentale Piemonte, Liguria e Valle d'Aosta, Genova, Italy*

## Introduction

Biosecurity in ruminants is often an overlooked area, but it is a key aspect in a One Health approach. Future scenario models aimed at reducing multi-drug resistant bacteria pose a challenge for AMU control systems. Animal welfare (AW) and biosecurity are also essential tools to achieve this goal.

## Objectives

The aim is to describe the correlation between Biosecurity, AW and AMU.

## Material and Methods

In ClassyFarm, AMU is estimated using the Defined Daily Dose Animal for Italy (DDDAit). The AW assessment for water buffalo includes 62 non-animal-based measures (N-ABMs) and 17 animal-based measures (ABMs). The N-ABMs were divided into 'management' (32 items) and 'housing' (30 items). Biosecurity is assessed with 15 items. AW and Biosecurity scores are expressed as percentages.DDDAit, AW and Biosecurity were assessed on 382 buffalo farms.

## Results

The overall mean DDDAit was 0.40±0.04, with 43% of the farms scoring DDDAit=0, while the mean of the only farms with DDDAit≠0 was 0.7±0.07. The AW score was 76.9±9.8% and the Biosecurity score was 68.9±15.3%. Statistical analysis was performed using Spearman's rank correlation. Biosecurity and AW were positively correlated ($\rho$=0.42; $p<0.001$). A positive correlation was also observed between Biosecurity and both Management ($\rho$=0.61; $p<0.001$) and Housing scores ($\rho$=0.36; $p<0.001$).

## Conclusions

No significant correlation was found between AMU, Biosecurity and AW, probably due to the low levels of AMU found. Conversely to the linear narrative often suggested between AMU, biosecurity and AW, the dynamic system we described is far more complex and articulated. Knowing the level of biosecurity and AW, their relationship and critical points on livestock farms is a tool for planning strategic priorities in human resources and investments.

However, while these tools are necessary, they are insufficient to significantly reduce AMU. We believe it is essential to integrate mitigation measures with decision-making processes for appropriate diagnostic and treatment protocols involving breeders, veterinarians and farm workers.

## Keywords

Biosecurity • Animal Welfare • Antimicrobial Use • Buffalo • ClassyFarm System • One Health

## ID 13
# STAKEHOLDERS' PERCEPTIONS TO BIOSECURITY AND ONE HEALTH CONCEPTS

**Mehmet Murat Dogusan**
*Burdur Mehmet Akif Ersoy Uniersity*

### Introduction
The One Health approach recognizes the interconnectedness of human, animal, and environmental health and Biosecurity is crucial for preventing zoonotic disease transmission. Comparative knowledge about livestock sector stakeholders' perception about these issues can be an asset for future interventions.

### Objectives
The aim of this study is to investigate the perceptions of livestock sector stakeholders' approach to Biosecurity and One Health concepts in Turkey while going around stakeholders' lack of terminological knowledge about Biosecurity and One Health.

### Material and Methods
A cross-sectional survey was conducted using an online questionnaire, collecting data on demographics, knowledge, and attitudes related to Biosecurity and One Health concepts. Questions were chosen specifically to avoid using terms of Biosecurity and One Health. The aim of this approach is to minimize lack of terminological knowledge's effects on the results. Applicants are grouped by their stakeholder status and specific factors depending on their statuses.

### Results
Preliminary results indicate a high level of awareness while there is still some variation between their approach to different topics. For example, agreement for "animal health workers are at risk of contracting zoonotic diseases" was higher than "the relationship between climate change and health." while, importance given to "monitoring zoonotic diseases for human health" was higher than "combat climate change to prevent emerging diseases."

### Conclusions
While awareness about the dangers of direct contact for zoonotic diseases are higher than the consumption of animal products. On the other hand, awareness about human-animal health components are high but awareness of environmental health, particularly the effects of climate change is relatively low.Currently representation of different stakeholders vary and it is aimed to be sufficiently corrected for the purpose of evaluating each group and the effects of different factors in each group.

### Keywords
Biosecurity • One Health • Stakeholder perception

## ID 14
# ASSESSMENT OF BASIC BIOSECURITY MEASURES RELATED TO THE OUTBREAK OF CANINE DISTEMPER VIRUS IN MINK FARMS IN GREECE

**Anna Maria Iatrou**
*School of Agricultural Sciences, Department of Agriculture, University of Western Macedonia, Florina, Greece*

### Introduction
In autumn 2024, a Canine Distemper Virus (CDV) outbreak hit mink farms in Western Macedonia, Greece, causing thousands of animal losses and severe economic impacts. CDV, a virus primarily affecting Carnivora species, spreads through direct contact. This outbreak represents the most extensive occurrence of CDV in Greece to date. Although annual vaccination with a modified live vaccine is a common preventive practice, the outbreak highlighted potential biosecurity gaps that warranted investigation.

### Objectives
This study evaluates the fundamental biosecurity measures in place to prevent CDV introduction.

### Material and Methods
A survey completed by 12 farmers was developed. The questionnaire addressed key factors, including fencing, disinfection systems, protective gear, vaccination practices, wildlife access, and vehicle entry.

### Results
Results revealed that 92% of farms had an external fencing, 58% of them an extra–internal fencing, and 100% single controlled entrance. None of the farms had foot or wheel baths for disinfection. Across all farms, vehicle entry into the farm were not permitted, in 25% of them, vehicle access was stricktly limited to common areas (between external-internal fencing). In 75% of farms feed truck was delivering the feed without entering the farm. Wildlife and stray animal presence was a notable risk, with 42% of farms reporting wild animal entry and 100% stray dogs present around all farms. Vaccination practices were moderate, with 42% vaccinating dogs, and 75% vaccinating kits in summer. Farm-specific protective gear use was variable, with 67% using dedicated boots and clothes.

### Conclusions
The results indicate that the fundamental biosecurity measures related to the transmission of CDV, including preventive vaccination and robust farm fencing, are satisfactory. However, greater attention should be given to wild animals and stray dogs surrounding the farms, as they serve as a natural reservoir of the virus and pose a direct threat to mink farms.

### Keywords
mink • canine distemper virus • biosecurity measures

## ID 15
# BIOSECURITY LEGISLATION FOR POULTRY FARMS IN ITALY: IMPROVING IMPLEMENTATION OVER THE YEARS

**Franscesco Galuppo**[1]; Andrea Laconi[2]; Alessandra Piccirillo[2]
*1. Unità Locale Socio-Sanitaria (ULSS) 6 Euganea, Padua, Italy; 2. Department of Comparative Medicine and Food Science, University of Padua - Legnaro, Padova, Italy*

### Introduction
Since the 1999-2000 HPAI epidemic, the Italian Competent Veterinary Authorities and legislators have prioritized the prevention of new outbreaks through biosecurity measures in poultry farms. In response to this crisis, the first national biosecurity legislation was introduced with the Ministerial Order (MO) 26/08/2005. Over the years, the MO underwent continuous revisions, to adapt to evolving epidemiological challenges, culminating in the publication of the Ministerial Decree (MD) of 30/05/2023, which introduced new biosecurity regulations under the framework of EU Regulation 429/2016.

### Objectives
The aim of this study is to present the evolution of biosecurity regulations in the Italian poultry sector, focusing on the implementation of the MD of 30/05/2023.

### Material and Methods
The study is based on a review of regulatory frameworks and biosecurity protocols implemented in Italian poultry farms.

### Results
This decree incorporates updated structural and managerial biosecurity requirements to prevent disease spread, as well as risk-based rules tailored to different areas of the Italian territory, establishments (e.g., poultry markets, hatcheries, and egg processing plants), and poultry species. The decree introduces stricter hygiene protocols, including fixed automated disinfection stations, designated farm hygiene locks with separate clean and dirty areas, and enhanced dust control systems, for large farms (>250 birds). It also establishes minimum distances between poultry farms, pig farms, and biogas plants for new establishments to reduce the risk of disease transmission. Furthermore, it mandates annual official inspections covering at least 10% of poultry farms (100% of weaners). Additional management measures include visitor bans, mandatory handwashing and dedicated clothing, restrictions on poultry movement between different housing units (only for turkeys), and biosecurity compliance training for personnel mandated by law.

### Conclusions
The MD of 30/05/2023 represents a major advancement in poultry farm biosecurity in Italy. By strengthening structural and managerial biosecurity requirements, the decree enhances disease prevention strategies beyond AI, ensuring better protection for the poultry sector.

### Keywords
Biosecurity • Legislation • Poultry • Implementation

## ID 16
# ENHANCING BIOSECURITY AWARENESS IN THE U.S. EXHIBITION SWINE INDUSTRY

**Andreia Arruda;** Marissa Hall; Jacqueline Nolting; Magnus Campler
*The Ohio State University*

### Introduction
The exhibition swine industry is a small part of the U.S. swine population, but crucial in disease transmission due to the frequent movement of pigs and their interactions with other animals and humans. Despite extensive biosecurity measures in commercial swine production, the exhibition swine sector remains underprepared for potential foreign animal disease (FAD) outbreaks, as educational efforts have not adequately targeted them, leading to significant gaps in knowledge and readiness.

### Objectives
This study aimed to adapt commercial swine biosecurity plan templates to the show pig industry, conduct hands-on sessions to help exhibitors create biosecurity plans, and analyze data to determine if demographic factors influence biosecurity levels.

### Material and Methods
Adapted educational materials based on the Secure Pork Supply framework were developed to assist exhibitors in biosecurity planning during shows. Recruitment was facilitated through booths where investigators helped participants complete maps and written plans. Biosecurity scores (0-10) were calculated based on factors such as having a plan on-site, a line of separation, carcass disposal methods, and other biosecurity measures. A mixed Poisson model was constructed using biosecurity scores as the outcome. Predictors included type of housing, number of pigs, presence of other animals in the premise, and region.

### Results
In total, 155 biosecurity plans were created across 11 pig shows, representing 21 US states. Most participants were from the Midwest (58.2%). 92.0% of participants owned 50 pigs or less, and 62.0% reported having indoor-only access for their pigs. Most participants (59.6%) had other animal species on their property. The median biosecurity score was 4.0 (SD: 2.1). None of the predictor variables considered for analysis were statistically significant, indicating that biosecurity education might be needed regardless of exhibitor's demographics within this specific segment of the industry.

### Conclusions
This study highlights the critical need for improved biosecurity education and planning within the exhibition swine industry to prevent disease transmission.

### Financial support and Acknowledgements
This project was suuported by the 2021 National Animal Disease Preparedness and Response Program (NADPRP), USDA; Award AWD-112334.

## ID 17

# PROCEED: PUERTO RICO CONTRA ENFERMEDADES EMERGENTES DE CERDOS (PROTECTING PUERTO RICO AGAINST SWINE EMERGING DISEASES)

**Andreia Arruda;** Kara Flaherty; Alex Fonseca-Martinez
*The Ohio State University*

### Introduction

In 2021, following the detection of African swine fever in the Dominican Republic and Haiti, the U.S. Department of Agriculture\'s Animal and Plant Health Inspection Service issued a Federal Order to suspend the interstate movement of swine and related products from Puerto Rico and the U.S. Virgin Islands to the mainland. The success of this protection strategy is contingent upon rigorous biosecurity practices, especially in Puerto Rico, where small-scale swine farming is prevalent and specialized veterinary resources are scarce. The absence of localized, culturally appropriate biosecurity resources makes this a difficult task.

### Objectives

This project aimed to create culturally relevant materials for educating Puerto Rican swine stakeholders on biosecurity practices and to describe current biosecurity practices amongst these small-scale producers.

### Material and Methods

Six 3-hour, in-person workshops were conducted in collaboration with USDA staff at various locations in Puerto Rico. These sessions combined presentations and hands-on development of standardized biosecurity plans, including premise characterization, detailed biosecurity protocols, and a premise map highlighting 13 key components. Data was descriptively analyzed.

### Results

Ninety-two individuals attended these workshops. The average farm had 59 pigs, with 58% practicing waste feeding and 30% raising other animal species. Analysis of written biosecurity plans revealed 80% of site workers lacked biosecurity training, and 87.5% of participants did not have a prior biosecurity plan. Many sites were missing infrastructure, such as cleaning stations, protected entry points, logbooks, and emergency euthanasia equipment; and most participants had difficulties in marking carcass removal paths. The workshops were well-received, with participants reporting gain of valuable insights.

### Conclusions

This study underscores the urgent need for ongoing education and support to close biosecurity gaps among Puerto Rican swine producers. Continued efforts are crucial to bolster the island\'s defenses against ASF and ensure the protection zone's success in preventing the spread of this diseases.

### Financial support and Acknowledgements

This project was suuported by the 2022 National Animal Disease Preparedness and Response Program (NADPRP), USDA; Award AWD-114716.

## ID 18
# CIRCULATION OF PATHOGENS IN BACKYARD POULTRY AND THEIR ASSOCIATION WITH BIOSECURITY

**Jelena Maletic**[1]; Ljiljana Spalević[1]; Nemanja Jezdimirović[1]; Bojan Milovanović[1]; Marko Pajić[2]; Biljana Đurđević[2]; Branislav Kureljušić[1]
*1. Scientific Institute of Veterinary Medicine of Serbia; 2. Scientific Institute of Veterinary Medicine "Novi Sad"*

### Introduction
Backyard poultry rearing is common in rural Serbia for self-consumption and income supplementation, with outdoor access exposing birds to potential diseases from wild birds and other animals.

### Objectives
The objectives of the study were to assess the seroprevalence of various pathogens in backyard poultry, evaluate the biosecurity measures on these farms, and highlight the potential risks they pose to nearby commercial poultry systems.

### Material and Methods
It were sampled 85 non-vaccinated birds from 20 randomly selected backyard holdings and tested them for antibodies to Infectious Bronchitis Virus (IBV), Infectious Bursal Disease (IBD), Avian Metapneumovirus (APV), Mycoplasma synoviae, Mycoplasma gallisepticum, and Reovirus (REO) using enzyme-linked immunosorbent assay (ELISA). In addition, an evaluation of the current biosecurity measures on these farms was conducted using the Biocheck.UGent online survey (https://biocheckgent.com/en/questionnaires/backyard-poultry).

### Results
Based on the findings, the overall seroprevalence in the sampled birds for IBV, IBD, APV, MS, MG, and REO were 77.64% (66/85), 56.47% (48/85), 89.41% (76/85), 67.05% (57/85), 87.05% (74/85), and 87.05% (74/85), respectively (Figure 1). The concerning fact is that only one of the flocks was negative for IBV, and only one was negative for IBD.The scores for the subcategories varied across the farms, with the largest discrepancies observed in the areas of purchasing new birds (27.92%) and manure and carcass disposal (45.90%). Additionally, low scores were recorded for disease management (21.90%) and cleaning and disinfection (25.95%) (Figure 2).

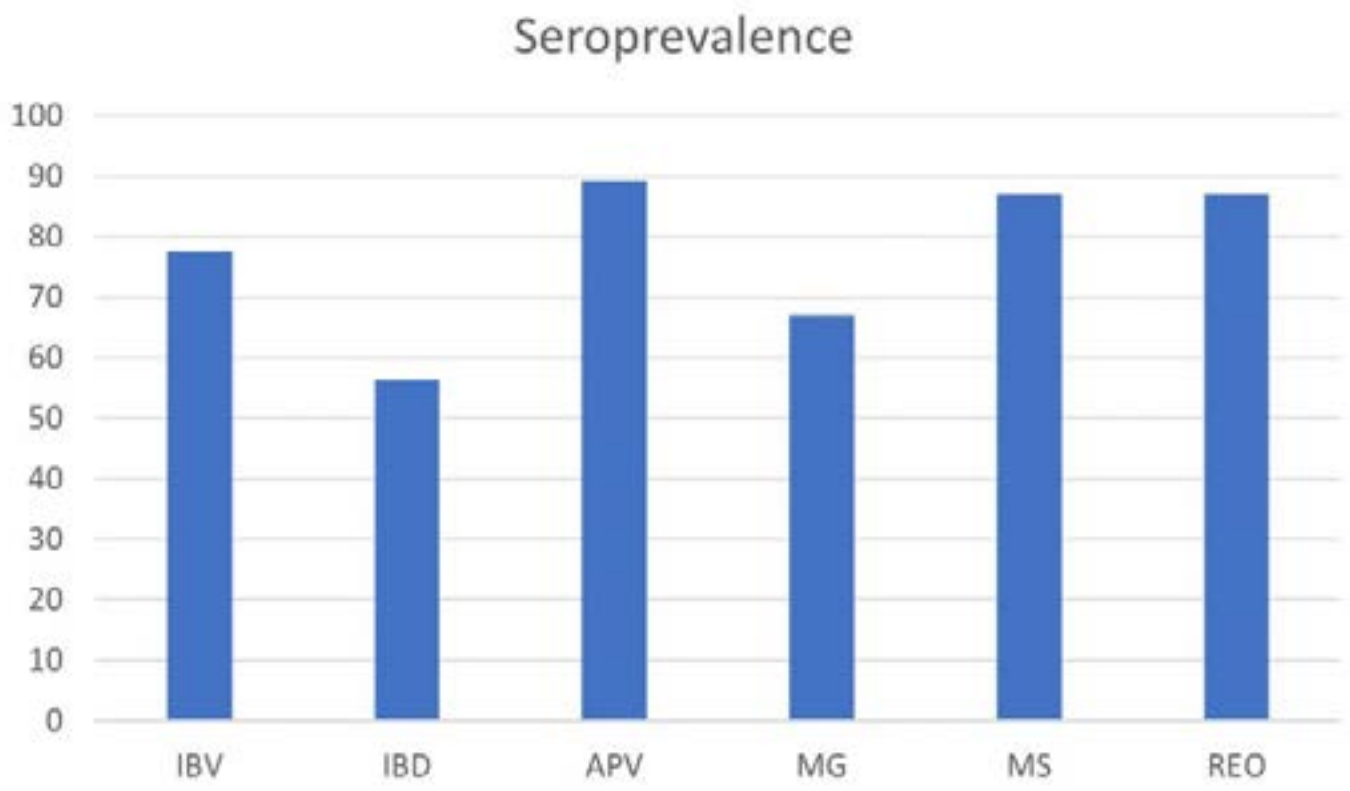
### Conclusions
It is important to consider the seroprevalence of IBV, IBD, APV, MG, MS, and REO in backyard poultry flocks, as backyard chickens may act as reservoirs for pathogens and pose a risk to nearby intensive poultry farms. Given the lack of information about these risks, it is essential to educate farmers and highlight flexible, adaptable measures they can implement on their farms to prevent the spread of diseases and mitigate economic losses.

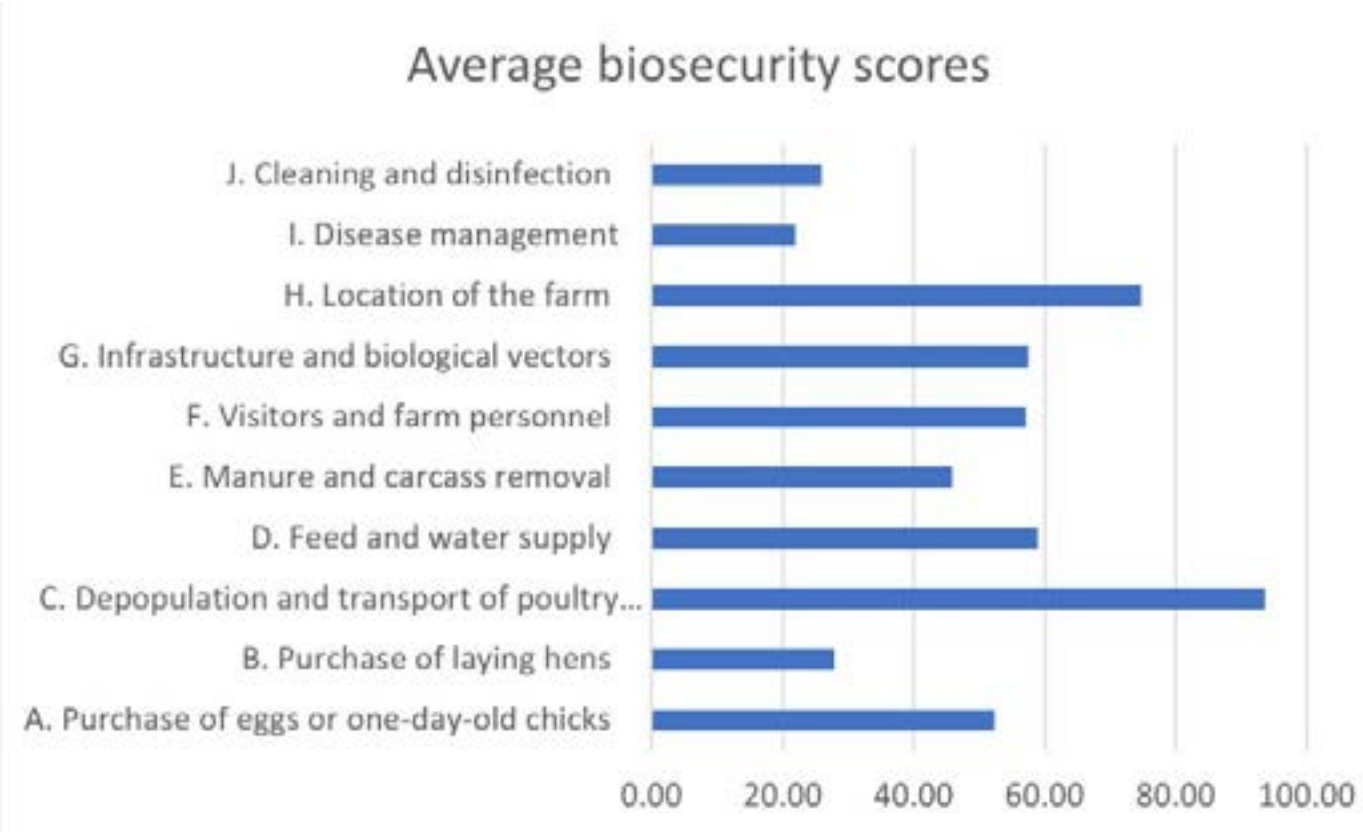
### Financial support and Acknowledgements
This research was funded by the Ministry of Science, Technological Development, and Innovation under contract number 451-03-136/2025-03/200030.

### Keywords
backyard poultry • major pathogens • biosecurity

Continue –>

## POSTER COMMUNICATIONS



## ID 19
# AVAILABILITY OF BIOSECURITY SUPPORTING MEASURES TO ENHANCE IMPLEMENTATION ON LIVESTOCK FARMS

**Evelien Biebaut;** Jeroen Dewulf
*Department of Internal Medicine, Reproduction and Population Medicine, Faculty of Veterinary Medicine, Ghent University*

## Introduction
Implementing biosecurity measures on livestock farms is the responsibility of the farmer. Although good on-farm biosecurity has proven its benefit, farmers have several reasons for not implementing biosecurity measures. To motivate and stimulate farmers to increase the level of biosecurity on their farm, biosecurity supporting measures (BSM) exist.

## Objectives
An overview of existing biosecurity supporting measures was created withing the BIOSECURE project.

## Material and Methods
A questionnaire was distributed to the BIOSECURE consortium partners gathering information on existing BSM, supplemented by online searches. Legislative BSM and one-time initiatives no longer available online were excluded.

## Results
So far, 51 BSM have been identified across various categories. Some fit multiple categories, target multiple species, and are available in different languages. The categories include ‘online courses/webinars’ (n=15), ‘books/manuals/guidelines’ (n=15), ‘biosecurity checks/audits’ (n=8), ‘training’ (n=6), ‘coaching’ (n=5), ‘financial support’ (n=3), and ‘other’ (n=4). Most BSM focus on pigs (n=30), followed by cattle (n=24), poultry (n=22), and small ruminants (n=11). Twelve BSM address biosecurity measures focussing on specific diseases like ASF or HPAI. Availability in different languages depends on the source, whether a government institution, university, private company, or European project. In total, 14 languages were identified, with English being the most common. A complete overview of the 51 BSM, along with additional details, is available on the BIOSECURE project website (https://biosecure.eu/biosecurity-dashboards/biosecurity-supporting-measures/).

## Conclusions
Biosecurity information is available to farmers in various formats. Some measures, like financial support or mandatory on-farm audits, actively encourage implementation. Others, such as books, online courses, or webinars, rely on farmers’ interest and initiative. In conclusion, BSM are available but their adoption ultimately depends on the farmer.

## Financial support and Acknowledgements
This work was funded by the European Union under the Horizon Europe grant 101083923 (BIOSECURE). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

## Keywords
Supporting measure • Livestock species • Implementation

## ID 20

# STATE REGULATION OF BIOLOGICAL SAFETY AND BIOSECURITY IN UKRAINE IN THE CONTEXT OF IMPLEMENTATION OF THE JOINT WOAH -WHO-FAO "ONE HEALTH" APPROACH

**Anton Gerilovych**
*One Health Scientific and Research Institute, PSI*

## Introduction

The globalization of the modern world, the increase in the volume of international trade operations, transportation of people, animals, and agricultural products, the risks of the emergence and spread of infectious diseases, as well as the spread of pathogens that cause them, are significantly exacerbated. This explains the fact that biological security is a key component of national security. International organizations deal with biosecurity issues in the world (WHO, WOAH and FAO) in the context of implementing the One Health approach, which considers the processes of homeostasis in the living world as a whole.

## Objectives

The aim of this poster presentation is to provide information about One Health approached Biosafety and Biosecurity policy implemetation in Ukraine

## Material and Methods

The analysis was performed based on biosafety and security legal framework analysis in Ukraine and international initiatives outcomes review

## Results

Ukraine participates in multiple international initiatives and implements different international projects and programs regarding biosafety and security.

The main baselines for biosafety and security regulation include:

- Harmonization of Ukrainian legislation governing biological safety and biological security in accordance with international requirements;
- Improvement physical protection of places where hazardous and valuable biological materials are stored and handled, including such measures as bars on windows, reinforced doors, electronic access control, security, alarms and volume sensors, video surveillance, etc;
- Improvement the material support (equipment and diagnostics) of laboratories responsible for detecting dangerous infectious diseases;
- Introduction of a unified system of electronic accounting of biological materials and control over the movement of hazardous biological materials;
- Conducting training for specialists of laboratories working with hazardous biological materials on new diagnostic approaches, as well as on biosafety and biosecurity issues.

## Conclusions

Multiple biosafety and biosecurity related activities were implemented under support and supervision of Biological Threats Reduction Program (U.S.), German Biosecurity Program (Germany), Bioengagement Program (U.S.), Global Partnership (G7), and other international initiatives.

## Keywords

Biosafety • biosecurity • policy

## ID 22
# CONSTRUCTION OF LSDV ORF 102 GENE DELETED LUMPY SKIN DISEASE VIRUS

**Berihun Afera Tadele**
*Associate Professor*

### Introduction
Lumpy skin disease (LSD) is a sub-acute to acute disease of cattle characterized by extensive cutaneous lesions on the skin of the animals.

### Objectives
Hence, the present study is conducted to delete LSDV ORF 102 using the left and right homologous arms and EGFP as marker.

### Material and Methods
Plasmid construction was done using homologous arms recombination and EGFP as marker and this was verified using PCR and sequencing. In addition western blotting technique was used to verify the plasmid. Moreover expression of IFN-β was done using RT-qPCR and luciferase assay test. Finally we used the co-Immunoprecipitation techniques to observe the protein interaction in the current experiment.

### Results
Plasmid pUC-57-Left-EGFP-Right was constructed and used to transfect vero cells and later infect bovine testis (BT) and rLSDVΔ102 recombinant virus was constructed. Green fluorescent monoclonal cells were picked and rLSDVΔ102 was purified and it was stable. The one step growth curve indicated that the green fluorescent protein was expressed. The current finding also indicated slightly low virus titer in recombinant virus compared to the parental virus. At the same time, expression of LSDV ORF 102 showed promotion of LSDV replication by inhibiting the production of IFN-β and ISGs in MDBK cells. During our current assessment we also observed interaction of LSDV ORF 102 with Bos-TBK-1-HA which is responsible for reduction of the production of IFN-β but no interaction with hs-cGAS- HA, hs-IRF-3-HA and hs-STING-GFP. The current finding highlighted that recombinant virus rLSDVΔ102 played a negative role in regulating IFN-β expression through cGAS-STING signaling pathway.

### Conclusions
Generally, the current finding indicated that the recombinant virus with deleted gene 102 was identified and the mechanism by which LSDV ORF 102 gene antagonizing IFN-I-mediated antiviral was assessed, which will help to give insight to further research in the detail investigation of the virus that is relevant for the future vaccine production.

### Financial support and Acknowledgements
Lanzhou Veterinary Research Institute

### Keywords
LSDV ORF 102 • Gene deletion • IFN Beta • TBK1

## ID 23

# BIOSECURITY ASSESSMENT IN BACKYARD PIG PRODUCTION IN SERBIA - FIRST RESULTS OF PILOT TESTING BY USING THE BIOCHECK.UGENT TOOL

**Branislav Kureljušić**[1]; Evelien Biebaut[2]; Nele Caekebeke[2]; Bojan Milovanović[1]; Jelena Maletić[1]; Jasna Prodanov-Radulović[3]; Jeroen Dewulf[2]

*1. Institute of Veterinary Medicine of Serbia, Belgrade, Serbia; 2. Veterinary Epidemiology Unit, Faculty of Veterinary Medicine, Ghent University, Belgium; 3. Scientific Veterinary Institute "Novi Sad"*

## Introduction

In Serbia, over 50% of pigs are raised on backyard farms with expected low biosecurity.

## Objectives

The aim of this study was to assess biosecurity measures on 31 backyard farms in Serbia.

## Material and Methods

To asses this the Biocheck.Ugent biosecurity scoring tool for backyard/small-scale pig farms was applied.

## Results

An average of 40.8 pigs per farm (sows, piglets, fatteners) was determined. Pig production was primarily for family consumption (74.2%), while 25.8% of farms had commercial activities. The average total biosecurity score was 56.9% (±11.3) with 54.9% (±10.4) for external and 61.9% (±17.6) for internal biosecurity. Some important findings where the fact that 48.4% of farms had access to outdoor areas of which 93.5% were fenced. Other animals were present in 77.4% of farms. Only one farm had a quarantine area. Mating occurred in 54.8% of farms of which 52.9% by natural mating, 35.3% by artificial insemination, and 11.8% using both. Vehicle disinfection was not practiced in 45.2% of farms. Home slaughtering was common (87.1%), and only three farms sold pigs at local markets. Carcasses were mostly buried or burned. Only one farm used service of rendering company. Commercial feed was used on 80.6% of farms, while in 38.7% swill feeding was practiced. Rodent control was in place in only 19.3% of the farms and contact with wild animals was possible in all farms. Only 12.9% of farmers received biosecurity training. Farm-specific clothing and boots were available in 77.4% of the farms, while hand washing was practiced only after handling pigs. Indoor areas had solid floors (87.1%), but only 51.6% were cleaned daily. Disinfection was “sometimes” performed in 51.6% of farms.

## Conclusions

The results demonstrate ample room for improvement in many aspects of biosecurity in these settings. The Biocheck.ugent scoring tool has demonstrated to be a valuable tool for evaluating biosecurity and identifying areas for improvement.

## Financial support and Acknowledgements

For the development of the ‘Pig backyard/small-scale’ Biocheck.Ugent survey, funding from the Internationalization of East Flemish knowledge institutions 2024-2025-2 was received.The study was partly funded by the Serbian Ministry of Science, Technological Development and Innovation (Contract No 451-03-136/2025-03/ 200030).

## Keywords

backyard pigs • biosecurity • assessment • Serbia

## ID 24
# DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF BIOSECURITY STANDARD OPERATING PROCEDURES IN A VETERINARY EDUCATION ESTABLISHMENT

**Saegerman Claude**
*University of Liège*

### Introduction
Over the last decades, biosecurity has received increasing attention in veterinary medicine and biosecurity was progressively integrated into regulation (Animals Health Law at EU level) and also as a standard in the European System of Evaluation of Veterinary Training (ESEVT).

### Objectives
To help vet students acquire new biosecurity skills, we developed biosecurity research and disseminated it through three interconnected instruments (biosecurity standard operating procedures, a biosecurity website and the organization of a Faculty of Veterinary Medicine annual biosecurity day).

### Material and Methods
A Faculty Biosecurity Unit was created. Its first task was to elaborate of biosecurity standard operating procedures (SOPs) [1]. The second task was the creation of a bilingual French and English Biosecurity website (for Faculty Veterinary Medicine students, staff and visitors) [2]. The third task was the organization of the FVM annual Biosecurity Day combining theoretical presentations and practical workshops to popularize and disseminate scientific knowledge operationally among FVM staff and students.

### Results
The SOPs (first instrument) are subdivided into sixteen chapters (Table 1). These SOPs are updated every 5 years, so a new update will be available in 2025. These SOPs are now widely used in European veterinary faculties and worldwide. The biosecurity website (second instrument) illustrates Biosecurity SOPs with extensive iconography. Annual statistics show 1,760 visits and 75,036 pages viewed. Visits are distributed worldwide and are permanent over time. The annual Biosecurity Day (third instrument) combining theoretical presentations and practical workshops to popularize and disseminate scientific knowledge operationally among FVM staff and students. The event has been organized since 2013 with no interruption. Around 100 people participate every year. The topics covered are variable and consider requests from participants.

### Conclusions
The use of the developed SOPs, the number of visits to the FVM Biosecurity website and the number of people trained are all factors that point to an improvement in veterinary biosecurity.

### Financial support and Acknowledgements
No funding.

### Keywords
biosecurity • SOP • Education • Veterinarian

Continue –>

**Table 1. Chapters of the Faculty of Veterinary Medicine standard operating procedures**

| | |
|---|---|
| 1. | General biosecurity |
| 2. | SOPs Biosecurity in equids |
| 3. | SOPs Biosecurity in ruminants |
| 4. | SOPs Biosecurity in pigs |
| 5. | SOPs Biosecurity in small animals |
| 6. | SOPs Biosecurity in birds, rabbits, rodents, poultry, zoological and exotic animals |
| 7. | SOPs Biosecurity in Animal Food Science - extramural practical works |
| 8. | SOPs Biosecurity in the Experimental Farm |
| 9. | SOPs Biosecurity in the Anatomy Department |
| 10. | SOPs Biosecurity in teaching laboratories and diagnostic procedures including Necropsy and Imaging |
| 11. | SOPs Biosecurity in Pest Control |
| 12. | SOPs Biosecurity in laundry of professional linen |
| 13. | SOPs Biosecurity relating to antimicrobial resistance |
| 14. | SOPs Quality assurance relating to biosecurity in the Faculty of Veterinary Medicine |
| 15. | SOPs Biosecurity crisis scenarios |
| 16. | Future tasks of the Faculty Biosecurity Unit |

## ID 25
# THE RELATIONSHIP BETWEEN BIOSECURITY PRACTICES AND ANTIMICROBIAL USE IN BROILER FARMS: INSIGHTS FROM PAKISTAN

**Qamer Mahmood;** Jeroen Dewulf; Ilias Chantziaras
*Ghent University*

### Introduction
Excessive antimicrobial use (AMU) in broiler production increases antimicrobial exposure, contributing to antimicrobial resistance.

### Objectives
This study aimed to compare AMU levels in Pakistani broiler farms with biosecurity practices, to determine whether better biosecurity is associated with lower antimicrobial use.

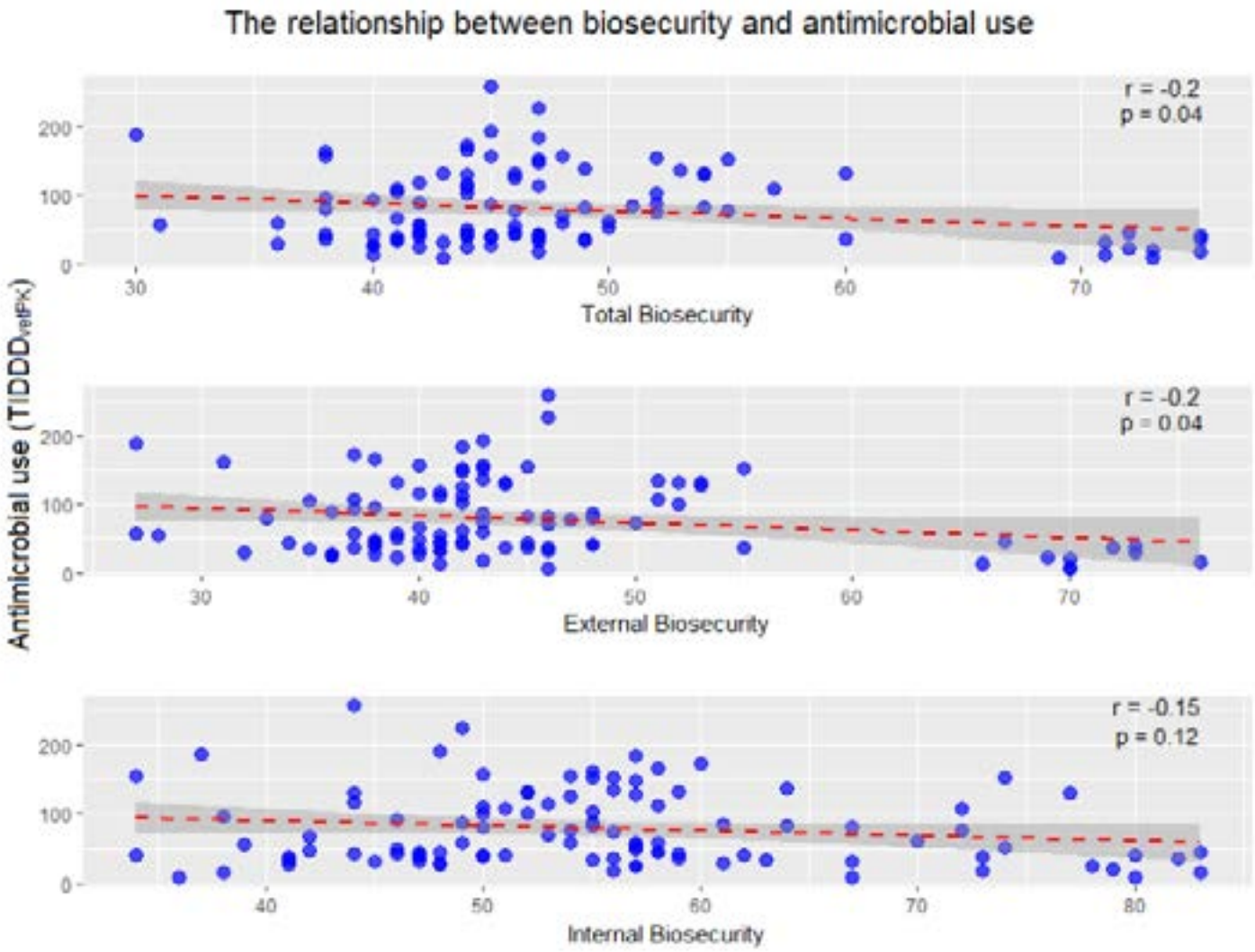
### Material and Methods
A cross-sectional survey of 100 conventional broiler farms was conducted to collect biosecurity data using the Biocheck. Ugent questionnaire and AMU data (both therapeutic and prophylactic) from farm records. Biosecurity was assessed using the Biocheck.Ugent scoring tool, while AMU was quantified using treatment incidence (TI) based on defined daily doses for veterinary antimicrobials in Pakistan (DDDvetPK).

### Results
A negative correlation was found between AMU and overall biosecurity ($r = -0.20$, $p = 0.04$), external biosecurity ($r = -0.20$, $p = 0.04$), and internal biosecurity ($r = -0.15$, $p = 0.12$), suggesting that better biosecurity reduces the need for antimicrobials. Among specific biosecurity measures, manure and carcass removal showed a significant association with AMU ($p = 0.02$). Other measures, including the purchase of one-day-old chicks ($p = 0.75$), depopulation of broilers ($p = 0.30$), feed and water management ($p = 0.39$), visitor and farmworker policies ($p = 0.27$), material supply ($p = 0.89$), infrastructure and biological vectors ($p = 0.83$), farm location ($p = 0.67$), disease management ($p = 0.16$), cleaning and disinfection ($p = 0.31$), and compartmentalization measures ($p = 0.24$), showed weaker associations.

### Conclusions
The observed inverse relationship between biosecurity practices and antimicrobial use suggest the potential of enhanced biosecurity as a practical intervention to reduce AMU in Pakistani broiler farms.

### Keywords
antimicrobial use • biosecurity • broiler farms • Pakistan

Continue –>


The relationship between biosecurity and antimicrobial use
r = -0.2
p = 0.04
Total Biosecurity
r = -0.2
p = 0.04
External Biosecurity
r = -0.15
p = 0.12
Internal Biosecurity
Antimicrobial use (TIDDDvetPK)

## ID 26
# NEW REAL TIME INNOVATIVE BIOSECURITY TOOL IN YOUR HANDS

**Saegerman Claude**[1]; Wielick Constance[1]; Harmegnies Maxime[2]; Humblet Marie-France[3]; Renault Véronique[4]; Leinartz Laurent[2]

*1. Research Unit of Epidemiology and Risk Analysis applied to veterinary science (UREAR-ULg), Faculty of Veterinary Medicine, University of Liege, 4000 Liege, Belgium; 2. ToolBox - CARE VetMeDiSim, Faculty of Veterinary Medicine, University of Liège, 4000 Liège, Belgium; 3. Unit Biosafety, Biosecurity and Environmental Licenses, Department for Occupational Protection and Hygiene, University of Liège, 4000 Liege, Belgium; 4. Vétérinaires Sans Frontières International, 1210 Brussels, Belgium*

## Introduction
Livestock biosecurity has gained increasing attention during the last decades. According to a recent survey, the most popular definition of biosecurity is related to the rules of 5 Bs [1]. Biosecurity gather all measures: (i) to limit the risk of introduction (bio-exclusion); (ii) to limit the spread of a pathogen within the same facility, e.g., by isolating excreting animals (bio-compartmentation); (iii) to limit the spread of a pathogen outside the facility (inter-herd transmission) (bio-containment); (iv) to prevent the risk of human contamination (bio-prevention); and (v) to prevent any environmental bio-contamination and persistence of the pathogen (bio-preservation) [1]. This definition fits well with the new definition of the One Health concept [2]. In addition, promoting compliance with biosecurity in livestock is a key issue [3].

## Objectives
The development of a real time innovative biosecurity tool directly in your hands based on the rules of the 5 Bs [1] and the SAF (suitability, acceptability and feasibility) model to select a strategy.

## Material and Methods
The rules of 5Bs and SAF model were used to construct the tool, which is based on multicriteria decision analysis and includes the efficacy of the BSM for a specific diease, the acceptability and the feasability of each biosecurity measure.

## Results
It is a farm-specific tool designed to assess biosecurity measures by allowing users to select their species, the disease of interest, the known associated risk factors and the appropriate biosecurity measures to mitigate the risk. The tool offers a real time assessment through a dashboard, visualization of improvements, and provides a final report in your hands (Figure 1). Each tool is first tested by students under field conditions (paraclinics) for refinement before being freely released (Figure 2).

## Conclusions
Farmers received their first real-time BSM TOOL in their hands. In addition, the tool was used by students, which become familiar with conducting audits.

## Financial support and Acknowledgements
The first BSMTOOLs were developed as part of the EFSA project entitled: “Developing an integrated approach to assess the emergence threat associated with influenza D viruses’ circulating in Europe” and as part of the EU-ICRAD project with co-funding of the Contractual research from the Health, Food Chain Security and Environment entitled: “European project entitled “Deciphering the role of influenza D virus in bovine and human respiratory diseases in Europe”.

## Keywords
animal • biosecurity • digital • tool • real time

Continue –>

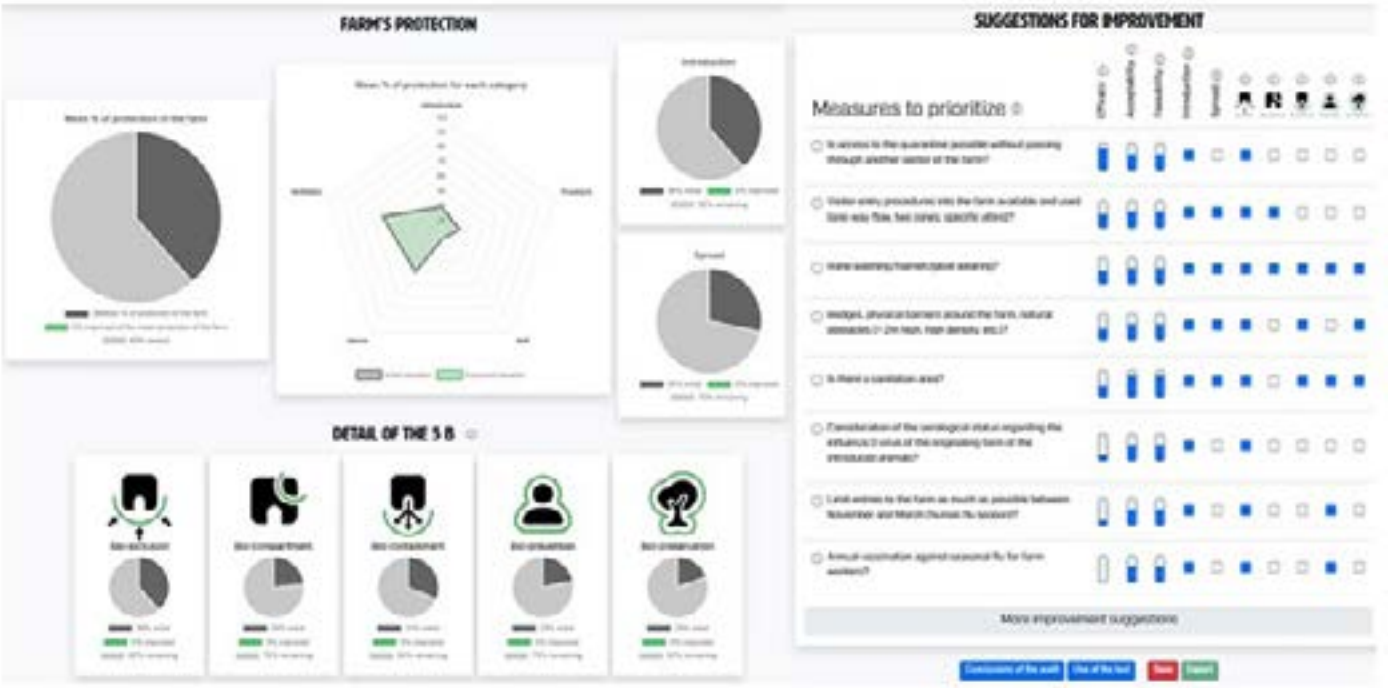



**Figure 1.** Dashboard related to the digital BSM Tool.

## ID 27
# SPANISH STRATEGIC BIOSECURITY PLAN IN PIG HOLDINGS

**Sergio Bonilla García;** Germán Cáceres Garrido; Luis José Romero González; Fátima Guerrero Carvajal
*Ministry of Agriculture, Fisheries and Food*

### Introduction
The pig sector is the most livestock important in Spain, representing a major income of the Spanish economy. Biosecurity remains an essential tool for preventing the entry and spread of pathogens and ensuring improved production, and for reducing antibiotic consumption, one of the current greatest challenges. In this context, Spain pioneered the development of a National Biosecurity Plan for pig farms in 2015, aligned with the national legal framework. It has been implemented in different phases and its main objective is to evaluate and improve the overall level of biosecurity on Spanish pig farms, both in intensive and extensive production.

### Objectives
Showing the work carried out by the MAPA, the AACC, and the Spanish pig sector through the aforementioned Plan, presenting it as a good practice and a potential example for other countries in developing biosecurity and official control programs.

### Material and Methods
Development and implementation in phases; all challenges detected, and the solutions and measures adopted, including the development of surveys and evaluator guides for the different production systems (intensive, extensive and backyards) and the development of the national database “Biosegpor”.

### Results
The basis for implementing the different phases of the plan will be presented, as well as the results obtained in each phase. Also, the contribution of this plan to raising awareness in biosecurity.

### Conclusions
With its implementation, it has been possible to improve the level of biosecurity on Spanish pig farms, which is key to preventing the entry and spread of diseases, particularly ASF and FMD. During these 10 years, difficulties have been encountered that required specific corrections, making it a plan adapted to the national legislation and the different production systems. The Plan has also facilitated extensive official controls, which has increased the sector’s awareness of biosecurity, being an essential pillar for pig production, making it a more competitive and resilient sector.

POSTER COMMUNICATIONS

## ID 28
# BIOSECURITY AGAINST SALMONELLA DUBLIN INTRODUCTION AND ESTABLISHMENT IN DAIRY CATTLE FARMS

**Lars Pedersen**[1]; Hans Houe[2]; Erik Rattenborg[3]; Liza Rosenbaum Nielsen[2]
*1. SEGES Innovation P/S, Animal Health and Welfare, Cattle Livestock, 8200 Aarhus; Denmark and Department of Veterinary and Animal Sciences, Section for Animal Health and Welfare, University of Copenhagen, 1870 Frederiksberg, Denmark; 2. Department of Veterinary and Animal Sciences, Section for Animal Health and Welfare, University of Copenhagen, 1870 Frederiksberg, Denmark; 3. SEGES Innovation P/S, Animal Health and Welfare, Cattle Livestock, 8200 Aarhus, Denmark*

## Introduction
Salmonella enterica subspecies enterica serotype Dublin (S. Dublin) is host-adapted to cattle. The infection has both enteropathogenic and systemic effects and is a serious zoonotic hazard. S. Dublin is excreted in faeces in varying quantities and survives in the environment. This enables between-farm transmission by fomites leading to many introduction pathways, with variabilities in day-to-day transmission probabilities. This makes it difficult to point out single environmental risk factors for S. Dublin. Furthermore, combinations of implemented on-farm control measures vary a lot, making it difficult to identify single biosecurity control measure effects.

## Objectives
The study objective was to gain new knowledge about the association between the probability of S. Dublin-introduction and -establishment in dairy cattle farms in S. Dublin-endemic areas of Denmark and the level of on-farm biosecurity assessed semi-quantitatively compiling several risk factors into an overall biosecurity score.

## Material and Methods
Dairy farms with no history of test-positive results for at least 2 years in the Danish S. Dublin surveillance programme were followed over a one-year period. Of 45 new test-positive case farms selected at the time of becoming test-positive, 37 were included in the study. Each case was matched by herd size with two test-negative farms from the target population, resulting in 74 control farms. A Biosecurity Assessment Framework with 12 expert-weighted farm sections was used to assess the overall biosecurity level for each farm, with biosecurity scores ranging from 0 (total lack of biosecurity measures) to 100 (excellent biosecurity), supported by on-farm observations and interviews.

## Results
Increased biosecurity level was associated with reduced odds of becoming a case (odds ratio=0.64 per 10-unit increment in biosecurity score) after adjusting for local infection pressure. None of the included farms scored high.

## Conclusions
In conclusion, preventing spread of S. Dublin requires initiatives to reduce local S. Dublin infection pressure and to improve the farm biosecurity levels.

## Keywords
biosecurity • salmonella • cattle • prevention • control

## ID 30
# MICROPLASTIC POLLUTION AND ANIMAL BIOSECURITY: RISKS, PATHWAYS, AND MITIGATION STRATEGIES

**Nurinisa Esenbuga**
*University of Ataturk*

### Introduction
Microplastic pollution is a growing threat to animal production systems and biosecurity. These contaminants enter livestock environments through feed, water, and environmental exposure. When ingested, microplastics accumulate in animal tissues, potentially causing adverse health effects. Their interactions with pathogens and toxic chemicals further increase biosecurity risks. Additionally, microplastics in animal products may impact human health. Despite rising awareness, knowledge on their contamination in farms and long-term effects remains limited.

### Objectives
This study evaluates the biosecurity risks of microplastic pollution in livestock. It aims to identify transmission routes, assess health impacts—particularly on gut microbiota, immunity, and reproduction—and examine their role as carriers of pathogens and toxicants. The study also emphasizes the need for improved monitoring and mitigation strategies to enhance biosecurity and sustainable animal production.

### Material and Methods
A literature review was conducted on microplastic contamination in livestock, focusing on sources, pathways, and health effects. Existing biosecurity strategies were examined to identify gaps in microplastic monitoring and risk management, and sustainable measures to reduce exposure were assessed.

### Results
The findings suggest that microplastics are prevalent in livestock environments, with feed and water being major sources of contamination. However, standard monitoring methods to detect microplastics on animal farms are still lacking. Studies suggest that microplastics can negatively impact animal health by disrupting gut microbiota, weakening immune responses, and interfering with reproductive functions. In addition, their potential role in transmitting pathogens and toxicants presents an additional biosecurity challenge.

### Conclusions
Microplastic pollution is an urgent issue that needs to be integrated into animal biosecurity policies. Effective monitoring systems, risk assessment models and sustainable management practices should be implemented to reduce its impacts. Expanding biosecurity strategies to address microplastic pollution is important to ensure the sustainability of animal production and protect public health.

### Keywords
Microplastic pollution • Animal biosecurity • Food chain contamination • Sustainable risk management

## ID 32
# ISOLATION, CHARACTERIZATION, AND PCR DETECTION OF SELECTED STRAINS OF LIPOLYTIC PSYCHROTROPHIC BACTERIA IN RAW MILK

**Kidane Workelul Yalew**
*Institution of Food Science and Technology*

### Introduction
Dairy products are susceptible to contamination by microorganisms, such as psychrotrophic bacteria, which can degrade milk quality due to the production of heat-resistant enzymes. Detecting these bacteria early is crucial for preventing production losses in the dairy industry. They are also well studied in the food microbial industry as they can grow slowly at cold chain temperatures, leading to spoilage of refrigerator foods such as seafood, meat, and dairy products. These enzymes are active at low temperatures, which means they can break down proteins, lipids, and carbohydrates in food over time.

### Objectives
Early detection of the lipolytic psychrotrophic bacteria,and helps in reducing production loss in the dairy industry.

### Material and Methods
The study employs culturing, an extracellular hydrolysis test, design-specific primer pairs, and molecular PCR amplification techniques for verification of 8 strains of the target gene isolates from the raw milk sample, which was among the data collection and analysis procedures employed in this study.

### Results
The findings in the research successfully indicate that the selected 8 strains isolated from stored raw milk are indeed psychrotrophic bacteria, with most exhibiting 6 strains lipase hydrolysis activity positive, 2 strains negative, and 1 negative control (NT) can't express hydrolysis on the Malachite green agar plate, and the best optimal incubation temperature was 28 oC. The designed primers show high specificity for only amplifying 6 lipase-positive strains, but can't amplify for the 2 lipase-negative strains, and 1 NT, offering promise for early detection before milk processing.

### Conclusions
In conclusion, this study adds value by presenting a novel approach to detecting psychrotrophic bacteria in raw milk using PCR techniques. Future improvements may involve validating the methodology with a larger sample size and comparing the PCR method with advanced molecular techniques like qPCR and multiplex qPCR to assess its efficiency, specificity, and sensitivity.

### Keywords
LipA • hydrolysis • psychrotrophic bacteria

## ID 33

# A META-REVIEW UNCOVERING KNOWLEDGE GAPS IN BIOSECURITY MEASURES ON EUROPEAN PIG FARMS

**Abbey Olsen**[1]; Søren Saxmose Nielsen[1]; Gerard Eduard Martin Valls[2]; Qamer Mahmood[3]; Richard Piers Smith[4]; Chelsea Voller[4]; Susanna Sternberg Lewerin[5]; Sotiria Eleni Antoniou[6]; Ilias Chantziaras[7]

*1. Department of Veterinary and Animal Sciences, Faculty of Health and Medical Sciences, University of Copenhagen; 2. Department of Animal Health and Anatomy, Facultat de Veterinària, Universitat Autònoma de Barcelona; 3. Ghent University; 4. Department of Epidemiological Sciences, Animal and Plant Health Agency; 5. Department of Animal Biosciences and Veterinary Public Health, Swedish University of Agricultural Sciences; 6. Biological Hazards & Animal Health and Welfare Unit, Risk Assessment Production Department, European Food Safety Authority, Parma, Italy. Sotiria-Eleni Antoniou is employed with the European Food Safety Authority (EFSA). However, the present abstract is drafted under the sole responsibility of the author and may not be considered as an EFSA scientific output. The positions and opinions presented in this abstract are those of the author alone and are not intended to/do not necessarily represent the views/any official position of EFSA. To know about the views or scientific outputs of EFSA, please consult its website under http://www.efsa.europa.eu; 7. Veterinary Epidemiology Unit, Department of Internal Medicine, Reproduction and Population Medicine, Faculty of Veterinary Medicine, Ghent University, Belgium*

## Itroduction

Biosecurity is essential for disease prevention in pig farming; however, its implementation varies. Identifying knowledge gaps in biosecurity practices can help improve disease control strategies.

## Objectives

A meta-review was conducted to identify knowledge gaps after screening review manuscripts that focus on pig biosecurity.

## Material and Methods

Eleven peer-reviewed review studies were selected following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Forty internal and external biosecurity measures were identified and categorized into ten groups: geographical factors, barriers for contact control with other animals (livestock, wildlife, pests), transport-related factors, waste and biological waste management, personnel and visitor management, feed, water, bedding, and stock management, pig management, land and outdoor area management, animal health, welfare, and care management, and hygiene management. A predefined data extraction process enabled a subjective assessment of each biosecurity measure as “not mentioned”, “poorly covered”, “moderately covered”, or “extensively covered”. Measures not relevant to a study (e.g., those assessing feed production) were marked as “not applicable”. Each study was reviewed by three experts, with one serving as a validator to ensure consensus. The median assessment level for each biosecurity variable was determined by ranking assigned levels in ascending order.

## Results

Over half of biosecurity measures were “poorly covered”, lacking sufficient detail on implementation, while 44% were “not mentioned”, highlighting potential significant knowledge gaps. Key gaps included insufficient coverage of farm location risks, such as proximity to wildlife and slaughterhouses, and limited details on fencing and transport protocols. Waste management, visitor policies, and movement restrictions for pigs were also not fully addressed. Measures specific for outdoor production systems were particularly lacking. Additionally, essential measures for emergencies and disinfection were largely absent or poorly documented.

## Conclusions

Significant gaps exist in the literature regarding on-farm biosecurity measures. A standardized framework for assessing biosecurity implementation is needed to improve consistency and support effective disease control strategies.

## Financial support and Acknowledgements

This work was conducted for the needs of The European Partnership on Animal Health and Welfare and is co-funded by the European Union’s Horizon Europe Project 101136346 EUPAHW

## Keywords

biosecurity • Pig farming

## ID 35
# DETERMINATION OF BIOCONTAINMENT LEVELS FOR BIOBANKED SAMPLES – A SOUTH AFRICAN CASE STUDY

**Puseletso Johnston;** Lia Suzanne Rotherham
*Agricultural Research Council*

### Introduction
In 2014 the Agricultural Research Council – Onderstepoort Veterinary Research embarked on a project to create a central biobank for field and laboratory isolates housed in various diagnostic and research laboratories.

### Objectives
The correct level of biocontainment when storing pathogens (biobanking) is vital not only from a biosafety point of view, but also a biosecurity point of view. Determining the biocontainment level of these biobank samples can sometimes be challenging

### Material and Methods
The Pathogen Asset Control System was used to compile the data from the laboratories, and determination of containment was based on parental pathogen characteristics. To ensure that the biocontainment level was accurately assigned various multiplex screening assays were done on the samples to be banked in the central biobank.

### Results
Various molecular-based multiplex screening assays were performed on the samples to be deposited into the biobank, the assays were designed to identify some of the common veterinary important pathogens in both ruminants (n=24) and poultry (n=9). Samples that were to be banked in the central biobank were tested for the presence of pathogens, other than the pathogen recorded on the PACS by the depositing laboratory. The preliminary results indicated that in 90% of the cases the correct biocontainment level was assigned to the samples to be deposited in the central biobank. However, in 10% of the cases higher biocontainment levels had to be assigned to the samples. The discrepancy was seen mostly in field samples that had been tested for a single pathogen, and upon the multiplex screening, other pathogens were detected in the sample that required more stringent biocontainment levels.

### Conclusions
In conclusion it has been found that the use of the molecular based multiplex screening assays has been a critical tool for the centralised biobanking of field and laboratory samples to ensure adequate containment of the pathogens in the sample.

Continue –>

## POSTER COMMUNICATIONS

# Determination Of Rincontainment Levels For Biobanked Samples – A South African Case Study

Fuseleto Johnston[1] and Lia Rotherham[1]

[1]Vaccine and Diagnostic Development Programme, Biological Services Unit, Onderstepoort Veterinary Research, Agricultural Research Council, Pretoria, South Africa

## Introduction

## Methodology

## Results

## Conclusion

## ID 36

# BIOSECURITY RISK FACTOR ANALYSES ON AFRICAN SWINE FEVER TRANSMISSION IN DIFFERENT EXTENSIVE PIG PRODUCTION SETTINGS IN SERBIA

**Jasna Prodanov-Radulović[1]; Melita Hajdinjak[2]; Siniša Grubač[1]; Biljana Đurđević[1]; Marina Štukelj[3]**

*1. Scientific Veterinary Institute Novi Sad, 21000 Novi Sad; 2. Laboratory of Applied Mathematics and Statistics, Faculty of Electrical Engineering, University of Ljubljana, 1000 Ljubljana, Slovenia; 3. Clinic for Ruminants and Pigs, Clinic for Reproduction and Large Animals, Veterinary Faculty, University of Ljubljana, 1000 Ljubljana, Slovenia*

## Introduction

The first case of ASF in a domestic pig population in Serbia was confirmed in 2019 in a backyard population. Today, outbreaks in wild boar and, more importantly, in domestic pigs are still occurring, although the government measures for ASF prevention are in place.

## Objectives

The aim of this study was to determine critical risk factors and identify the possible reasons for ASF introduction into different extensive pig farms.

## Material and Methods

The study was conducted on 26 extensive pig farms with confirmed ASF outbreaks, with data collected from beginning of 2020 to the end of 2022. Collected epidemiological data were divided into 21 main categories. We represented the data in the form of contingency tables to study associations between pairs of variables using Fisher's exact test.

## Results

After identifying specific values of variables as critical for ASF transmission, we identified nine important ASF transmission indicators as those variables for which at least 2/3 of the observed farms reported values critical for ASF transmission. Among them were type of holding, distance to hunting ground, farm/yard fencing, and home slaughtering; however, the hunting activity of pig holders, swill feeding, and feeding with mowed green mass were not included. All pairs of variables in the group including type of holding, farm/yard fencing, domestic pig–wild boar contact, and hunting activity were significantly related; hunting activity of pig holders, holding pigs in backyards, unfenced yards, and domestic pig–wild boar contact were observed on the same farms. Free-range pig farming led to observed domestic pig–wild boar contact on all farms.

## Conclusions

Different types of extensive pig farms, in combination with the traditions and mindsets of individuals involved in pig production, pose the biggest threat for the spread of ASF. The identified critical risk factors need to be strictly addressed to prevent the further spread of ASF in Serbia and elsewhere.

## Financial support and Acknowledgements

This study is based upon joint research work from scientific and technological cooperation between the Republic of Serbia and the Republic ofSlovenia, bilateral project number: 337-00-110/2023-05/48, supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia and Ministry of Higher Education, Science and Innovation of Republic of Slovenia 34-ARRSBI.RS/23-25-048.

## Keywords

African swine fever • backyards • biosecurity

## ID 37
# IDENTIFYING INFECTION PREVENTION AND CONTROL GAPS IN GENERAL HOSPITAL DEBA , GOMBE STATE ,NORTHEAST, NIGERIA

**Nneka Anyaegbu Kokelu**[1]; Peter Ubong Enyo[2]
*1. Laboratory Department, State Specialist Hospital, Gombe; 2. State,General Hospital Deba,Gombe State, Nigeria*

### Introduction
Infection prevention and control (IPC),water sanitation and hygiene (WASH) are essential component for maintaining safe health operations and mitigating risk of health care associated infections during essential health service delivery. Challenges such as lack of training for the healthcare workers on IPC,inadequate IPC commodities, indiscriminate waste disposal and insufficient funding of the IPC has been a set back for improvement plan on IPC.

### Objectives
To access, identify and improve the gaps in the infection prevention and control (IPC) compliance in General Hospital Deba, Gombe state, Nigeria. The objectives are to conduct baseline assessment for identification of gaps on IPC, filling up the gaps and follow-up assessment using standard checklists

### Material and Methods
A description cross-sectional study was carried out for a period of six months from March – August 2024 using the CWA15793 and WHO infections prevention and control checklists. Descriptive statistics and double bar graph were employed to explore and visualize the data set obtained.

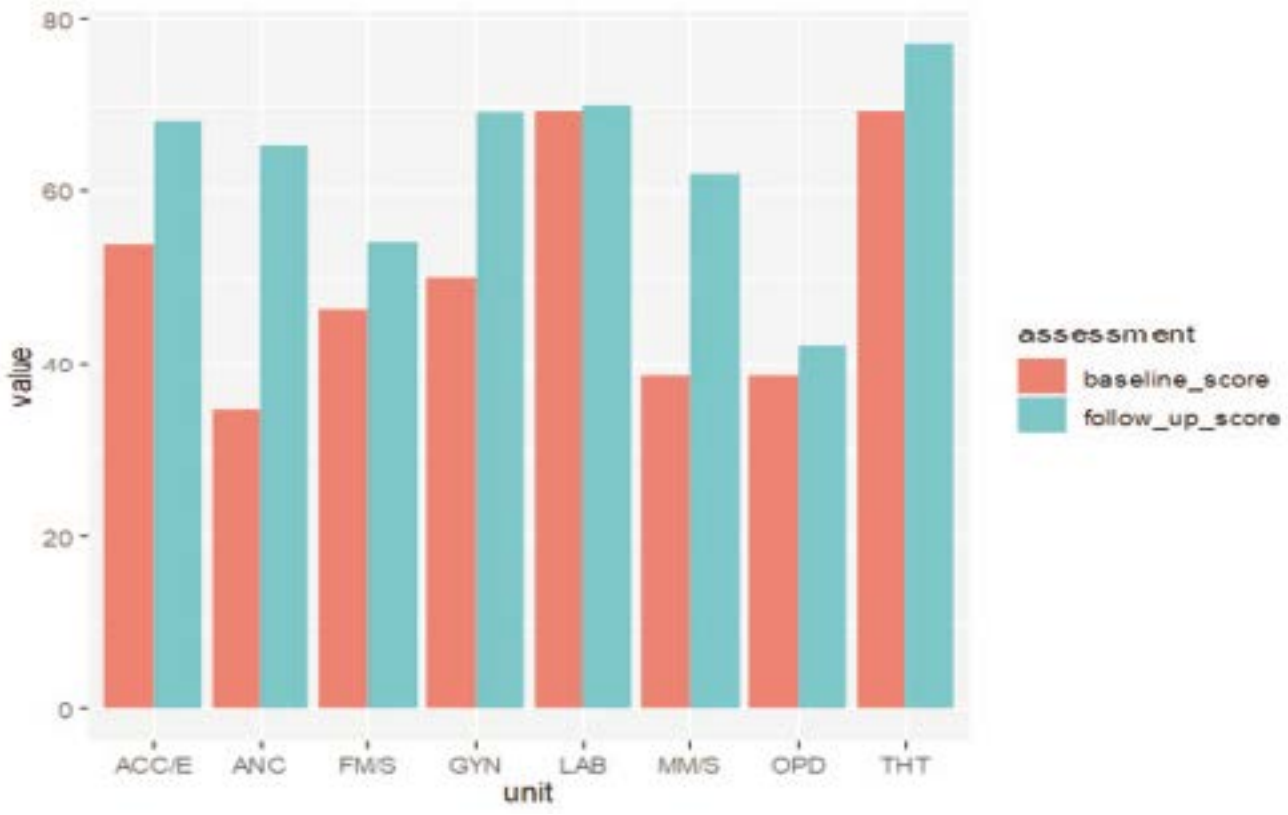
### Results
To identify gaps in the IPC strategies in the facility, eight (8) units were assessed for IPC gaps for baseline and follow-up to know the level of improvement. From the descriptive statistics, the minimum, 1stQuartile, median, mean and the maximum 38.49, 48.08, 49.99, 57.65, 69.20 and 42.00, 60.00, 66.50, 63.38, 69.25, 77.00 for baseline and the follow-up assessment score respectively. The two descriptive scores indicate effects of the treatment. However, it is obvious from the double bar graph that the theatre (69.2) and laboratory (69.2) are characterized with highest bar and the lowest is observed from antenatal care (34.6) as observed from the baseline assessment. Also, it is noticeable that follow-up scores witnessed an improvement across the units except the out-patient department.

### Conclusions
The result showed existing gaps of IPC among hospital units. Training and provision of IPC commodities resulted in improved performance across the units.

### Financial support and Acknowledgements
Self sponsored

### Keywords
IPC: Infection Prevention and Control • WASH:Water,Sanitation and Hygiene

Continue –>


80
60
40
20
0
value
ACC/E
ANC
FM/S
GYN
LAB
MM/S
OPD
THT
unit
assessment
baseline_score
follow_up_score

## ID 38

# SALMONELLA CROSS-CONTAMINATION BETWEEN ANIMAL SECTORS (POULTRY, CATTLE, PIGS): TESTING A SYSTEMIC APPROACH TO BIOSECURITY SUPPORT

**Justine Grillet**[1]; Nathalie Rousset[1]; Adeline Huneau-Salaün[2]; Muriel Guyard[3]; Laetitia Bonifait[3]
*1. ITAVI, health, hygiene and product quality department, Angers, France; 2. Anses, EPISABE Unit, Ploufragan-Plouzané-Niort Laboratory, Ploufragan, France; 3. Anses, HQPAP Unit, Ploufragan-Plouzané-Niort Laboratory, Ploufragan, France*

## Introduction

Salmonella's persistence in the environment and its presence in various species complicate control efforts, especially on farms with diverse livestock activities (like poultry, cattle and pigs). This setup, common in France, increases the risk of cross-contamination through the movement of vehicles, people, and equipment. Despite the challenge, it has received little attention.

## Objectives

This project aims to address it by using a territorial and dynamic approach of Salmonella's epidemiology, to identify effective control measures.

## Material and Methods

Poultry farms with recurrent Salmonella contamination and diverse livestock activities are selected to undergo a systematic approach. First, potential contamination routes are identified on site through flow mapping. Then, 120 to 150 environmental samples are collected over 3 to 4 visits across different seasons for Salmonella detection (serotyping and genotyping). Finally, a participatory approach engages farmers and veterinarians and other epidemiologicaly linked actors to highlight sanitary barriers, flows and risk management strategies to minimize cross-contamination.

## Results

In 2024, a first farm was recruited with a rabbit unit, broiler and duck units, a cattle unit, and 350 ha of crops. In November 2023, Salmonella Typhimurium was found in the rabbitry, severely affecting the rabbit flock. In April 2024, Salmonella Arizonae was detected in rabbit manure pit, and in November 2024, Salmonella Veneziana was found in a cattle stall. Salmonella Typhimurium was also detected on shared equipment and in a nearby pasture, indicating significant environmental contamination. A first workshop helped with representing the flows and high risks areas on the farm. To mitigate risks, the farmer proposed relocating the carcass freezer, moving shared equipment storage, and changing cattle manure evacuation routes.

## Conclusions

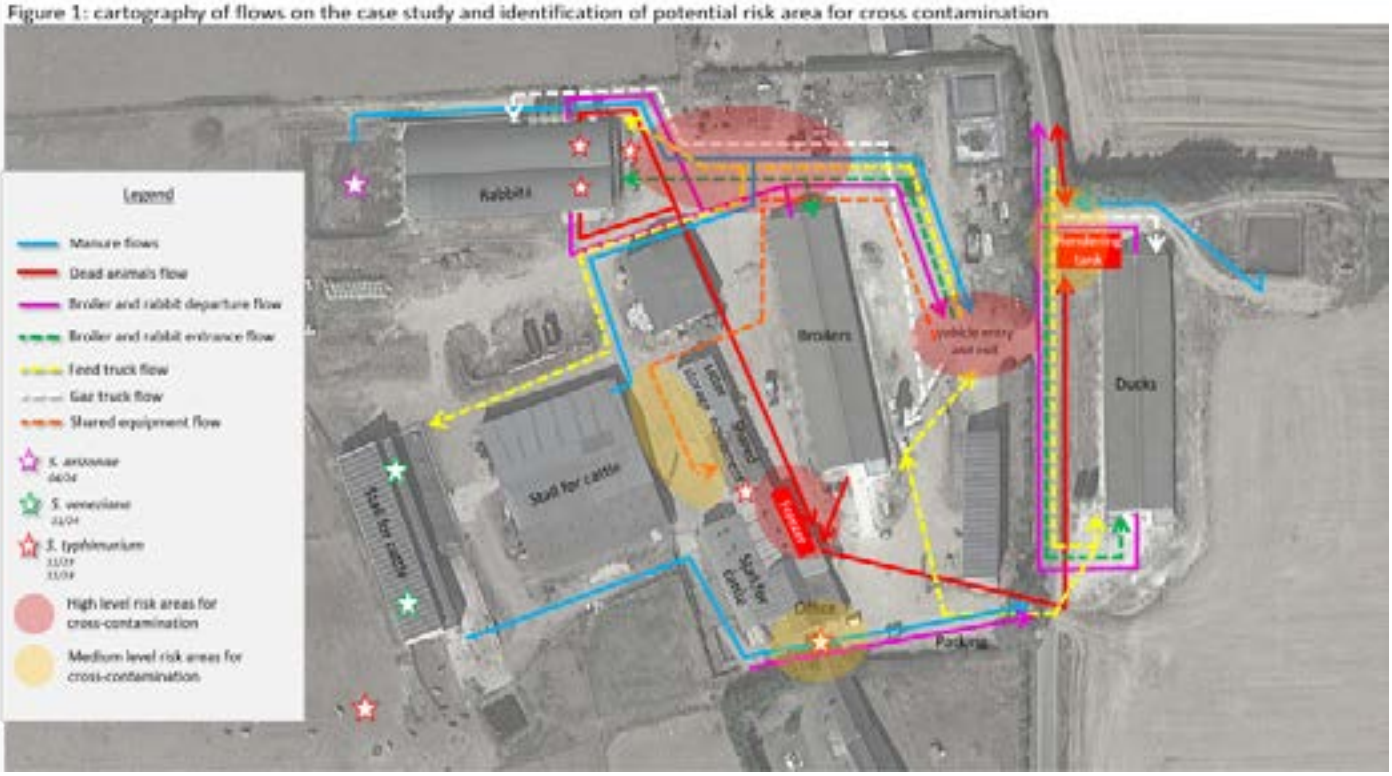
This approach allowed the farmers to materialize clearly the risks, decide which realistic biosecurity measures should be implemented and get motivated to do it. Ongoing monitoring will assess the effectiveness of these changes on reducing environmental contamination.

## Keywords

salmonella • participatory approach • biosecurity • cross-contamination

Continue –>

Figure 1: cartography of flows on the case study and identification of potential risk area for cross contamination



## ID 39
# BIOSECURITY MEASURES IN SMALL RUMINANT FLOCKS IN SLOVENIA – STRATEGIES FOR IMPROVEMENT

**Jože Starič**[1]; Rok Marzel[1]; Lena Veren Geč[1]; Branka Kramberger[2]; Jožica Ježek[1]
*1. University of Ljubljana, Veterinary faculty; 2. Administration for Food Safety, Veterinary Sector and Plant Protection*

### Introduction
Biosecurity is crucial for maintaining health and productivity of small ruminant flocks, particularly in Slovenia, where sheep and goat farming play a significant role especially in semi-subsistence agricultural production.

### Objectives
This study assesses biosecurity practices, identifies gaps, and suggests strategies to reduce disease risks.

### Material and Methods
A survey of 225 farms examined biosecurity measures related to animal movement, farm access, sanitation, and pest control.

### Results
Among respondents, 49.8% raised sheep, 29.8% goats, and 20.4% both, with average flock sizes of 132 sheep, 53 goats, and 31 mixed. While nearly 50% implemented basic biosecurity measures (e.g., fly and rodent control, separate barns), fewer than 20% adopted comprehensive measures such as quarantining new animals and using disinfection barriers. Smaller farms (<50 animals) showed significantly lower compliance due to resource constraints and limited awareness.

### Conclusions
Key challenges included a lack of quarantine facilities and insufficient farmer education on disease prevention. To address these issues, a multi-faceted approach is proposed: tailored biosecurity guidelines, financial support for infrastructure, and enhanced training programs. Publicly traceable digital tools should monitor infectious diseases like lentivirus infections, caseous lymphadenitis, paratuberculosis, and foot rot to strengthen biosecurity.

Collaboration between government agencies, veterinary services, and farmers is essential to improving biosecurity, ensuring food security, and supporting sustainable small ruminant farming. Although EU Animal Health Law (Regulation (EU) 2016/429) mandates written biosecurity plans for all livestock farms, Slovenia currently lacks systemic support for implementation. Addressing this gap is crucial for effective enforcement and compliance, ultimately improving farmers' knowledge and perception of biosecurity's importance.

### Financial support and Acknowledgements
The Slovenian Research Agency and the Ministry of Agriculture, Forestry, and Food financially supported this research through the Central Research Project (CRP V4-2024) and Research Core Funding P4-0092 (Animal Health, Environment, and Food Safety).

### Keywords
bio-exclusion • farm management • animal health • disease prevention • goat • sheep

## ID 40

# FACTORS INFLUENCING THE USE OF BIOSECURITY ON POULTRY FARMS IN THE UK: A QUALITATIVE STUDY ASSESSING THE PERSPECTIVES OF DIFFERENT STAKEHOLDERS

**Paniz Hosseini**[1]; Ivo Syndicus[2]; Eve Houghton[2]; Mathew Hennessey[2]; Pablo Alarcon[2]; Ian Brown[3]; Richard Hepple[4]; Ashley Banyard[4]; James Wood[1]

*1. University of Cambridge; 2. Royal Veterinary College; 3. The Pirbright Institute; 4. Animal and Plant Health Agency*

## Introduction

Using biosecurity to prevent diseases such as Highly Pathogenic Avian Influenza (HPAI) has been an increasing area of focus in countries such as the United Kingdom (UK), where widespread outbreaks of HPAI have been occurring on poultry farms since 2020. While the correct adoption of biosecurity measures on farms can help prevent the spread of diseases such as HPAI, improve animal welfare and reduce the likelihood of zoonotic transmission, research suggests that not all farmers' use biosecurity in the same way, and that many factors can influence their biosecurity implementation.

## Objectives

Using qualitative methods to understand the socio-ecological factors which may impact the use of biosecurity on UK poultry farms.

## Material and Methods

Through the use of qualitative semi-structured interviews, we speak with various stakeholders in the industry (including veterinarians, government agencies, poultry companies and farmers, using a snowball sampling approach) to understand their perspectives on the factors impacting biosecurity use, and the challenges faced within the industry. Interviews are being analysed using a thematic analysis approach to identify key themes and patterns emerging through the data.

## Results

Results suggest that factors including time, "biosecurity fatigue", compliance, financial constraints, risk perceptions, speed of response from the government and the role of other groups in the industry, play a part in the implementation of biosecurity at farm level. While informational resources are made available, it is also difficult to determine how effectively this is passed down to farmers, and the subsequent extent of engagement with content provided by the industry.

## Conclusions

Providing additional training and access to updated information and resources around biosecurity, using a central or more accessible platform, would be beneficial. Some structural factors identified will require major system changes, highlighting the need for further discussion between companies and policy makers to improve the resilience of the industry while protecting public and animal health.

## Keywords

Biosecurity • Poultry • Avian influenza

## ID 41

# BIOSECURITY ASSESSMENT OF ALBANIAN DAIRY FARMS USING THE BIOCHECK. UGENT™ SCORING SYSTEM: A QUANTITATIVE EVALUATION OF 107 HERDS

**Xhelil Koleci;** Pellumb Zalla; Majlind Sulce; Gerald Muca; Rezalt Postoli
*Faculty of Veterinary Medicine, Tirana, Albania*

### Introduction

In dairy herds, biosecurity is essential to managing health and preventing disease. Using the standardised Biocheck.UGent scoring system, this study intended to assess the biosecurity level of 107 Albanian dairy farms and compare the findings to benchmark averages from around the world. Both internal and external biosecurity components were the focus of the evaluation.

### Objectives

In order to identify important gaps and opportunities for improving disease prevention practices, the goal of this study is to use the Biocheck.UGentTM scoring system to thoroughly assess the degree of internal, external, and overall biosecurity implemented on Albanian dairy farms. The results will then be compared to international standards.

### Material and Methods

Eleven important metrics that were divided into internal (calving, calf and adult management, equipment organisation) and external (animal acquisition, transportation, feed hygiene) categories were used to measure biosecurity performance. The Biocheck.UGent program, which measures biosecurity protocol compliance levels on a percentage scale, was used to generate scores. To ascertain statistical differences between the study and global averages, paired t-tests were used.

### Results

The farms under study had an average total biosecurity score of 40.5%, which was less than the 48.0% global norm ($p = 0.053$). There was no significant difference between external biosecurity indicators and worldwide standards (48.2% vs. 53.7%, $p = 0.458$). Internal biosecurity, however, performed noticeably worse than international norms (32.8% vs. 42.3%, $p = 0.0068$). Important deficiencies were noted in the handling of equipment, dairy cleanliness, and calving management.

### Conclusions

The results show a significant weakness in the internal biosecurity procedures used by Albanian dairy farms as evaluated by the Biocheck.UGent system. To comply with global preventive health standards and reduce the spread of diseases among herds, specific enhancements in calving procedures, animal care, and facility management are vital.

### Financial support and Acknowledgements

The study was financially supportedfrom the National Agency for Science, Research and Innovation (NASRI TUBITAK, Turkey)

### Keywords

Dairy farming • Biosecurity • Biocheck.UGent • Internal biosecurity • Preventive veterinary medici

## ID 42
# ANTIMICROBIAL POTENTIAL OF SAPONIFIED CONIFEROUS ROSIN IN HYGIENE PRODUCTS FOR ANIMAL FARMS

**Hannele Kettunen;** Juhani Vuorenmaa
*Hankkija Oy*

### Introduction
Rosin is the natural protection mechanism of coniferous trees against microbial pathogens. Tree rosin is biodegradable and safe to handle, and it has been collected and used as topical treatment of wounds for centuries (1).

### Objectives
The present experiments studied the ability tree rosin, especially the saponified, water soluble form, to act against bacterial, viral or parasitic pathogens in vitro. The ultimate objective was to evaluate the potential of tree rosin as a component of hygiene products for animal farms.

### Material and Methods
Routine in vitro -procedures for bacteria, viruses, and Apicomplexan parasites were used throughout the study.

### Results
First plate-culture experiments proved that tree rosin inhibits the growth of pig and poultry -specific strains of Clostridium perfringens and pig and cattle -specific strains of Staphylococcus aureus (2). The following in vitro experiments demonstrated the efficacy of saponified tree rosin (STR) against the growth of Enterococcus faecium, Staphylococcus aureus (MRSA), Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter spp., which often cause hospital-acquired infections in humans (3). Furthermore, the combination of 2.5% STR and 0.5% glutaraldehyde permanently prevented the germination of Clostridium difficile spores, though their standalone sporicidal activity was limited (3). Enveloped viruses such as Influenza A virus were also proven to be sensitive to STR (4). Sensitivity of Apicomplexan parasite spores to STR was suggested in an experiment in which 1% of STR inhibited the sporulation and virulence of Eimeria tenella spores by 99% (5).

### Conclusions
In summary, the results suggested significant anti-pathogen potential for STR. Tree rosin has not been registered as a biocide in EU, which currently limits its use in disinfectant products. Further studies in farm environments are needed, but it is fair to assume that STR-based detergent or other hygiene products could be useful in improving biosecurity in animal farms.

### Financial support and Acknowledgements
The experiments were financed by Hankkija Oy.

### Keywords
tree rosin • anti-pathogen potential

## ID 32

# RISK FACTORS FOR DISEASE INTRODUCTION AND TRANSMISSION IN POULTRY FARMING SYSTEMS: A COMPARATIVE STUDY OF INTENSIVE AND EXTENSIVE SYSTEMS

**Yasmin Bakhshi**; Francisca Velkers; Arjan Stegeman
*Utrecht University, Faculty of Veterinary Medicine, Department of Population Health Sciences – Farm Animal Health*

### Introduction

Good biosecurity practices on poultry farms can improve animal health, welfare, and productivity. Although general biosecurity guidelines are available, compliance with biosecurity practices varies across poultry farming systems. Recurrent highly pathogenic avian influenza (HPAI) outbreaks and shifts toward more extensive farming have introduced specific risks, including increased exposure to the outdoor environment. Understanding differences in biosecurity measures between farming systems may facilitate more risk-based and targeted improvements.

### Objectives

This study explores key differences between intensive and extensive broiler farms in the Netherlands, focusing on biosecurity-associated risks for introduction and transmission of HPAI using biosecurity survey data.

### Material and Methods

A comparative case-control structured study was conducted on 78 Dutch broiler farms, including 63 conventional ('intensive') and 15 broiler farms with covered outdoor area ('extensive'). Data were collected using the validated Biocheck.UGent survey—administered in-person for extensive farms and via existing records for intensive farms—and refined through data cleaning and standardization. Based on a literature review, 28 key HPAI-related risk factors were selected from an initial set of 40 survey variables for analysis. Bayesian logistic regression with horseshoe priors was applied for variable selection.

### Results

Three key differences emerged between the two systems: carcass storage cleaning practices, stocking density, and chick delivery frequency. Intensive farms reported more frequent carcass storage cleaning, higher stocking densities above 33 kg/m2, and more frequent chick deliveries (3–6 times per year).

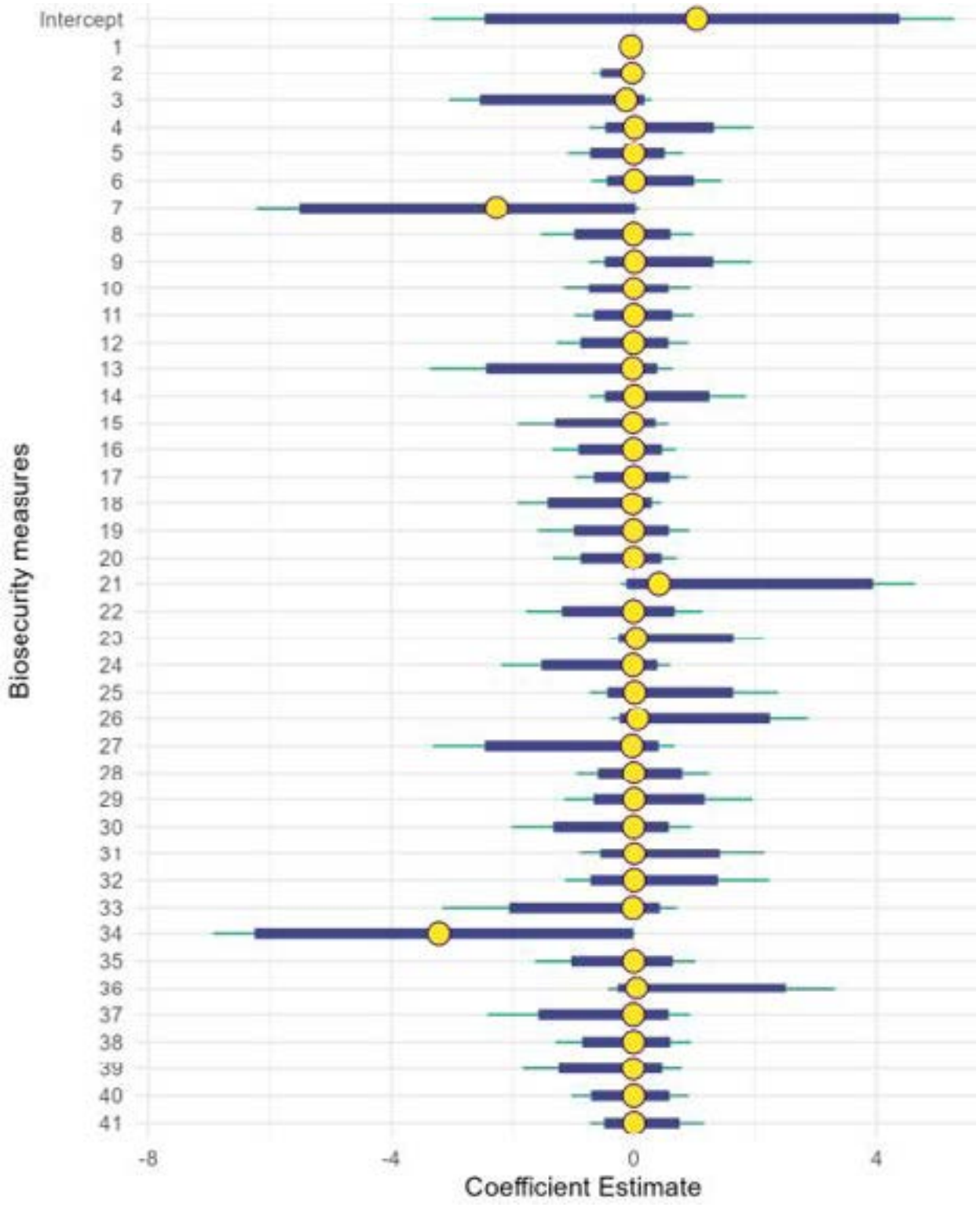
### Conclusions

Differences in stocking density and chick delivery frequency are closely tied to criteria defining each farming system, suggesting that targeted criteria and regulations may promote better biosecurity practices. Meanwhile, carcass storage cleaning practices and other measures with no significant difference between the two farming types reflect variation in adoption of measures based on individual farm-level decision-making, necessitating tailored strategies. Farm-specific biosecurity plans and on-site coaching are likely to address gaps more effectively than uniform guidelines.

### Keywords

Biosecurity • Broiler farms • Highly pathogenic avian influenza • Intensive and extensive farming

Continue –>


Intercept
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
Biosecurity measures
-8
-4
0
4
Coefficient Estimate

## ID 44
# EFFECTIVENESS OF BACTERIOPHAGES IN REDUCING BACTERIAL LOAD IN BIOFILMS FORMED ON SURFACES

**Naim Deniz Ayaz**[1]; Gizem Cufaoglu[1]; Muammer Goncuoglu[2]; Irfan Erol[3]; Aysenur Erdinc[1]; Tansu Yildiz[1]
*1. Kırıkkale University Faculty of Veterinary Medicine Department of Food Hygiene and Technology; 2. Ankara University Faculty of Veterinary Medicine Department of Food Hygiene and Technology; 3. Lokman Hekim University Faculty of Health Sciences*

## Introduction
The biggest obstacle to the elimination of bacteria on farm surfaces is biofilms, which serve as reservoirs for pathogens. Biofilms are populations of bacteria in which cells are surrounded by an extracellular polysaccharide matrix that can be formed by almost all bacteria under favorable conditions. In this microenvironment, bacteria adhering to farm surfaces gain resistance to environmental conditions and chemicals and become a constant source of contamination. One of the promising approaches to combating biofilms is bacteriophages.

## Objectives
The aim of this study was to investigate the activities of bacteriophages on Escherichia coli O157:H7, Salmonella Enteritidis, Listeria monocytogenes, Staphylococcus aureus and Enterecoccus feacalis biofilms on polystyrene, rubber and metal surfaces.

## Material and Methods
The biofilm-forming properties of the selected pathogens was investigated in a 96-well polystyrene plate. In order to determine the sensitivity of biofilms to phages, 24-well polystyrene plates, rubber and stainless steel surfaces were used.

## Results
According to the results of the analysis, biofilm formation was observed in all bacterial groups. However, it was observed that S. Enteritidis, S. aureus and L. monocytogenes showed a synergistic effect with E. faecalis and increased biofilm formation, whereas there was no significant change in biofilm formation in E. coli O157:H7 and E. faecalis combination. It has been observed that bacteriophage cocktails in biofilm groups formed by bacteria in polystyrene plates reduce the number of bacteria in the biofilm at the level of 1.90 to 5.82 log cfu/ml. It has been determined that bacteriophage cocktails on steel and rubber surfaces cause a reduction in the number of bacteria in the biofilm at the level of 2.70 to 5.48 log cfu/ml.

## Conclusions
As a result, it was observed that phage cocktails developed within the scope of the study were effective on biofilms formed on plastic, steel and rubber surfaces in farms.

## Financial support and Acknowledgements
This study contains a part of the results of the project no. 121Z447 supported by TÜBITAK.

## Keywords
Bacteriophage • Biofilm • Biosecurity • Farm surfaces

## ID 45

# A PARTICIPATORY APPROACH TO ENHANCING COST-EFFECTIVE BIOSECURITY IN INDONESIAN FEEDLOTS

**Ben Madin**; Emma Zalcman; Sonny Handaru; Prama Rangga; Isabel MacPhillamy; Nina Matsumoto; Firdha Aulia; Havan Yusuf
*Ausvet*

### Introduction
Foot and mouth disease (FMD) re-emerged and lumpy skin disease (LSD) emerged in Indonesia in early 2022, posing significant economic threats to livestock industries, in particular the feedlot industry which imports Australian bred Bos indicus cattle. The feedlot industry gained access to FMD and LSD vaccines during 2022 and rapidly improved their biosecurity measures. However, many measures were leading to an unnecessary overspend with minimal effectiveness. This paper focuses on a participatory project to improve the cost-effectivenss of biosecurity in Indonesian feedlots and abattoirs recieving Australian live export cattle.

### Objectives
This work aimed at empowering Indonesian feedlots to implement cost-effective biosecurity measures.

### Material and Methods
The project engaged 22 feedlots and 11 abattoirs through workshops, site-specific risk assessments, and tailored recommendations. Technical workshops focused on identifying common transmission pathways through which disease would enter feedlots and the biosecurity measures that mitigate risk associated with those pathways. Site visits utilised a structured risk assessment to identify opportunities for improvement at individual sites, noting that many sites were over-spending on ineffective biosecurity measures

### Results
Within six months, 65% of recommendations were implement in feedlots and 75% in abattoirs. Feedlot adoption further increasing to 75% by the project's end.

### Conclusions
This initiative not only enhanced biosecurity practices but also improved understanding of disease transmission and instilled greater confidence in biosecurity measures across the industry.

### Financial support and Acknowledgements
This work was supported by Meat and Livestock Australia and the Australian Department of Agriculture, Forestries and Fisheries

### Keywords
Biosecurity • Indonesia • Foot and Mouth Disease • Cost-effective • Lumpy skin disease • Feedlot

## ID 46
# BATHING OF SOWS AS A PREVENTIVE MEASURE OF EXUDATIVE EPIDERMITIS OF PIGS

**Milan Ninković**; Jadranka Žutić; Branislav Kureljušić; Bojan Milovanović; Bozidar Savić; Nemanja Zdravković
*Scientific Institute of Veterinary Medicine of Serbia, Belgrade, Serbia*

### Introduction
Due to the desire to produce as many piglets as possible, the presence of numerous pathological conditions in piglets in the first days of life often leads to death and costs due to therapy.

### Objectives
This paper describes a case of exudative epidermitis (EE) in 56 piglets originating from five gilts that were purchased from a large commercial farm. Clinical symptoms in piglets appear in the first 7 days of life.

### Material and Methods
Clinical symptoms in piglets appear in the first 7 days of life. The disease was manifested by the appearance of brown deposits, one to two centimetres in diameter, covered with serum and exudate. T

### Results
The therapy of (EE) is based on the application of beta-lactam antibiotics that prevent further losses due to the presence of the disease. A contribution to this is that the disease is more common in new herds or when many gilts are introduced into an already established herd.

### Conclusions
Prevention of EE can be achieved by adequate preparation of sows before farrowing, standards of sanitary conditions for pregnant sows, especially in housing, and washing of sows before entering the farrowing. After the therapy of the piglets with the improvement of hygiene measures, especially the washing of the sow immediately before entering the farrowing pen, no occurrence of exudative epidermatitis was recorded. With the improvement of hygienic conditions in the farrowing house, with better ventilation, cleaner and drier pens, controlled humidity and reduced stocking density. Also, as a prophylactic measure, vaccination with autogenous St. hyicus bacteria can be carried out on farms with the mentioned problems. Control of the health condition of sows, with the application of biosafety and hygiene measures, are key factors in preventing various pathological conditions in newborn piglets.

### Financial support and Acknowledgements
This research was funded by the Serbian Ministry of Science, Technological Development and Innovation, grant number 451-03-66/2024-03/ 200030

### Keywords
Bathing • pigs • Exudative epidermitis • sows • St.hyicus

## ID 49
# IMPACT OF BIOSECURITY ON PRODUCTION PERFORMANCE AND ANTIBIOTIC USAGE IN BROILER FARMS IN A LOW AND MIDDLE INCOME COUNTRY

**Ronald Vougat Ngom**[1]; Stephane Ziebe[1]; Adonis Akoussa[1]; Henry Bogning[2]; Henriette Zangue[3]
*1. Department of Animal Production, School of Veterinary Medicine and Sciences, University of Ngaoundere, Ngaoundere, Cameroon; 2. SPC, Bafoussam, Cameroon; 3. National School of Agro-industrial Sciences Ngaoundere, Ngaoundere, Cameroon*

### Introduction
In low and middle income African countries, poultry plays an important role in terms of human nutrition. Due to the lack of strict legislation, antimicrobials are extensively used to treat diseases, the main hindrance of the sector. Among the solutions to minimize the risk of disease, strengthening biosecurity is the key strategy.

### Objectives
This study aimed to evaluate the biosecurity implementation and its relation with production performance and antibiotic usage in broiler farms in Cameroon.

### Material and Methods
A total of 57 broiler farms were visited and data concerning biosecurity, production performance (average daily gain or ADG, mortality rate, feed conversion ratio or FCR and performance index or PI) and antimicrobial usage (AMU) were collected.

### Results
The mean total biosecurity score of broiler farms was 52%. The ADG was significantly (P=0.034) higher in farms with good biosecurity (46.54±5.18g) compared to those with poor biosecurity (43.80±4.16g). Similarly, FCR (1.59±0.61 versus 1.75±0.58, P=0.026), mortality rate (2.47% versus 6.65%, P<0.001) and PI (339.21±105.79 versus 268.22±101.09, P =0.015) were statistically better in farms with good biosecurity. Prophylactic administration of antimicrobials was more common (58.3% of antibiotics) on farms and 83.9% antibiotic used were underdosed/overdosed. The majority of antibiotics used (55.2%) were classified as critically important for human medicine. No correlation was noted between biosecurity and the amount of antibiotics used, although there was a trend towards reduced use in farms with good biosecurity.

### Conclusions
The higher use and misuse of antibiotics will certainly result in an increasing development of antimicrobial resistance that can afterwards be transmitted to humans. This study highlights the importance of biosecurity in improving poultry performance and reducing AMU. Continuous training and awareness-raising efforts among farmers on the importance of biosecurity and AMU are needed to reduce antibiotic use, and improve production performance and farmers' profitability.

### Financial support and Acknowledgements
No funding was received for this study

### Keywords
Biosecurity • antimicrobial • poultry • FCR

## ID 50

# RISK FACTORS FOR DISEASE INTRODUCTION AND TRANSMISSION IN POULTRY FARMING SYSTEMS: A COMPARATIVE STUDY OF INTENSIVE AND EXTENSIVE SYSTEMS

**Yasmin Bakhshi**; Francisca Velkers; Arjan Stegeman
*Utrecht University, Faculty of Veterinary Medicine, Department of Population Health Sciences – Farm Animal Health*

### Introduction

Good biosecurity practices on poultry farms can improve animal health, welfare, and productivity. Although general biosecurity guidelines are available, compliance with biosecurity practices varies across poultry farming systems. Recurrent highly pathogenic avian influenza (HPAI) outbreaks and shifts toward more extensive farming have introduced specific risks, including increased exposure to the outdoor environment. Understanding differences in biosecurity measures between farming systems may facilitate more risk-based and targeted improvements.

### Objectives

This study explores key differences between intensive and extensive broiler farms in the Netherlands, focusing on biosecurity-associated risks for introduction and transmission of HPAI using biosecurity survey data.

### Material and Methods

A comparative case-control structured study was conducted on 78 Dutch broiler farms, including 63 conventional ('intensive') and 15 broiler farms with covered outdoor area ('extensive'). Data were collected using the validated Biocheck.UGent survey—administered in-person for extensive farms and via existing records for intensive farms—and refined through data cleaning and standardization. Based on a literature review, 28 key HPAI-related risk factors were selected from an initial set of 40 survey variables for analysis. Bayesian logistic regression with horseshoe priors was applied for variable selection.

### Results

Three key differences emerged between the two systems: carcass storage cleaning practices, stocking density, and chick delivery frequency. Intensive farms reported more frequent carcass storage cleaning, higher stocking densities above 33 kg/m2, and more frequent chick deliveries (3–6 times per year).

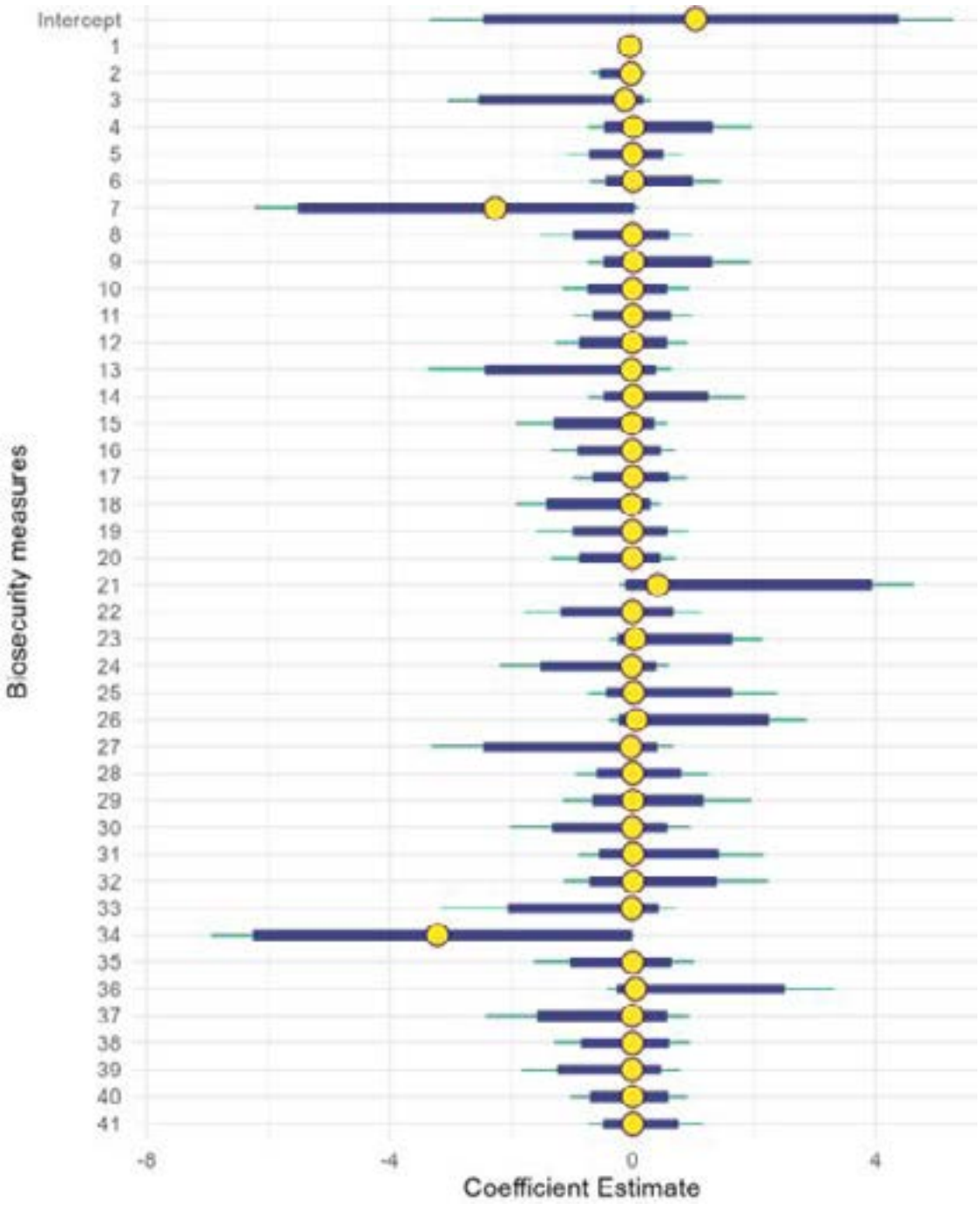
### Conclusions

Differences in stocking density and chick delivery frequency are closely tied to criteria defining each farming system, suggesting that targeted criteria and regulations may promote better biosecurity practices. Meanwhile, carcass storage cleaning practices and other measures with no significant difference between the two farming types reflect variation in adoption of measures based on individual farm-level decision-making, necessitating tailored strategies. Farm-specific biosecurity plans and on-site coaching are likely to address gaps more effectively than uniform guidelines.

### Keywords

Biosecurity • Broiler farms • Highly pathogenic avian influenza • Intensive and extensive farming

Continue –>


Intercept
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
Biosecurity measures
-8
-4
0
4
Coefficient Estimate

## ID 51
# LIVE WORKSHOP AS A SUPPORTING MEASURE FOR THE IMPLEMENTATION OF FARM BIOSECURITY IN POULTRY PRODUCTION IN POLAND

**Artur Żbikowski**; Karol Pawłowski; Krzysztof Adamczyk; Joanna Turniak; Filippa Hertzberg; Piotr Szeleszczuk
*Department of Pathology and Veterinary Diagnostics, Institute of Veterinary Medicine, Warsaw University of Life Sciences, Poland*

### Introduction
In the frame of the H2020 Netpoulsafe project, the practices that aim at supporting the implementation of biosecurity in poultry farms “supporting measures” (SM) were analyzed.

### Objectives
In Poland, the biosecurity training live workshop (SM) was selected and evaluated on 20 Pilot Farms (PF). This SM serves as a tool to demonstrate specific topics, facilitate idea exchange, and solve problems, thereby improving stakeholders\’ skills, motivation, awareness, and knowledge.

### Material and Methods
Farm owners, managers, and advisors from various production sectors-broilers, layers, breeders, turkeys, and hatcheries—voluntarily participated in a one-day in-person training led by the Network Facilitator at WULS. Invited specialists in the field of biosecurity presented and discussed the following topics with the audience: external and internal biosecurity on poultry farms and hatcheries, biosecurity law regulations, and the Biocheck.UGent® scoring system. At the end, all participants took a short single-choice test, received a certificate, and were provided with printed course materials.

### Results
After at least six months, participants were asked whether implementing biosecurity measures became easier following the SM. Participants stated that ’this SM was helpful, and many aspects of biosecurity became clearer, ”it should be held annually with more topics covered”, “it made it easier to identify and address biosecurity gaps on farms or within companies”, and “discussions with professionals and experience-sharing with other stakeholders, built confidence in the benefits of implementing biosecurity practices”. Participants evaluated the biosecurity training live workshop as an SM on a scale of 1 to 5, with 20% of PF rating it as “5”, 30% as “4”, and 10% as “3”. According to 10% of PF, the impact was difficult to assess as only minor changes in biosecurity were made, while 30% did not implement any new measures.

### Conclusions
The biosecurity training live workshop is considered an effective supporting measure for enhancing education, awareness, and knowledge among stakeholders regarding biosecurity.

### Financial support and Acknowledgements
The Netpoulsafe project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No.101000728.

### Keywords
Supporting measures • live workshop • biosecurity • Poland

## ID 52

# A CALL FOR JOINT ASSESSMENT TOOLS – WHY IS THIS NEEDED FOR SMALLHOLDER PIG SYSTEMS?

**Jenny-Ann Toribio**[1]; Fred Unger[2]; Rebecca Doyle[3]
*1. University of Sydney; 2. International Livestock Research Institute; 3. University of Edinburgh*

## Introduction

Smallholder pig production systems remain an important contributor to food security, livelihoods and socio-cultural practices in low-to-middle income countries (LMIC). Their vital role and resilience are demonstrated by continuity despite the ASF pandemic with huge pig losses across Asia since 2018. A distinguishing feature of smallholder pig systems is their diversity, arising from differences in geographic location, the farmer's main purpose for pig raising, and husbandry practices. Smallholder pigs in LMIC include free-roaming indigenous pigs reared for subsistence and cultural purposes; crossbred pigs kept tethered or in simple pens raised for consumption and local sale; and fully confined exotic and crossbred pigs raised for household income.

## Material and Methods

Whilst husbandry practices and production levels are documented for various smallholder pig systems, consideration of biosecurity has often been limited or focused on biosecurity relevant to a specific disease. Further, though documented constraints on pig health and production indicate adverse welfare impacts in some settings, virtually no investigations of smallholder pig welfare exist.

## Results

Recently there have been initiatives to address these gaps. For on-farm biosecurity assessment, the Biocheck.UGent Pig backyard/small-scale survey is an advance, but its relevance and applicability may be limited in some smallholder contexts. For on-farm welfare assessment, the pilot of a smallholder pig welfare assessment protocol in Vietnam demonstrated feasibility of assessment in two contrasting pig systems, and found inadequate water and feed were critical welfare and production constraints on some farms.

## Conclusions

As nutrition, health and welfare are interconnected, this paper is a strategic call for a suite of comprehensive assessment tools to benchmark feeding, biosecurity and welfare for free-range through to fully confined smallholder pigs. Such tools will provide a holistic, thorough investigation encompassing outcomes and potential risks to health, productivity and welfare; which is the essential foundation for co-design with smallholder communities of context appropriate interventions.

## Financial support and Acknowledgements

No funding to declare

## Keywords

smallholder • pig • low-to-middle income countries • biosecurity • welfare

## ID 53

# ESTIMATE THE MOST COST-EFFECTIVE OPTION FOR IMPROVING BIOSECURITY ON DAIRY CATTLE FARMS TO SUPPORT INFORMED DECISION MAKING

**Fernando Duarte Godoy**[1]; Alberto Allepuz Palau[1]; Arnau Alvarez Capella[1]; Natalia Ciria Artiga[1]; Bodil Højlund Nielsen[2]; Jehan Ettema[2]; Jordi Casal[1]; Marta Jimeno[1]; Giovanna Ciaravino[1]

*1. Departament de Sanitat i Anatomia Animals, Universitat Autònoma de Barcelona (UAB), Bellaterra, Barcelona 08193, Spain; 2. SimHerd A/S, Agro Business Park, Niels Pedersens Allé 2, 8830 Tjele, Denmark*

## Introduction

Farm biosecurity decisions depend on experience, risk perception, social pressure, economic and epidemiological factors. Methodologies identifying the most profitable decisions can support biosecurity improvements.

## Objectives

The objective of the study was to estimate the most profitable decision for the farm to improve biosecurity.

## Material and Methods

We developed a calculator to estimate costs of biosecurity measures (BM). This calculator was fed by a database created with prices of related items. To estimate the probability of pathogen introduction, the quantitative risk assessment model developed by Ciria et al., (2024) was used. The cost of an outbreak was estimated using the SimHerd model (Clasen et al., 2024). Bovine Viral Diarrhoea (BVD) was selected as the case study due to its well-documented impact on dairy cattle. A decision tree analysis (Fig. 1) was applied in a dairy farm with 724 cows to determine the highest expected monetary value (EMV) of different possible biosecurity improvements.

## Results

The risk analysis model estimated a 3.36% annual probability of BVD introduction into the farm under current conditions and recommended providing 1)boots for drivers, 2)visitors clothing and 3)visitors boots to reduce such risk. The current biosecurity cost was estimated at €19,906 and the cost of a BVD outbreak as €153,871 per year. Implementing the recommended BMs would increase the cost by €23.54, €42.03, and €15.69 per year, but would reduce the risk 29%, 3% and 2%, respectively.The EMV estimated through the decision tree analysis evidenced that all the proposed BMs were profitable. However, providing boots for drivers yielded the best value improving the financial outcome by €1,482.9 compared to the current situation (Table 1).

## Conclusions

Using this methodology, it was possible to determine which biosecurity measure most effectively reduced risk while offering the best cost-efficiency for the farm. The findings can encourage farmers to adopt biosecurity by showcasing risk reduction and economic benefits.

## Financial support and Acknowledgements

This research project was funded by BIOSECURE Horizon Europe project (https://biosecure.eu/) and BioRisk (supported by MCIN/AEI/10.13039/501100011033, ref. PID2020-118302RB-I00). The first author is financed by the Chilean National Agency for Research and Development (ANID) / Scholarship Program / DOCTORADO BECAS CHILE/2020 – 72210236.

## Keywords

Economic analysis • Farm biosecurity • Bovine Viral Diarrhoea • Cost-effectiveness • Tool-based

Continue –>

**Figure 1. Visual representation of the decision analysis of different alternatives to improve biosecurity on dairy farms.**

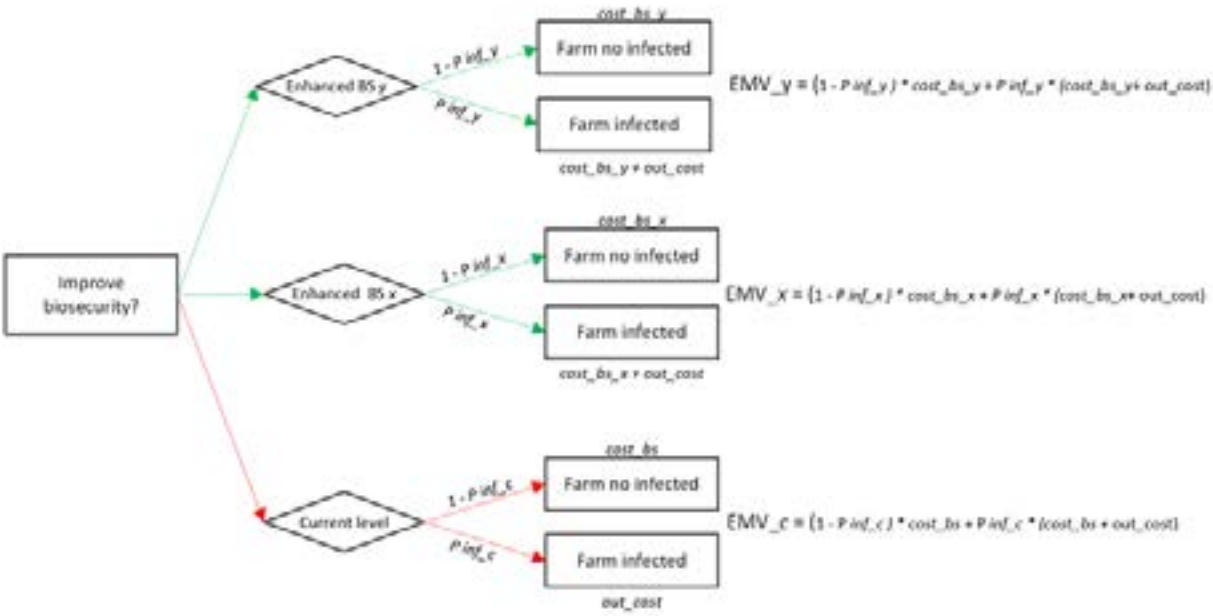



**Table 1. Summary of the results of the decision tree analysis.**

| Scenarios | | Disease | No Disease | EMV |
|---|---|---|---|---|
| Current level | Euro € | -173,777€ | -19,905.99 € | |
| | *p* | 3.36% | 96.64% | |
| | *Euro €*p* | -5,837.46 € | -19,237.31 € | **-25,074.78 €** |
| Provide boots to all drivers | Euro € | -173,801 € | -19,929.53 € | |
| | *p* | 2.38% | 97.62% | |
| | *Euro €*p* | -4,136.70 € | -19,455.18 € | **-23,591.88 €** |
| Provide clothing for all visitors who will have contact with the animals | Euro € | -173,819 € | -19,948.02 € | |
| | *p* | 3.26% | 96.74% | |
| | *Euro €*p* | -5,672.64 € | -19,297.01 € | **-24,969.65 €** |
| Provide boots to all visitors (exc. drivers) | Euro € | -173,793€ | -19,921.68 € | |
| | *p* | 3.29% | 96.71% | |
| | *Euro €*p* | -5,719.59 € | -19,266.05 € | **-24,985.64 €** |

## ID 54

# HIDDEN RISKS ABOVE WHEELS: ASSESSING HYGIENE IN THE BOOT STORAGE COMPARTMENT OF PIG TRANSPORT TRUCKS

**Annalisa Scollo**[1]; Alice Perrucci[1]; Alice Magri[2]; Vanessa Cardana[1]; Simona Zoppi[2]; Daniele De Meneghi[1]; Claudia Cossettini[3]
*1. Department of Veterinary Sciences, University of Turin; 2. Istituto Zooprofilattico Sperimentale Del Piemonte Liguria E Valle D'Aosta; 3. Chemifarma spa, Forlì, Italy*

## Introduction

Effective disinfection of pig transport trucks is essential for preventing the spread of infectious disease agents. While disinfection protocols typically focus on cargo and animal-contact areas, the footwear storage compartment—where drivers store their boots—has received limited attention. This area presents a significant biosecurity risk due to its potential for harboring pathogens and transferring them between the cabin, livestock area, and farms.

## Objectives

The aim of the study was to assess the level of cleanliness of trucks used for transporting pigs after commercial disinfection, with particular attention to the areas designated for the driver.

## Material and Methods

Three methods were used: ATP bioluminescence, visual inspection (scored on a percentage scale: 0%=completely dirty; 100%=visibly clean), and microbiological swabbing (hygienogram, quantified as mesophilic colony counts). Ten commercial pig trucks were evaluated across the boot storage compartment, driver's cabin, and cargo area.

## Results

Results showed that the boot storage and cabin were the least clean zones post-washing, with visual inspection averaging 70.1% and 68.5%, respectively, compared to 83.3% in the cargo area ($p=0.009$). Hygienograms confirmed the highest bacterial load in the boot compartment (3859 ±5085 CFU/cm$^2$; $p=0.025$), with 100% of samples exceeding literature thresholds. A tendency toward negative correlation between visual and microbial results in the boot storage ($r=0.81$; $p=0.09$) and cabin ($r=0.86$; $p=0.07$) suggests that visual inspection may reflect microbial status, though not reliably enough to be used alone. ATP readings frequently exceeded the device's detection limit, preventing meaningful comparison with other measures.

## Conclusions

These findings highlight the need to include driver-specific areas, such as boot storage, in routine sanitation protocols. Standardized visual and microbial assessments should first ensure that surfaces meet acceptable thresholds of cleanliness, thereafter ATP bioluminescence can be incorporated for more detailed or high-frequency evaluations. Educating and training of truck drivers is essential to improve hygiene awareness and compliance in high-risk, often overlooked, compartments.

## Keywords

pig • vehicles • disinfection • hygienogram • ATP bioluminescence • boot storage compartment • transport • visual inspection

## ID 55

# INFLUENCE OF HYGIENE IMPROVEMENTS ON ANTIMICROBIAL RESISTANCE OCCURRENCE IN PIG HUSBANDRY AND THE ROLE OF FLIES AS TRANSMISSION VECTORS

**Megarsa Jaleta**[1]; Ulrich Nübel[2]; Doreen Werner[3]; Christina Hölzel[4]; Thomas Amon[1]; Tina Kabelitz[1]

*1. Leibniz Institute for Agricultural Engineering and Bioeconomy e.V. (ATB); 2. Leibniz-Institute DSMZ – German Collection of Microorganisms and Cell Cultures; 3. Leibniz Centre for Agricultural Landscape Research (ZALF); 4. Christian-Albrechts-University of Kiel*

## Introduction

The spread of antimicrobial resistance (AMR) in animal husbandry is usually attributed to the use of antibiotics, poor hygiene and lack of biosecurity.

## Objectives

I) We conducted experimental trials to improve hygiene management in weaned pig houses and assessed the impact on AMR spread. II) Flies (Musca domestica) was studied as vector for AMR transmission within the barn and into urban areas.

## Material and Methods

For the experimental groups, we increased cleaning, disinfection, dust removal and fly control, while regular hygiene measures were carried out for the control groups. The occurrence and spread of AMR were determined in Escherichia coli as indicator organism, using cultivation-dependent (CFU quantification) and -independent (qPCR) methods, as well as whole genome sequencing of isolates in samples of various origins, including pig feces, flies (Musca domestica), feed and sedimented dust.

## Results

We detected abundant cephalosporin- and fluoroquinolone-resistant Escherichia coli in all sample types. There were no significant differences in the prevalence of AMR E. coli in pig feces from groups managed with conventional hygiene in comparison to improved hygiene. Close genomic relationships indicated frequent transmission of AMR E. coli between different pig herds and across farm buildings and suggested dust and flies as vectors for dissemination of fecal pathogens. We repeatedly recovered E. coli from flies in urban habitation areas up to 2 km away from the farm- E. coli genome sequences were identical or closely related to those from pig feces isolates, indicating the fly-associated transport of AMR E. coli from the pig farm.

## Conclusions

I) Managing hygiene alone was insufficient for reducing AMR in pig rearing, probably since piglets arrived already colonized. II) Fly-borne transport poses a risk of transmission of AMR enteric pathogens from livestock to man.

## Financial support and Acknowledgements

This study was executed and supported in the framework of the Leibniz Research Alliance INFECTIONS (interdisciplinary project “AMR spread in pig husbandry—mechanisms and possible interventions”), funded by the Leibniz senate panel “Strategische Vorhaben” (SAS) from 2021 to 2025.

## Keywords

AMR • hygiene • Escherichia coli • flies • pork

## ID 56

# BIOSECURITY IN ESTONIAN DAIRY AND BEEF CATTLE HERDS. RESULTS OF THE BIOCHECK.UGENT ASSESSMENT

**Andres Reilent**; Dagni-Alice Viidu; Kerli Mõtus; Arvo Viltrop
*Estonian University of Life Sciences*

### Introduction

Biosecurity is crucial on cattle farms. It prevents the spread of diseases, ensuring the health and productivity of the herd. Knowing the level of biosecurity is the first step in understanding deficiencies present at farms.

### Objectives

Biosecurity in Estonian dairy and beef cattle herds was assessed using Biocheck.UGent, an independent scoring system, which provides a report with scoring results per subcategory (such as animal management, transport, cleaning etc), divided in external and internal biosecurity. The herd sizes of the study herds ranged from 72 to 1120 milking cows for dairy farms. Beef herd sizes ranged from 21 to 185 dams.

### Material and Methods

A random sample of registered Estonian dairy (n=25) and beef (n=20) cattle farms were selected for the study, excluding the bottom herd size quartile for both populations. The assessments were conducted during the spring and summer seasons in 2024.

### Results

The study found that the average total score for dairy farms was 58% (world average: 55%) and for beef farms 49% (world average: 52%). The general biosecurity level in dairy herds was found to be compatible with world average with most of the evaluated subcategory scores being higher than the world average, 2 out of 11 subcategories scores being lower than the world averages scores. In beef farms, the subcategory scores were lower than the world averages, with 6 out of 10 subcategories being lower on average than the world average.

### Conclusions

In the surveyed dairy farms improvements can be made in external biosecurity measures (Transport & carcass removal and feed & water). In beef cattle farms there were some deficiencies in external measures, but a number of improvements are necessary in internal biosecurity management (health-, calf-, adult cattle management, work organization and equipment).

## ID 58

# ADAPTATION OF NEXT GENERATION BIOSECURITY ENHANCES PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME TYPE 1 CONTROL IN A UK PIG HERD – PRELIMINARY RESULTS

**Alex Thomsett**[1]; Margaret Bolton[2]; Jerry Williams[2]; Lysan Eppink[2]
*1. The George Veterinary Group; 2. Boehringer Ingelheim Animal Health UK Ltd*

## Introduction

On a breed to grower (40kg) farm, Porcine Reproductive and Respiratory Syndrome Virus (PRRSv) type 1 positive, stable (1) for the proceeding nine years, routine monitoring of unvaccinated, growing pigs identified PRRSv infection by PCR testing of oral fluids and serum. The variant detected was 98.5% homologous (ORF 5) to historical PRRSv isolates recovered from a finishing herd within the same production system. Herd monitoring was completed quarterly.

## Objectives

The goal of the producer was to re-establish a PRRSv negative, unvaccinated status from wean to finish to reduce the cost of production. To achieve this, evidence-based biosecurity measures (2,3) and enhancement of the PRRSv vaccination programme (booster vaccine at 40kg) would be applied to the production system.

## Material and Methods

All sites in the production system were audited using UGhent Biocheck (4) to identify key biosecurity interventions (Table 1).

Monitoring of the PRRSv status of the herd will be by monthly PCR testing of serum and oral fluid samples collected from due-to-wean piglets (28 days old), growers and gilts (Table 2).

Biosecurity audits will be repeated on all sites at 6 months and key performance indicators (KPIs) for both breeding and feeding herds will be compared before and after interventions. Results will undergo statistical analysis.

## Results

Preliminary data from biosecurity audits identified external scores of 63-80% and internal scores of 32-57%. Biocheck world average at the time was 68% (external) and 63% (internal).Key biosecurity interventions identified included direction of pig flow, hygiene of pig transport vehicles, and adherence to site entry and loading ramp protocols (Table 1)Routine PRRSv monitoring continues and to date has returned negative PCR results from all groups (Table 2).

## Conclusions

To date, biosecurity interventions have been characterised and implemented (November 2024). Preliminary data are promising. Monthly PRRSv monitoring continues.Follow-up biosecurity audits, KPI evaluation, and cessation of enhanced PRRSv vaccination are due for completion.

## Keywords

PRRSv • Biosecurity

Continue –>

Table 1 Key biosecurity issues identified and corrective actions implemented

| Issue | Action |
|---|---|
| Poor adherence to unidirectional pig flow | • Re-establish direction of pig flow<br>• Inform all staff and visitors of correct flow between sites<br>• Ensure all pigs, personnel and people follow unidirectional flow |
| Poor cleaning and disinfection of pig transportation | • All vehicles transporting pigs between sites to be properly cleaned and disinfected between uses |
| Poor adherence to site entry protocols | • ALL external personnel entering each site required to observe 2 nights pig freedom<br>• ALL personnel required to shower in and out of each site<br>• Where possible maintenance equipment to be available at each site OR fully cleaned and disinfected before entry |
| Enhanced loading ramp protocol | • No personnel to enter sites via loading ramp<br>• Drivers to use coveralls and boots provided at each ramp for whenever loading or unloading pigs |

Table 2 PRRSv monitoring results from January 2024 to February 2025

| Date | Animals sampled | Type of sample/test | Results |
|---|---|---|---|
| January 2024 | Growers | Oral fluid/PCR | 9/9 Negative |
| May 2024 | Growers | Oral fluid/PCR | 2/8 Positive, 6/8 Negative |
| June 2024 | Growers | Blood/PCR | 9/12 Positive pools<br>3/12 Negative pools |
| October 2024 | Nursery | Blood/PCR | 1/60 Positive<br>59/60 Negative |
| December 2024 | Due-to-wean | Blood/PCR | 30/30 Negative |
| February 2025 | Due-to-wean | Blood/PCR | 30/30 Negative |
| | Growers | Oral fluid/PCR | 5/5 Negative |
| | Gilts | Oral fluid/PCR | 4/4 Negative |
| March 2025 | Due-to-wean | Blood/PCR | 30/30 Negative |

Green = Monitoring immediately before PRRSv breakdown; Red = Diagnostic sampling to characterise breakdown; Yellow = monitoring samples collected after enhanced vaccination and biosecurity actions implemented

## ID 59
# MAPPING BIOSECURITY PRACTISES AND FLOCK HEALTH IN GREEK DAIRY SHEEP FARMS

**Georgios Batikas**[1]; Maria Eleni Flippitzi[1]; Alexandra Zemou[1]; Sotiria Vouraki[2]; Georgios Arsenos[1]
*1. Aristotle University of Thessaloniki, School of Veterinary Medicine, University Campus, 54124 Thessaloniki, Greece; 2. University of Ioannina, School of Agriculture, Kostakioi, 47100 Arta, Greece*

### Introduction
Farm biosecurity supports animal health, welfare and productivity.

### Objectives
The objective of this study was to assess the biosecurity measures and animal health status in commercial dairy sheep farms in the region of Eastern Macedonia and Thrace (EMT) of Greece that borders with Turkey.

### Material and Methods
Data were collected from 44 farms through structured interviews and on-site inspections. A standardized questionnaire was used to assess biosecurity protocols, management practices, and flock health. Descriptive statistics were computed using R programming language.

### Results
Goats and other livestock species were additionally reared in 18.2% and 38.6% of farms, respectively. In 36.4% of farms, maintenance of milking parlour was not annual; in 27.3% of farms was performed by unskilled technicians. Isolation pens were not available in 68.2% of farms. Veterinary medication was administered in the milking parlour in 90.9% of farms; treatment records were kept at 31.8% of farms. None of the farms implemented quarantine for newly bought animals, or maintained a designated clean area, or restricted visitor access. Vaccinations against Clostridium perfringens, Mycoplasma agalactiae, and Chlamydia abortus were performed in 45.5% of farms; 34.1% administered additional vaccines. Mastitis was reported in all farms (mean prevalence: 5.3% ± 9.1%) with gangrenous mastitis being dominants in 65.9% of farms. Lameness affected 72.7% of sheep (mean prevalence: 9.19% ± 13.06%). Maedi-Visna was reported in 45.5% of farms, with a mean mortality rate of 8.6% ± 15.4%. Sheep pox was detected in 18.2% of farms.

### Conclusions
The results suggest that the absence of essential and structured biosecurity measures is associated with widespread disease presence and economic losses. Policy interventions, including stricter quarantine protocols, improved biosecurity training, and promoting preventive health practices, are critical to safeguard animal health and farm productivity.

### Financial support and Acknowledgements
This work is part of a research project funded by the Region of Eastern Macedonia & Thrace (ELKE-AUTH: 76290).

### Keywords
Dairy sheep • Biosecurity • Flock health

POSTER COMMUNICATIONS

## ID 61

# STRATEGIC RESPONSE TO THE RE-EMERGENCE OF FOOT-AND-MOUTH DISEASE IN EUROPE: NATIONAL PREPAREDNESS AND BIOSECURITY REINFORCEMENT IN SERBIA

**Bojan Milovanović**[1]; Vesna Milićević[1]; Milan Ninković[1]; Jelena Maletić[1]; Božidar Savić[1]; Branislav Kureljušić[1]; Milan Maletić[2]; Boban Đurić[3]

*1. Scientific Institute of Veterinary Medicine of Serbia; 2. Faculty of Veterinary Medicine, University of Belgrade, Serbia; 3. Ministry of Agriculture, Forestry, and Water Management – Veterinary Directorate of the Republic of Serbia*

## Introduction

Foot-and-mouth disease (FMD) was re-confirmed in Europe on January 10, 2025, in Germany after a 37-year absence, followed by cases in Hungary (March 6) and Slovakia (March 21). FMD remains one of the most severe and economically damaging transboundary animal diseases, with morbidity up to 100%. While adult cattle mortality rarely exceeds 5%, the EU currently mandates culling all animals on infected farms, resulting in total (100%) mortality.

## Objectives

In light of the unfavorable epidemiological developments, the Republic of Serbia has launched targeted education programs for veterinarians and commercial livestock producers. The agenda included raising awareness on caprine and ovine pox, peste des petits ruminants; however, primary emphasis was placed on FMD as the most critical threat.

## Material and Methods

The education programs were divided into three core segments: current epidemiological trends, clinical and differential diagnosis, and the implementation of biosecurity measures as a cornerstone of reducing the risk of incursion pathogens to the countries and farms. Particular attention was given to the Operational Manual for Implementation of the Crisis Plan for Control and Eradication of Foot-and-Mouth Disease (Ministry of Agriculture, Forestry, and Water Management – Veterinary Directorate of the Republic of Serbia).

## Results

A “round table” discussion followed, yielding key conclusions:Urgent strengthening of biosecurity protocols is crucial to prevent pathogen incursion;Border control (land and air) is the first line of defense;A new Order on Preventive Measures for FMD Introduction into Serbia (Official Gazette RS, No. 6/2025) has been enacted;Human activity- direct or indirect (vehicles, clothing, footwear) and air transmision poses the highest risk;Monitoring of workers’ movements is essential due to travel to possibe FMD-affected countries;Passive surveillance represents one of the most effective methods for early disease detection.

## Conclusions

The Republic of Serbia recognized the importance of FMD prevention and implemented necessary measures.

## Financial support and Acknowledgements

The study was funded by the Serbian Ministry of Science, Technological Development and Innovation (Contract 451-03-47/2023-01/200030).

## Keywords

FMD • biosecurity • transboundary animal diseases • training • crisis menagment

## ID 62
# ASSESSMENT OF CLEANING AND DISINFECTION PRACTICES ON CONVENTIONAL INDOOR PIG FARMS ACROSS 19 COUNTRIES WORLDWIDE

**Iryna Makovska**[1]; Ilias Chantziaras[1]; Nele Caekebeke[2]; Jeroen Dewulf[1]
*1. Ghent University; 2. Biocheck.Gent BV*

### Introduction
Biosecurity measures play a pivotal role in minimizing the risk of introducing and spreading infectious agents. Within biosecurity, cleaning and disinfection (C&D) procedures play an important role.

### Objectives
The current study aimed to assess the implementation of C&D procedures on conventional pig farms during 2019–2023, with a focus on identifying areas that warrant improvement.

### Material and Methods
Biocheck.UGent (https://biocheckgent.com) data from 22285 pig farms in 19 countries worldwide collected between 2019–2023 were considered, and parameters that are of interest to C&D measures were selected.

### Results
In terms of protecting the farm from external threats (external biosecurity), 70% of the respondents reported the presence of a hygiene lock and its use by visitors. This practice was especially high in Germany (94%), the Netherlands (94%), and South Africa (95%). Disinfection baths/boot washers were present at the entrance of 57% of farms, with regular changing of fluid in the baths on 67% of farms. However, the application of specific measures for the proper introduction of material was reported on only 35% of the farms. Regarding internal biosecurity, 43% of farms reported the presence of disinfection baths and/or boot washers between compartments/units, and even fewer farms (24%)had hand washing stations and/or hand disinfection equipment between compartments/units. The protocol for C&D of equipment after use was present in almost half of the farms (49%). More than half of farms (64%) reported following proper cleaning and disinfection procedures. In terms of implementing C&D procedures after each production cycle, 84% of farms revealed a well-implemented practice in all countries. However, the effectiveness of these practices (e.g., by taking samples) was only validated on 9% of the farms.

### Conclusions
The assessment of C&D measures revealed both areas of high implementation and scope for improvement. Improving the knowledge exchange on biosecurity among pig farming actors might be the way forward.

### Keywords
biosecurity • Biocheck.Ugent • pig farming • barn hygiene • cleaning|disinfection

Continue –>

**External farm biosecurity factors associated with C&D**

| Country | 1. Presence of Hygiene Lock | 2. Presence of Disinfection Baths/Boot Washers Present at the Entrance of the Farm | 3. Appropriate Change of Fluid in Disinfection Baths * | 4. C&D Measures Taken for the Introduction of Materials |
|---|---|---|---|---|
| Australia | 66% | 13% | 47% | 41% |
| Belgium | 86% | 89% | 88% | 21% |
| Brazil | 59% | 15% | 20% | 16% |
| China | 89% | 79% | 78% | 83% |
| Finland | 88% | 79% | 55% | 19% |
| Germany | 94% | 42% | 58% | 22% |
| Hungary | 86% | 71% | 81% | 45% |
| Ireland | 56% | 49% | 92% | 13% |
| Italy | 76% | 29% | 80% | 14% |
| The Netherlands | 94% | 60% | 60% | 22% |
| Nigeria | 7% | 65% | 100% | 13% |
| Philippines | 16% | 28% | 21% | 36% |
| Poland | 89% | 80% | 82% | 70% |
| Serbia | 56% | 59% | 38% | 19% |
| Slovenia | 27% | 19% | 78% | 21% |
| South Africa | 95% | 100% | 84% | 55% |
| South Korea | 85% | 76% | 74% | 76% |
| Spain | 81% | 52% | 75% | 22% |
| Vietnam | 91% | 80% | 68% | 62% |
| **Average** | **70%** | **57%** | **67%** | **35%** |

*—only applicable to farms that reported the presence of disinfection baths.

**Internal farm biosecurity factors associated with C&D**

| Country | 1. Presence of Protocol for the C&D of Equipment | 2. Presence of Hand Washing Stations and/or Hand Disinfection Equipment between Compartments/Units | 3. Presence of Disinfection Baths/Boot Washers between Compartments/Units | 4. C&D Measures in Corridors and Loading Areas | 5. Conducted C&D after Each Production Cycle | 6. Provided Different Stages in the C&D Process | 7. Long Enough Sanitary Break | 8. Checking the Efficacy of C&D |
|---|---|---|---|---|---|---|---|---|
| Australia | 15% | 6% | 19% | 19% | 63% | 55% | 66% | 0% |
| Belgium | 59% | 24% | 38% | 79% | 74% | 90% | 97% | 2% |
| Brazil | 39% | 26% | 15% | 78% | 96% | 72% | 82% | 6% |
| China | 66% | 48% | 79% | 74% | 95% | 75% | 90% | 53% |
| Finland | 35% | 12% | 27% | 43% | 50% | 58% | 92% | 0% |
| Germany | 57% | 10% | 31% | 50% | 90% | 54% | 75% | 0% |
| Hungary | 50% | 43% | 52% | 43% | 95% | 67% | 69% | 5% |
| Ireland | 46% | 20% | 35% | 51% | 45% | 61% | 87% | 2% |
| Italy | 55% | 31% | 38% | 85% | 94% | 94% | 96% | 2% |
| The Netherlands | 48% | 13% | 55% | 60% | 82% | 62% | 72% | 2% |
| Nigeria | 4% | 4% | 2% | 50% | 80% | 2% | 4% | 0% |
| Philippines | 61% | 26% | 20% | 53% | 87% | 59% | 76% | 5% |
| Poland | 46% | 52% | 69% | 63% | 96% | 86% | 93% | 3% |
| Serbia | 65% | 7% | 42% | 64% | 98% | 30% | 62% | 1% |
| Slovenia | 25% | 21% | 17% | 50% | 65% | 56% | 63% | 0% |
| South Africa | 56% | 32% | 99% | 33% | 97% | 79% | 90% | 7% |
| South Korea | 85% | 29% | 69% | 88% | 97% | 82% | 88% | 46% |
| Spain | 54% | 11% | 46% | 48% | 97% | 69% | 89% | 3% |
| Vietnam | 70% | 40% | 58% | 79% | 95% | 59% | 88% | 39% |
| **Average** | **49%** | **24%** | **43%** | **58%** | **84%** | **64%** | **78%** | **9%** |

## ID 63
# ASSESSING BIOSECURITY COMPLIANCE AND TRENDS IN IRISH BROILER FARMS FROM 2019 TO 2023

**Lianjie Wei**[1]; Edgar Garcia Manzanilla[1]; Alberto Allepuz Palau[2]; Carla Correia-Gomes[3]
*1. Teagasc & Universitat Autònoma de Barcelona, Teagasc; 2. Universitat Autònoma de Barcelona; 3. Animal Health Ireland*

### Introduction
Biosecurity measures are essential to prevent the introduction and spread of pathogens within and between broiler farms. Implementing effective biosecurity practices not only protects animal health but also enhances productivity, welfare, and farm sustainability in general, highlighting the importance of monitoring and improving biosecurity compliance.

### Objectives
This study aimed to assess temporal trends in biosecurity compliance on Irish broiler farms from 2019 to 2023, identify areas of low compliance based on biosecurity scores, and explore potential causes using the recommendations provided by private veterinary practitioners (PVPs).

### Material and Methods
Data from 403 commercial broiler farms were collected through annual assessments using the Biocheck.UGent tool, completed by trained PVPs. Biosecurity scores (internal, external, total) and categorized recommendations were analysed and visualised over time. For farms assessed more than twice, trends were examined across sequential visits. Statistical analyses included Kruskal-Wallis and Dunn's post-hoc tests to evaluate differences between years and visits.

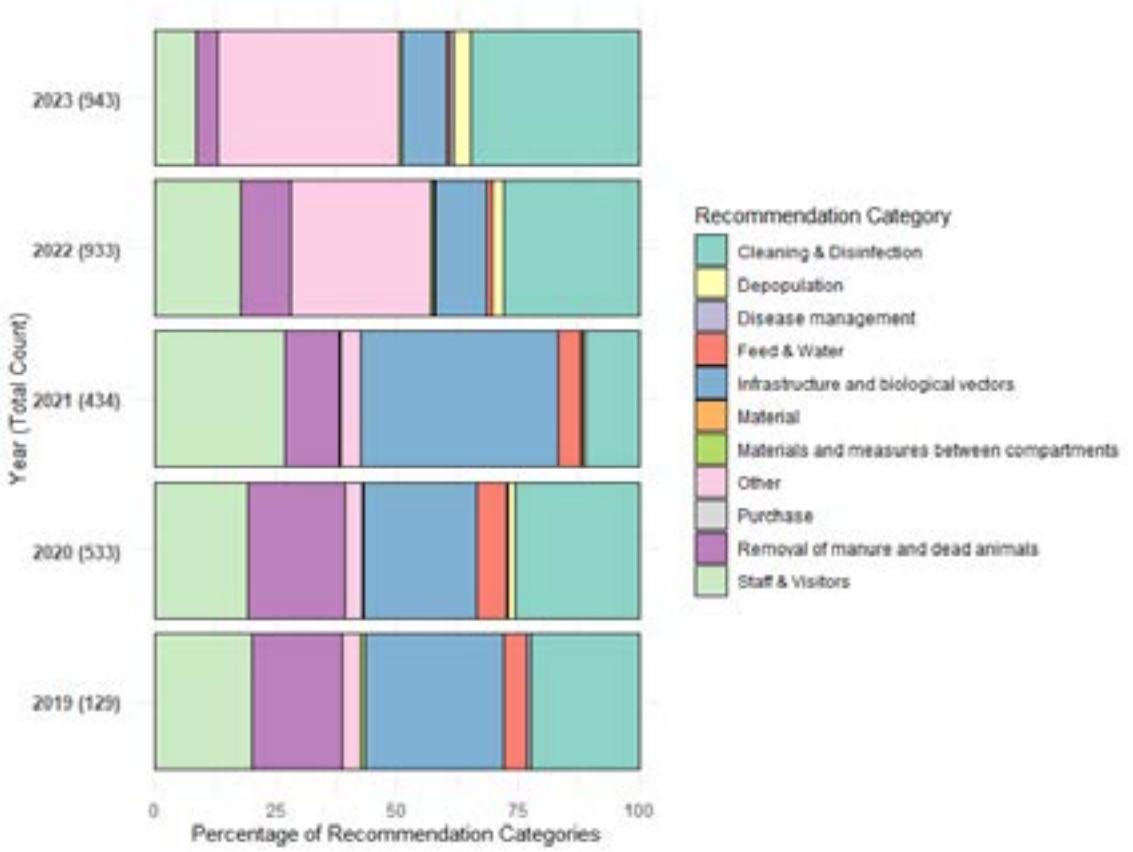
### Results
An overall upward trend was observed in biosecurity compliance. Median internal scores increased from 60 to 75 and external scores from 50 to 65 ($p < 0.05$). Among farms assessed at least three times, total scores improved by approximately 10 points after the first visit. However, some categories showed persistently low scores. such as material supply and cleaning and disinfection, with the latter being one of the most frequently recommended area. Notably, the distribution of recommendations were not always aligned with scores of categories, which means categories with high compliance may receive frequent recommendations, such as infrastructure and biological vectors.

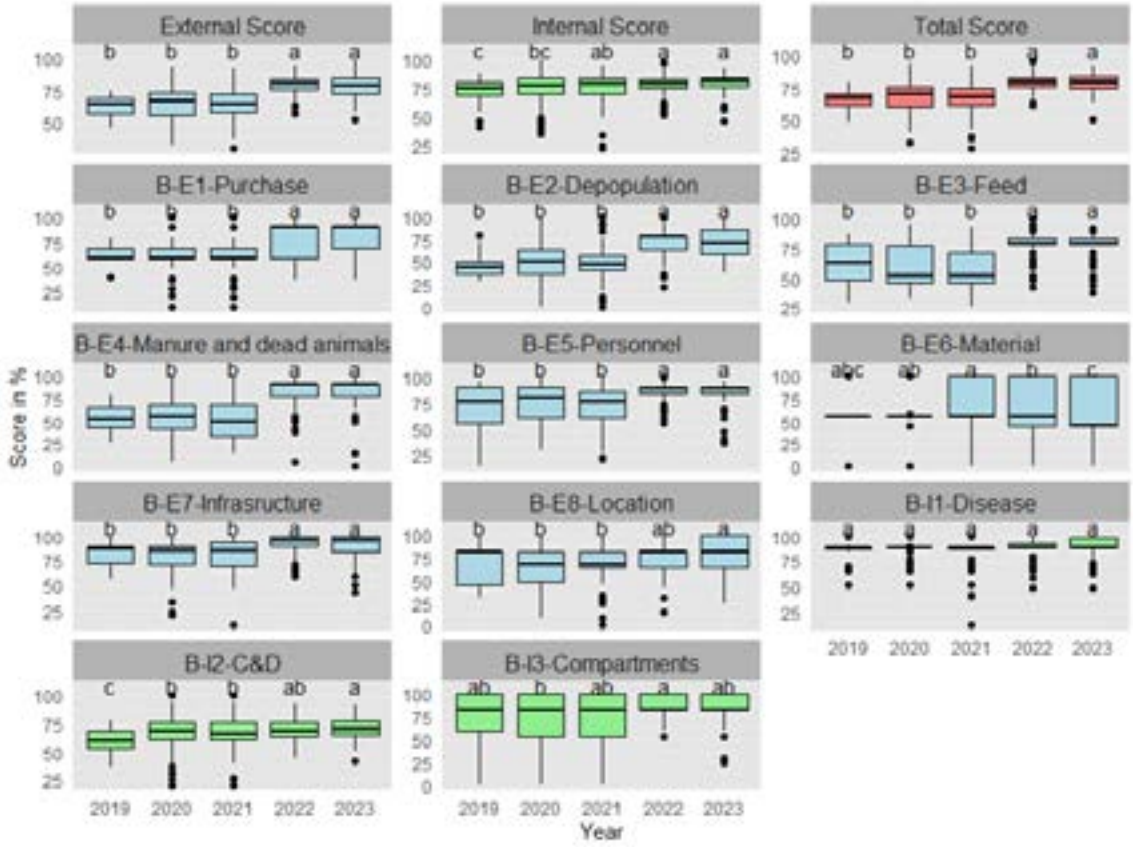
### Conclusions
While general improvement in broiler farm biosecurity compliance was observed, categories with weak compliance still exist. Targeted practices should be implemented after identification of these areas. Greater support should be provided to farmers to implement recommended practices, and further training for PVPs may help ensure that recommendations align more consistently with quantified scores.

### Keywords
Biocheck.Ugent • biosecurity • broilers • Ireland

Continue –>

## **POSTER** COMMUNICATIONS



## ID 64
# HOW CAN WE DO BIOSECURITY BETTER? RESEARCH GAPS AND OPPORTUNITIES

**Julia M. Smith**[1]; Victoria J. Brookes[2]; Jake Fountain[3]; Lynne Hayes[4]; Jennifer Manyweathers[4]; Jenny-Ann Toribio[2]; Suman Das Gupta[4]; Jane Heller[4]; Marta Hernandez-Jover[4]

*1. University of Vermont; 2. University of Sydney; 3. Charles Sturt University; 4. Charles Sturt University and Gulbali Institute*

### Introduction
Given the combination of socio-psychological and economic drivers of behavior, developing and delivering effective interventions to motivate the adoption of biosecurity measures is a complex challenge. Previous studies have sought to understand the perceptions of various types of farmers and the associated benefits and barriers relevant to performing biosecurity and animal health measures broadly as well as the role of veterinarians in promoting preventive health on client farms.

### Objectives
A scoping review was conducted to first identify and evaluate reported efforts in which the objective was to make a change in behavior relevant to disease prevention (i.e., implement a biosecurity intervention) and secondly, to explore frameworks and theoretical constructs informing the implementation of future biosecurity interventions.

### Material and Methods
This review was conducted consistent with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews guidelines, and the protocol was published on OSF. Structured searches were conducted within CAB Abstracts, Education Resources Information Center (ERIC), Communication and Mass Media Complete, MEDLINE, SCOPUS, and Web of Science Core Collection. These searches yielded 534 records that were uploaded into Covidence prior to de-duplication and screening. Title and abstract screening was followed by full text screening to identify records that were peer-reviewed primary sources in English, had full text available, and reported an investigation in which the objective was to evaluate behavior change interventions aimed at protecting animal health at the farm level from infectious disease challenges.

### Results
Following de-duplication 360 records remained, of which 271 were eligible for full-text screening, and 24 met the inclusion criteria.

### Conclusions
Results so far suggest there has been limited focus on tools to improve biosecurity and the value of the second objective of the review, which is to address how to fill this gap by leveraging the theoretical constructs and frameworks of behavior change used in multiple disciplines.

### Keywords
animal biosecurity • behavior change • scoping review

## ID 65

# BIOSECURITY PRACTICES AND BRUCELLOSIS INCIDENCE IN DAIRY FARMS: A STUDY OF CATTLE FARMS IN KOSOVO

**Blerta Mehmedi Kastrati**[1]; Curtis R. Youngs[2]; Armend Cana[3]; Vesna Knights[4]; Krenar Terstena[5]

*1. Faculty of Agriculture and Veterinary, University of Prishtina, Kosovo; 2. Department of Animal Science, Iowa State University, Ames, Iowa, US; 3. Kosovo Food and Veterinary Agency, Kosovo; 4. Faculty of Technology and Technical Sciences, University St. Kliment Ohridski-Bitola, North Macedonia; 5. Veterinary Practitioner*

## Introduction

Brucellosis is a zoonotic disease caused by Brucella bacteria, affecting multiple livestock species and posing serious public health risks, with over 500,000 human cases annually (Pappas et al., 2006). While many European countries have eradicated it, some cases may be travel-acquired (Pappas et al., 2006). The disease persists in developing nations, including Kosovo, where weak biosecurity leads to frequent outbreaks (Izadi et al., 2024). Despite strict EU regulations, cross-border livestock trade with non-EU countries continues, posing a serious risk and highlighting the need for effective biosecurity measures (Fèvre et al., 2006).

## Objectives

This study evaluates the implementation level of biosecurity measures in dairy farms in Kosovo and its correlation with brucellosis incidence.

## Material and Methods

The study was conducted on 39 cattle farms across the municipalities of Istog, Klina, Gjilan, Kamnica, Peja, Suhareka, and Lipjan. Data were collected between September 2023 and January 2024. The questionnaire was created by Working Group 1 of the sub-group on cattle in the COST Action “Better” and consists of 37 questions.

## Results

A comparison between Brucella-free Fig. 1 (n = 14) and Brucella-infected farms Fig. 2 (n = 25) revealed substantial disparities in biosecurity practices. Brucellosis-free farms demonstrated stricter quarantine enforcement (93% vs. 52%), more stringent visitor hygiene protocols (71% vs. 32%), more restricted grazing contact with other herds (71% vs. 40%), and higher rates of disinfection of feedstuffs (75% vs. 40%). Conversely, post-entry disease testing was higher in infected farms than non-infected farms (88% vs. 79%), indicating a reactive rather than preventive approach.

## Conclusions

This study confirms a strong correlation between inadequate biosecurity measures and brucellosis outbreaks in Kosovo’s cattle farms. Poor quarantine enforcement, insufficient disease testing, and weak protective measures significantly increased infection rates. The study highlights the urgent need for a national biosecurity strategy to protect public health and prevent further disease outbreaks and economic losses.

## Financial support and Acknowledgements

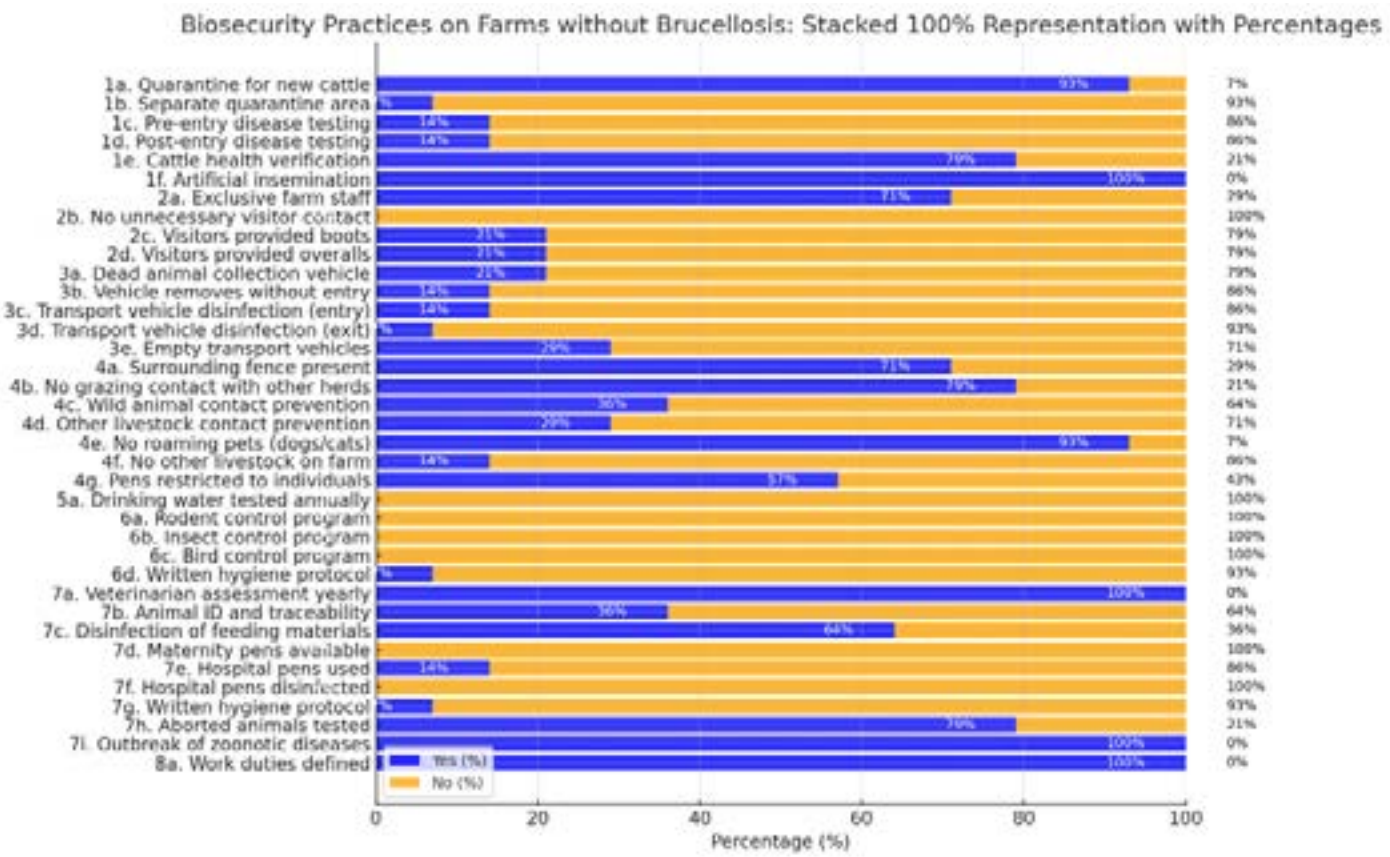
No

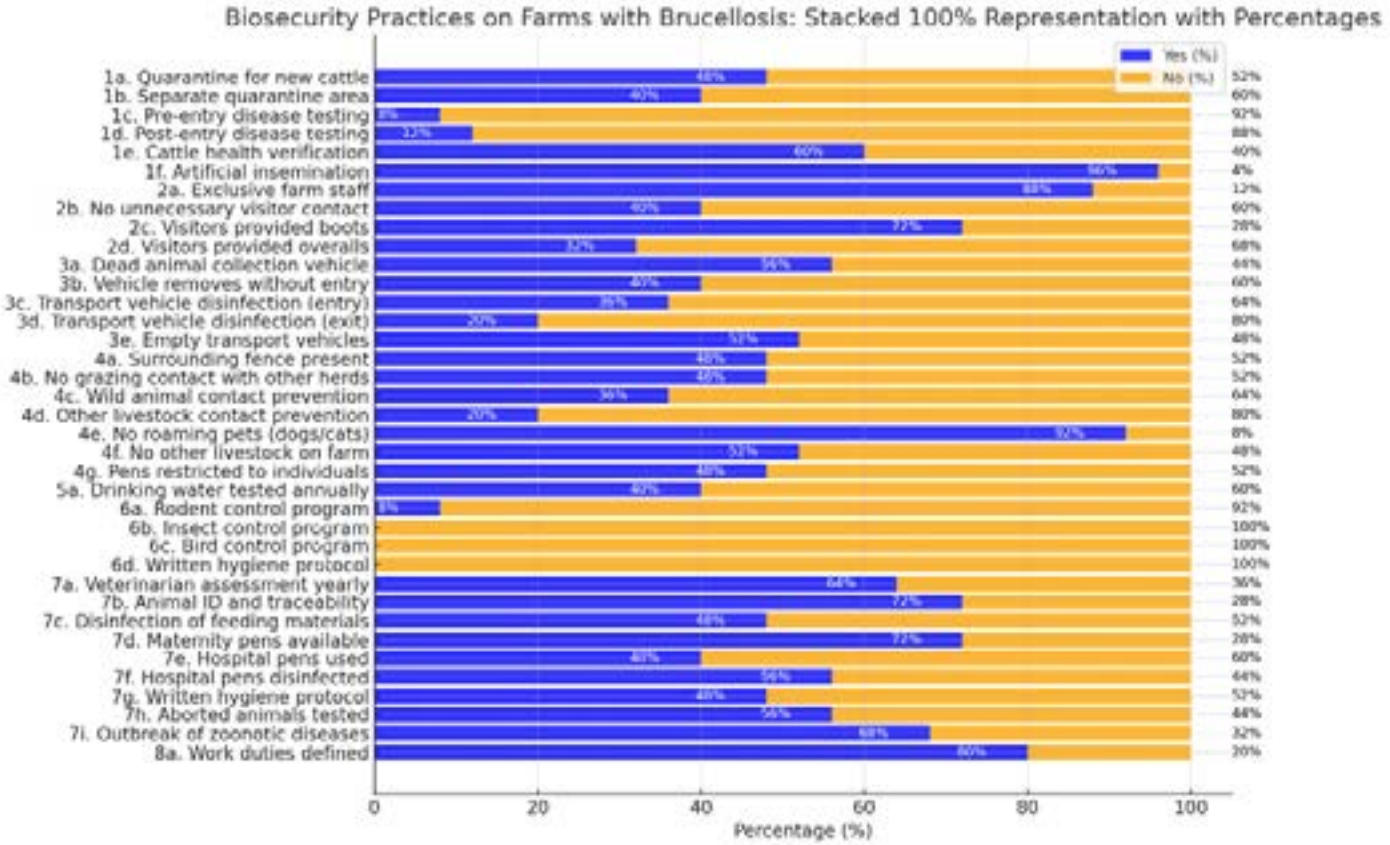
## Keywords

Brucellosis • biosecurity • dairy farms • Kosovo

Continue –>

## **POSTER** COMMUNICATIONS



## ID 66
# PERSONAL BIOSECURITY PRACTICES ADOPTED BY RUMINANT FARMERS AND VETERINARIANS IN GEORGIA

**Saliha Sahin**[1]; Daniel Beltrán-Alcrudo[2]; Ipek Keskin[3]; Dragan Angelovski[4]; Mikheil Sokhadze[5]
*1. Marmara University, School of Medicine, Türkiye, Food and Agriculture Organization (FAO); 2. Regional Office for Europe and Central Asia, Budapest, Hungary; 3. Department of Epidemiology, Republic of Türkiye Ministry of Agriculture and Forestry; 4. FAO Georgia, technical advisor; 5. FAO Georgia, National Team Leader of NAITS project*

## Introduction
Zoonoses pose a major economic and public health threat globally and Georgia is particularly impacted by several of them, such as brucellosis or echinococcosis, among others. By implementing personal biosecurity measures, exposure to those pathogens can be minimized.

## Objectives
The aim of this study was to evaluate the extent to which veterinarians and farmers working with ruminants adopt personal biosecurity measures.

## Material and Methods
A cross-sectional questionnaire-based study was conducted from July–September 2024 among ruminant farmers and veterinarians across the country of Georgia.

## Results
A total of 433 farmers and 114 veterinarians were surveyed. Most of them (table 1) reported to practice proper hand washing, milk boiling, carcass disposal, cleaning, and disinfection; as well as personal protective equipment (PPE) usage while working with animals in different situations. However, an insuficient use of face masks and protective glasses in high-risk situations such as managing aborted materials was identified. Moreover, 41.8% of the farmers did not believe they could contract a disease from animals.

## Conclusions
Despite widespread adoption of personal biosecurity practices among farmers and veterinarians; insufficient use of face masks and protective glasses in high-risk situations, combined with the belief among some farmers that animals cannot transmit diseases and the gaps in knowledge about zoonoses, require further attention. In the future, policies and research should prioritize tailored education and awareness campaigns to strengthen personal biosecurity and zoonosies prevention. Such campaigns could integrate the One Health approach.

## Financial support and Acknowledgements
The study was done in the context of the project GCP/GLO/074/USA “Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs)” which was funded by the United States Department of Defense, Defense Threat Reduction Agency (DTRA). The content of the information does not necessarily reflect the position or the policy of the Federal Government of the United States, and no official endorsement should be inferred.

## Keywords
Personal Biosecurity • Ruminants • Zoonoses

Continue –>

**Table 1. Implementation level of some personal protective equipment (PPE) by farmers**

| PPE items / Situations | Farm-clothing n (%) * | Gloves n (%) * | Face mask n (%) * | Protective glasses n (%) * |
|---|---|---|---|---|
| Contact with clinically sick animals | | | | |
| Always | 339 (78.3) | 291 (67.2) | 191 (44.1) | 121 (27.9) |
| Sometimes | 63 (14.5) | 105 (24.2) | 116 (26.8) | 108 (24.9) |
| Never | 31 (7.2) | 37 (8.5) | 126 (29.1) | 204 (47.1) |
| Contact with dead animals/disposing of carcasses | | | | |
| Always | 347 (80.1) | 338 (78.1) | 229 (52.9) | 138 (31.9) |
| Sometimes | 50 (11.5) | 60 (13.9) | 91 (21) | 105 (24.3) |
| Never | 36 (8.3) | 35 (8.1) | 113 (26.1) | 190 (43.9) |
| Assisting parturition | | | | |
| Always | 354 (82.1) | 319 (74) | 154 (36.4) | 94 (22.6) |
| Sometimes | 56 (13) | 84 (19.5) | 119 (28.1) | 101 (24.3) |
| Never | 21 (4.9) | 28 (6.5) | 150 (35.5) | 220 (53) |
| Disposal of aborted placentas and stillbirths | | | | |
| Always | 334 (77.1) | 306 (70.7) | 186 (43) | 125 (28.9) |
| Sometimes | 59 (13.6) | 80 (18.5) | 113 (26.1) | 102 (23.6) |
| Never | 40 (9.2) | 47 (10.9) | 134 (30.9) | 206 (47.6) |
| Cleaning surfaces/stables | | | | |
| Always | 316 (73.3) | 254 (58.7) | 132 (30.5) | 106 (24.5) |
| Sometimes | 90 (20.9) | 130 (30) | 139 (32.1) | 102 (23.6) |
| Never | 25 (5.8) | 49 (11.3) | 162 (37.4) | 225 (52) |

* Percentage of column

## ID 67

# DEVELOPMENT OF A NOVEL BIOSECURITY RISK ASSESSMENT SCORING TOOL FOR IRISH PASTURE-BASED DAIRY FARMS: BIOSECOREDAIRY

**Siobhán O'Donovan**[1]; John Mee[2]; Conor McAloon[3]; Luke O'Grady[4]; Tim Geraghty[5]
*1. Teagasc Moorepark and University College Dublin; 2. Teagasc Moorepark; 3. University College Dublin; 4. University College Dublin; 5. SRUC*

### Introduction
Biosecurity risk assessment tools are important to identify deficits in animal health management practices.

### Objectives
To develop a biosecurity scoring tool to be used on Irish dairy pasture-based farms.

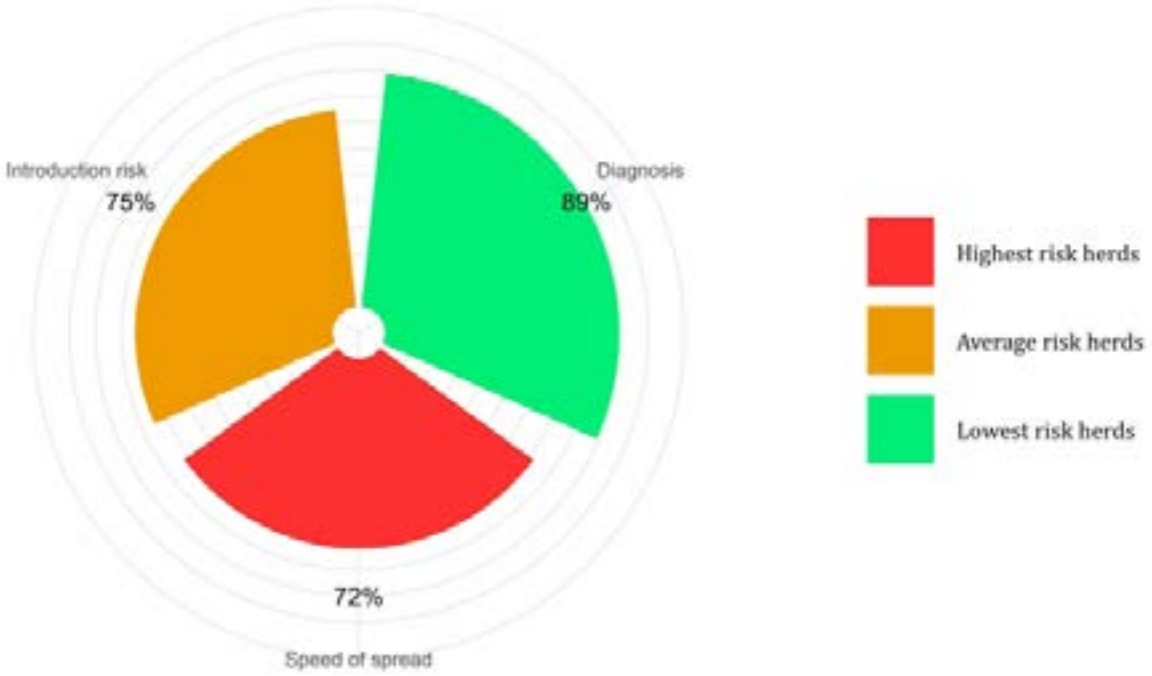
### Material and Methods
BioscoreDairy is an online risk assessment tool which contains 4 sections; Risk of disease entry, Speed of spread of disease, Diagnosis of infection and Vaccination/Baseline resilience. A biosecurity questionnaire with 75 questions was drafted based on the relevant literature (O Donovan et al., 2024). The responses to questions were weighted by expert opinion using the best-worst scaling (BWS) system in the software Conjointly. Experts in biosecurity carried out the weighting process in three online sessions. The five expert groups included veterinary practitioners (n=5), ECBHM (European College of Bovine Health Management) (n=7) members, Department of Agriculture Food and Marine (DAFM) (n= 14) specialists in biosecurity, Animal Health Ireland's (AHI) Technical Working Group (TWG) (n=8) for biosecurity and the project team (n=5). In total 39 experts took part in the weighting process. As part of the BioscoreDairy report, the animal movements into the herd are analysed. This takes into account the number of animal movements into the herd and the number of source herds.

### Results
Following completion of the three online sessions the software assigned best and worst scores to 53 biosecurity practices and a farm biosecurity score per section. BiosecoreDairy is now being used as part of a biosecurity audit and intervention study.

### Conclusions
This project will determine current national biosecurity status and assess the impact of interventions.

### Keywords
Biosecurity • Pasture based • Dairy • BioscoreDairy • Risk assessment tool

Continue –>




| | Your herd | Average herd |
|---|---|---|
| *Diagnosis* | 89 | 76 |
| *Introduction risk* | 75 | 74 |
| *Speed of spread* | 72 | 78 |

## ID 68
# BIOSECURITY PRACTICES IN SMALL RUMINANT FARMS IN TÜRKIYE

**Mafalda Pedro Mil-Homens**[1]; Senem Elcin Berber[2]; Ipek Keskin[1]; Eran Raizman[3]; Daniel Beltrán-Alcrudo[3]; Alberto Allepuz Palau[1]

*1. Universitat Autònoma de Barcelona, Barcelona, Spain; 2. United Nations Environment Programme/Mediterranean Action Plan, Athens, Greece; 3. Food and Agriculture Organization of the United Nations, Regional Office for Europe and Central Asia, Budapest, Hungary*

## Introduction
Small ruminant farming plays an important role in Türkiye. Therefore, it is crucial to prevent diseases by enhancing biosecurity. A project part of the "Global Framework for the Progressive Control of Transboundary Animal Diseases", funded by the United States Department of Defense, Defense Threat Reduction Agency, addressed this issue.

## Objectives
The main objective was to characterize biosecurity practices implemented in small ruminant farms across Türkiye.

## Material and Methods
A cross-sectional study surveyed 364 small ruminant breeders across five provinces of Türkiye, Ankara, Van, Canakkale, Mersin, and Balikesir. The survey featured nine sections, including general information, farm management, health management, direct contact, indirect contact, animal purchase, selling animals, animal movements, and management of dead animals. Data analysis involved descriptive statistics, alongside a Multiple-Correspondence Analysis.

## Results
The survey found that 57% of herds interacted with other animals in shared pastures, while 30% shared vehicles or equipment. Additionally, 59% attended festivals, and 99% bought animals in the last two years, with 67% not implementing quarantine, and only 19% implementing quarantines for more than 15 days. For dead animal disposal, 39% buried them, and 9% fed them to dogs. The study found differences in biosecurity practices based on province, gender, education, herd size, and production system.

## Conclusions
Results showed that there is room for improvement, particularly in animal movements, management of dead animals, and sharing of vehicles and equipment. The high proportion of herds with direct contact with other farms suggests that biosecurity improvement programs should be targeted at the community level rather than at the individual herd level, while considering local cultural and socio-economic circumstances and practices. Moreover, differences between provinces, genders, education, and herd size and type suggest that biosecurity improvement programs should be tailored to each group's needs.

## Financial support and Acknowledgements
The study was done in the context of the project GCP/GLO/074/USA "Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs)" which was funded by the United States Department of Defense, Defense Threat Reduction Agency (DTRA). The content of the information does not necessarily reflect the position or the policy of the Federal Government of the United States, and no official endorsement should be inferred.

## Keywords
Biosecurity • Small ruminants • Health management • Survey analysis • Multiple correspondence analysis

## ID 69

# RELATIONSHIP BETWEEN LEARNING OUTCOMES, COMPETENCIES AND FORMATIVE AND SUMMATIVE ASSESSMENT OF STUDENT LEARNING IN FARM ANIMALS BIOSECURITY COURSES

**Slavča Hristov**[1]; Branislav Stanković[1]; Dimitar Nakov[2]; Jasna Prodanov Radulović[3]; Branislav Kureljušić[4]; Milica Rađenović[1]
*1. Faculty of Agriculture, University of Belgrade, Belgrade-Zemun, Serbia; 2. Faculty of Agriculture, Goce Delcev University, Stip, North Macedonia; 3. Scientific Veterinary Institute "Novi Sad", Novi Sad, Serbia; 4. Institute of Veterinary Medicine of Serbia, Belgrade, Serbia*

## Introduction

Constructive alignment (CA) that includes learning outcomes (LOs), competencies (COs), formative assessment (FA) and summative assessment (SA) of student learning is very important for the successful teaching by educators and the acquisition of student competencies.

## Objectives

The paper aims to analyze relationships between LOs, COs, FA and SA of student learning in farm animals biosecurity (FAB) courses and their CA.

## Material and Methods

The authors' focus group analyzed 51 papers to identify issues related to the definition of LOs, COs, FA and SA related to FAB courses, and tables were created, illustrating relationships between LOs, COs, FA and SA for FAB courses.

## Results

The FAB courses should equip students with the knowledge, skills, and attitudes to implement biosecurity in various farm settings. Three core competency groups are identified: generic (instrumental, interpersonal, systemic), 21st-century skills, and program-specific competencies. Students must develop a strong foundation in biosecurity principles, including risk analysis, disease transmission, and prevention. This enables them to conduct risk assessments and implement biosecurity measures effectively. Decision-making at strategic, tactical, and operational levels is essential for addressing evolving challenges. Biosecurity expertise also requires sociocultural awareness, communication, and problem-solving skills.Assessment should combine formative and summative approaches. Formative assessment provides feedback, while summative assessment evaluates final competency achievement. Traditional exams test theoretical knowledge, while practical assessments—such as risk analysis, case studies, and simulations—measure students' ability to apply knowledge in real-world situations.

## Conclusions

The LOs define expected knowledge, skills, and attitudes, while COs ensure students develop expertise in biosecurity applications. Assessment methods verify the achievement of these COs. A competency-based approach should blend foundational knowledge with experiential learning and rigorous assessment methods, ensuring students are well-prepared for theoretical and practical biosecurity challenges, including policy implementation, risk assessment, fieldwork, emergency response, and stakeholder communication.

## Financial support and Acknowledgements

This paper was done as part of: BETTER - COST ACTION CA20103 - Biosecurity Enhanced Through Training Evaluation and Raising Awareness.

## Keywords

farm animal biosecurity • learning outcomes • competencies • assessment

Continue –>

| Table 1. Structural Framework for Aligning Learning Outcomes and Competencies | |
|---|---|
| **Component** | **Definition in Farm Biosecurity Context** |
| Learning Outcomes | What students should know, understand, and be able to do upon course completion. |
| Competencies | The combination of knowledge, skills, values and attitudes that students develop to perform biosecurity-related tasks effectively |
| Assessment Methods | Tools and techniques used to evaluate whether students have achieved the intended learning outcomes and acquired the necessary competencies |

| Table 2. Learning Outcomes and Their Direct Connection to Competencies and Assessment | | |
|---|---|---|
| **Learning Outcomes** | **Related Competencies** | **Assessment Methods** |
| 1. Understanding the principles and importance of farm biosecurity | Instrumental: Knowledge of epidemiology, pathogen transmission, and risk factors | Written exams (Multiple Choice Questions (MCQs), case studies)<br>Oral presentations on biosecurity principles |
| | Systemic: Ability to integrate biosecurity measures into sustainable farm management | |
| 2. Identifying and assessing farm biosecurity risks | Instrumental: Risk assessment skills, problem-solving | Practical risk assessment report on a farm<br>AI-based risk assessment simulation |
| | Professional: Application of risk analysis frameworks | |
| | 21st-Century Competencies: Digital biosecurity risk analysis tools | |
| 3. Implementing biosecurity protocols in farm settings | Professional: Proper use of Personal Protective Equipment (PPE), disinfection methods, animal movement control | Practical skills test on biosecurity implementation<br>Farm biosecurity audit report |
| | Interpersonal: Communication with farm staff | |
| | Systemic: Decision-making in emergency situations | |
| 4. Applying One Health principles in farm biosecurity | Systemic: Understanding zoonotic risks, antimicrobial resistance | Group discussions on One Health case studies<br>Reflective essay on the global impact of farm biosecurity |
| | 21st-Century Competencies: Use of data-driven disease prevention strategies | |
| | Interpersonal: Collaboration with public health and veterinary authorities | |
| 5. Using digital tools for farm biosecurity monitoring | 21st-Century Competencies: AI, IoT, blockchain applications in biosecurity | Digital farm biosecurity monitoring project<br>Interactive simulations of disease outbreak scenarios |
| | Professional: Technology-assisted surveillance and data interpretation | |
| 6. Educating farm workers on biosecurity measures | Interpersonal: Communication, leadership, training skills | Recorded training session or workshop for farm workers<br>Peer-reviewed biosecurity education campaign |
| | Professional: Ability to translate technical knowledge into practical instructions | |
| | Systemic: Ethical responsibility for disease prevention | |
| 7. Develop and implement farm biosecurity improvement plans | Professional: Ability to design evidence-based biosecurity programs | Farm biosecurity plan project with policy recommendations<br>Presentation to stakeholders on improving farm biosecurity |
| | Systemic: Long-term strategic thinking | |
| | Instrumental: Policy and regulatory knowledge | |
| 8. Respond to biosecurity breaches and disease outbreaks effectively | Professional: Crisis management skills, emergency response | Role-playing emergency outbreak response<br>Case study analysis of a real-world biosecurity failure |
| | Systemic: Adaptability in changing disease scenarios | |
| | 21st-Century Competencies: Data-driven outbreak management | |

| Table 3. Assessment Model for Competency Acquisition | | |
|---|---|---|
| **Assessment Type** | **Purpose** | **Competency Evaluated** |
| Written Exams | Test theoretical knowledge of biosecurity principles | Instrumental (Cognitive Skills) |
| Farm Biosecurity Audit Report | Evaluate practical risk assessment and management skills | Professional and Systemic |
| Practical Lab Test | Assess biosecurity measures application (PPE, disinfection) | Professional |
| Digital Biosecurity Project | Apply AI and IoT tools for monitoring farm biosecurity | 21st-Century Competencies |
| Training Session Presentation | Assess ability to educate others on biosecurity | Interpersonal |
| Policy Proposal for Biosecurity Improvement | Evaluate long-term planning and systemic thinking | Systemic and Professional |
| Outbreak Response Role-Play | Assess crisis management and adaptability | Professional and Systemic |

## ID 70
# ENHANCING BIOSECURITY IN SMALL-SCALE PIG FARMING: A COMMUNITY-BASED APPROACH IN LAO PDR

**Véronique Renault**; Claude Saegerman
*University of Liege*

### Introduction
Biosecurity measures are essential for the prevention and control of infectious diseases. However, their implementation remains challenging in extensive production systems and backyard farming.

### Objectives
In Lao PDR, an initiative funded by Agronomes et Vétérinaires Sans Frontières aimed to test, develop, and support a community-based approach to pig farming to mitigate the introduction of African Swine Fever (ASF) and other infectious diseases.

### Material and Methods
The methodology involved the identification of two communities in a district previously affected by ASF, both willing to engage in a participatory process. This process focused on assessing the risks of infectious disease introduction in their pig farms and developing a community-based action plan to enhance biosecurity measures. As a result, community regulations with enforcement mechanisms were established, along with an action plan that received financial support from the initiative.

### Results
The primary risk factors identified were visitor access and free-ranging of pigs. The community committees also recognized the importance of vaccination in strengthening herd immunity. Consequently, the key measures adopted in both villages included: (i) the organization of a biannual vaccination campaign against Classical Swine Fever, (ii) a prohibition on free-ranging, requiring all pigs to be confined in pens, and (iii) the regulation of high-risk visitors, particularly middlemen involved in pig trading. One village implemented a complete ban on middlemen entering the village, instead establishing a designated loading area for livestock at the village entrance. The second village opted to enforce a strict cleaning and disinfection protocol for middlemen's motorcycles upon entry.

### Conclusions
The long-term sustainability and effectiveness of these biosecurity measures will require continuous monitoring. It is essential that the action plans be regularly evaluated and updated by the communities to ensure their ongoing relevance and impact in preventing infectious disease outbreaks.

### Financial support and Acknowledgements
The project was funded by Agronomes and Vétérinaires Sans Frontières - France throuhg a fundraising initiative.

### Keywords
Biosecurity • community-based • pig

## ID 71

# COMMUNITY AFRICAN SWINE FEVER BIOSECURITY INTERVENTIONS (CABI) IN THE WESTERN BALKANS

**Mark Harald Hovari**[1]; Daniel Beltran-Alcrudo[1]; Blagojcho Tabakovski[2]; Jasna Prodanov-Radulovic[3]; Xhelil Koleci[4]; Jeton Muhaxhiri[2]; Goran Filipović[1]

*1. Food and Agriculture Organization; 2. No affiliation; 3. Scientific Veterinary Institute "Novi Sad" Novi Sad, Serbia; 4. Faculty of Veterinary Medicine, Agricultural University of Tirana, Albania*

## Introduction

Backyard pig settings, have been identified as the highest risk to the spread of ASF and other swine diseases. 300 backyard pig keepers were selected in Albania, Kosovo, North Macedonia, Serbia and Montenegro to participate in the CABI program.

## Objectives

To improve the biosecurity and knowledge on ASF in backyard pig settings through trainings and equipment/tools, and to measure such improvements.

## Material and Methods

Each backyard pig producer was surveyed to identify their production parameters, ASF knowledge, and farm biosecurity. Questionnaires originally designed for CABI in the Philippines were adjusted to the Western Balkan reality to measure both the status and the improvements. Surveys were collected in Epicollect5. This was followed by three trainings focusing on "Pig breeding and feeding", "ASF and pig diseases", and "Cleaning and Disinfection and Biosecurity". Producers also received biosecurity packages consisting of rubber boots, brushes and brooms, handheld sprayers, detergent and disinfectant. Farmers were visited after the trainings to review the use of the tools received, and to repeat the survey on knowledge on ASF and farm biosecurity to measure the changes.

## Results

The intervention in Kosovo is complete, while the interventions in Albania, North Macedonia, Serbia and Montenegro are on-going. In Kosovo, 62 backyard farmers were involved. After the intervention their ASF knowledge doubled (out of 13 questions, 5.5 were correct before the intervention and 10.3 after the intervention). Several biosecurity practices increased, such as washing hands (from 30.65% to 58.06%); using soap and detergent (from 3.23% to 93.55%); using disinfectant (from 0% to 95.16%); or improved biosecurity for visitors (96% did nothing before, now 87% request disinfection of shoes).

## Conclusions

The data shows that the interventions lead to a measurable increase in ASF knowledge and improved biosecurity.

## Financial support and Acknowledgements

The project was financed under FAO's Technical Cooperation Project TCP/RER/3907 and Special Fund for Emergency and Rehabilitation Activities (SFERA).This work is aligned with the principles of FAO's Progressive Management Pathway for Terrestrial Animal Biosecurity, which is FAO's institutional initiative to support Member States at strengthening biosecurity in livestock value chains.All references to Kosovo should be understood to be in the context of United Nations SCR 1244 (1999).

## Keywords

African swine fever • biosecurity • training

## ID 72
# IMPROVING RUMINANT BIOSECURITY THROUGH A COMPREHENSIVE ONLINE AND FACE-TO-FACE TRAINING PROGRAM

**Mark Harald Hovari**[1]; Daniel Beltran-Alcrudo[1]; Alberto Allepuz Palau[2]
*1. Food and Agriculture Organization; 2. Departament de Sanitat i Anatomia Animals, Universitat Autònoma de Barcelona*

### Introduction
A training regime was developed and delivered to address biosecurity issue in countries of the Black Sea Basin.

### Objectives
To improve the biosecurity of ruminant farms by training farmers and veterinarians virtually and face-to-face.

### Material and Methods
FAO's Virtual Learning Centre (VLC) developed and delivered an online course on ruminant biosecurity consisting of eleven interactive modules and 10 hours of study time over 4 weeks. The course, primarily addressed to veterinarians, covered basic biosecurity concepts, as well as the specifics of the main ruminant production systems. Delivered four times in 2024 (in English, Romanian, Russian and Turkish), the training involved experts, a discussion forum, webinars, pre- and post-course surveys, and a test that participants had to receive their certificate (Accredited by the Veterinary Continuing Education in Europe - VetCEE). In December 2023, a workshop was held to prepare the trainers in charge of delivering face-to-face training to farmers (50 events), veterinarians (40 events) and middleman (6 events) in Armenia, Azerbaijan, Georgia and Moldova. The attitude of participants to biosecurity is assessed at the start of the training and repeated for a limited number of farmers.

### Results
During the delivery of the four VLC courses, 60.9% of participants completed the course (961 out of 1,577). Participants were mostly government veterinarians (61.5%), from the private sector (23.5%), and academia (7.7%). Participants improved their knowledge for the five learning objectives, and found the course relevant for their job, and of good quality (4.5 and 4.6 weighted averages on Likert scale, respectively). The face-to-face courses are ongoing.

### Conclusions
Online trainings were cost effective training almost 1,000 veterinarians, who are best place to advice farmers on how to improve biosecurity. Face to face trainings further improved understanding on ruminant biosecurity.

### Financial support and Acknowledgements
The study was done in the context of the project GCP/GLO/074/USA "Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs)" which was funded by the United States Department of Defense, Defense Threat Reduction Agency (DTRA). The content of the information does not necessarily reflect the position or the policy of the Federal Government of the United States, and no official endorsement should be inferred.This work is aligned with the principles of FAO's Progressive Management Pathway for Terrestrial Animal Biosecurity, which is FAO's institutional initiative to support Member States at strengthening biosecurity in livestock value chains.

### Keywords
biosecurity • ruminants • training

## ID 73
# EVALUATING BIOSECURITY PRACTICES IN LIVE ANIMAL MARKETS: A CASE STUDY FROM TÜRKIYE

**Sarah Oste**[1]; Naim Deniz Ayaz[2]; Daniel Beltrán-Alcrudo[3]; Görkem Cengiz[4]; Gizem Çufaoğlu[2]; Mehmet Murat Doğusan[5]; Alberto Allepuz[1]; Mark Hovari[3]

*1. Departament de Sanitat i Anatomia Animals, Facultat de Veterinària, Universitat Autònoma de Barcelona, Barcelona, Spain; 2. Department of Food Hygiene and Technology, Faculty of Veterinary Medicine, Kırıkkale University, Kırıkkale, Türkiye; 3. Food and Agriculture Organization of the United Nations (FAO), Regional Office for Europe and Central Asia, Budapest, Hungary; 4. Department of Food Hygiene and Technology, Faculty of Veterinary Medicine, Ankara University, Ankara, Türkiye 5. Department of Animal Science, Faculty of Veterinary Medicine, University of Burdur Mehmet Akif Ersoy, Burdur, Türkiye*

## Introduction
Live animal markets (LAMs) are crucial for ruminant trade in the Black Sea Basin, supporting livelihoods and food security, but also facilitating the spread of endemic and emerging ruminant diseases.

## Objectives
This study assesses biosecurity practices in LAMs and identifies gaps for risk mitigation.

## Material and Methods
A survey based on disease transmission risk factors was developed through literature and expert consultations. In February 2025, face-to-face interviews were conducted with 31 market users (25.8% farmers, 32.3% traders, 41.9% mixed roles) and 4 market managers (official veterinarians) across four LAMs in Central Anatolia and the Mediterranean Region, Türkiye.

## Results
Despite regulations and market licensing by the Ministry of Agriculture and Forestry, enforcement was inconsistent. Isolation areas for diseased animals existed but were mainly used during Eid al-Adha (Feast of Sacrifice). Segregation did not fully prevent direct contact between animals from different herds. Health measures for animals brought to market were limited to mandatory vaccinations (64.5%). Most users (80.6%) relied only on self-inspection to assess animal health. Transportation posed additional risks, with 44% of users sharing transport and inconsistent vehicle cleaning. Although 80.6% of respondents cleaned vehicles, only two followed a full protocol. On-farm quarantine practices varied, with unsold returning animals often not quarantined.

Both LAM managers and users recognized that livestock markets play a “moderately” to “extremely” significant role in disease transmission, but their views differed. Managers prioritized documentation and vehicle disinfection as key biosecurity measures, while users placed more importance on informal health inspections. Additionally, managers claimed to provide guidelines, yet 90.3% of users reported they did not see any.

## Conclusions
These findings highlight biosecurity gaps and the need for standardized guidelines and improved stakeholder engagement to reduce disease transmission risks in LAMs. Results from this study will be communicated to national authorities to inform awareness and training programs for key stakeholders to improve biosecurity in LAMs.

## Financial support and Acknowledgements
The study was done in the context of the project GCP/GLO/074/USA “Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs)” which was funded by the United States Department of Defense, Defense Threat Reduction Agency (DTRA). The content of the information does not necessarily reflect the position or the policy of the Federal Government of the United States, and no official endorsement should be inferred.

## Keywords
Live animal market • Türkiye • Biosecurity practices • Ruminants • Infectious disease control • Livestock trade

## ID 74
# BIOSECURITY GAPS IN UKRAINIAN HUNTING GROUNDS AMID THE THREAT OF AFRICAN SWINE FEVER

**Oleksandr Ryevnivtsev**; Vitalii Nedosekov
*1. Department of Veterinary Epidemiology, National University of Life and Environmental Science of Ukraine, 03041 Kyiv, Ukraine; 2. Food and Agriculture Organization of the United Nations (FAO), FAO Investment Centre, 00153 Rome, Italy, Department of Veterinary Epidemiology, National University of Life and Environmental Science of Ukraine, 03041 Kyiv, Ukraine*

## Introduction
Since 2014, when African swine fever (ASF) was first detected in wild boar in Ukraine, cases have been most frequently reported in regions bordering Belarus, Poland, Hungary, and Moldova. The virus's tenacity for over a decade, coupled with low numbers of hunted wild boars, raises concerns about the effectiveness of surveillance and control measures on hunting grounds.

## Objectives
This study aimed to explore hunters' awareness and practices related to ASF prevention and control.

## Material and Methods
A survey was conducted among 74 hunting ground managers across 19 regions in Ukraine between December 2022 and January 2023 as part of the project Ensuring Animal Health in Ukraine, supported by the U.S. Department of Agriculture (USDA).

## Results
All participants were male, with the majority being between 31 and 60 years old. Additionally, 58% had more than ten years of hunting experience, and 42% had formal education related to hunting. The findings revealed significant gaps in ASF control efforts. Only 14% of respondents stated they would report a discovered wild boar carcass to the competent authority and 32% of respondents reported submitting samples from harvested wild boar carcasses for ASF virus testing. Furthermore, 90% of respondents were not aware of the expediency and feasibility of using designated dressing areas on hunting grounds as a tool for preventing ASF spread, and only 22% indicated that their dressing areas on hunting grounds were perceived to meet basic biosecurity standards.

## Conclusions
The study highlights critical gaps in the implementation of passive surveillance and control measures on hunting grounds in Ukraine. Targeted education, infrastructure improvements, and stricter enforcement of biosecurity measures, especially under the circumstances posed by ongoing military invasion, are essential to mitigating the spread of ASF in Ukraine.

## Financial support and Acknowledgements
project Ensuring Animal Health in Ukraine, supported by the U.S. Department of Agriculture (USDA)

## Keywords
African Swine Fever • Hunters • Biosecurity • Control measures • Passive surveillance

## ID 75
# BOOT HYGIENE PRACTICES AND THEIR EFFECTIVENESS IN PIG- AND POULTRY FARMS

**Julia Gabrielle Jerab**[1]; Evelien Biebaut[1]; Ilias Chantziaras[1]; Filip Van Immerseel[2]; Jeroen Dewulf[1]
*1. Veterinary Epidemiology Unit, Faculty of Veterinary Medicine, Ghent University, Belgium; 2. Department of Pathobiology, Pharmacology and Zoological Medicine, Faculty of Veterinary Medicine, Ghent University, Belgium*

## Introduction
Proper boot hygiene is a key biosecurity measures, that help prevent the spread of infectious diseases in livestock. However, the lack of standardised guidelines leads to variability in its implementation and effectiveness.

## Objectives
This field study aimed to describe the current boot hygiene practices of Belgian pig- and poultry farmers and test their effectiveness.

## Material and Methods
Eight pig- and six poultry farms were visited from July 2024 to March 2025. Farmers were asked to perform their regular boot hygiene practices, during which samples were taken before and after cleaning and disinfection. Two samples were taken from each boot (top and bottom) to determine the total viable cell count (TVC) and gram-negative enteric bacterial count (GNB) which indicate faecal contamination.

## Results
Two pig- and one poultry farm did not practice any form of boot hygiene beyond wearing farm specific boots. This resulted in high levels of faecal contamination, with GNB counts of up to 5.13 log CFU/25 $cm^2$. In one pig farm the boots were only cleaned and here TVC and GNB counts increased. Boots were cleaned and disinfected in seven farms, including four poultry farms who only cleaned and disinfected their boots between production rounds. Cleaning and disinfection of boots resulted in a mean log reduction of TVC which ranged from 0.32 to 5.51 log CFU/25$cm^2$, with a higher effectiveness seen in the poultry farmers compared to the pig farmers. Two pig farms and one poultry farm disinfected their boots without cleaning first. In one farm this resulted in a full elimination of GNB, while the other two had indicator bacteria at several locations.

## Conclusions
Most of the farmers recognized the importance of boot hygiene and implemented some form of boot hygiene including stable specific boots. However, the measures implemented and their effectiveness varied largely and was often insufficient.

## Financial support and Acknowledgements
This work was funded by the European Union under the Horizon Europe grant 101083923 (BIOSECURE). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

## Keywords
Biosecurity • Boot hygiene • Pig • Poultry

## ID 76

# HAND HYGIENE PRACTICES AND THEIR EFFECTIVENESS IN PIG- AND POULTRY FARMS

**Julia Gabrielle Jerab**[1]; Evelien Biebaut[1]; Ilias Chantziaras[1]; Filip Van Immerseel[2]; Jeroen Dewulf[1]
*1. Veterinary Epidemiology Unit, Faculty of Veterinary Medicine, Ghent University, Belgium; 2. Department of Pathobiology, Pharmacology and Zoological Medicine, Faculty of Veterinary Medicine, Ghent University, Belgium*

## Introduction

Proper hand hygiene is a simple, effective biosecurity measure prevention pathogen transmission. Despite the available guidelines, information on the implementation and effectiveness among farmers is limited.

## Objectives

This field study identified current hand hygiene practices and their effectiveness in Belgian pig- and poultry farms.

## Material and Methods

Nine pig- and six poultry farms were visited from July 2024 to March 2025. Farmers were asked to perform their regular hand hygiene practices, during which samples were taken before and after washing and disinfection. A surface of 25 $cm^2$ of the dominant hand and the entire non-dominant hand were swabbed to determine the total viable cell count (TVC) and gram-negative enteric bacterial count (GNB) which indicate faecal contamination. UV-lotion was also used to directly visualize the effectiveness of hand washing.

## Results

None of the farmers regularly disinfected their hands and two pig farmers regularly used gloves. Changing gloves reduced the TVC and GNB, however GNB were still detected on at least one fresh glove of each farmer. For the others, hand washing decreased the TVC and GNB in all cases, though only three farmers had no GNB detected after cleaning on both hands. An average of 0.53 log CFU/25$cm^2$ and 1.53 log CFU/hand of GNB were detected on the washed dominant and non-dominant hand, respectively. Indicator bacteria were detected after washing on the non-dominant hand more often than the dominant hand, demonstrating the influence of the sampling surface on bacterial detection. After washing, the majority of farmers had UV-lotion remaining on at least one area of their hands, with the nail beds and wrists being the most common areas.

## Conclusions

While all farmers did implement hand hygiene measures, results indicated these practices were often ineffective. This may be due to the absence of disinfection steps in their hand hygiene protocol or inadequate coverage of hand areas during washing.

## Financial support and Acknowledgements

This work was funded by the European Union under the Horizon Europe grant 101083923(BIOSECURE). Views and opinions expressed are however those of the author(s) only and donot necessarily reflect those of the European Union or the European Research ExecutiveAgency (REA). Neither the European Union nor the granting authority can be heldresponsible for them.

## Keywords

Biosecurity • Hand hygiene • Pig • Poultry

## ID 77

# ASSESSMENT OF FARM BIOSECURITY FOR PIGS AND RUMINANTS WITH OUTDOOR ACCESS, IN EXTENSIVE OR ALTERNATIVE SYSTEM

**Gerard Martín-Valls**[1]; Gloria Herrero-García[2]; Chelsea Voller[3]; Miroslav Kjosevsky[4]; Sotiria-Eleni Antoniou[5]; Ludovica Preite[6]; Federica Iapaolo[7]; Gabriele Casadei[8]; Alfonso Rosamilia[8]; Siv Meling[9]; Lena-Mari Tamminen[10]

*1. Departament de Sanitat i Anatomia Animals, Facultat de Veterinària, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain; 2. SaBio Instituto de Investigación en Recursos Cinegéticos (IREC) CSIC-UCLM-JCCM, Ciudad Real, Spain / Departamento de Sanidad Animal, Facultad de Veterinaria, Universidad de León, León, Spain; 3. Department of Epidemiological Sciences, Animal and Plant Health Agency (APHA) – Weybridge, Woodham Lane, New Haw, Addlestone, Surrey KT15 3NB. UK; 4. Department of Animal Hygiene and Environmental Protection, Faculty of Veterinary Medicine – Skopje, SS. Cyril and Methodius University, Skopje, Macedonia; 5. European Food Safety Authority (EFSA), Italy; 6. European Food Safety Authority (EFSA), Parma, Italy; 7. Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale"; 8. Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia-Romagna, Brescia, Italy , Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia-Romagna, Via A. Bianchi 9, 25124 Brescia, Italy; 9. Norwegian Veterinary Institute, Sandnes, Norway; 10. Department of Clinical Sciences, Swedish University of Agricultural Sciences, Uppsala, Sweden*

## Introduction

Pigs and ruminants on farms with outdoor access (e.g. extensive, organic, backyard) present both strengths (e.g. reduced population renewal) and weaknesses (e.g. interaction at the wildlife-livestock interface). The assessment of biosecurity is frequently tailored to intensive farms, with less attention given to the specific needs of alternative systems.

## Objectives

To determine which parameters are currently considered in the biosecurity assessment for pigs and ruminants with outdoor access, and to identify potential gaps relevant to their specific context.

## Material and Methods

Thirty-one articles for pigs, and forty-one for ruminants, assessing biosecurity in farms which provide outdoor access in Europe, America, Oceania and EU neighbouring countries were selected from a previous scoping review on biosecurity for the COST Action BETTER project (https://better-biosecurity.eu/). Forty-eight parameters for pigs and fifty for pigs and ruminants, were relevant for biosecurity assessment in these systems. The full text and questionnaires from the above-mentioned articles were screened for these parameters.

## Results

For both species, the following parameters were considered in more than 50% of the articles: fencing, visitor policies, quarantines and testing of purchased animals, and management of carcasses. Hygiene of lands and outdoor areas, as well as the use of vehicles within the farm boundaries were assessed in less than 10% of the articles for both species. Measures related to visiting agricultural fairs for pigs and hunting related hygienic measures for ruminants were rarely considered (<10% of articles). Regarding the interaction with wildlife, most of the parameters considered in the review were assessed in less than 30% of the articles. The presence of specific wildlife and the use of preventive measures to avoid direct interaction with livestock were the only exceptions and only for pigs (see figure 1).

## Conclusions

The methods for assessing biosecurity in outdoor systems need to be adapted to include relevant aspects to their specific context.

Continue –>

## Financial support and Acknowledgements
The present work was funded by the European partnership of health and welfare (EUPAHW, HORIZON-CL6-2023-FARM2FORK-01-2). Sotiria-Eleni Antoniou and Ludovica Preite are employed with the European Food Safety Authority (EFSA). However, the present abstract is drafted under the sole responsibility of the authors and may not be considered as an EFSA scientific output. The positions and opinions presented in this abstract are those of the authors alone and are not intended to/do not necessarily represent the views/any official position of EFSA. To know about the views or scientific outputs of EFSA, please consult its website under http://www.efsa.europa.eu

## Keywords
Outdoor systems • Assessment of biosecurity • Wildlife-livestock interface • Extensive • Alternative farming systems

**Table 1. Percentage of articles assessing of different parameters for pigs and ruminants. A selection of relevant parameters is included in this table.**

| Parameter | Description | N (%) pigs | N (%) ruminants |
|---|---|---|---|
| Presence of neighbouring livestock (different species) | *Is the article assessing the presence of neighbouring farms/slaughterhouses and/or pastures with livestock?* | 13 (41.94) | 18 (43.9) |
| Presence of neighbouring farms? (same species) | *Is the article assessing the presence of neighbouring with? the same species' farms/slaughterhouses?* | 17 (54.84) | 17 (39.00) |
| Fences | *Assessment of measures other than fencing, such as livestock guardian dogs, lasers, lights, sounds* | 22 (70.97) | 17 (41.46) |
| Measures to prevent interaction with other animals | *Assessment of measures other than fencing, such as livestock guardian dogs, lasers, lights, sounds* | 8 (25.8) | 6 (14.63) |
| Management of pastures | *Assessment of movements to own and shared pastures/regular movements, grazing period, routes to pasture, neighbour animals* | N/A | 21 (51.22) |
| Measures against wildlife | *Are these fences and other measures specifically assessed regarding interaction with wildlife?* | 15 (48.39) | 9 (21.95) |
| Markets/ agricultural fairs | *Is the article considering non-regular movements or movements to markets/fairs?* | 4 (12.8) | 17 (41.46) |
| Quarantines and testing | *Assessment of specific facilities/period of quarantine/testing of animals at arrival* | 17 (34.8) | 23 (56.10) |
| Personnel participate in hunting activities | *Are the personnel of the farm hunting? Or is the personnel taking measures when hunting?* | 15 (25.8) | 3 (7.32) |
| Maintenance, working tools, others | *The article assesses whether materials and tools (e.g. maintenance, echographs, other specific tools) are shared between* | 14 (45.16) | 2 (41.46) |
| Hygiene for outdoor surface | In the areas where concrete surfaces are present (e.g. shelters, outdoor runs), cleaning and disinfection is assessed | 2 (6.45)<br>2 (4.87) | |

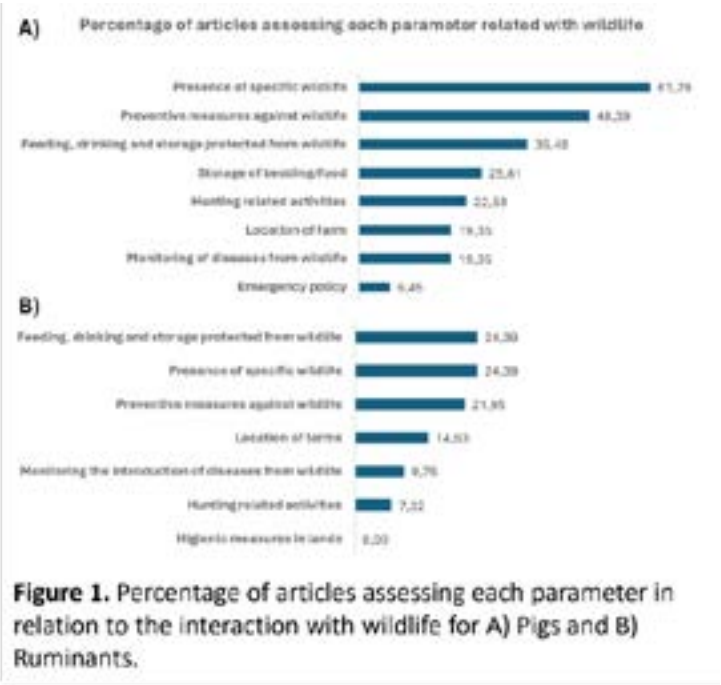



**Figure 1.** Percentage of articles assessing each parameter in relation to the interaction with wildlife for A) Pigs and B) Ruminants.

## ID 78
# INVESTIGATING THE NON-MONETARY IMPACTS OF HIGH PATHOGENIC AVIAN INFLUENZA GLOBALLY

**Zahraa Nisaa**[1]; Barbara Häsler[1]; Houda Bennani[1]; Raquel Jorquera[2]; Francesca Scolamacchia[3]; Pablo Alarcón López[1]
*1. The Royal Veterinary College, Department of Pathobiology and Population Sciences. Veterinary Epidemiology, Economics and Public Health Group (VEEPH); 2. The Animal Plant Health Agency; 3. Istituto Zooprofilattico Sperimentale delle Venezie*

## Introduction
The evolving epidemiology of the High Pathogenic Avian Influenza (HPAI) H5 virus has resulted in major economic losses and increased expenditures for both industry and society. Authors' prior study has concentrated on quantifying the monetary cost of previous HPAI epidemics, there remains a gap in documenting non-monetary impacts such as species diversity loss and broader ecosystem changes.

## Objectives
This study aimed to collate information on the non-monetary implications of HPAI outbreaks.

## Material and Methods
After an initial literature review on non-monetary impacts, primary data was collected through a workshop and semi-structured interviews directed towards key informants involved in HPAI outbreaks and their control (e.g., affected poultry companies, government officers, farmers, researchers, etc.). Interviewees were asked about their experiences and involvement during these HPAI outbreaks; they were asked to comment on observations, personal experience, and the aftermath. A deductive hybrid thematic approach was used to identify recurring patterns across different contexts and stakeholder experiences. This data will be further utilised to construct a framework of non-monetary HPAI impacts, providing a structure for the classification of the different types of impacts supported by examples.

## Results
Three key themes emerged: (1) emotional distress, (2) changes in resource allocation, and (3) loss in species diversity. The HPAI framework classifies impacts into five categories: public health, environmental, animal welfare and ethics, government, and community and social. Preliminary findings highlight the significant implications of One Health, encompassing human, animal and environmental dimensions of HPAI outbreaks.

## Conclusions
Key concerns include psychological stress among workers, increased illegal wildlife trade, and growing risks for women, children and indigenous communities. The non-monetary impacts add to the overall burden of the disease, disproportionately affecting vulnerable and marginalised populations. These insights have critical implications for government and policymakers, emphasising the need for support strategies, resource mobilisation and tailored interventions to protect individuals with direct experiences of HPAI outbreaks.

## Keywords
HPAI • Disease burden • Non-monetary impact • One health • Control interventions

POSTER COMMUNICATIONS

## ID 79
# CAMERA TRAPPING AND MIST NET CAPTURE REVEAL DIFFERENTIAL COMPOSITION OF WILD BIRD COMMUNITIES ON POULTRY FARM PREMISES

**Alberto Sánchez-Cano Moreno de Redrojo**
*PhD student (IREC-UCLM-CSIC)*

### Introduction
Monitoring wild birds associated to poultry farm environments is essential to address biosecurity risks.

### Objectives
This study investigates the complementary data on passerine bird communities obtained through mist net capture and camera traps as on different types of poultry farms in Southwest Spain.

### Material and Methods
Between January 2018 and November 2020, fieldwork was conducted on poultry farms located in Southwest Spain. 34 mist netting sessions were carried out across the farms, and between 5 and 10 camera traps were installed per farm to passively monitor bird activity.

Mist nets were used to physically capture birds, allowing species identification and biological sampling, while camera traps continuously recorded images, focusing on locations where birds frequently visited, such as feed and water sources or perches near farm infrastructure.

### Results
Between January 2018 and November 2020, 34 mist netting sessions were conducted, and 5 to 10 camera traps were installed per farm. A total of 524 mist net captures and 139,246 bird images were recorded. Although both methods detected passerines, species composition varied significantly: mist nets captured small, cryptic mostly insectivorous species such as Carduelis spinus, Phylloscopus collybita, and Sylvia atricapilla, while camera traps documented more conspicuous species associated with farm structures, such as Passer domesticus and Columba livia.

The Sørensen similarity index (0.517) revealed a moderate overlap between methods, indicating that each technique biases detection toward certain groups. Mist nets were more effective at detecting migratory and insectivorous species, whereas camera traps facilitated the recording of resident species and their behaviour.

### Conclusions
These results highlight the importance of combining both methodologies to obtain a comprehensive assessment of avifauna in poultry production systems as a basis for improving strategies for mitigating sanitary risks.

### Keywords
bird monitoring • mist nets • camera traps • passerines • biosecurity • avifauna in productive systems

## ID 82

# TOWARDS COLLECTIVE BIOSECURITY: A PARTICIPATORY APPROACH IN FRENCH COMMUNITIES OF POULTRY FARMERS

**Saccavini Oksana**[1]; Hibbard Rebecca[1]; Brauneisen Philippe[1]; Delpont Mattias[1]; Vaillancourt Jean-Pierre[2]; Paul Mathilde[1]
*1. IHAP, Université de Toulouse, INRAE, ENVT, Toulouse, France, IHAP; 2. Department of Clinical Sciences, Faculty of Veterinary Medicine, Université de Montréal, St-Hyacinthe, QC, Canada*

## Introduction

Biosecurity approaches have traditionally been implemented at the individual farm level. However, in light of major outbreaks of highly pathogenic avian influenza in the French poultry sector in recent years, individually-framed approach to biosecurity have become increasingly insufficient to control disease risks for farms that are epidemiologically interconnected through geographic proximity, shared equipment, personnel or animals. An alternative approach is to consider biosecurity more collectively at the level of a functional or geographic territory defined by shared risks.

## Objectives

This study implemented a participatory approach to help farmers conceptualize biosecurity collectively, and to assess the approach's impact on relationship dynamics within farmers' communities. Individual interviews and four participatory workshops were designed to (1) identify shared motivations, values, and needs within communities, (2) identify shared risk factors, (3) foster understanding of epidemiological risks through expert discussions, and (4) identify collective, context-adapted solutions.

## Material and Methods

Two farming communities in France were identified, consisting of seven and nine stakeholders, mainly chicken and duck farmers, from diverse production systems. Data were collected throughout the research process using full recording and transcription of the workshops.

## Results

The results suggested that farmers' shared values prioritized autonomy and quality of production, and that farmers perceived risks such as wildlife and wind transmission as major concerns over which they felt powerless to act. This study also highlighted the difficulty of engaging all stakeholders in collective biosecurity management. However, the participatory process generated enthusiasm. Many farmers, disillusioned by top-down biosecurity policies, welcomed a more inclusive, context-sensitive approach. The findings emphasized the role of key farmers as "pivot stakeholders" who can engage their peers and facilitate the shift towards a territorial-scale biosecurity strategy.

## Conclusions

The follow-up of farmers' communities over a longer time frame should provide new insights on the collective actions which can be implemented by farmers as a group to manage infectious diseases.

## ID 83

# COMPARING THE INCOMPARABLE: USE OF REALIST METHODOLOGY TO ANALYSE BIOSECURITY INTERVENTIONS IN HETEROGENOUS AND COMPLEX SETTINGS

**Rebecca Hibbard**[1]; Sharon Sweeney[2]; Hedvig Stenberg[3]; Kelly McCall[2]; Marnie Brennan[4]; Áine Regan[2]; Erika Chenais[3]; Mathilde Paul[1]

*1. IHAP, Université de Toulouse, INRAE, ENVT, Toulouse, France; 2. Teagasc – Agriculture and Food Development Authority, Ireland; 3. Swedish Veterinary Agency, Uppsala, Sweden; 4. Centre for Evidence-Based Veterinary Medicine, University of Nottingham*

## Introduction

Community-based approaches to biosecurity involve using participatory approaches to consider local needs and motivation and foster stakeholder collaboration to develop bottom-up solutions to biosecurity challenges. These approaches are of particular interest for their ability to be adapted to specific local contexts and settings – however, this adaptability can make it challenging to subsequently evaluate the impact of an intervention when applied in very different settings. Realist evaluation, a theory-driven, interpretive approach to understanding programme intervention that explicitly takes context into account, has the potential to be useful for this purpose.

## Objectives

We aimed to evaluate why and how a community-based intervention may work (or not) in three different contexts with known biosecurity challenges: poultry farms in areas with repeated avian influenza outbreaks in France, cattle populations in Sweden in areas where Salmonella Dublin is a threat, and pig farms working on disease control and antibiotic reduction in Ireland.

## Material and Methods

We developed a protocol for a realist evaluation of the implementation of longitudinal community-based biosecurity interventions in each of these settings based on qualitative data from interviews and workshops, and highlighting the contextual factors that influenced the interventions' outcomes (both successes and failures) with context-mechanism-outcome configurations.

## Results

The protocol provides an example of how a realist approach can be applied in the context of veterinary epidemiology, with potential future applications in evaluating other interventions related to farmers' and veterinarians' practices across complex and heterogenous settings. Preliminary findings suggest that across all three contexts, existing relationships of trust (both between participants and between participants and researchers), and the presence and the acknowledgement of a problem or shared risk to be managed may act as mechanisms to drive identification of collective solutions.

## Conclusions

Ongoing workshops will allow further elaboration of individual context-mechanism-outcome configurations to better understand where and how community-based approaches to biosecurity could be successfully implemented.

## ID 84

# BIOSECURITY AND BUREAUCRACY: THE ADMINISTRATIVE BURDEN OF PAPERWORK AND ITS ESTRANGEMENT FROM STAKEHOLDER PERCEPTIONS OF BETTER BIOSECURITY

**Rebecca Hibbard**; Philippe Brauneisen; Oksana Saccavini; Amélie Solarino; Mattias Delpont; Mathilde Paul
*IHAP, Université de Toulouse, INRAE, ENVT, Toulouse, France*

### Introduction

Biosecurity is an important strategy for disease risk mitigation in the face of increasing outbreaks of emerging infectious diseases. As biosecurity has grown in prominence, there has been a proliferation of paperwork to assess its implementation – including audit schemes, checklists, and other administrative tasks required by government or industry bodies.

### Objectives

In this qualitative study, we sought to understand the perceptions of field actors concerning biosecurity-related paperwork and its impact on their work, using France as a case study.

### Material and Methods

We relied on information from a desk-based policy analysis and semi-structured interviews with 30 pig and poultry farmers and other field actors in Southwest and Western France. Thematic analysis was performed to develop themes corresponding to field actors' experiences with biosecurity-associated paperwork.

### Results

The findings demonstrated a complex administrative landscape consisting of multiple organisational levels, each including different actors with their own information requirements for biosecurity. Field actors considered that paperwork constituted a significant time burden and often necessitated collecting information not applicable to their situation. We also identified a decoupling between notions of "good biosecurity" from the perspective of administrators, and from that of farmers – with farmers feeling that the need to meet administrative biosecurity requirements was at best disconnected from, and at worst detracted from, their capacity to effectively mitigate disease risk.

### Conclusions

Our findings suggest there is a need to simplify the administrative burden associated with biosecurity, and for a conceptual shift to reorientate biosecurity back to its original aim of mitigating disease risk. In practice, this could be done through adapting biosecurity to local contexts and augmenting the role of local veterinarians in managing biosecurity at field level. This work has implications for other countries and production systems which are facing an increase in administrative paperwork, not only for biosecurity but also for animal welfare and disease surveillance.

## ID 85
# EXPLORING THE USE OF GENERATIVE AI TOOLS FOR SELF-EVALUATION OF ON-FARM BIOSECURITY PRACTICES

**Bekir Cetintav**[1]; Mehmet Murat Dogusan[2]
*1. Burdur Mehmet Akif Ersoy University; 2. Burdur Mehmet Akif Ersoy Üniversitesi- Veteriner Fakültesi*

### Introduction
Effective on-farm biosecurity is essential for safeguarding animal health, yet its implementation often relies on farmers' awareness and behavioral compliance. With the recent emergence of generative AI (GenAI) tools such as GPT and Gemini, new opportunities arise for enhancing biosecurity education and encouraging self-reflection among stakeholders.

### Objectives
This study aims to assess the potential of GenAI tools to support self-evaluation in farm biosecurity. Specifically, it investigates whether these tools can help users identify strengths and gaps in their biosecurity knowledge and daily practices.

### Material and Methods
We designed interactive, scenario-based prompts aligned with standard biosecurity protocols and deployed them via GPT-4 and Gemini interfaces. A pilot group of farm professionals, veterinary students, and advisors engaged with the tools. Participants' responses and self-assessments were compared against expert-reviewed criteria. We evaluated user experience, perceived accuracy, and the clarity of AI-generated feedback.

### Results
Preliminary findings indicate that GenAI tools can foster meaningful reflection on biosecurity measures and promote awareness of key risk areas. Most users reported improved understanding after interacting with the AI, especially in areas such as disease entry points, personnel hygiene, and animal movement controls. However, limitations were observed in nuanced or region-specific recommendations.

### Conclusions
GenAI tools demonstrate promise as complementary instruments for biosecurity education and self-evaluation. Their adaptability and accessibility make them valuable in engaging a wider range of farm actors. Future work should focus on integrating these tools into broader training programs and ensuring their alignment with evolving field standards.

### Keywords
Biosecurity • Generative AI • GPT • Gemini • Self-assessment • Farm management

## ID 87
# BIOSECURITY AT THE TOP OF THE PRODUCTION CHAIN: IDENTIFICATION OF CRITICAL POINTS

**Paula Rebollo-Igual**[1]; Hernan Botero[1]; Celia Martínez[2]; Natalia Yeste-Vizcaíno[2]; Antonio González-Bulnes[2]; Alberto Allepuz Palau[1]; Enric Mateu[1]

*1. Departament de Sanitat i Anatomia Animals, Universitat Autònoma de Barcelona (UAB). Bellaterra, Barcelona, Spain; 2. Cuarte S.L., Grupo Jorge, Monzalbarba, Zaragoza, Spain*

## Introduction
Integrated pig production systems in Spain are increasing, managed by companies that incorporate all production stages. In some systems, the flow of animal movements has some particularities that may heighten disease transmission risks. Early production stages are crucial, as diseases introduced at this point can spread downstream throughout the entire system.

## Objectives
This study assesses the biosecurity status in 31 sow farms in Aragón, Spain, to identify potential risks and gaps in biosecurity measures that could jeopardize animal health and farm productivity.

## Material and Methods
Biocheck.UGentTM, a risk-based scoring tool, was used to evaluate the biosecurity measures implemented on the 31 sow farms. Data was collected from February to December 2024.

## Results
External biosecurity measures widely implemented include disinfection and empty animal transports (90%), manure removal through dirty roads (87%), and visitor registration (100%). However, gaps were identified: some professionals, like feed suppliers (19%) and transporters (23%), accessed holding areas, despite using personal protective equipment. Rodents posed a problem in 53% of farms with established pest control programs. Only 13% of workers consistently practiced handwashing, and 29% of deadstock disposal areas were accessible to wild animals.Regarding internal biosecurity, practices were less consistent. While separating sick from healthy animals was common (90%), only 55% handled healthy pigs before sick ones. Cross-fostering was performed more than once per piglet (71%) and four days after birth (29%). There were no protocols for material cleaning (93%), which was shared between batches in 40% of farms. Only 7% followed cleaning and disinfection phases, and 97% did not verify hygiene effectiveness.

## Conclusions
Despite good biosecurity, studied farms should minimize potential pathogen introduction risks due to their crucial role in the system. Key improvements for biosecurity include restricting clean zone access to farm workers, implementing systematic cleaning and disinfection protocols, enhancing deadstock disposal safety, and enforcing stricter management of sick animals and piglets.

## Financial support and Acknowledgements
Ministerio de Ciencia e Innovación. 2023. Proyecto BIOTEGANIA: Prevención, Control de Patógenos y Optimización de la Sostenibilidad en Producción Agroalimentaria Mediante un Sistema Inteligente Integrado de Bioseguridad y Logística Digitales y Uso de Herramientas Biotecnológicas Desde una Perspectiva One Health (PLEC2023-010275).

## Keywords
biosecurity • pig production • disease prevention • sow farms

## ID 88
# HEALTH MANAGEMENT REGISTERS AS BIOSECURITY IMPROVEMENT PROGRAMS IN FINLAND

**Ina Toppari**; Vera Talvitie; Milla Hiekkaranta
*Animal Health ETT, Finland*

### Introduction
Animal Health ETT is a non-governmental organization maintained by slaughterhouses, dairies, and egg-packing companies. Geolocation, climate and wide commitment to ETT guidelines for the control of specified diseases has contributed Finland´s excellent animal health situation. Many globally common diseases are absent. ETT coordinates cattle and swine health management by administrating registers for cattle (Naseva) and swine herds (Sikava).

### Objectives
The objective of the registers is to promote animal health and welfare, as well as food safety. Sikava functions as a nationwide SPF (Specific Pathogen Free) system. The herds are classified by their health status; swine herds are obliged to be free from mycoplasma pneumoniae, brachyspiral dysentery, mange and atrophic rhinitis. Naseva has control programs for Mycoplasma bovis and ringworm. The statutory salmonella control program specifies that salmonella must not be present in food-producing animals.

### Material and Methods
Biosecurity and disease control were drivers for the register development. Health management includes herd visits and a health plan. Veterinarians visit farms at regular intervals to assess animal health, welfare, and biosecurity. The observations are recorded in the register database. Biosecurity is audited annually in swine herds, and occasionally in cattle herds, using the Biocheck.UGent® tool which is integrated to the system by licence.

### Results
Disease control in the pig sector has been effective, with only a few cases of dysentery, mycoplasma and salmonella in recent years. In the cattle sector, the disease control strategy has been successful in animal trade and animal shows.

### Conclusions
The health classification system in Sikava and it`s mandatory nature appears effective in controlling disease and enhancing biosecurity. In contrast, the diversity of the cattle sector and the voluntary nature of Naseva participation pose challenges for disease control. Nevertheless, there is a strong commitment to ETT guidelines, and systematic veterinary advice is a key factor in successful disease control and biosecurity improvement.

### Keywords
herd health • biosecurity improvement program

## ID 89
# EFFECT OF A COMPLETE HYGIENE PROGRAM DURING GROW-OUT ON SALMONELLA CONTROL ON BREEDER FARMS, DRINKING WATER AND BROILER CARCASSES

**Hedia Nasri Smaili**
*CID lines, An Ecolab Company, Ieper, Belgium*

### Introduction
Salmonella, a common pathogen in poultry, presents significant food safety risks and is a substantial public health concern.

### Objectives
The effect of hygiene protocol (barn cleaning and disinfection and drinking water-system cleaning during the sanitary stop and drinking water disinfection during production) on Salmonella prevalence and concentrations on the poultry production and carcasses was evaluated.

### Material and Methods
The study was conducted in an US poultry integration in partnership with the University of Georgia\'s. A total of 72,000 pullets were divided into four broiler breeder groups (two Control and two Treatment groups) and raised from 0 to 65 weeks. A total of 56,000 chicks originated from these flocks were divided into two groups (Control and Treatment groups). Environment (n=398) and water (n=96) samples were collected at both pullet (4, 8, 12, and 20 weeks of age) and breeder phases (30, 34, 38 and 42 weeks of age). At slaughterhouse, pre-chill carcasses rinsate (n=30) were sampled. Microbial populations in the water samples were determined.

### Results
Overall, Salmonella prevalence in the control houses (80%) was higher ($p \leq 0.05$) than in the treated houses (40%). Salmonella concentration was negative in the treatment houses ($p \leq 0.05$) compared to the control houses starting 12 weeks of age. Salmonella prevalence using boot swab, drag swab and litter samples were 79.2% during the 30 to 42 weeks period in control, compared ($p \leq 0.05$) to treatment flock samples (4.2%; 0%; 4.2%, respectively). The microbial populations in the drinking water were higher ($p \leq 0.05$) in the Control compared to the Treatment group. At 34 weeks of age, Salmonella prevalence was higher ($p \leq 0.05$) in control (37.5%) compared to Treatment (0%) in water samples. Salmonella prevalence for carcasses decreased ($p \leq 0.05$) by 67% for Treatment compared to Control group.

### Conclusions
An appropriate hygiene program reduced the Salmonella prevalence in both pullet and breeder houses, drinking water and pre-chilled carcasses.

### Keywords
Salmonella • Hygiene Protocol • Water Treatment • Broiler Breeders • Carcasses

## ID 90
# REVIEW OF BIOSECURITY MEASURES IN PIG FARMS FOR CONTROL AND PREVENTION OF SWINE INFLUENZA

**Paula Rebollo-Igual**[1]; Han Smits[2]; Miroslav Kjosevski[3]
*1. Departament de Sanitat i Anatomia Animals, Universitat Autònoma de Barcelona (UAB). Bellaterra, Barcelona, Spain; 2. Ceva Santé Animale, libourne, France; 3. Ss. Cyril and Methodius University in Skopje, Faculty of Veterinary Medicine, Department for animal hygiene and environmental protection*

## Introduction
Swine Influenza is a zoonotic pandemic infectious disease with potential. While many studies address biosecurity, few link it specifically to swine influenza. Analyzing biosecurity data is essential for identifying knowledge gaps that can enhance the management and control of swine influenza in pig herds.

## Objectives
This review aims to compile information on biosecurity measures related to swine influenza and other respiratory diseases and identify research gaps.

## Material and Methods
The research was conducted under Cost Action CA21132 “European Swine Influenza Network” (ESFLU, 2022), specifically within working group 3 and subgroup 3.5. Experts in this subgroup identified 11 key biosecurity topics and 109 relevant measures for swine influenza and other respiratory diseases, compiling them into a matrix.The literature search included terms such as pigs, biosecurity, vaccination, respiratory diseases, and swine influenza, covering studies published from 1995 to 2022. The database comprised peer-reviewed articles, conference proceedings, and case reports. Studies meeting eligibility criteria were included with 30% of papers validated by a second reviewer. Topics were selected in the matrix for each paper.

## Results
The most present topics in the literature were “Transport of animals, removal of carcasses and manure” (n=106 papers), “Animal flow” (n=92), and “Visitors and farm workers” (n=87). The less studied topics were “Cleaning and disinfection” (n=20), “Quality interior and hygiene” (n=23), and “Internal farm climate and ventilation” (n=28). The top-cited measures belonged to external biosecurity; “Entering trucks at the farm”, “Storage of carcasses and manure”, “All-in-all-out system”. No studies addressed “hygiene sluice”, “parking vehicles”, “bush/grass/trees”, “cleaning and disinfection outdoor”, “disinfection protocols at quarantine”, “age of the animals”. Only 29 out of the 93 selected papers were specific about biosecurity for swine influenza.

## Conclusions
The least reported measures in the literature were those related to internal biosecurity. Few specific measures were evaluated for Swine Influenza, highlighting the need for further research.

## Financial support and Acknowledgements
COST (European Cooperation in Science and Technology). ESFLU COST Action CA21132.

## Keywords
biosecurity • swine influenza • pig production • disease prevention

## ID 91

# EVALUATION OF CLEANING AND DISINFECTION IN SWINE MATERNITIES AND NURSERIES AND ITS IMPACT ON BIOSECURITY AND HEALTH STATUS OF PIGLETS

**Joaquin Morales**[1]; Elien Claeys[2]; Ana Mansilla[2]; Elisabet Rodriguez[2]
*1. Animal Data analitics; 2. CID LINES, An Ecolab Company*

## Introduction

Implementing biosecurity programs is essential, cleaning and disinfection (C&D) plays a crucial role to prevent diseases.

## Objectives

In this study, a specific C&D program was tested in maternity and nursery of four commercial swine farms.

## Material and Methods

The current C&D program (CN group) was compared with the new program (KV group). Including an alkaline detergent, and a concentrated disinfectant (quaternary ammonium compounds and glutaraldehyde). It was a before-after study, two batches in the CN group and 6 batches in the KV group were followed. All clinical incidences were recorded daily. 542 and 1621 litters in the CN and KV groups were followed up in maternity and 24,814 weaned piglets (28 days) in the nursery.

## Results

Pre-weaning mortality was reduced (13.2% vs 15.8%; P<0.01), mainly associated with less digestive disease and lameness and the number of weaned piglets per litter was increased (12.0 vs 11.8; P<0.05) in the KV group. The percentage of piglets requiring antibiotics in maternity was reduced 4.7 times in KV litters in all farms, especially to treat diarrhoea (18.0% vs 3.8%; P<0.0001). Antibiotics in nursery reduced from 6.40% to 4.07% (P<0.05) mainly due to reduction of respiratory problems (1.67% vs 0.66%; P<0.05), lameness (2.47% vs 1.01%; P<0.05) and meningitis (1.19% vs 0.72%; P<0.05) after applying the KV program. The incidence of digestive problems increased in the KV group (P<0.05), this was likely due to a one-time outbreak in the before-after study. Mortality in the nursery was reduced from 6.45% to 5.39% (P<0.05), the main causes were lameness and meningitis, which were heavily decreased (0.72% vs 0.38% and 1.48% to 0.86%; P<0.05).

## Conclusions

An effective cleaning and disinfection program is efficient to improve health status of piglets and helps to reduce antibiotics, mortality and disease incidence in maternities and nurseries in commercial farms.

## Keywords

biosecuriy • cleaning • disinfection • hygiene • prevention

## ID 92
# WHAT IS NEEDED TO IMPROVE BIOSECURITY MEASURES IN RUMINANT FARMS: THE OPINION OF FIELD VETERINARIANS

**Georgina Molero Murà**[1]; Teresa Imperial[1]; Gerard Martín[1]; Giovanna Ciaravino[1]; Josep Espluga[2]; Laia Batalla[3]; Ramon Armengol[4]; Daniel Villalba[4]; Alberto Allepuz Palau[1]

*1. Departament de Sanitat i Anatomia Animals, Universitat Autònoma de Barcelona (UAB), Bellaterra, Barcelona, Spain; 2. Departament de Sociologia, Universitat Autònoma de Barcelona (UAB), Bellaterra, Barcelona, Spain; 3. Escola de Pastors de Catalunya, Spain; 4. Departament de Ciencia Animal, Universitat de Lleida, Spain*

## Introduction
Implementing some biosecurity measures can be challenging in ruminant farms due to several factors, such as enough economic resources, awareness, adequate infrastructures or access to outdoor areas. Finding feasible and acceptable solutions to overcome such challenges is paramount to enhancing biosecurity in ruminant farms.

## Objectives
This study aimed to identify challenges associated with implementing specific biosecurity measures and which solutions could overcome them.

## Material and Methods
A selection of 16 biosecurity measures identified by the research team as challenging measures in previous studies was proposed for discussion. A participative workshop was conducted with 19 field veterinarians working either with large and/or small ruminant farms. These challenging measures were related to the purchase of animals, animal transport, visitors, fencing, rodent and bird control, sharing of pastures and interaction with wildlife animals.

## Results
Results from the workshop pointed out that the main challenges were related to a lack of farmer awareness about the risks and benefits of biosecurity due to the sector\'s structural problems, lack of time from vets to advise on biosecurity, reduced economic resources to conduct investments and absence of cleaning and disinfection points for animal transport. Veterinarians suggested solutions focused on improving resources to have technicians specialized in biosecurity, resources to have exclusive farm material at disposition for the visitors, or the need to spread awareness of the importance of biosecurity among the farmers. They stressed the need for more involvement from competent authorities to implement these measures. Figure 1 illustrates the challenges and proposed solutions discussed during the workshop with veterinarians, while Table 1 offers three examples of measures along with their challenges and solutions.

## Conclusions
In the view of field veterinarians, the main challenges for implementing specific biosecurity measures are the farmers\' lack of awareness and reduced economic resources. Thus, cooperative efforts are essential to improve communication and exchange visions among stakeholders.

## Financial support and Acknowledgements
This work was supported by the INNOTUB II project [grant number EFA115-01] funded by the Interreg-POCTEFA 2021–2027 and co-financed from the ERDF (European Regional Development Fund). The funders had no role in the study design, data collection and analysis, or preparation of the manuscript.

## Keywords
Biosecurity • Challenges • Solutions • Veterinarians • Participative Workshop

Continue –>

**Figure 1. Challenges and solutions proposed by the veterinarians during the workshop**


workshop

| BIOSECURITY MEASURE | CHALLENGES | SOLUTIONS |
|---|---|---|
| **Animal entrance:** know the health status of the farm of origin in front of unwanted (and unregulated) diseases and/or perform diagnostic tests before movement | Low awareness of the risks | Increase information and training among the farmers |
| | Farms' veterinarian role | The Administration should assume the expenses of this role. |
| | Assume biosecurity is a benefit for the farm | Further training and counsel are needed for the farmers. |
| | Increase veterinarian-farm ratio | More economic resources should be provided by the Administration. |
| **Animal transport:** animals are transported in a truck that has been cleaned and disinfected correctly. | Lack/absence of disinfection points | Set up nearby and affordable cleaning and disinfection centres. The administration should assume this. |
| | Few livestock transport companies | Look for some kind of incentive, especially for extensive livestock |
| **Visits:** providing boots and work clothes from the farm to visitors and the more frequent professionals in contact with the farm animals (e.g. to the veterinarian). | Convince the farmer to buy this material (boots and work clothes) for professionals and other people who visit the farm | Explain the importance of the measure and the associated risks of not implementing it. Consider establishing this as a rule of mandatory compliance. |
| | Keep veterinarians' boots on the farm. | The veterinarian could be responsible for the appropriate mantainance and custody of the material. Also, consider labelling the material. |
| | Insistence of the veterinarian | The veterinarian has to raise interest and help the farmer be aware of the importance of respecting these measures. |

## ID 93
# BRIDGING EPIDEMIOLOGY AND SOCIOLOGY TO IMPROVE CATTLE BIOSECURITY

**Teresa Imperial-Esteban**; Natalia Ciria Artiga; Alberto Allepuz Palau; Giovanna Ciaravino
*UAB*

### Introduction
Evidence-based practices are crucial to guide the biosecurity implementation in animal production systems. However, integrating these practices into daily farm operations is often hindered by limited knowledge, economic constraints, or the feasibility of certain measures. The use of Behavioural Change Techniques (BCTs) [1] can help promoting the adoption of biosecurity measures and support farmers to overcome barriers.

### Objectives
This study aims to provide practical solutions and ensure a sustainable approach to biosecurity implementation in cattle farms by combining social science and veterinary epidemiological methods.

### Material and Methods
Since July 2024, a mixed methods approach has been implemented on 10 Spanish cattle farms (5 dairy and 5 beef), each farm being visited 5 times in one year (Figure 1). BCTs, such as motivational interviewing, together with epidemiological assessment tools such as FarmR!sk [2] and Biocheck.Ugent [3] have been used to promote changes in farmers' behaviour and to encourage improvements in on-farm biosecurity. Pre-post evaluations were conducted to assess the intervention\'s impact, by collecting qualitative, semi-qualitative and quantitative data.

### Results
Preliminary findings in dairy cattle farms show that farmers are becoming more proactive in adopting biosecurity practices with each visit, though full implementation remains limited. By visit 2, only one farm had partially adopted the recommended measures. Between visits 2 and 3, two farms adjusted their practices following discussions about pathogen risks and legislation changes, such as fencing requirements. At the final visit, biosecurity will be reassessed to track changes and determine whether these align with shifts in farmers' attitudes.

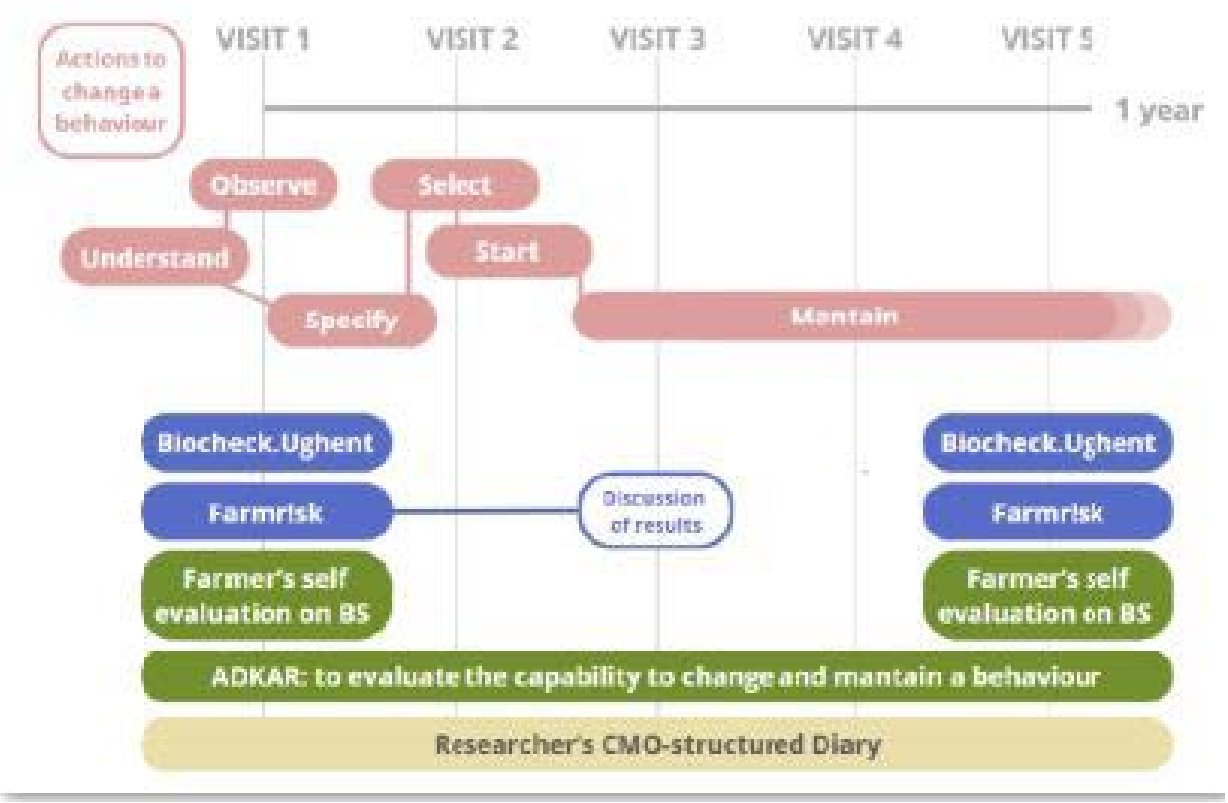
### Conclusions
The study shows that farmers are increasingly proactive in improving biosecurity. Social science methodologies and BCTs combined with epidemiological assessment tools to facilitate discussion seems to be effective in shifting attitudes and practices. The intervention emphasizes the importance of personalized support for long-term biosecurity adoption, with continued BCTs and veterinary advice being essential for maintaining sustainable improvements.

### Financial support and Acknowledgements
This research project was funded by BIOSECURE Horizon Europe project (www.better-biosecurity.eu) and BioRisk (supported by MCIN/AEI/10.13039/501100011033, ref. PID2020-118302RB-I00).

### Keywords
Behaviour • Coaching • Biosecurity assessment • Ruminant • Farming practices

Continue –>

**Figure 1. Scheme of the study design, indicating the activities conducted in each of the farms'visits**



## ID 94
# UNLEASHING THE IMAGINATION OF SCHOOLCHILDREN TO INCREASE AWARENESS ABOUT ZOONOTIC DISEASE TRANSMISSION AND PERSONAL BIOSECURITY MEASURES

**Karin Berggren**; Krista Tuominen; Lena-Mari Tamminen
*Swedish University of Agricultural Sciences*

### Introduction
Awareness of zoonotic diseases is a basic requisite for the implementation of personal biosecurity practices. However, informing the general public through science communication comes with challenges as people differ in characteristics, ways of interpreting information and previous knowledge. Thus, science communication needs to be adaptive and flexible. Also, information is best shared on a platform that creates dialogue as well as excitement.

### Objectives
To increase awareness of zoonotic disease among schoolchildren, we prepared an activity for a science festival arranged by the local municipality and local universities (Uppsala University and Swedish University of Agricultural Sciences) in Uppsala, Sweden.

### Material and Methods
The activity was targeted to children between 7-12 years old and included an arts and crafts corner where the students had access to different materials for creating their own zoonotic pathogen. The space was decorated with pictures of real zoonotic pathogens and printed examples of illustrations of pathogens. After creating their pathogen, the students were asked to fill in a “microbe passport” together with a researcher (Figure 1). In the passport, children could draw the host animal(s), choose if it was a virus or bacteria, specify symptoms, transmission routes and suggest protection measures.

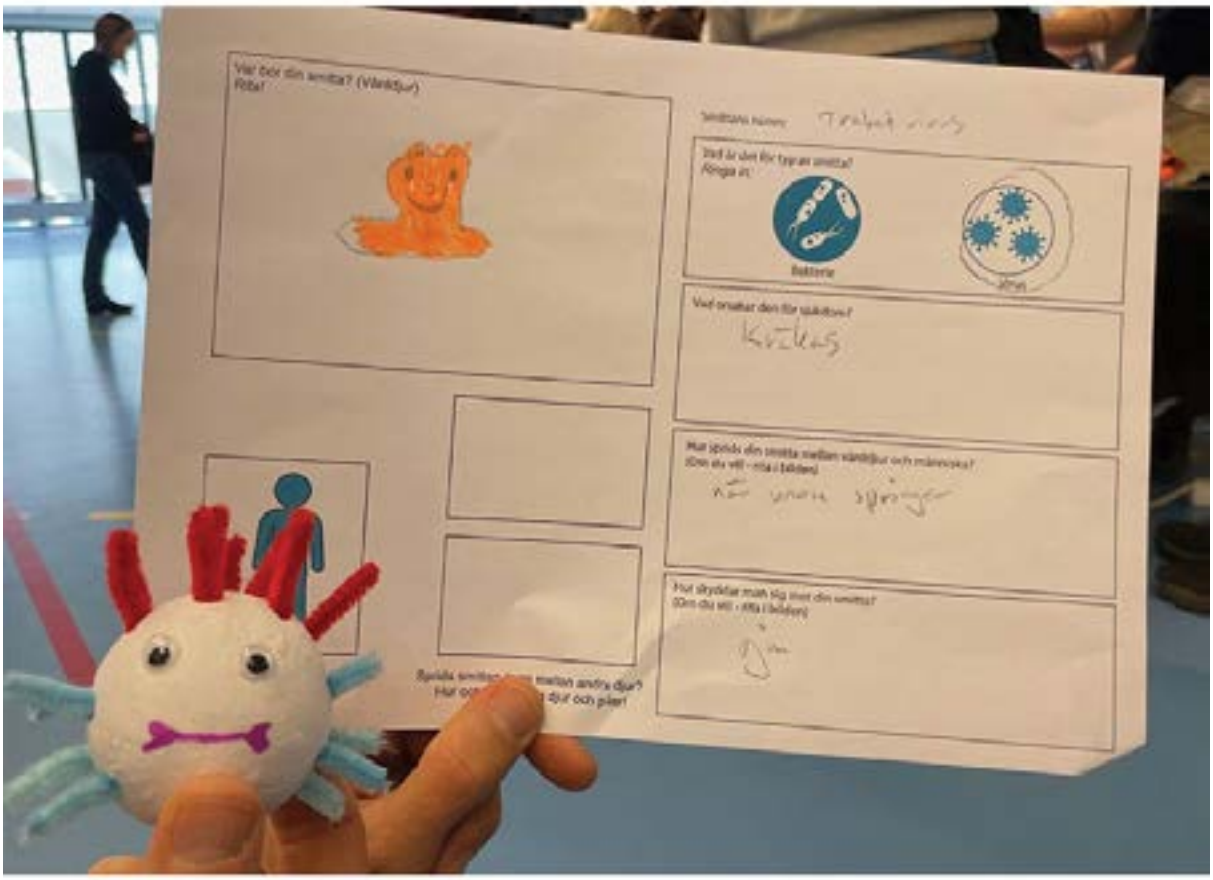
### Results
Interaction with the children during the exercise generated discussion and questions based on each individual’s perception and knowledge. These, in turn, allowed researchers to provide examples and mention existing zoonoses. In particular, discussions about routes of transmission and protection from the pathogen sparked various ideas in the children. In the discussions, the researchers could relate their ideas to common ways of disease transmission and related biosecurity practices.

### Conclusions
Overall, our impression is that the activity created a platform for meeting the children at their individual knowledge level and harnessed their imagination and curiosity to increase understanding of zoonotic disease transmission and personal biosecurity measures.

### Financial support and Acknowledgements
Development of the activity was co-funded by the Swedish research council Formas (Dnr 2022-02779).

### Keywords
Science communication • Zoonosis • Personal biosecurity

Continue –>


Bakterie
Virus

## ID 95

# CLEAN ENVIRONMENT, HEALTHY CHICKENS: EVALUATION OF THE EFFECTIVENESS OF A COMPREHENSIVE HYGIENE PROGRAM IN COMMERCIAL BROILER FARMS

**Giuditta Tilli**[1]; Hedia Nasri Smaili[2]; Ana Mansilla[2]; Elien Claeys[2]; Elisabet Rodríguez-González[2]; Giulia Graziosi[3]; Tiago Prucha[1]; Maarten De Gussem[4]

*1. Vetworks bv, Poeke, Belgium; 2. CID lines, An Ecolab Company, Ieper, Belgium; 3. Department of Veterinary Medical Sciences, University of Bologna, Ozzano dell'Emilia (BO), Italy; 4. Vetworks bv, Knokstraat 38, B-9880 Poeke, Belgium; Faculty of Veterinary medicine, University of Ghent, Merelbeke, Belgium*

## Introduction

A complete hygiene program (including cleaning, disinfection, and water hygiene) is a key biosecurity strategy to decontaminate poultry houses between consecutive production rounds, thereby playing a crucial role in ensuring optimal flock performances.

## Objectives

This study evaluated the efficacy of a complete hygiene program versus current practices in commercial broiler farms, and its impact on flock performance.

## Material and Methods

Four broiler farms in Belgium were selected, and sampling was conducted over three production cycles (A, B, C) after cleaning, after disinfection, and at start of rearing. Environmental samples were collected from floor, feeders, drinkers, walls, ceiling, inlets, and feed hoppers in the poultry barn, both after cleaning and after disinfection. Samples were then tested for ATP concentration, total bacterial count, Enterococcus spp. count, Escherichia coli and fungal presence. Cloacal samples were collected from 7-days-old chicks, and tested for astrovirus, avian nephritis virus, reovirus, rotavirus A. Water samples were also collected before and after drinking lines disinfection, and tested for Enterococcus spp., coliforms, Salmonella spp., and aerobic bacterial count at 22°C and 37°C.

## Results

Results showed a decrease of Enterococcus spp. count in all rounds both after cleaning (1351, 791, 118 CFU/ml), and after disinfection (50, 3, 0 CFU/ml), for rounds A, B, C, respectively. A decrease in Avian Nephritis Virus detection on 7-day-old chicks was observed (ct values: 23.65, 27.38, 27.13 for rounds A, B, C, respectively). An increase in the end weight (2.63, 2.64, 2.65 kg), along with improvements in mortality (2.43%, 1.75%, 2.14%), and FCR (1.532, 1.527, 1.531) for rounds A, B, C, respectively, were also detected. Linear and Generalized Linear Mixed Models are being used to assess correlations between the hygiene program and technical outcomes. Results show a significant mortality reduction in round B vs. round A ($t = -3.142$).

## Conclusions

Results of this study suggest efficacy of the adopted hygiene program.

## Keywords

Biosecurity • Cleaning and Disinfection • Water hygiene • Broiler • Commercial farms

## ID 96

# IMPORTANCE OF OUTBREAK INVESTIGATION FOR IMPROVING BIOSECURITY IN PIG FARMS FREE OF PORCINE PATHOGENS

**Laura Valeria Alarcón**
*Universidad Nacional de La Plata*

### Introduction
Outbreak investigation evaluates the effectiveness of prevention strategies, raises awareness, and disseminates information on the importance of biosecurity.

### Objectives
To describe a lack of biosecurity in the event of pathogen introduction in naive pig farms in Argentina, highlighting the valuable role of the(OI)in improving biosecurity.

### Material and Methods
Four disease-free farms that suffered the introduction of Aujeszky's disease (AD) and Mycoplasma hyopneumoniae (MH) were visited. Epidemic curves were constructed to estimate incubation periods and determine the study time. A comprehensive questionnaire was used to take data about the first clinical signs, time, location, and the external connections. The facilities, and all records present on farm were reviewed. Service providers and personnel involved in biosecurity processes, were interviewed. The main hypotheses suggested by the temporal and spatial relationship, the lack or changes in biosecurity measures, were proposed.

### Results
1. **Fattening center:** AD's first clinical signs (FCS) were observed where external maintenance personnel worked, serving several pig farms were present. They parked their vehicles near the barns, entering and exiting repeatedly.
2. **Fattening center:** FCS was observed in barns adjacent to the dressroom; personnel used the barns to walk to their work areas.
3. **Two fattening centers:** FCS appeared in barns where external vaccinators entered to perform immunocastration and worked on other premises. Pigs exposed to these were 2.22 times more likely to become ill.
4. **Sow farm:** The first sows ill with MH were in pens near the dressroom. After attending an affluent event, a veterinarian entered without downtime(<14h), and gas fitters entered with their tools. Sows exposed to the veterinarian had 51 times more chances of getting sick, and those exposed to installers had an OR of 38.59.

### Conclusions
The OI allows for identifying biosecurity lapses at moments when there is a high level of awareness and emphasizes the importance of maintaining external connection records and conducting proper analysis.

### Keywords
Swine Epidemiology • Outbreak investigation • Biosecurity