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DEPARTMENT OF INTERNAL MEDICINE, REPRODUCTION AND POPULATION MEDICINE
VETERINARY EPIDEMIOLOGY

THE IMPORTANCE OF BIOSECURITY IN ANIMAL HEALTH PROTECTION

Prof. Jeroen Dewulf

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Bio-what ?

BIOSECURITY

=

The application of a set of **management**, **behavioural** and **physical** measures designed to reduce the risk of **introduction**, **establishment** and **spread** of pathogenic agents **to, within and from** an animal population.

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BIOSECURITY is (should be) the basis of any disease control program

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Is biosecurity important?

31.3.2016 EN Official Journal of the European Union L 84/1

REGULATION (EU) 2016/429 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 9 March 2016

on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law')

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

- The word "veterinarian" is mentioned 49 times
- The word "biosecurity" is mentioned 70 times

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Is biosecurity important?

TERRESTRIAL CODE – USE OF THE TERM 'BIOSECURITY'

The term 'Biosecurity' appears 274 times in the Terrestrial Code (233 times in part 1 and 41 times in part 2), across 12 Sections and 46 Chapters.

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World Organisation for Animal Health

The State of the World's Animal Health | 92nd General Session | SEARCH

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Home » What we do » Standards » Codes and Manuals

Codes and Manuals

Our Terrestrial and Aquatic Animal Health Codes provide standards for the improvement of animal health and welfare and veterinary public health worldwide, including through standards for safe international trade in terrestrial and aquatic animals and their products.

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DRAFT

SECTION 4.

DISEASE PREVENTION AND CONTROL

CHAPTER 4.X.

BIOSECURITY

DRAFT

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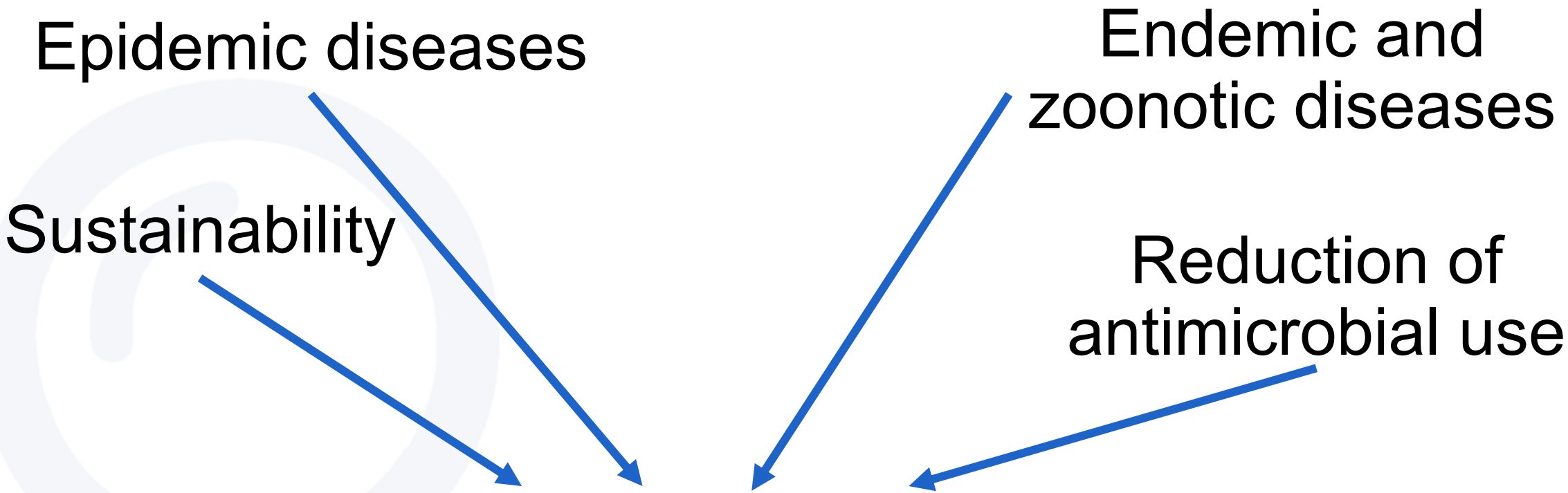
Is biosecurity important?



Biosecurity helps to address of all of these challenges

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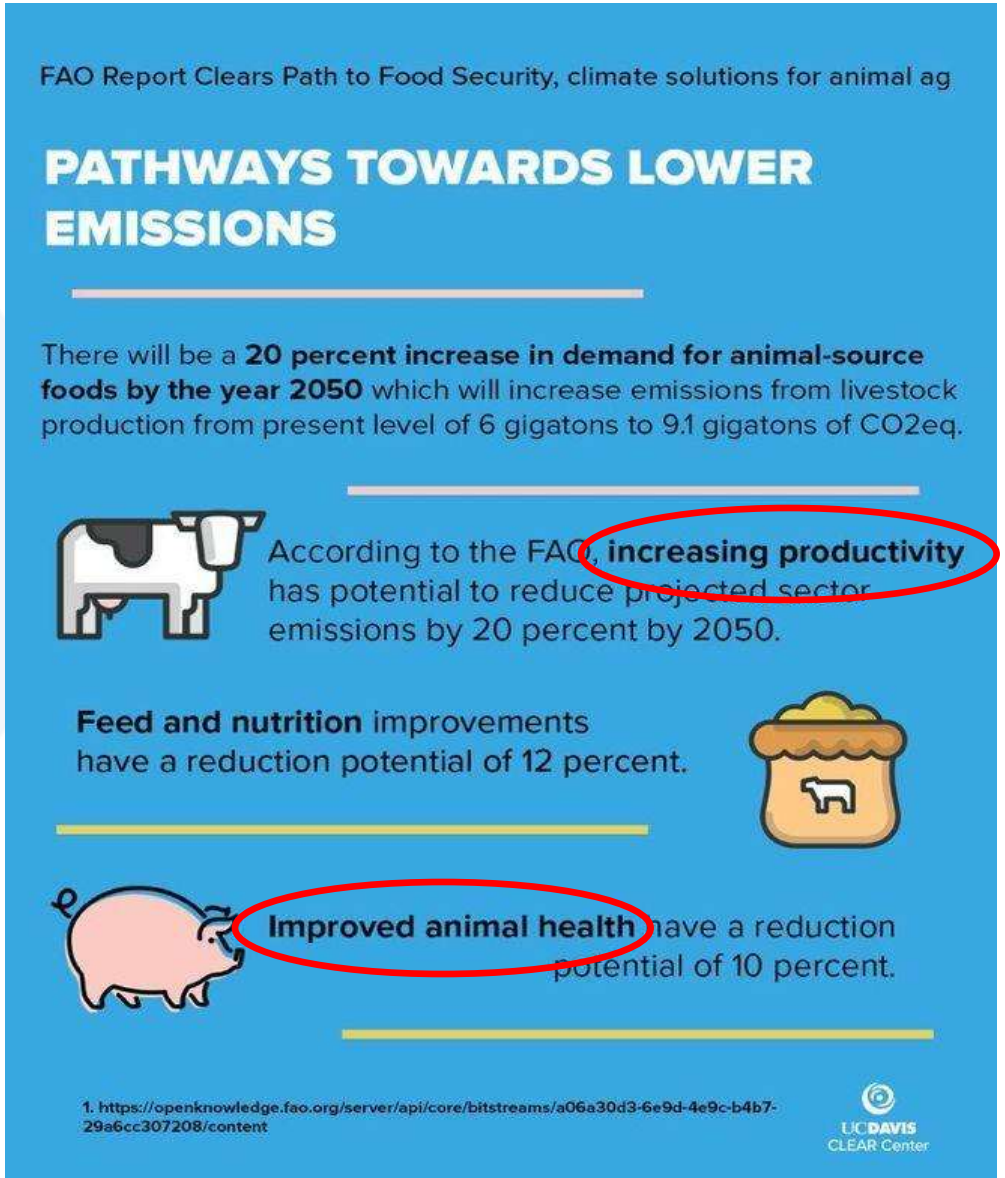
Is biosecurity important?



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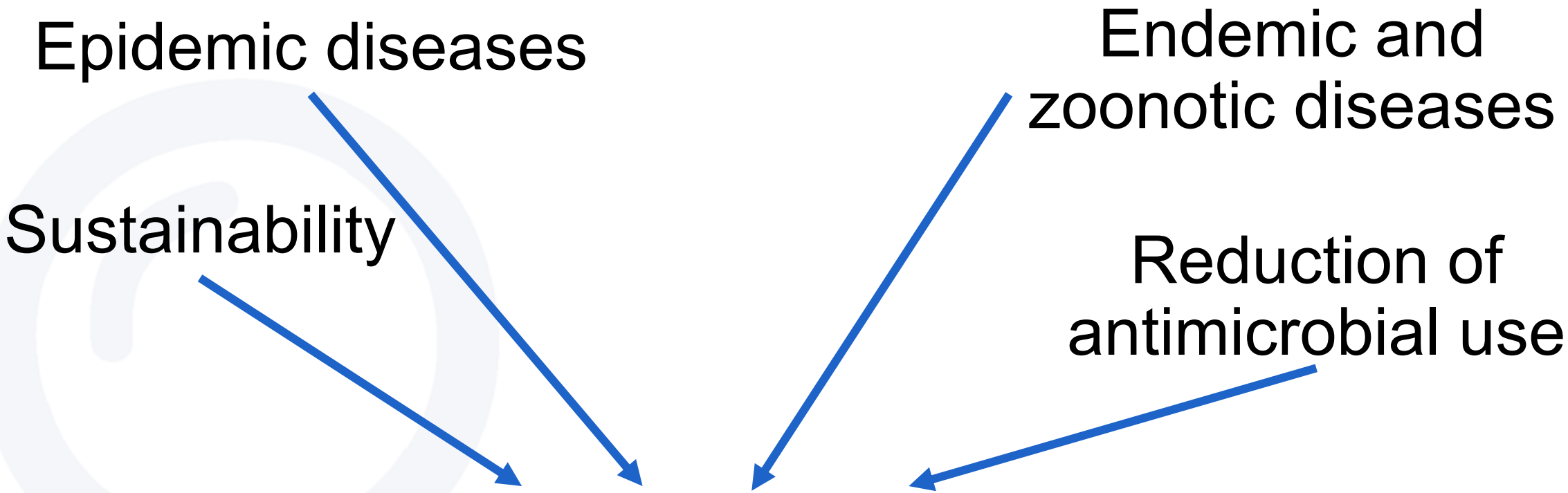
Is biosecurity important?



Biosecurity helps to address of all of these challenges

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THE IMPACT OF BIOSECURITY ON HEALTH AND PRODUCTION

Prof. Jeroen Dewulf

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IMPACT OF BIOSECURITY – PRODUCTION

The Veterinary Journal 198 (2013) 508–512

Contents lists available at ScienceDirect

The Veterinary Journal

journal homepage: www.elsevier.com/locate/tvjl

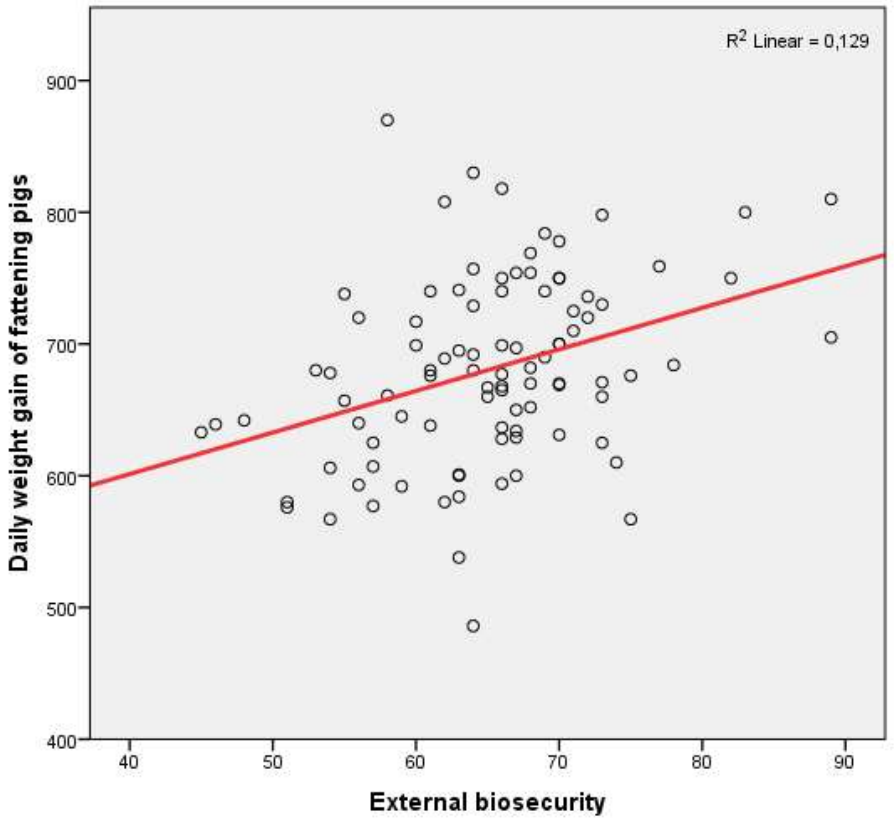
Relationship between biosecurity and production/antimicrobial treatment characteristics in pig herds

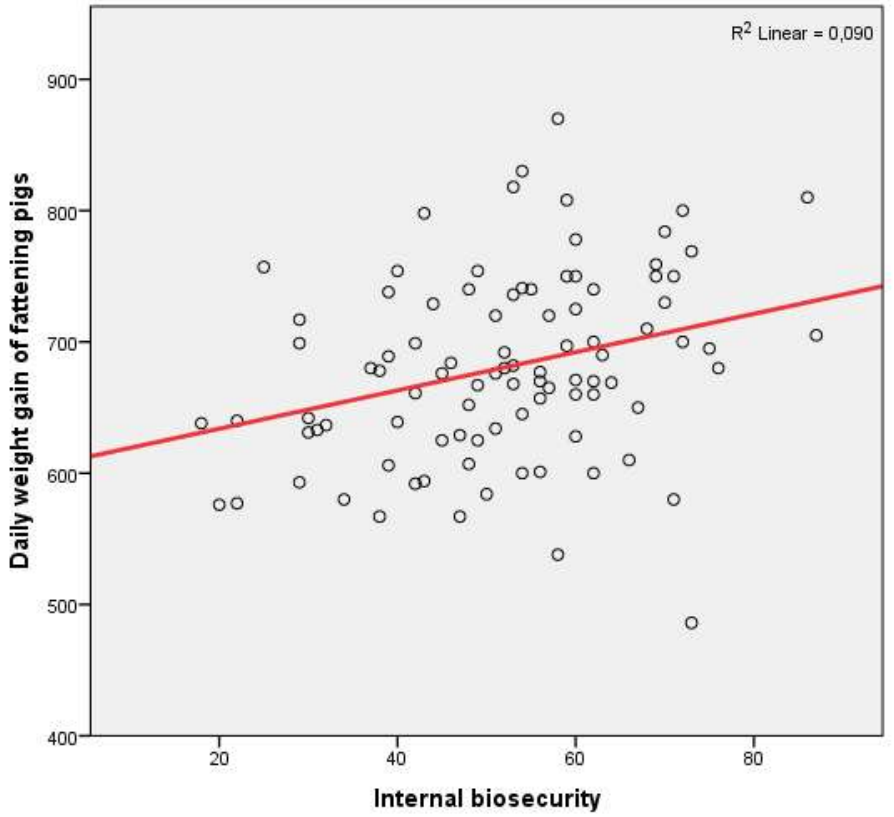
M. Laanen [a,*], D. Persoons [a,b], S. Ribbens [c], E. de Jong [c], B. Callens [a], M. Strubbe [c], D. Maes [a], J. Dewulf [a]

[a] Unit of Veterinary Epidemiology, Department of Reproduction, Obstetrics and Herd Health, Faculty of Veterinary Medicine, Ghent University, 9820 Merelbeke, Belgium
[b] Pharma.be, Belgian Association for the Pharmaceutical Industry, 1170 Brussels, Belgium
[c] Animal Health Care Flanders, 9000 Drongen, Belgium

IMPACT OF BIOSECURITY

Biosecurity vs daily weight gain





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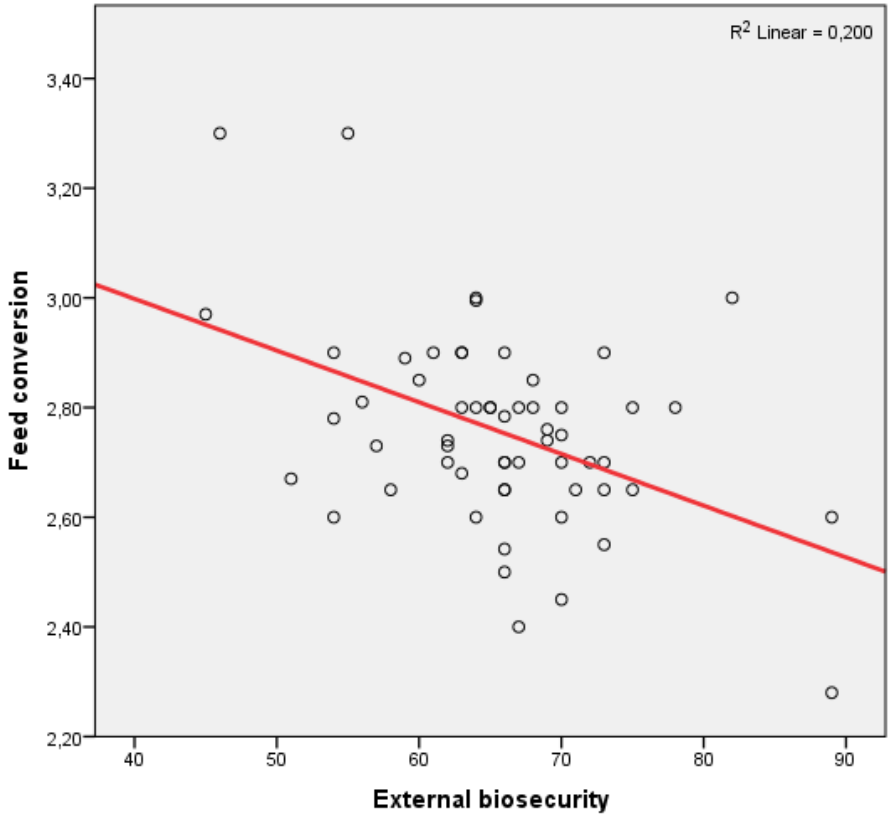
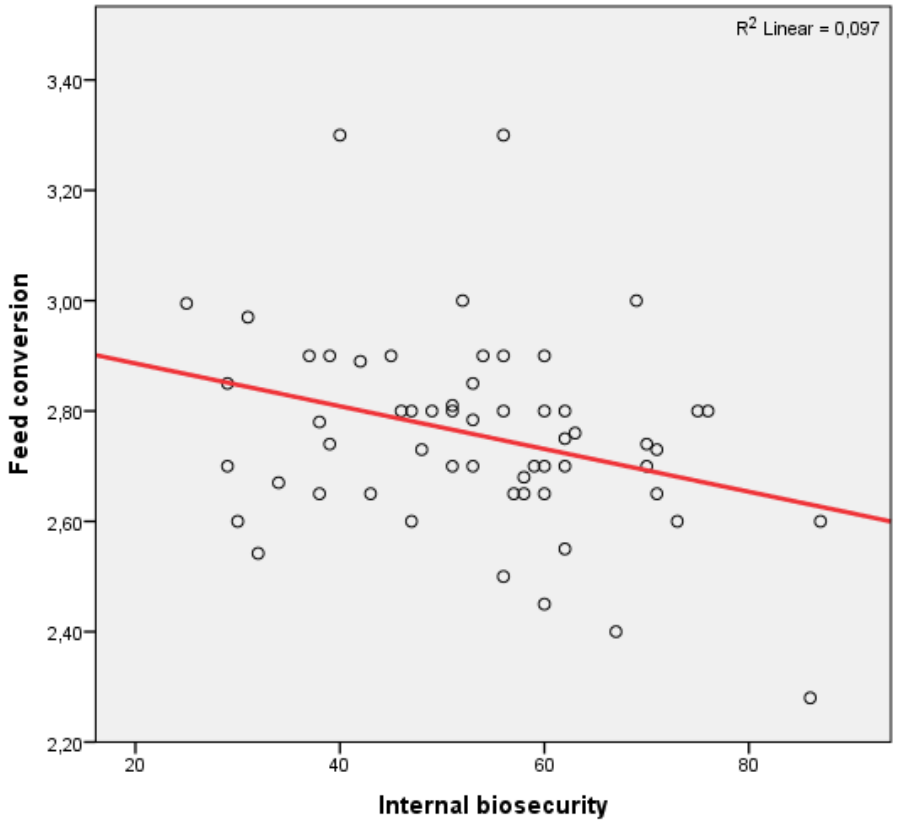
IMPACT OF BIOSECURITY

Biosecurity vs feed conversion





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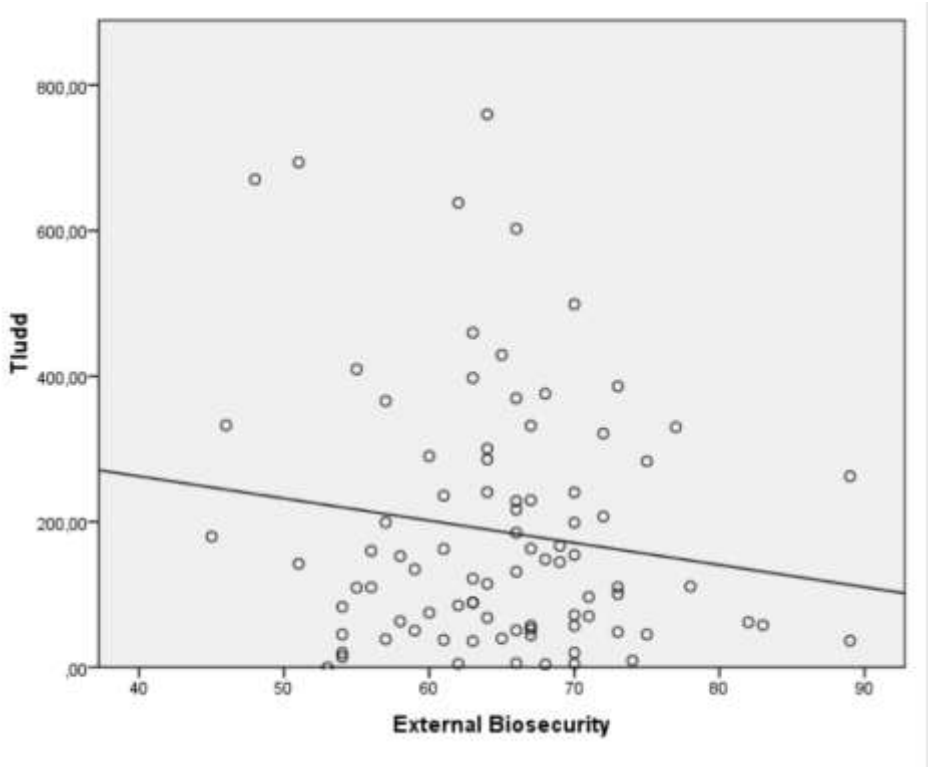
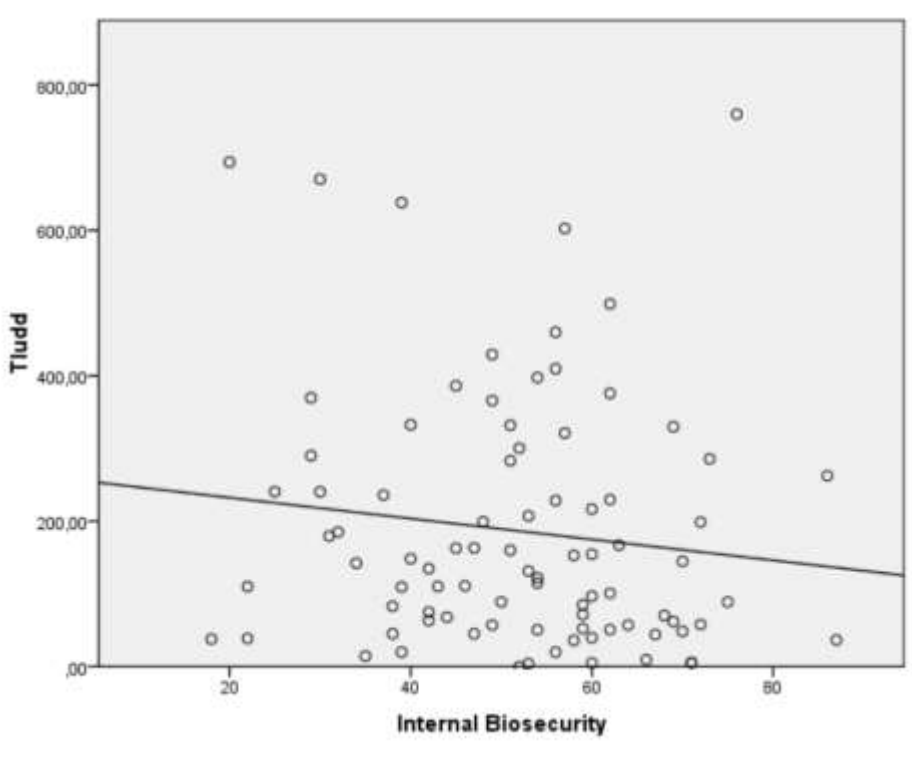
Biosecurity vs antimicrobial use



Pearson r = -0,15, p = 0,17



Pearson r = -0,12, p = 0,25

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Impact of biosecurity

Animal, page 1 of 12 © The Animal Consortium 2015
doi:10.1017/S1751731115002487

animal

The biosecurity status and its associations with production and management characteristics in farrow-to-finish pig herds

M. Postma[1†], A. Backhans[2,3], L. Collineau[4,5], S. Loesken[6], M. Sjölund[2,3], C. Belloc[5], U. Emanuelson[3], E. Grosse Beilage[6], K. D. C. Stärk[4] and J. Dewulf[1] on behalf of the MINAPIG consortium*

[1]Veterinary Epidemiology Unit, Department of Reproduction, Obstetrics and Herd Health, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium; [2]Department of Animal Health and Antimicrobial Strategies, National Veterinary Institute, SVA, SE-751 89 Uppsala, Sweden; [3]Department of Clinical Sciences, Swedish University of Agricultural Sciences, P.O. Box 7054, SE-750 07 Uppsala, Sweden; [4]SAFOSO AG, Waldeggstrasse 1, CH-3097 Liebefeld, Switzerland; [5]ONIRIS, UMR 1300 BioEpAR, BP40706, F-44307 Nantes, France; [6]Field Station for Epidemiology, University of Veterinary Medicine Hannover, Büscheler Straße 9, D-49456 Bakum, Germany

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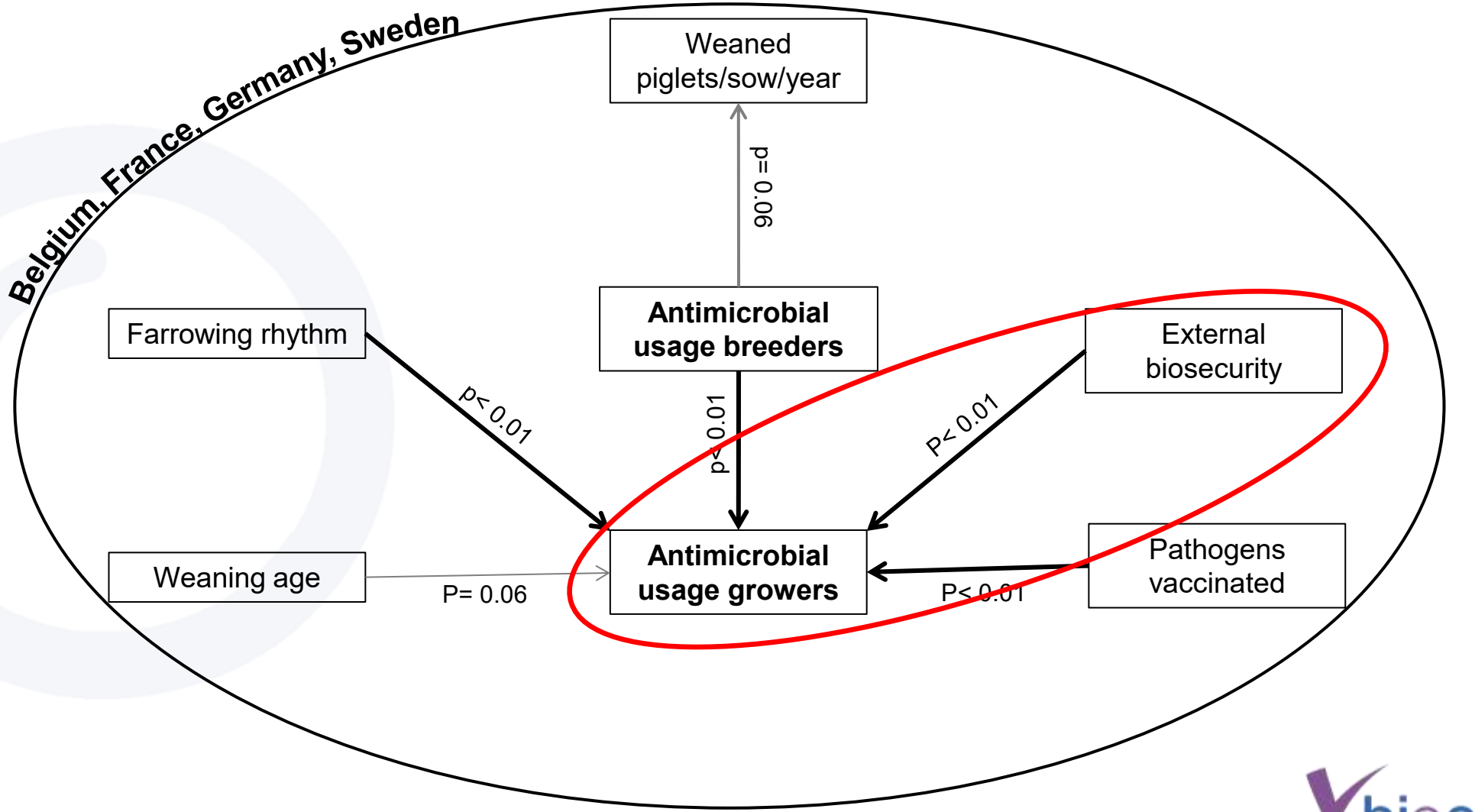
Impact of biosecurity



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Impact of biosecurity

PAPER

Profile of pig farms combining high performance and low antimicrobial usage within four European countries

Lucie Collineau,[1,2] Annette Backhans,[3] Jeroen Dewulf,[4] Ulf Emanuelson,[3] Elisabeth grosse Beilage,[5] Anne Lehébel,[6] Svenja Loesken,[5] Elisabeth Okholm Nielsen,[7] Merel Postma,[4] Marie Sjölund,[3,8] Katharina D C Stärk,[1,9] Catherine Belloc[6]

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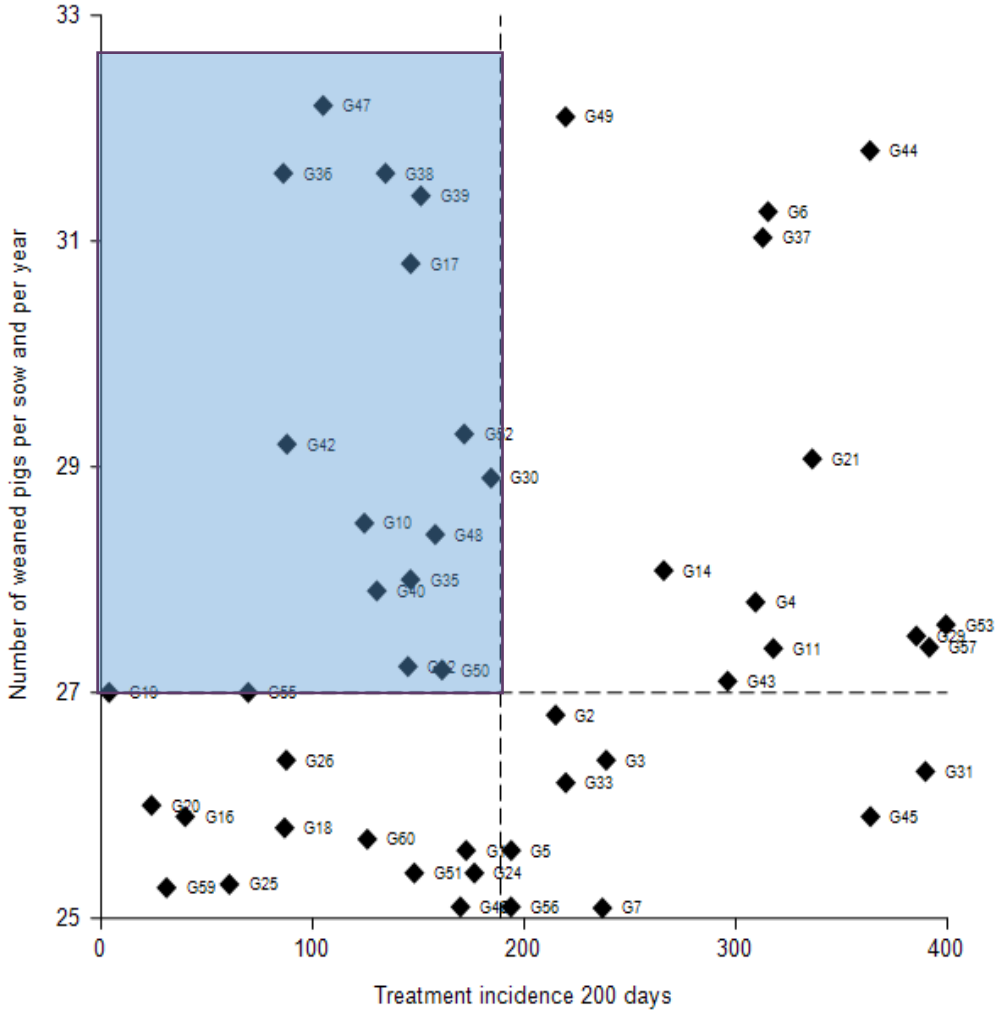
Impact of biosecurity



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Impact of biosecurity

- On average higher level of internal biosecurity
- Situated in a region with lower pig density
- Lesser frequent treatment against respiratory pathogens

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Impact of biosecurity

ELSEVIER

Preventive Veterinary Medicine

Volume 217, August 2023, 105968

Quantitative and qualitative analysis of antimicrobial usage and biosecurity on broiler and Sonali farms in Bangladesh

Nelima Ibrahim [a b], Ilias Chantziaras [a], Md. Abu Shoieb Mohsin [e], Filip Boyen [c], Guillaume Fournié [d f g], Sk Shaheenur Islam [b], Anna Catharina Berge [a], Nele Caekebeke [a], Philip Joosten [a], Jeroen Dewulf [a]

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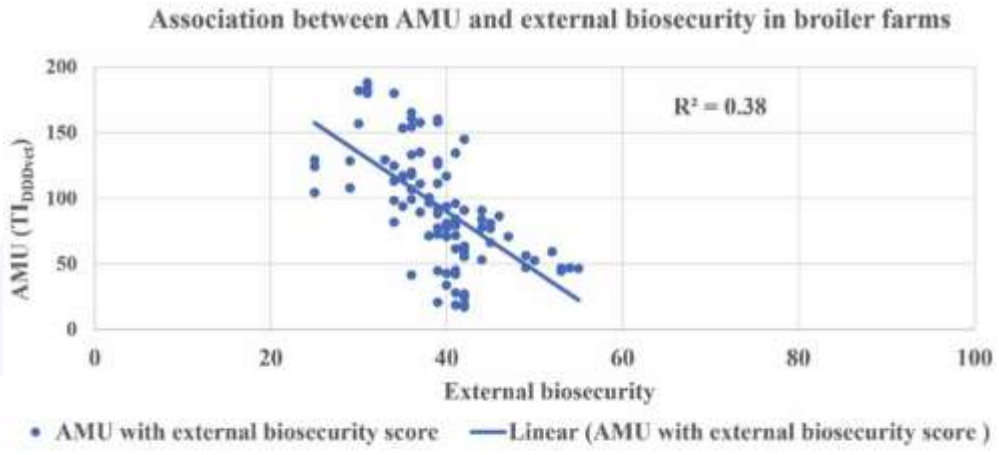
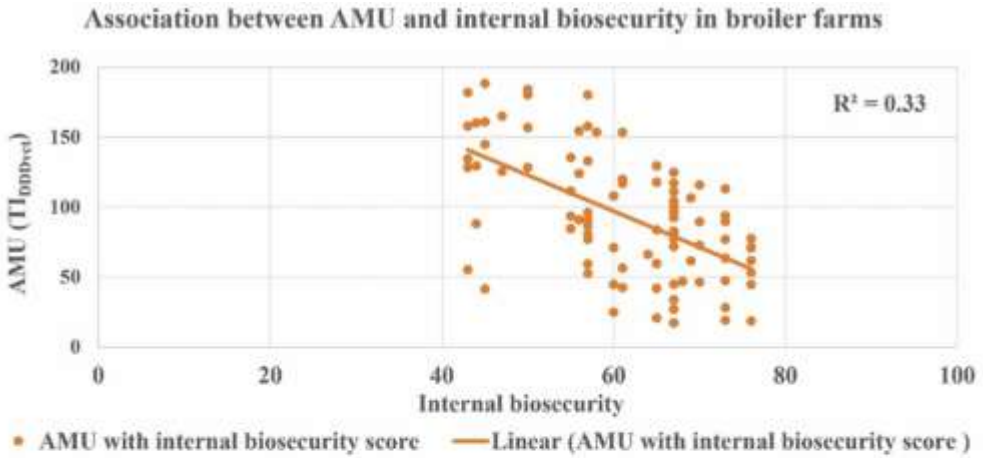
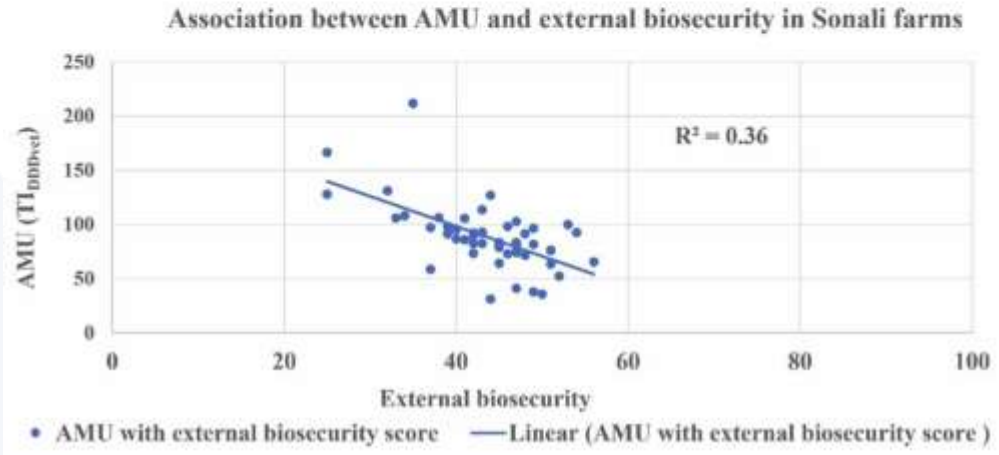
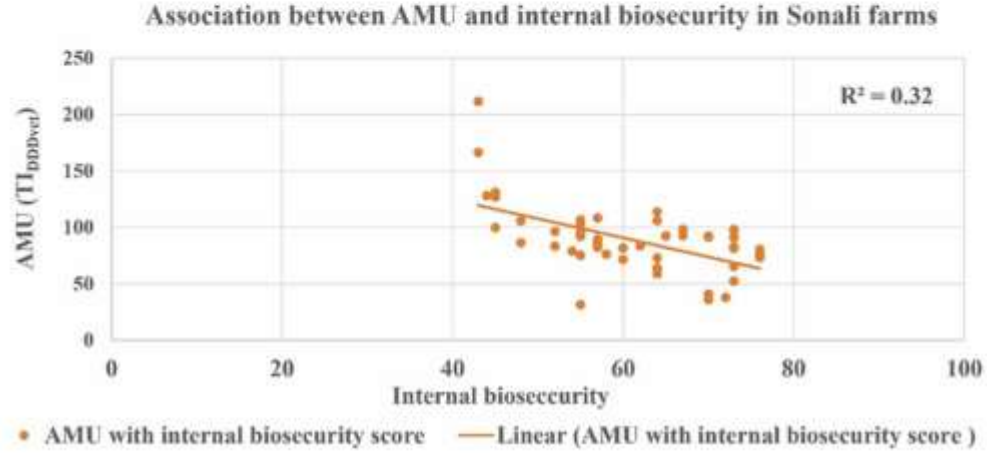
Impact of biosecurity









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Impact of biosecurity

Article

Impact of Biosecurity on Production Performance and Antimicrobial Usage in Broiler Farms in Cameroon

Stephane D. Ziebe [1,†], Ronald Vougat Ngom [1,*,†], Adonis M. M. Akoussa [1], Henry P. Bogning [2] and Henriette A. Zangue [3]

Abstract: The broiler industry is the most developed livestock sector in Cameroon. This study aimed to evaluate the relationship between biosecurity implementation with production performance and antibiotic usage in broiler farms in Cameroon. 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 in 57 farms in the Adamawa and North regions. The average total biosecurity score of broiler farms was 52/100. ADG (46.54 ± 5.18 g versus 43.80 ± 4.16 g), FCR (1.59 ± 0.61 versus 1.75 ± 0.58), mortality rate (2.47% versus 6.65%), and PI (339.21 ± 105.79 versus 268.22 ± 101.09) were statistically better in farms with good biosecurity. The majority of antibiotics used (55.2%) were classified as critically important for human medicine, with 83.9% of antibiotics underdosed/overdosed. No correlation was found between biosecurity and AMU, although there was a trend towards reduced use in farms with good biosecurity. The misuse of antibiotics will result in an increased development of antimicrobial resistance, which can be transmitted to humans. This study highlights the importance of biosecurity in improving poultry performance and reducing AMU. Continuous training

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Impact of biosecurity

ELSEVIER

Preventive Veterinary Medicine

Volume 246, January 2026, 106736

Quantitative assessment of biosecurity practices in conventional broiler farms in Punjab, Pakistan

Qamer Mahmood [a], Ilias Chantziaras [a], Shafique Ur Rehman [b], Mudassar Nazar [c], Jeroen Dewulf [a]

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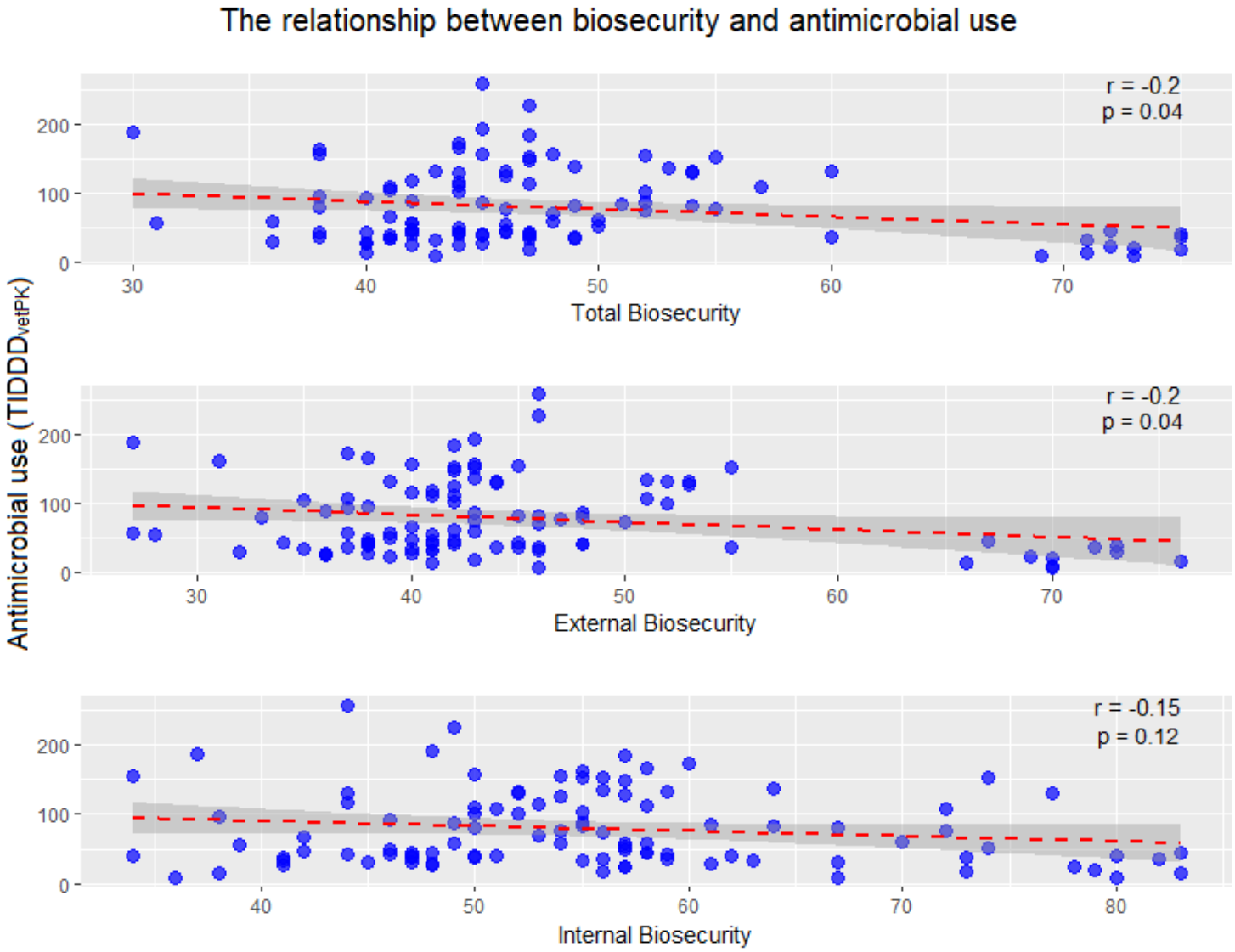
Impact of biosecurity



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Impact of biosecurity

Are you convinced, based on the results so far that better biosecurity results in lower AMU and improved productivity?

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Impact of biosecurity

Zoonoses AND PUBLIC HEALTH

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Original Article

Reducing Antimicrobial Usage in Pig Production without Jeopardizing Production Parameters

M. Postma ✉, W. Vanderhaeghen, S. Sarrazin, D. Maes, J. Dewulf

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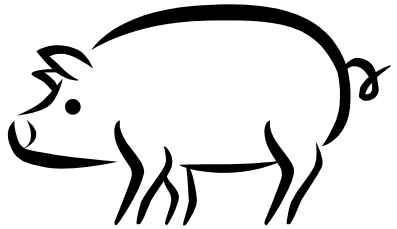

Total biosecurity: + 11,9%

Internal biosecurity: + 18,8%

External biosecurity: + 6,6%

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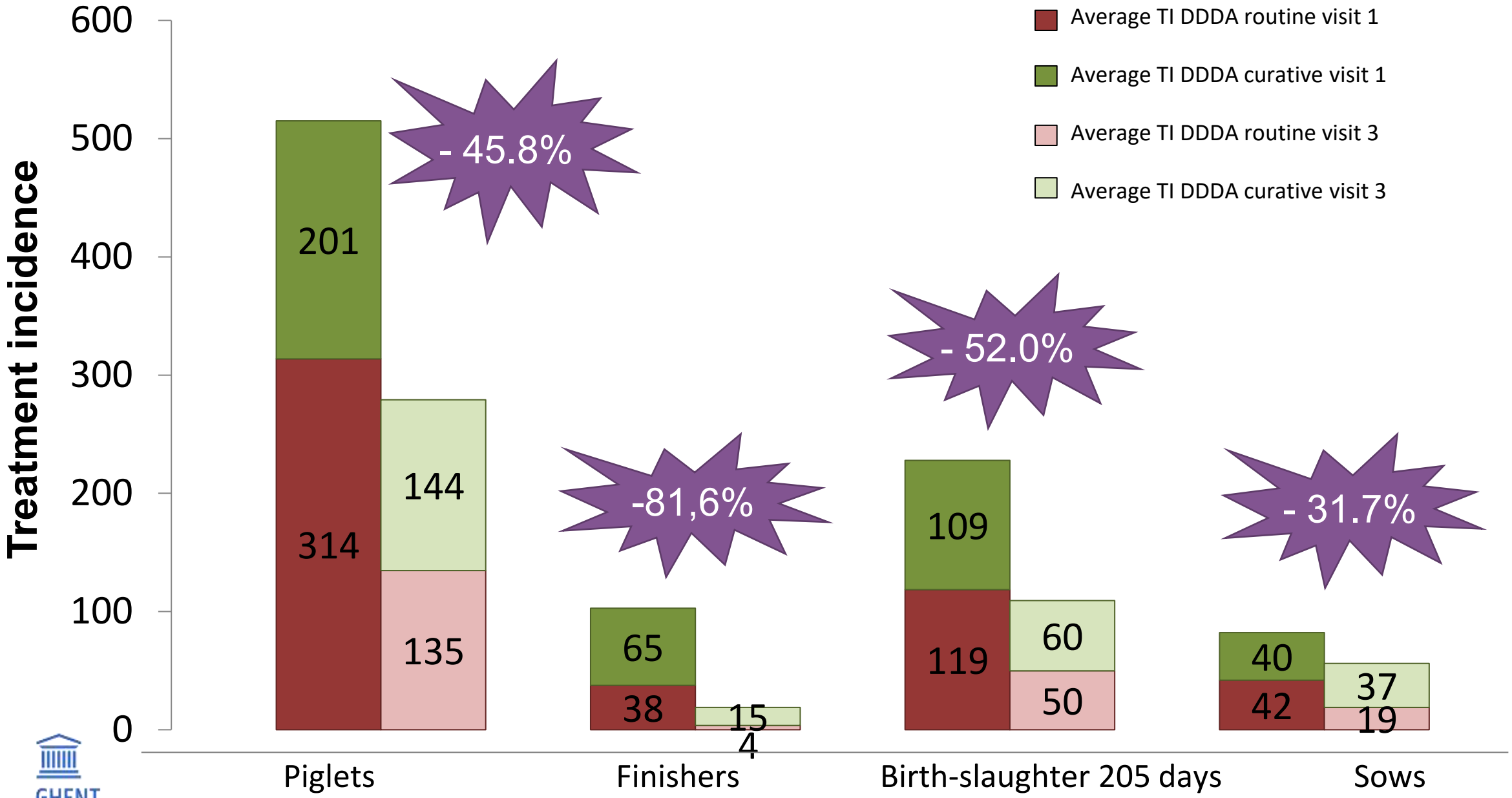

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Production results

	VISIT	MEAN	DIFFERENCE	P-VALUE
Weaned piglets per sow per year	Initial	26.4	+1,1	<0.01
	Follow up	27.5		
Daily weight gain fatteners	Initial	667.5	+7,7	0.01
	Follow up	675.2		
Mortality in fatteners (%)	Initial	3.2	-0,6	0.04
	Follow up	2.6		

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Postma et al, 2017

ADVANCE ACCESS

IMMUNOLOGY, HEALTH, AND DISEASE

Biocheck.UGent: A quantitative tool to measure biosecurity at broiler farms and the relationship with technical performances and antimicrobial use

P. Gelaude,*[1] M. Schlepers,* M. Verlinden,† M. Laanen,* and J. Dewulf*

*Unit of Veterinary Epidemiology, Department of Reproduction, Obstetrics and Herd Health, Faculty of Veterinary Medicine, Ghent University, 9820 Merelbeke, Belgium; and †Department of Pathology, Bacteriology and Poultry Diseases, Faculty of Veterinary Medicine, Ghent University, 9820 Merelbeke, Belgium

ABSTRACT The Biocheck.UGent scoring system has been developed to measure and quantify the level of system and accompanying questionnaire can be filled in for free at www.Biocheck.UGent.be. The obtained

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Counseling 13 broiler farms to improved biosecurity and reduced AMU

	Before	After	Change
External biosecurity	64	69	+5
Internal biosecurity	73	77	+4
Mortality first week	1,08	1,27	+0,19%
Total mortality	3,54	3,05	-0,49%
Average daily weight gain	57	57	+0
Feed conversion	1,8	1,7	-0,1
Performance index	318	332	+14
Antimicrobial use (TI)	**192**	**136**	**-29%**

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antibiotics

MDPI

Article

Coaching Belgian and Dutch broiler farmers aimed at antimicrobial stewardship and disease prevention

Nele Caekebeke [1,*], Moniek Ringenier [1], Franca J. Jonquiere [2], Tijs J. Tobias [2], Merel Postma [1], Angelique van den Hoogen [2], Manon A.M. Houben [3], Francisca C. Velkers [2], Nathalie Sleeckx [4], Arjan Stegeman [2], and Jeroen Dewulf [1], on behalf of the i-4-1-Health Study Group

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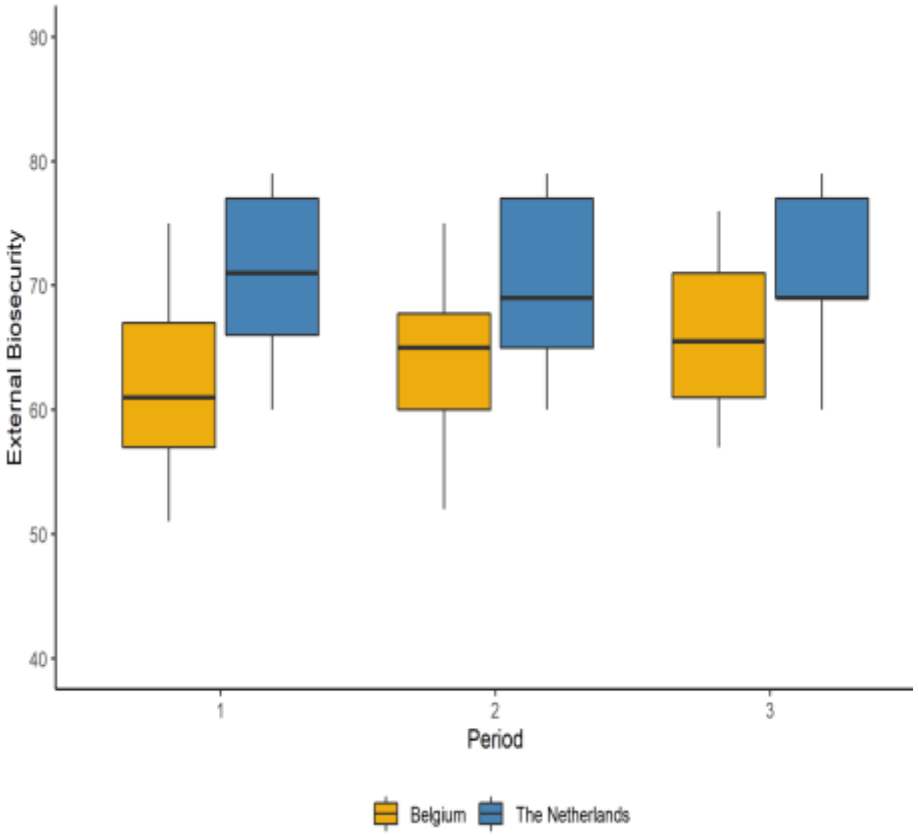
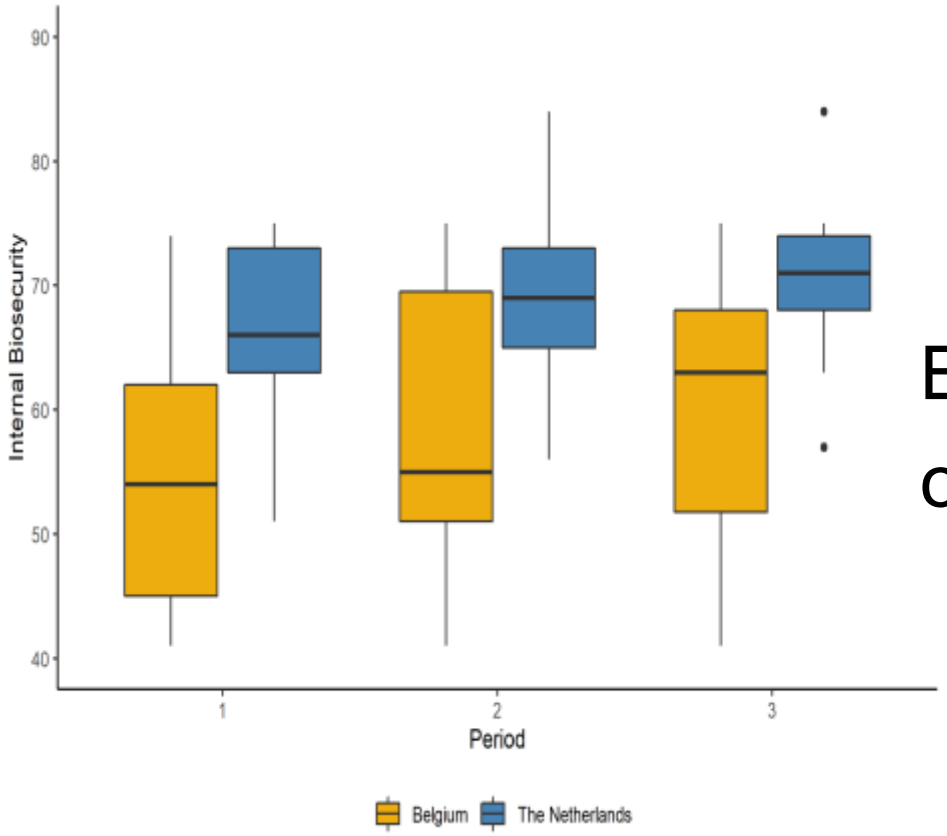
IMPACT OF BIOSECURITY





Biosecurity + 7% on average

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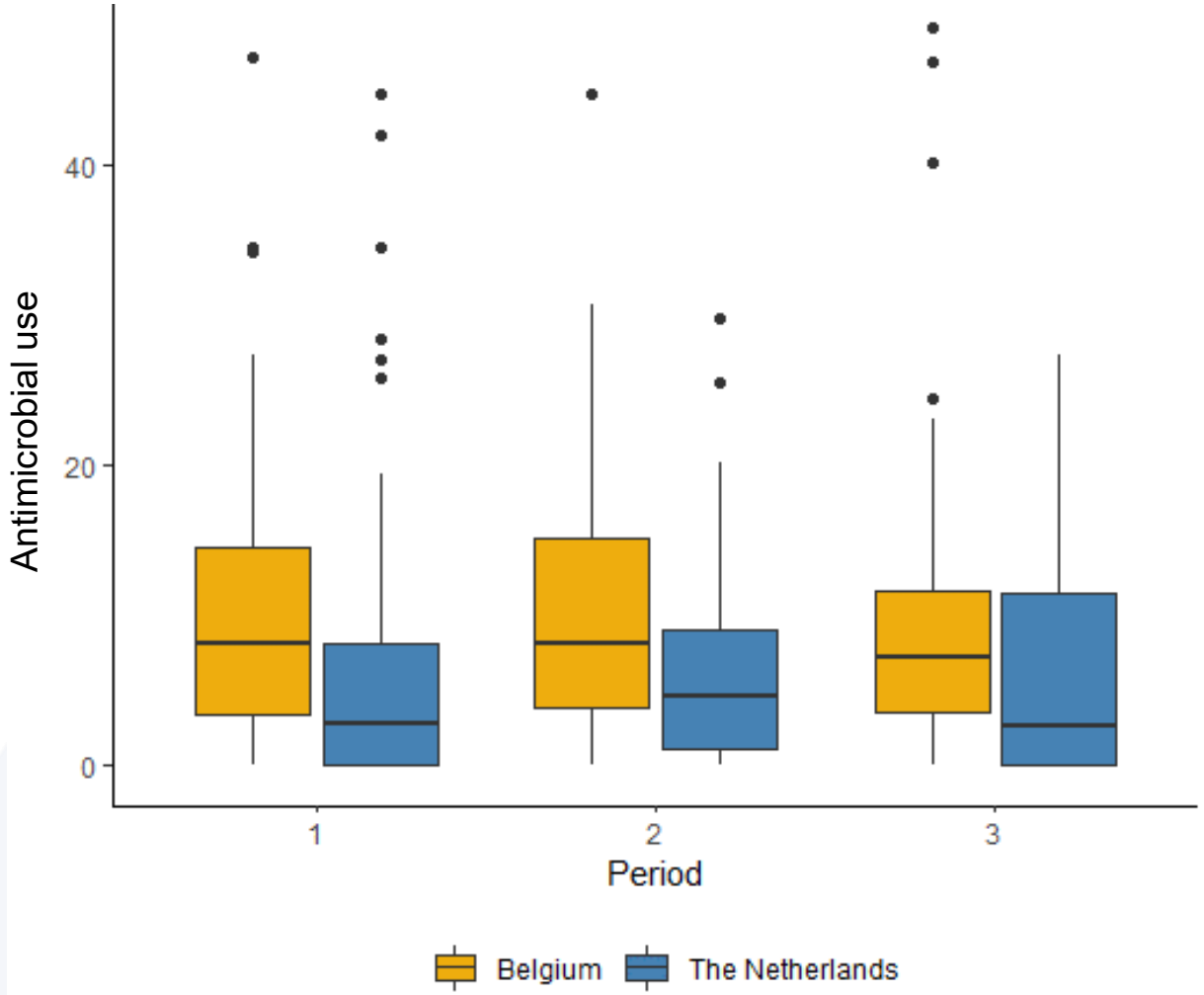
Reduced antimicrobial usage



-7% on average

No negative effects on production parameters

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Impact of biosecurity

animals

MDPI

Article

Determining the Characteristics of Farms That Raise Pigs without Antibiotics

Elise Bernaerdt [1,*], Dominiek Maes [1], Tommy Van Limbergen [2], Merel Postma [3] and Jeroen Dewulf [3]

1 Unit of Porcine Health Management, Department of Internal Medicine, Reproduction, and Population Medicine, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium; dominiek.maes@ugent.be
2 ANITOM bv, Pierstraat 122, 2630 Aartselaar, Belgium; tommy.vanlimbergen@anitom.be
3 Veterinary Epidemiology Unit, Department of Internal Medicine, Reproduction, and Population Medicine, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium; merel.postma@ugent.be (M.P.); jeroen.dewulf@ugent.be (J.D.)
* Correspondence: elise.bernaerdt@ugent.be

Simple Summary: Reduced and responsible antimicrobial use leads to a lower risk of developing antimicrobial resistance. One way to achieve this is to raise animals without antibiotics (RWA). This study described the criteria for a Belgian RWA program for pigs and evaluated whether farms could achieve and maintain this status. The study also identified possible differences between RWA and non-RWA farms. For this purpose, 28 farms were visited three times for the following reasons: (1) data collection, (2) farm-specific coaching, and (3) evaluation. Antimicrobial use, biosecurity, and farm characteristics were determined. The status of the farms, i.e., (non-)RWA, varied over time, and the distribution of RWA vs. non-RWA farms, was 10–18, 13–15, and 12–16 before the intervention,

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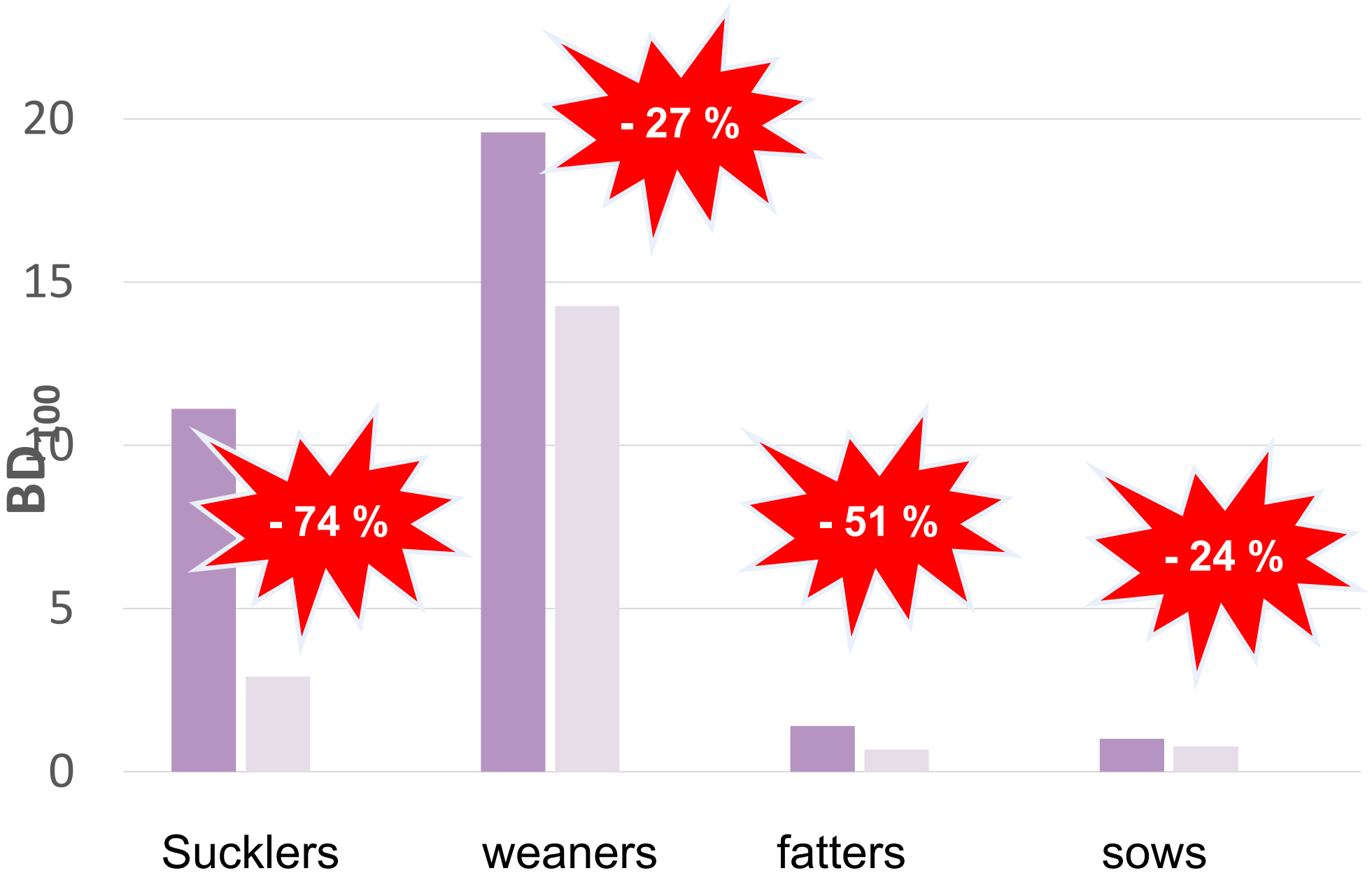
20
15
10
5
0
BD 100
- 27 %
- 74 %
- 51 %
- 24 %
Sucklers
weaners
fatters
sows

antibiotics

MDPI

Review

Can improved farm biosecurity reduce the need for antimicrobials in food animals? A Scoping Review

Pankaj Dhaka [1,2,*], Ilias Chantziaras [1,*], Deepthi Vijay [3], Jasbir Singh Bedi [2], Iryna Makovska [1], Evelien Biebaut [1] and Jeroen Dewulf [1]

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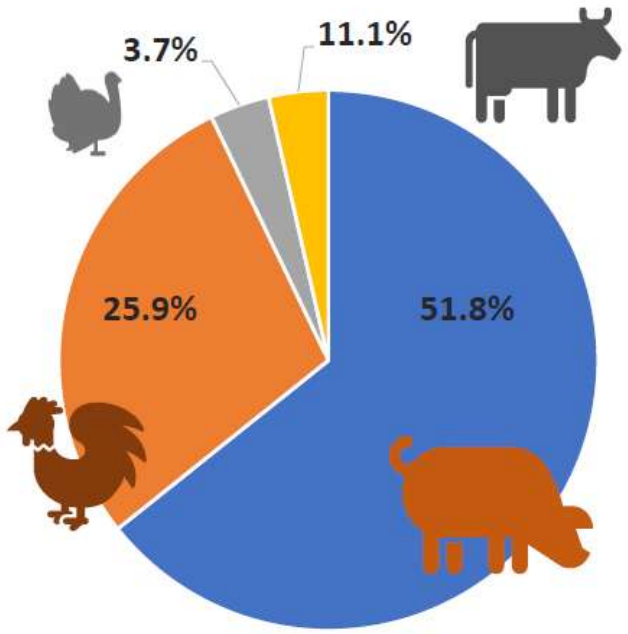
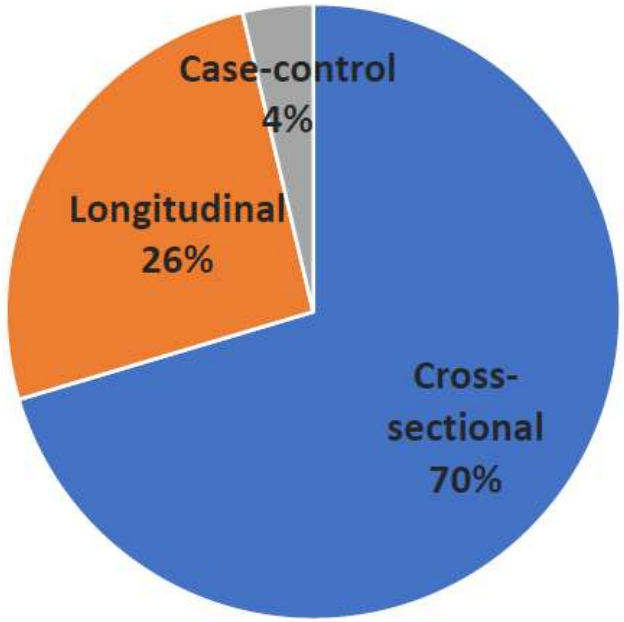
IMPACT OF BIOSECURITY

Species distribution



Two studies included both pigs and poultry farms

Study types



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IMPACT OF BIOSECURITY

Association between farm biosecurity and AMU

- **51.8% (14/27) studies**
  ↑ farm biosecurity : ↓ AMU
- **18.5% (5/27) studies**
  ↑ farm management : ↓ AMU
- **2 studies**
  ↑ coaching & awareness: ↓ AMU
- **1 study**
  ↑ biosecurity : ↓ AMU : ↑ farm economics

5 studies: farm biosecurity & AMU → Uncertain or spurious association

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Biosecurity is important!

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YET...

Biosecurity is important!

Yet…

- Big differences exist between farming systems and countries
- Many of the biosecurity measures are insufficiently evidence based
- Biosecurity is insufficiently included in veterinary education

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ASSESSMENT OF PERCEPTION TOWARDS IMPLEMENTATION OF BIOSECURITY

Conclusion:

- ✓ Positive attitudes
- ✓ Need for practical information
- ✓ From herd veterinarian

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Biosecurity is important!

Yet…

- Big differences exist between farming systems and countries
- Many of the biosecurity measures are insufficiently evidence based
- Biosecurity is insufficiently included in veterinary education
- Big differences exist between farmers expectations and veterinary delivery

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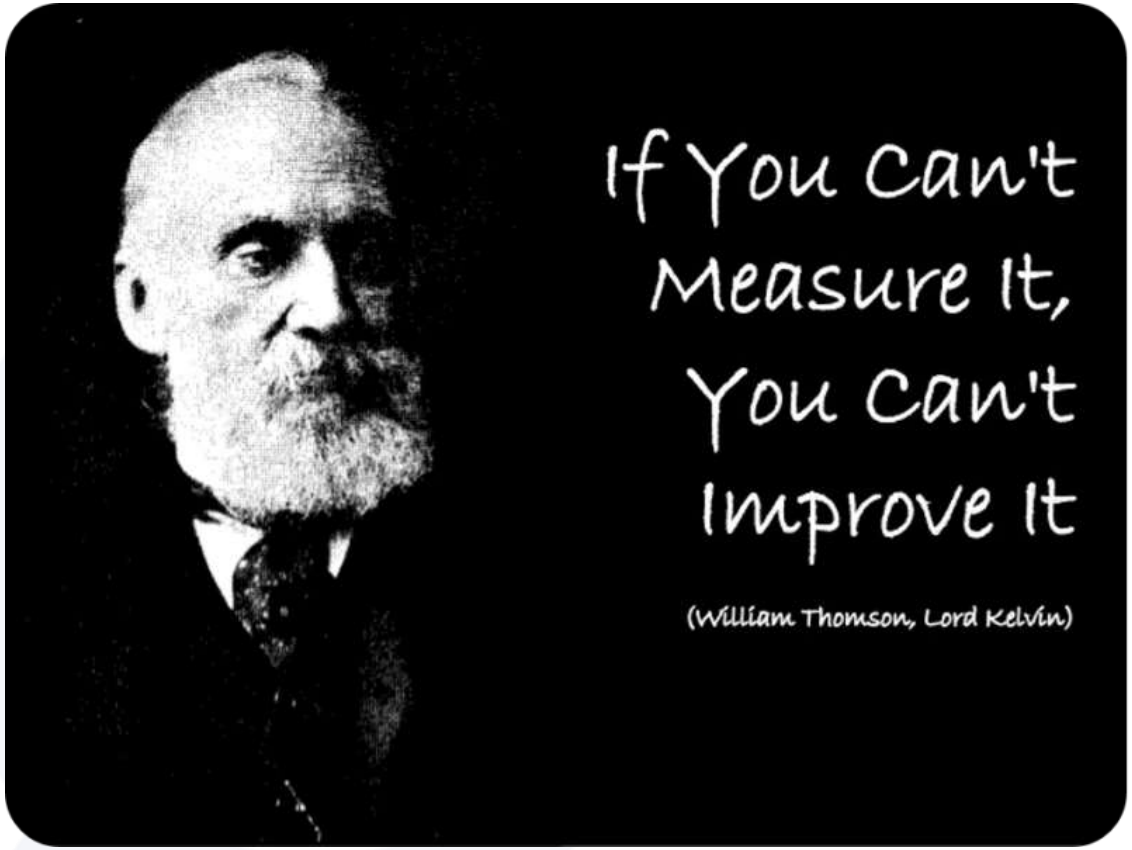

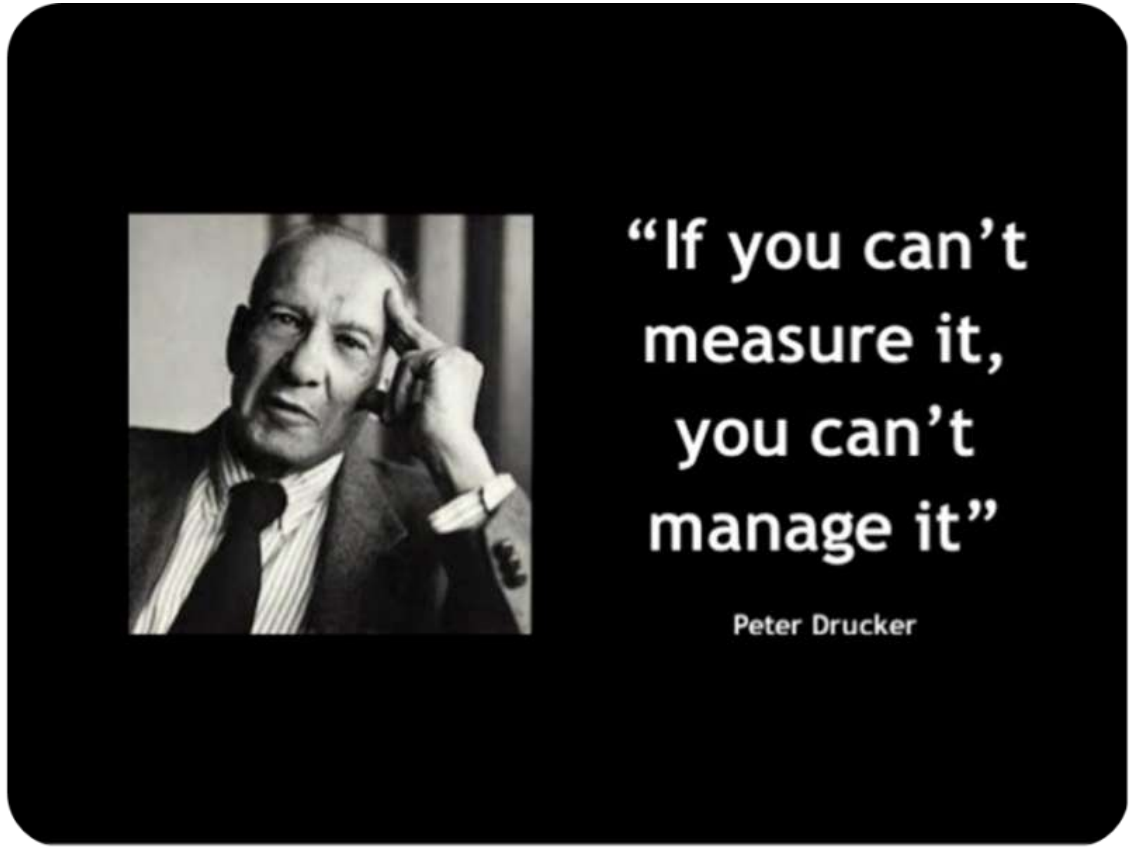

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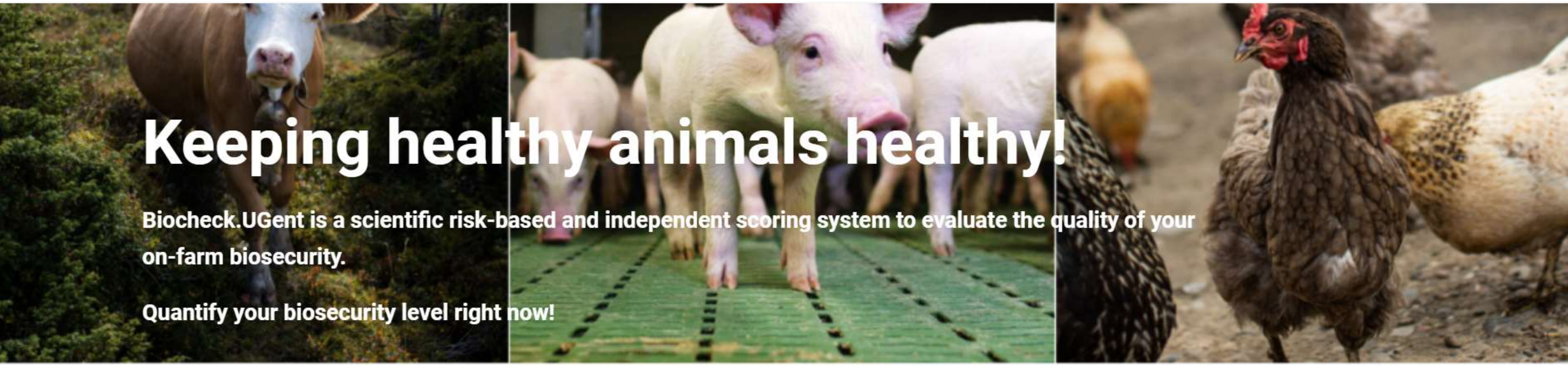

Keeping healthy animals healthy!

Biocheck.UGent is a scientific risk-based and independent scoring system to evaluate the quality of your on-farm biosecurity.

Quantify your biosecurity level right now!

BIOCHECK.UGENT

Platform to help increase biosecurity levels

Data-driven recommendations

With the goal to keeping healthy animals healthy

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Pig

- → Pigs indoor Preferred
- → Pigs indoor Old version
- → Pigs outdoor
- → Pig backyard/small-scale

Cattle

- → Veal calves
- → Beef cattle
- → Dairy cattle
- → Dairy-source beef cattle production

Small ruminants

- → Small ruminants dairy
- → Small ruminants meat

Poultry

- → Free range broilers
- → Free range layers
- → Ducks
- → Backyard poultry
- → Laying hens
- → Broilers
- → Turkeys
- → Breeders

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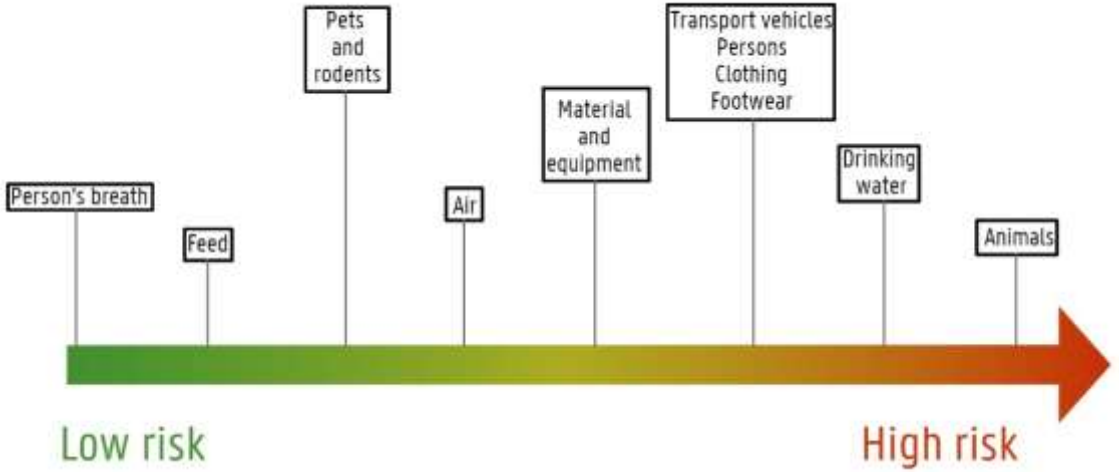
Risk based scoring system



Weighted scores

Based on scientific research

Risk for transmission: direct vs. indirect contact

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ID: 20388/691653/v/2_1/F
Entry date: 2019-03-10 13:22:08
Identification:

PIG

Nr	Description	Score	Country average	Global average
External biosecurity				
A	Purchase of animals and semen	100 %	88 %	89 %
B	Transport of animals, removal of manure and dead animals	41 %	70 %	70 %
C	Feed, water and equipment supply	27 %	38 %	50 %
D	Personnel and visitors	41 %	64 %	68 %
E	Vermin and bird control	50 %	64 %	67 %
F	Environment and region	60 %	53 %	64 %
	Subtotal External biosecurity:	***57 %***	***66 %***	***70 %***
Internal biosecurity				
A	Disease management	40 %	56 %	67 %
B	Farrowing and suckling period	64 %	59 %	56 %
C	Nursery unit	36 %	65 %	66 %
D	Fattening unit	N/A	72 %	67 %
E	Measures between compartments and the use of equipment	39 %	44 %	48 %
F	Cleaning and disinfection	20 %	48 %	59 %
	Subtotal Internal biosecurity:	***38 %***	***55 %***	***58 %***
N/A = Not applicable	**Total:**	**48 %**	**61 %**	**64 %**

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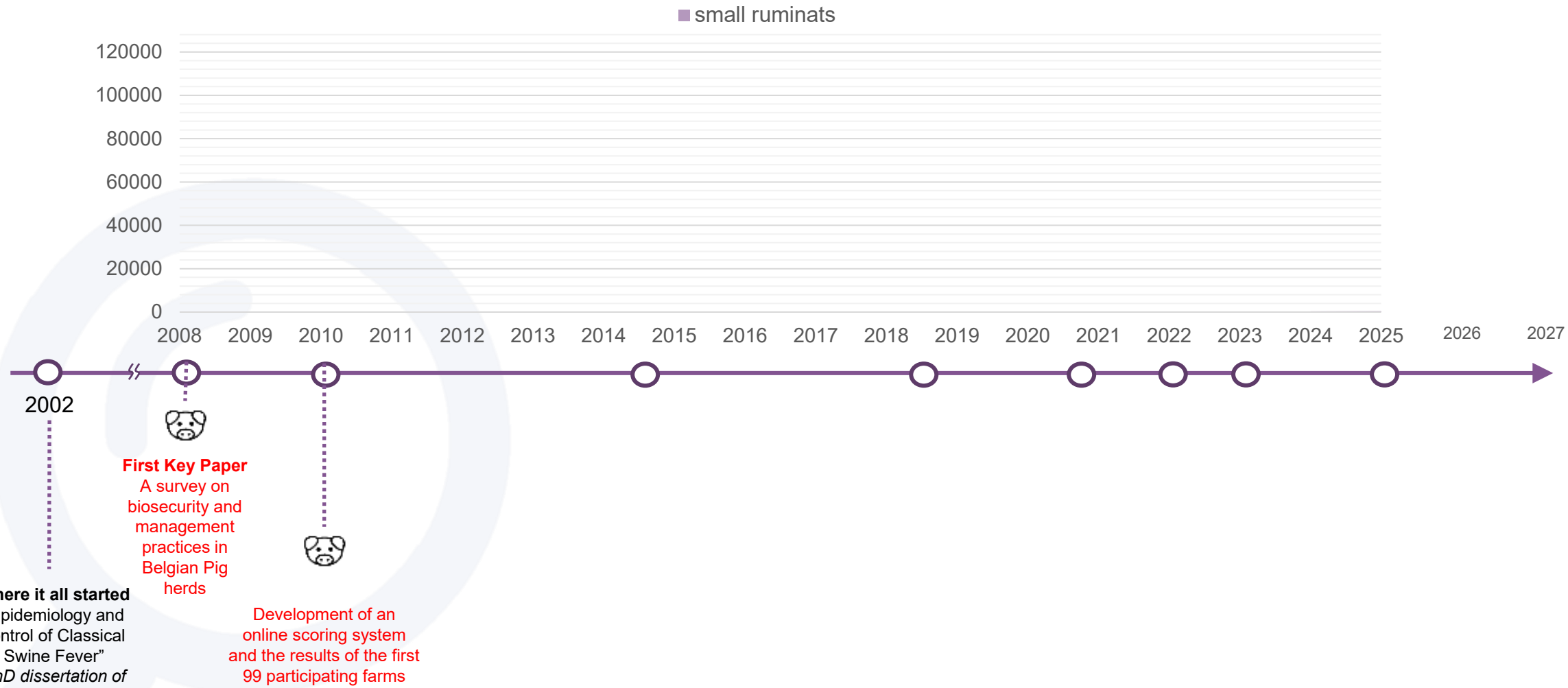

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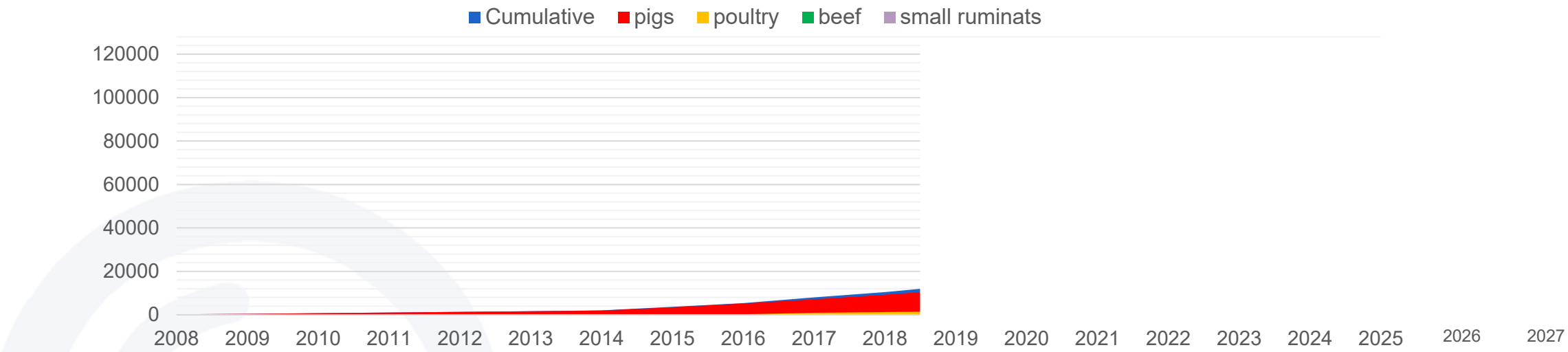

2002

Where it all started
"Epidemiology and control of Classical Swine Fever"
PhD dissertation of Jeroen Dewulf

First Key Paper
A survey on biosecurity and management practices in Belgian Pig herds

Development of an online scoring system and the results of the first 99 participating farms

Launch of Biocheck for broiler production

Launch of Biocheck for cattle production

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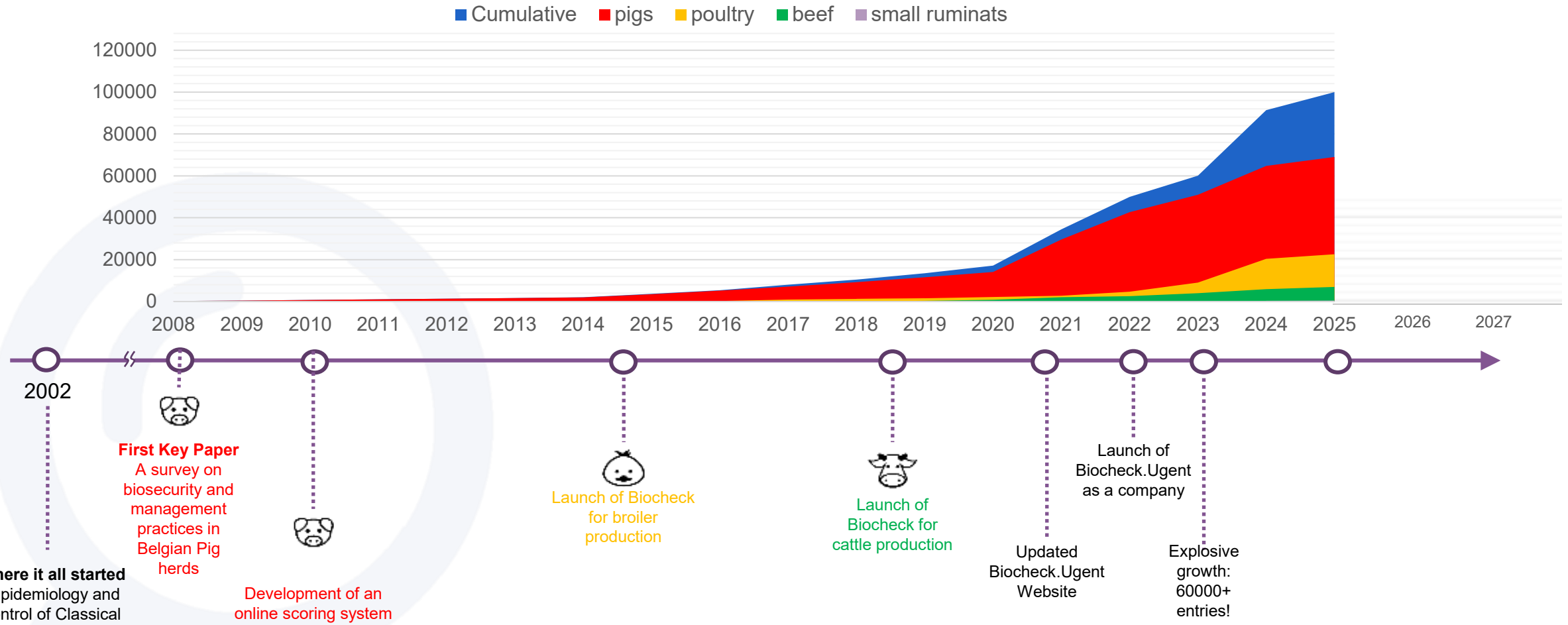

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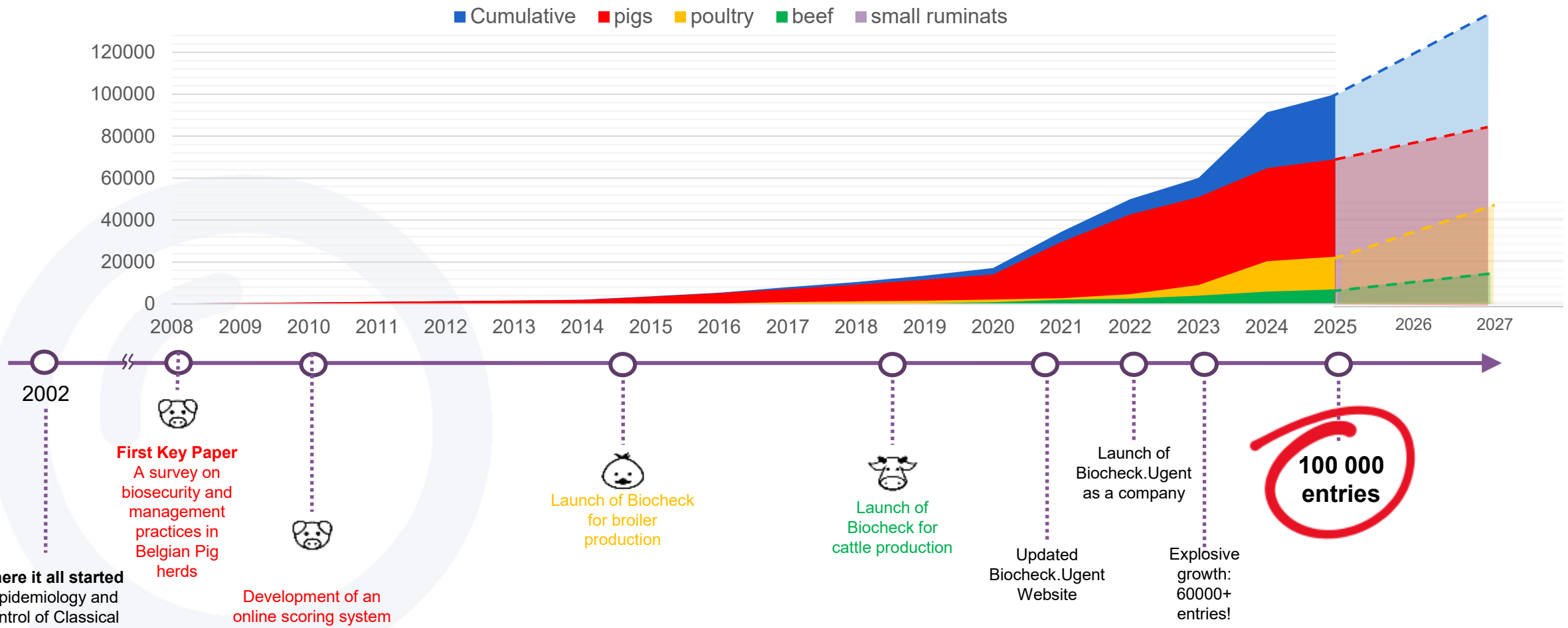

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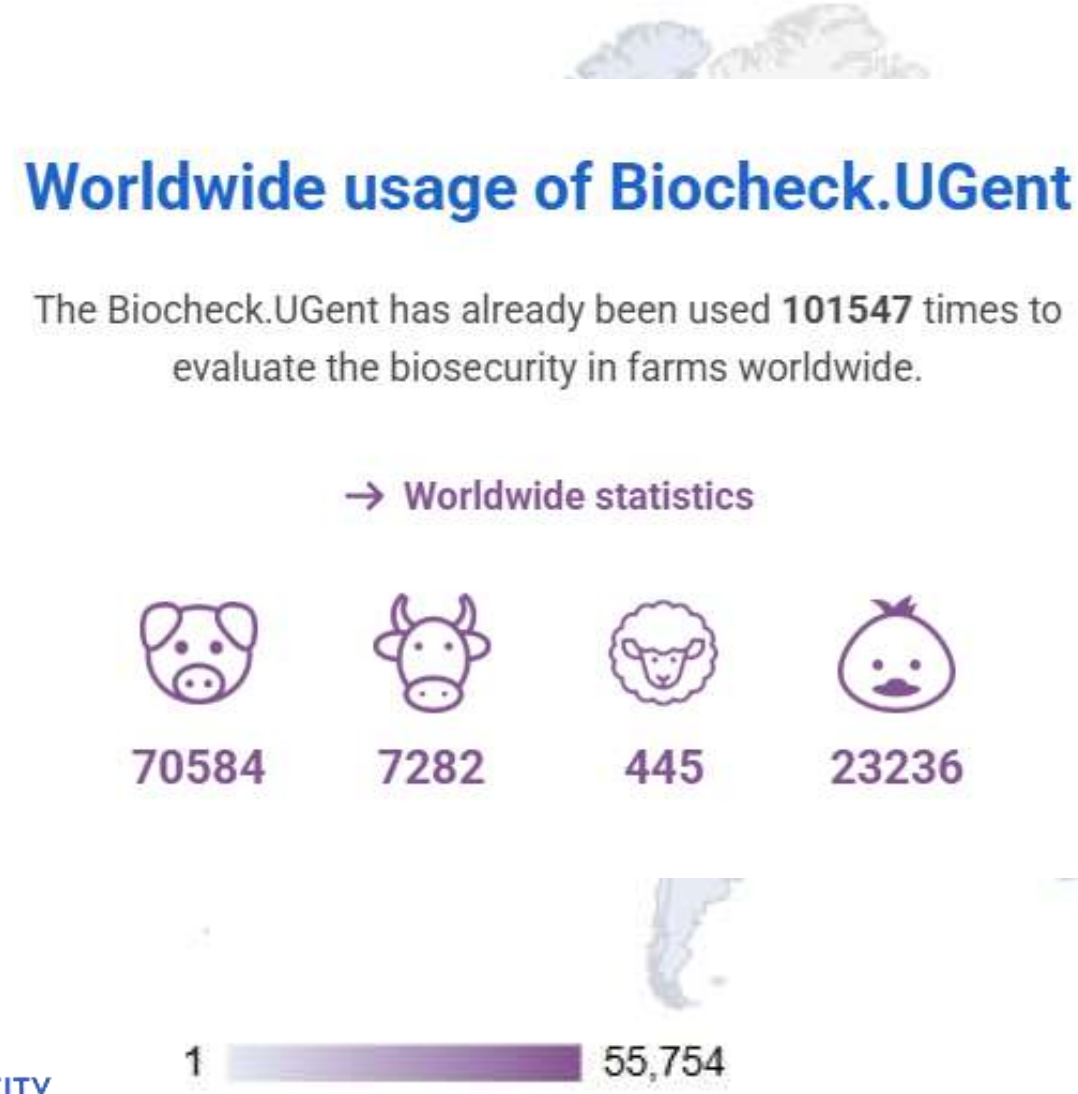
WORLD LARGEST DATABASE ON BIOSECURITY



National implementation in

- Belgium (pig, poultry)
- Ireland (pig, poultry)
- Finland (cattle, pig)
- Italy (pig)
- Czech Republic (pig, poultry, cattle)
- Luxemburg (cattle, pig, poultry)
- UK (Pigs)
- Shotland (Pigs)
- …

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1. Have wild boars been spotted within a 10-kilometres radius (6.2 miles) of your farm?

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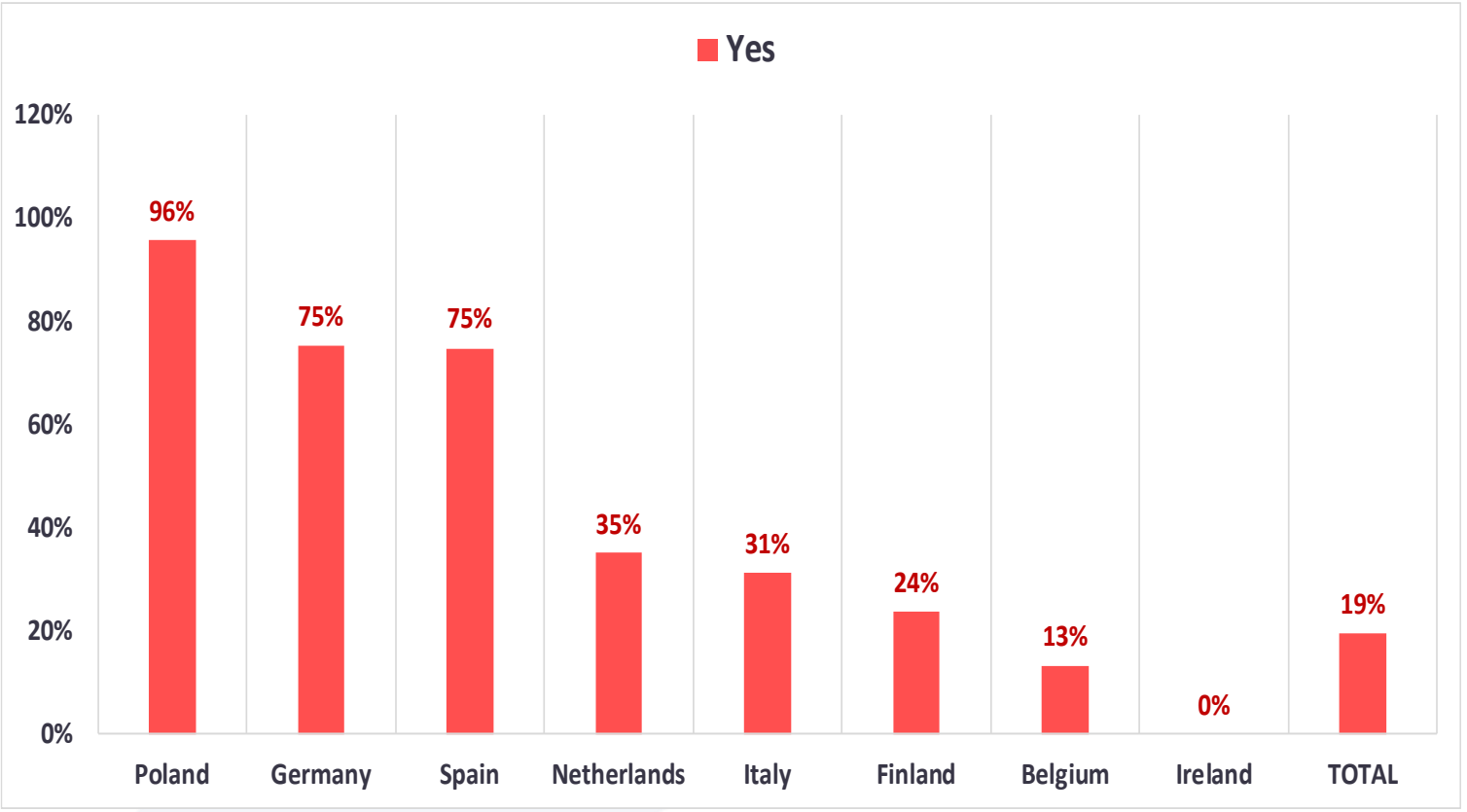
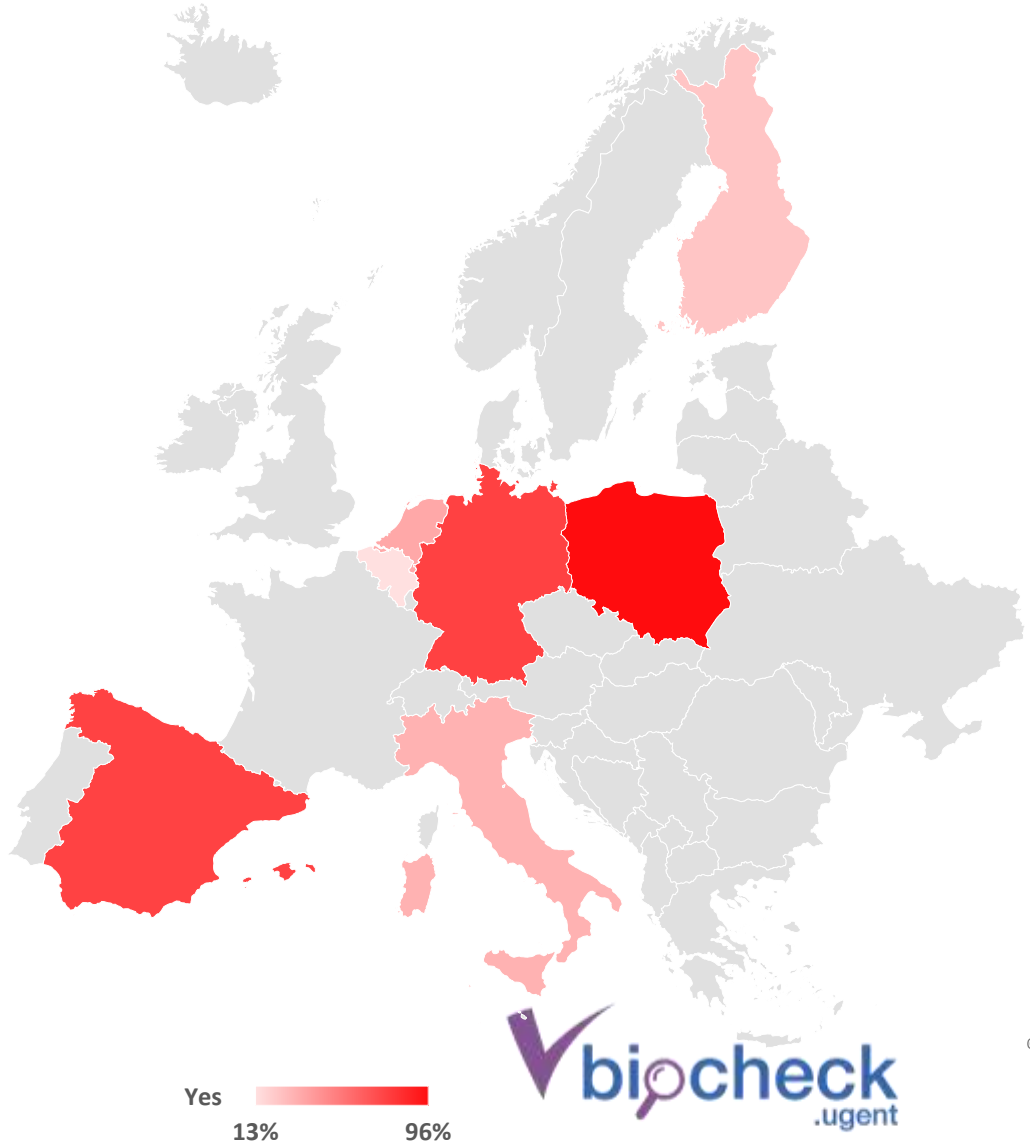
HAVE WILD BOARS BEEN SPOTTED WITHIN A 10-KILOMETRES RADIUS (6.2 MILES) OF YOUR FARM?





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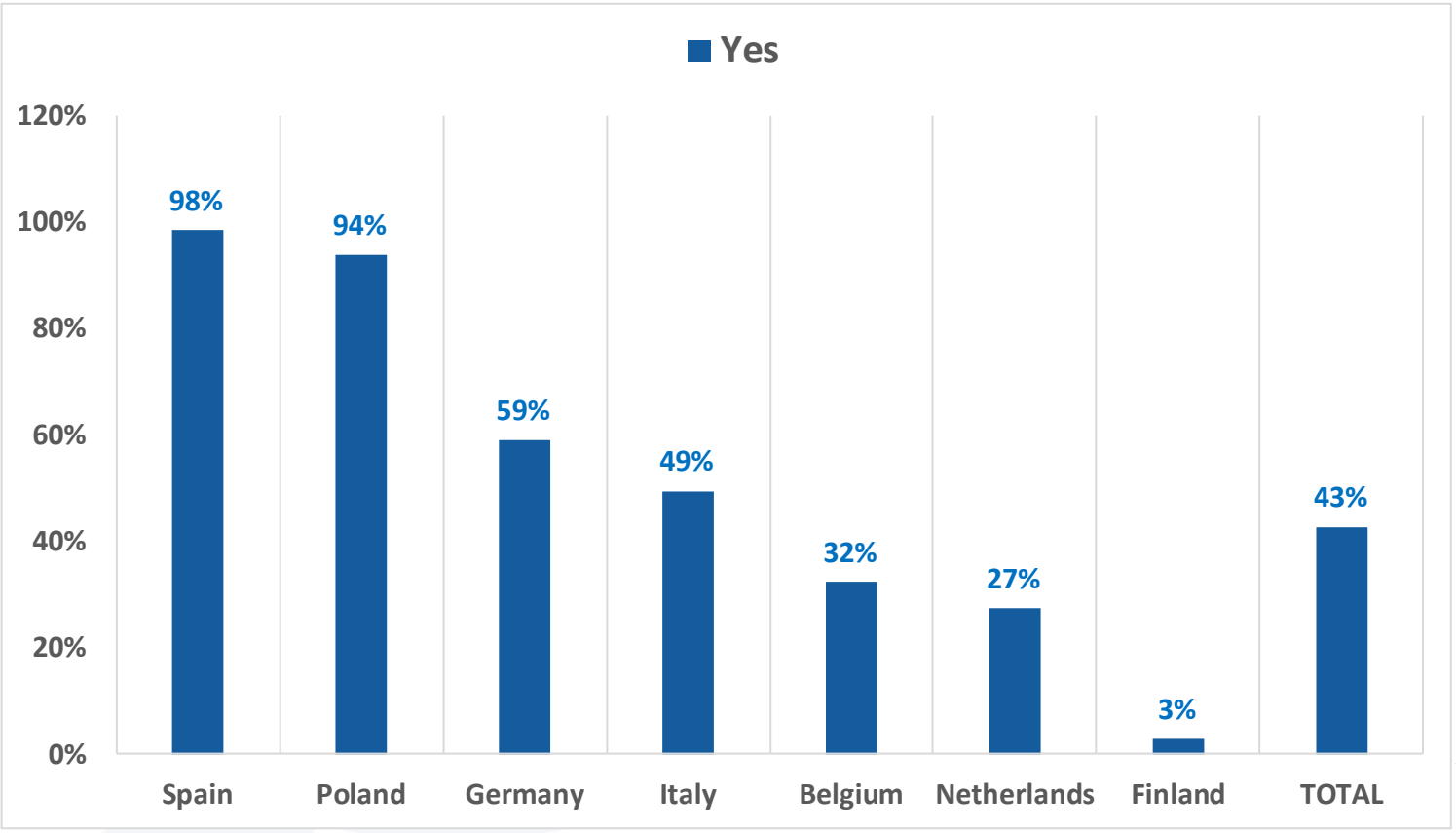
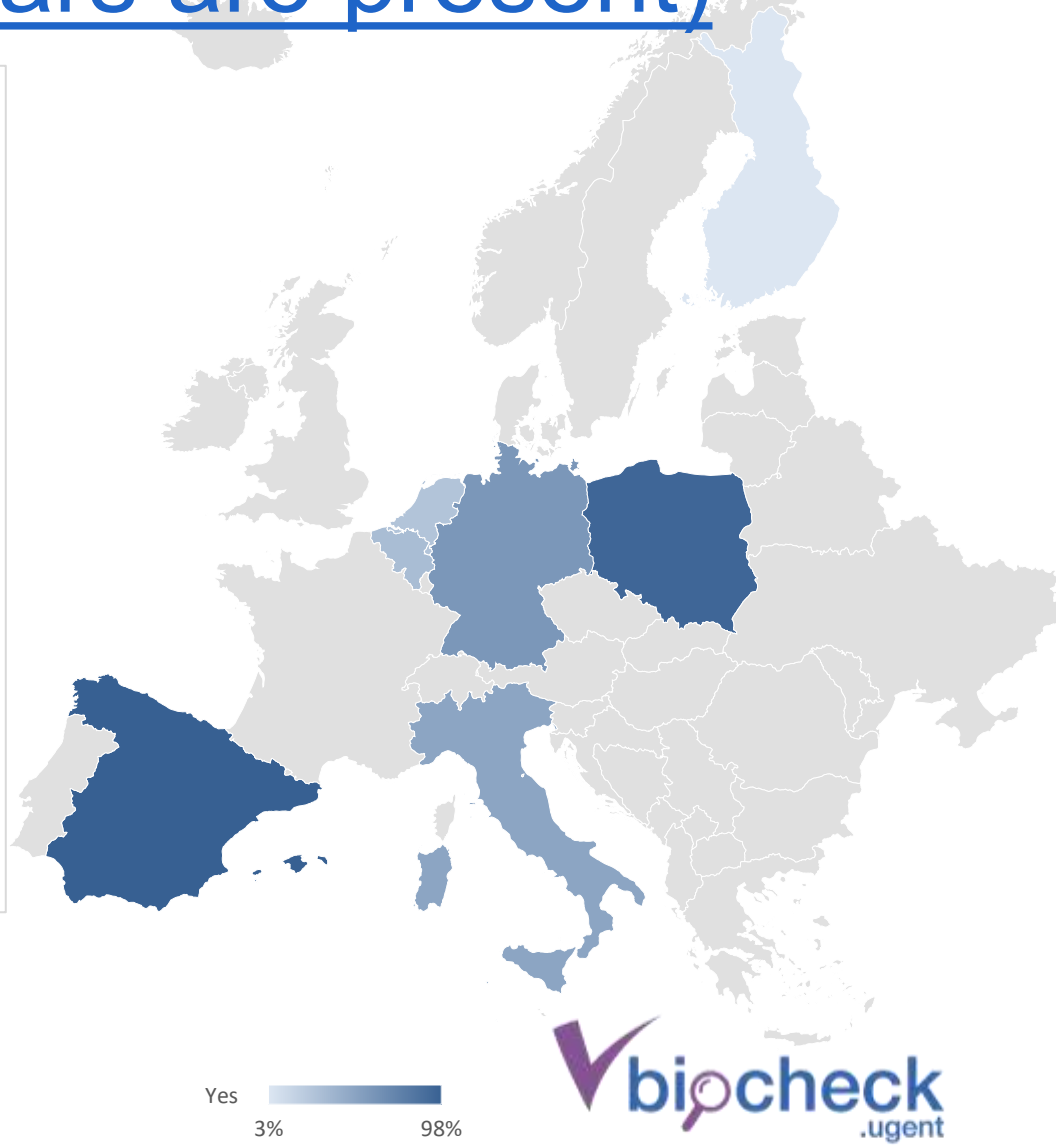
2. IS THE FARM ENCLOSED BY FENCES, WIRE, …?

2. IS THE FARM ENCLOSED BY FENCES, WIRE, …?
(only answered if wild boars are present)





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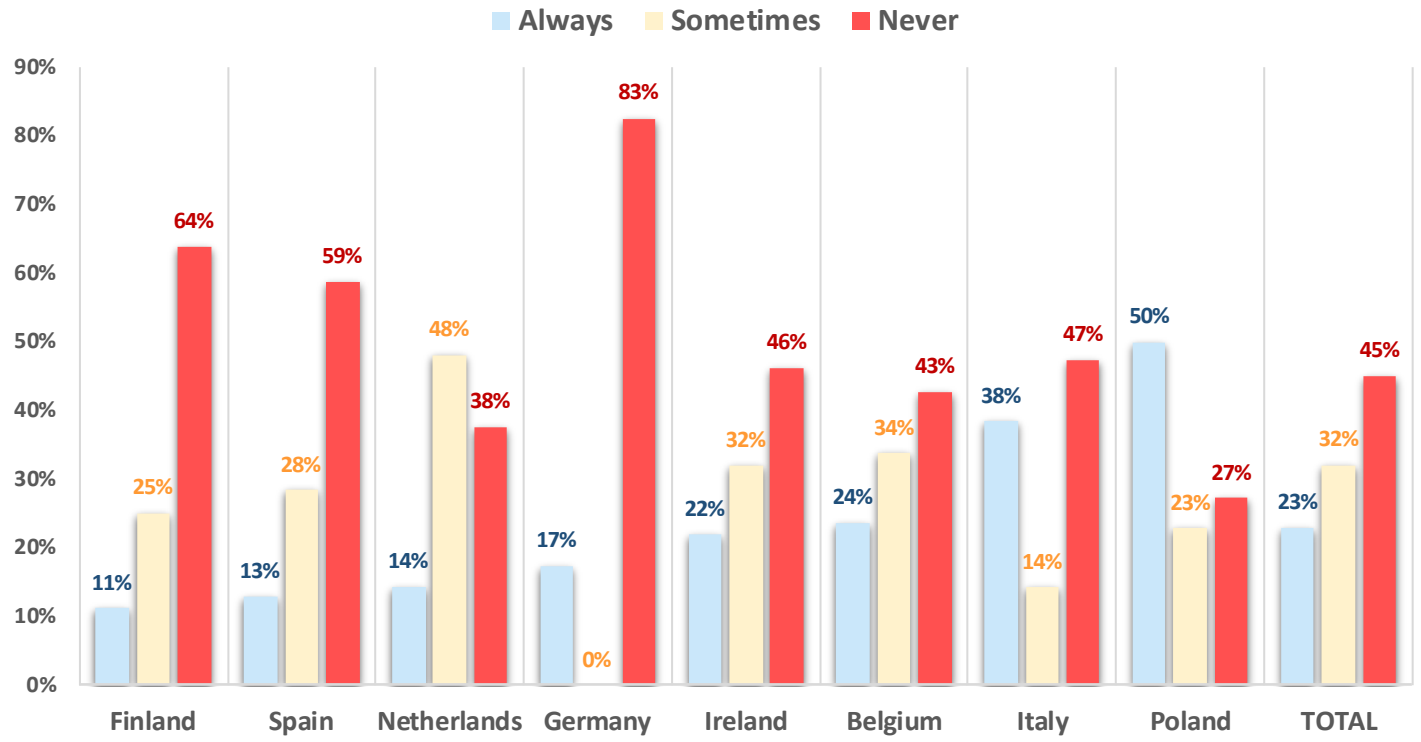
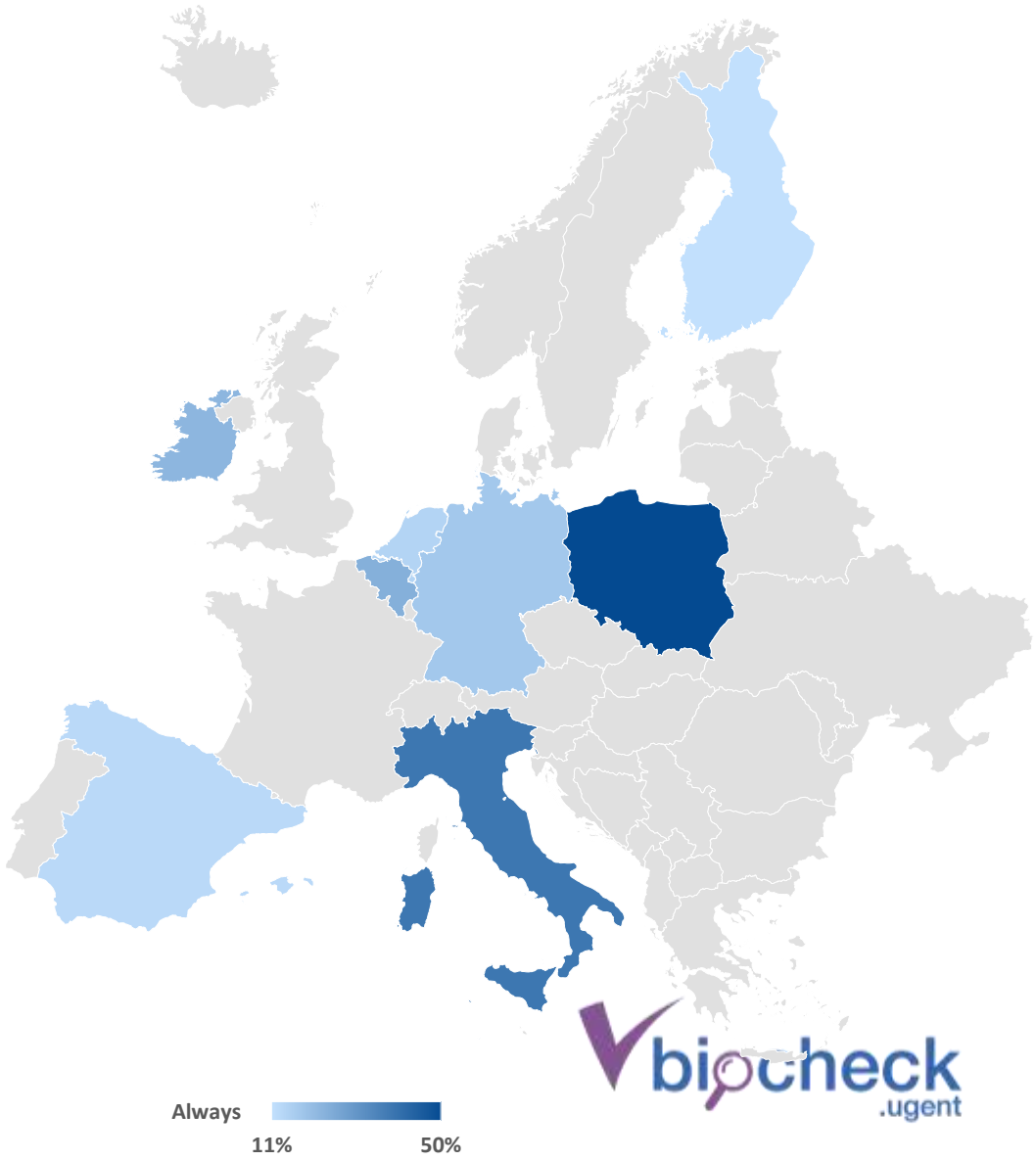
ARE HANDS WASHED AND/OR DISINFECTED BETWEEN DIFFERENT COMPARTMENTS/UNITS?

Are hands washed and/or disinfected between different compartments/units?





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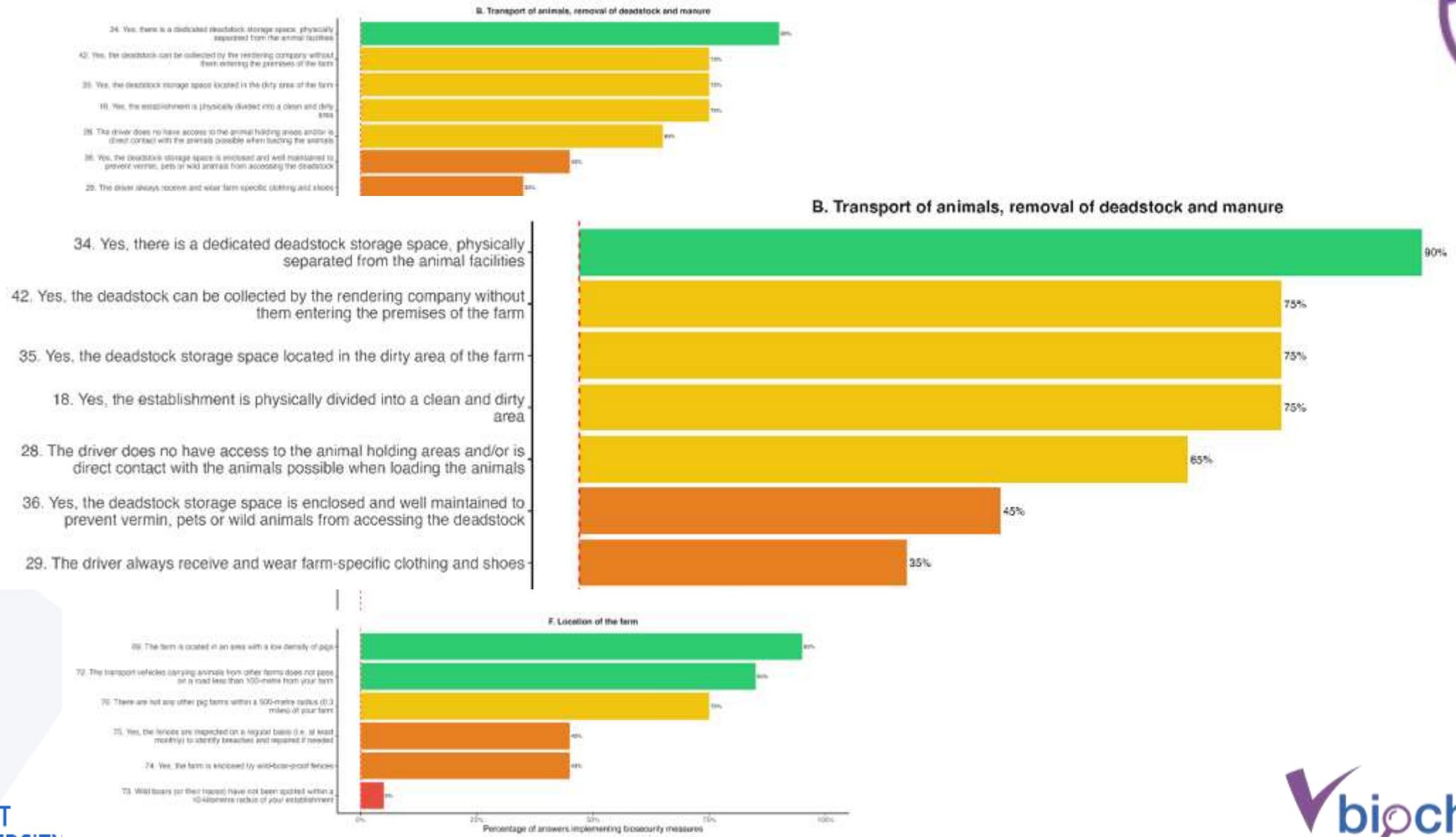
BIOCHECK.UGENT: INDOOR PIGS



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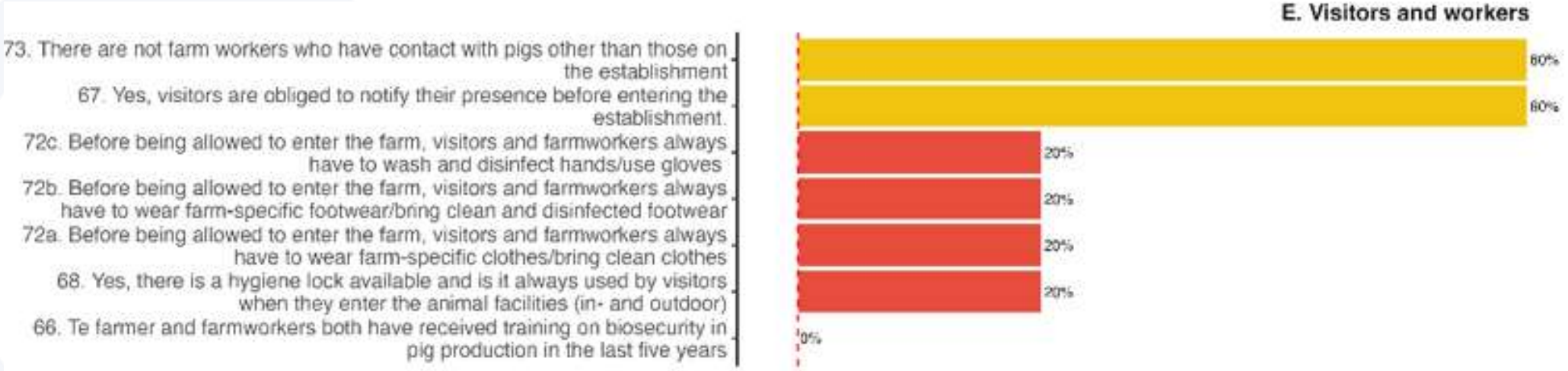
BIOCHECK.UGENT: OUTDOOR PIGS



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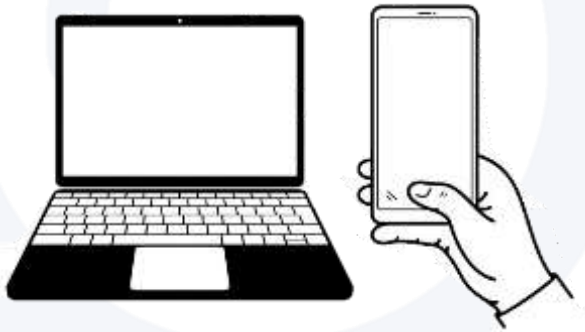
BIOCHECK IS A DECISION SUPPORT SYSTEM

User input



Comparative scoring

Feedback & coaching

Personalized dashboards

Visualize progress

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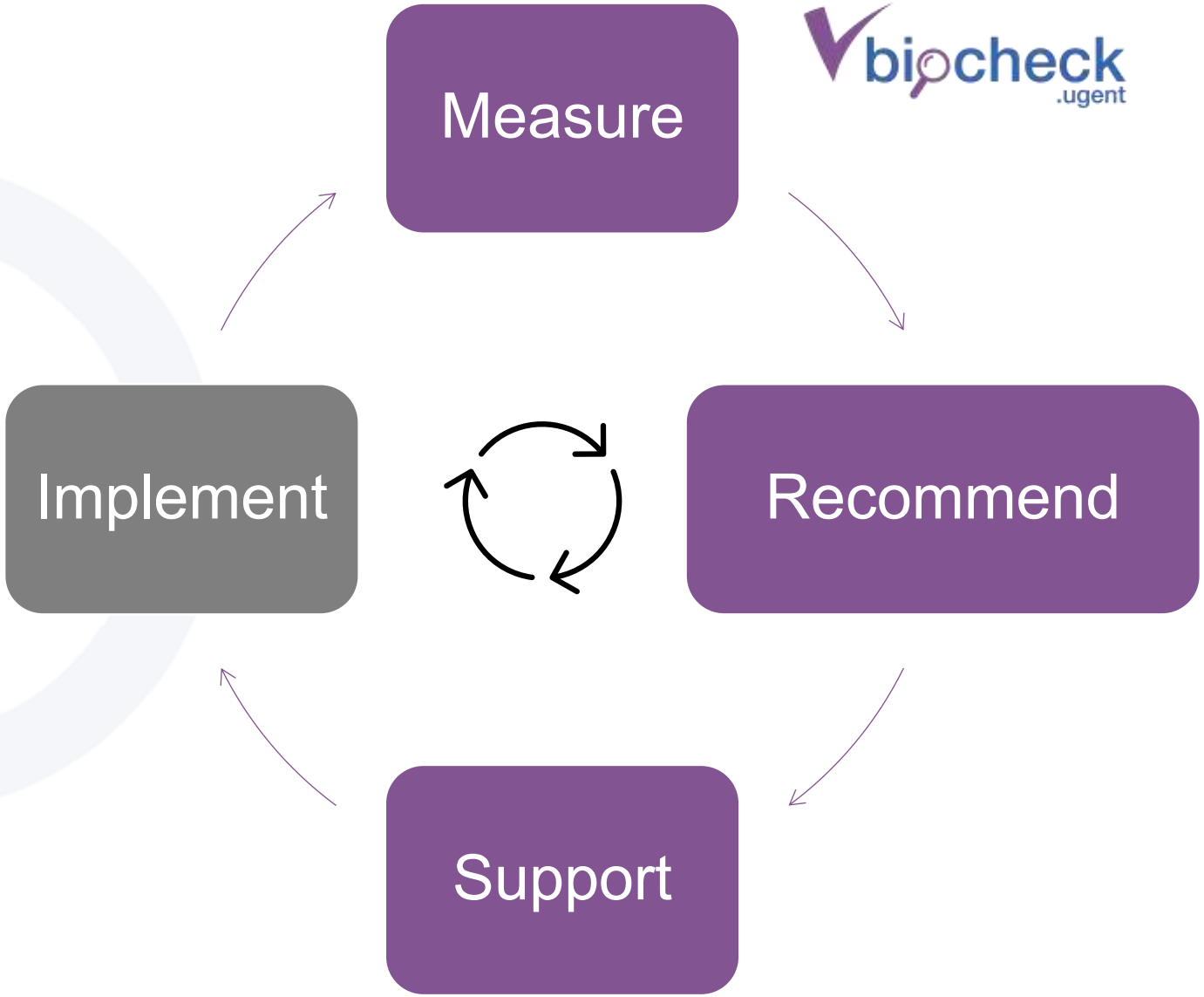
CYCLE OF IMPROVEMENT



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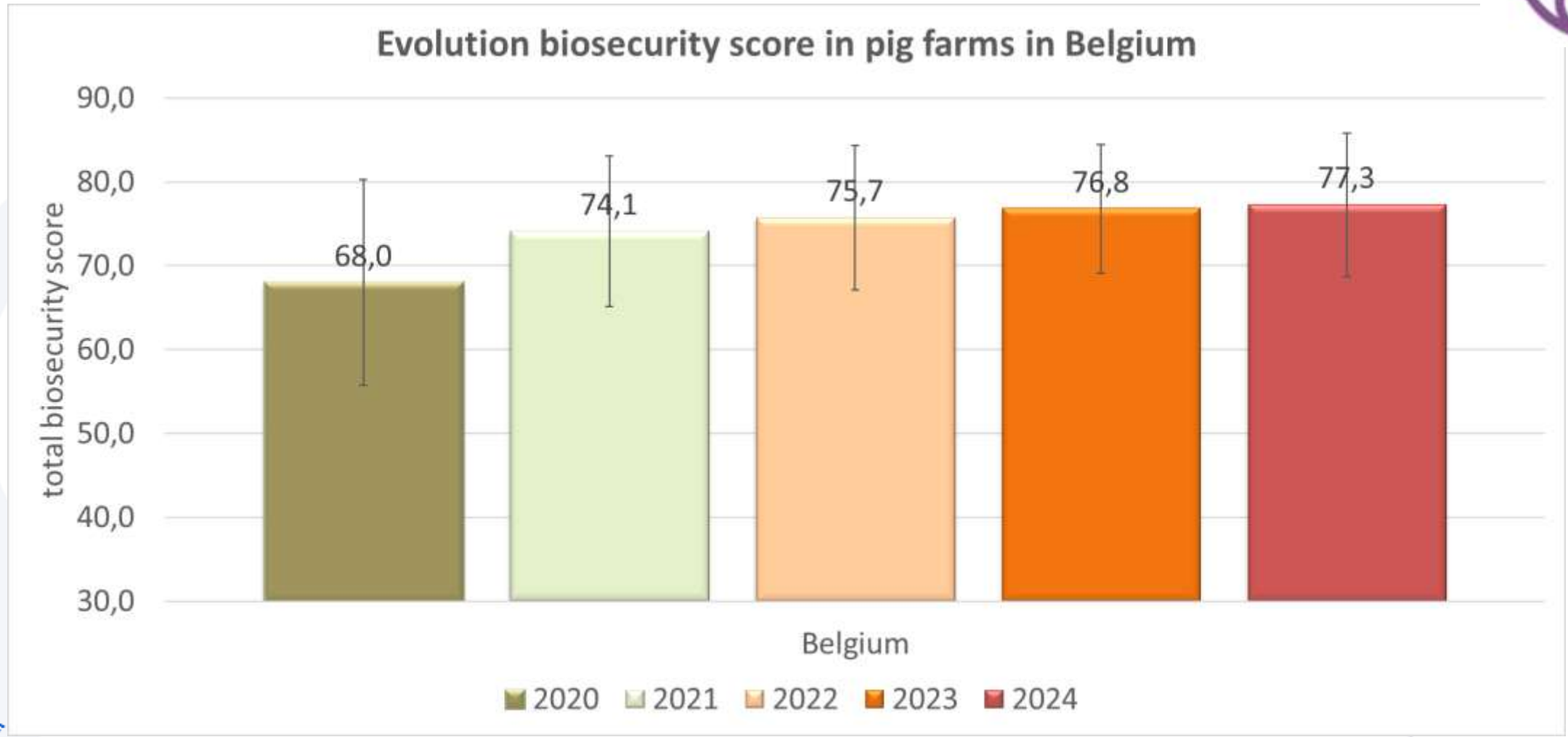
MEASURABLE INCREASE IN BIOSECURITY SCORE



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Message for the veterinary profession

"You can have results or excuses, but not both.“

A. Schwarzenegger

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World Animal Biosecurity Association

About Council Knowledge base Sponsors Membership Activities

WABA Conference 2026

World Anim Association

Bringing together e animal biosecurity

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Full Professor

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