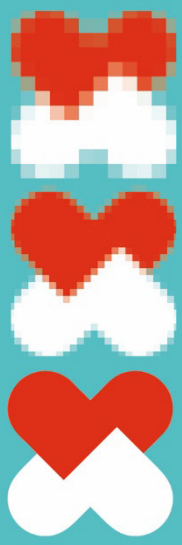
EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

Co-funded by the European Union

MILESTONES 10 & 13

REPORT OF THE WORKSHOP
"AMS & IPC IN ANIMAL HEALTH"



BUILDING A ONE HEALTH WORLD ♥
to reduce Antimicrobial Resistance (AMR)

WP6, T6.2 and WP7, T 7.2 | Milestone 10 & Milestone 13
Leader acronym | AEMPS, DGZ, UU/FVM
Author(s) | A.Becker, J.Debouvere, M.J.Vilar, I.Wayop
Reviewer(s) | E.Broens, E.De Graef, C.Muñoz
Dissemination level | Public
Delivery date | XX-X-2025

This document originates from the European Joint Action on Antimicrobial Resistance and Healthcare Associated Infections 2 project (EU-JAMRAI 2).

TABLE OF CONTENT

1 INTRODUCTION

EU-JAMRAI2, the second edition of the European Joint Action on Antimicrobial Resistance and Healthcare Associated Infections, emerges with the ambitious goal of changing the world's approach to antimicrobial resistance (AMR) through a One Health perspective, with several pivotal objectives for the implementation of state-of-the-art Infection Prevention and Control (IPC) measures and Antimicrobial Stewardship (AMS) strategies across diverse settings (human, animal and environmental health). EU-JAMRAI2 will also support Member States/Associated Countries in their efforts to develop and update their National Action Plan on AMR.

The European One Health Action Plan against AMR is urging to make the EU a best practice region. Furthermore, and according to the European Commission guidelines, the control of AMR can only be achieved by combining strong IPC measures with AMS programmes. Despite current plans and guidelines, EU Member States haven not reached the same level of proficiency concerning health policies on AMS and IPC. Following the policy recommendations from the first EU-JAMRAI (2017-2021), establishing harmonized core elements and standards at the European level is considered a priority for effective implementation of AMS and IPC programmes and a minimum framework to be used by all EU Member States.

On 11 March 2025, Task 6.2 AMS in Animal Health and Task 7.2 IPC in Animal Health jointly organized a workshop at Hotel Meliá in Bilbao, Spain.

The goal of the workshop was twofold:

1. To identify core elements and competencies for the development and implementation of IPC and AMS programmes in the animal health sector.
2. To facilitate the exchange of experiences and practices, models, and synergies on IPC and AMS between professionals in the human and animal health sectors through interactive breakout sessions.

In total, 76 participants from 50 different institutions (Appendix) representing in total 14 Member States/Associated Countries actively participated in the workshop. This report describes the workshop activities and the outcomes.

2 AGENDA OF THE WORKSHOP

8:30-9:00	*Coffee & Registration*
9:00-9:10	Welcome & Housekeeping
9:10-9:35	AMS and IPC in a One Health Framework (Tinna Ravnholt, SSI)
9:35-9:50	Status update AMS & IPC Literature Review (Gonçalo Portela, FVE & Anne Becker, DGZ)
9:50-10:20	AMS in the Animal Health Sector (Gabriela Olmos Antillón, SLU & Isabel Blanco Penedo, UdL)
10:20-10:30	Instructions for the interactive breakout sessions
10:30-10:55	*Coffee break & Networking*
10:55-11:00	*Transition*
11:00-12:00	Action Moment I: breakout session
12:00-12:05	*Transition*
12:05-13:05	Action Moment II: breakout session
13:05-14:00	*Lunch & Networking*
14:00-14:30	IPC in the Animal Health Sector (Ilias Chantziaras, UGent)
14:30-15:30	Group discussion on the outcomes of breakout sessions
15:30-16:00	*Coffee break & Networking*
16:00-16:45	Group discussion on the outcomes of breakout sessions
16:45-17:00	Conclusions & Closing remarks

3 PRESENTATIONS

To maximize the value of the workshop, experts were invited to share their insights and experiences in developing and implementing AMS and IPC programmes across various settings. Their presentations offered state-of-the-art information to encourage discussions during breakout sessions. Topics included the practical application of AMS and IPC using a One Health framework in Denmark, findings from a qualitative study on AMS implementation across three countries, and an overview of IPC efforts in the animal health sector, highlighting several biosecurity projects across Europe. Additionally, the results from a comprehensive review on AMS and IPC guidelines, protocols and programmes were presented. A detailed summary of each presentation is provided below, and the complete presentations can be found in the Appendix.

3.1 AMS and IPC in a One Health Framework - a Danish experience with handling LA-MRSA

Tinna Ravnholt Urth, Infection control nurse, MPH (SSI, Denmark)

Tinna presented a compelling case study from Denmark on the national response to livestock-associated methicillin-resistant *Staphylococcus aureus* (LA-MRSA) CC398 strain, with a particular focus on IPC strategies rooted in One Health principles. The presentation provided valuable insights into how Denmark, a country with a population of 5.8 million and an annual pig production exceeding 30 million, has responded to the rising prevalence of LA-MRSA over the past decade. By 2015, 88% of all Danish farms with slaughter pigs were colonized with LA-MRSA CC398 and the strain accounted for 39% of all MRSA cases in humans. This public health issue led to significant media attention, political engagement and societal stigma, especially for individuals working in pig farming.

The Danish Ministries of Health and Environment and Food established a MRSA Expert Group, with Advisory Services on LA-MRSA, to reassess the public health risks and recommend mitigation strategies. Rooted in a One Health framework, this advisory body set out three key goals:

1. Ensure that all individuals handling live pigs are equipped with the knowledge and skills to prevent the spread of LA-MRSA to the community.
2. Train healthcare workers to effectively manage patients carrying or infected with MRSA.
3. Provide transparent and accessible information and communication to local communities and nieghbors of pig farms.

A central compoment has been the compulsory hygiene training course for individuals in contact with live pigs. The course, delivered via a web-based e-learning platform was designed to promote behavioural change to reduce LA-MRSA transmission from farm to community and educate workers on the health implications of MRSA, effective daily preventive actions and how to navigate interactions with the healthcare system and the broader public.

The speaker highlighted the “Sense of Coherence” theory as a foundational framework for the training:

1. A challenge becomes comprehensible through education and access to knowledge.
2. It becomes manageable with the right resources.
3. It becomes meaningful when individuals feel empowered, involved in decision-making and responsible for preventing transmission – thereby boosting motivation and compliance.

The take-home messages from the presentation included: (1) a One Health approach is essential to prevent zoonotic microorganisms from spreading to humans and reduce antimicrobial use, (2) it is crucial to secure political mandate and institutional backing for such initiatives, (3) success relies on identifying and engaging stakeholders, fostering long-term networks, and embedding a sense of coherence among those involved in IPC efforts.

This case from Denmark provides a powerful example of cross-sectoral collaboration, evidence-based intervention, and behavioural insight in tackling a complex public health challenge.

3.2 Overview T6.2 & T7.2 Activity: Literature Review on AMS and IPC

Dr Anne Becker, Scientific Officer and Veterinarian at Animal Healthcare Flanders (DGZ, Belgium)

DVM Gonçalo Portela, Project Officer at the Federation of Veterinarians of Europe (FVE)

As part of the EU-JAMRAI2 project, Anne and Gonçalo jointly presented the first results of comprehensive literature reviews conducted under Work Packages 6 (Task 6.2) and 7 (Task 7.2). These reviews aim to map and analyze existing AMS and IPC/biosecurity guidelines, protocols and programmes relevant to the companion animal and food-producing animal sectors in European countries.

The overarching objectives of the review are twofold:

- To identify current AMS and IPC practices, tools and frameworks used by veterinary healthcare professionals and animal husbandry practitioners.
- To extract from the literature reviews the core elements that define AMS and IPC guidelines and programmes as well as the core competencies required to implement them effectively.

The speakers described the methodological approach, which followed a structured protocol based on the PCC(OT) framework and the PRISMA-ScR guidelines. Literature searches were carried out across three databases: Web of Science, Europe PMC and Scopus. The review process included systematic screening of titles, abstracts, and full texts in two phases to ensure the inclusion of relevant and high-quality publications.

Key findings from the AMS literature review in the food-producing animal sector included three consistent core elements of AMS programmes: (1) prudent use of antibiotics, (2) education and communication and (3) reporting, monitoring and surveillance. These same core elements were also commonly found in the companion animal sector. However, comparison between both sectors also highlighted sector-specific emphases with a greater focus on housing and management, hygiene and biosecurity for food-producing animals and more frequent inclusion of diagnostic tools, vaccination and alternative therapies as stewardship interventions in companion animals.

The speakers concluded by outlining the forward-looking steps for Task 6.2 and 7.2. The findings from the AMS and IPC literature reviews will be compiled into comprehensive reports and submitted for scientific publications. Most importantly, they will serve as a foundational evidence base for the development of an AMS and IPC framework supporting more efficient and harmonized implementation of AMS and IPC in the animal health sector. The identified core elements will inform the structure and content of guidelines, offering a basic, adaptable framework for practical application across European Member States. This work represents a significant contribution to EU-JAMRAI2's goal of supporting Member States in designing effective, evidence-informed AMS and IPC interventions in animal health, within the broader context of the One Health approach to combating AMR.

3.3 Untangling meanings, competencies and materials around AMS in the animal health sector

Dr. Gabriela Olmos Antillón, Senior Research Consultant, Swedish University of Agricultural Sciences (SLU, Sweden)

Dr. Isabel Blanco-Penedo, Associate professor at the University of Lleida (UdL, Spain) and Senior Lecturer Adjunct at the Swedish University of Agricultural Sciences (SLU, Sweden)

Gabriela and Isabel presented a project funded by the Swedish Research Council FORMAS (Grant No. 2019-00324). In that project, they found that AMS in veterinary practice is often approached through the quantitative tracking of antimicrobial use. However, their qualitative study—informed by social practice theory—highlighted critical gaps in diagnostic formalisation, follow-up practices, and everyday veterinary decision-making.

The speakers examined the Veterinary-Client-Animal relationship to identify barriers and opportunities for improving AMS, by drawing on a critical analysis of relevant legislation and guidelines, and 156 in-depth interviews with veterinarians, final-year veterinary students, dairy farmers, and pet owners across Brazil, Spain, and Sweden. They observed an over-reliance on tacit knowledge, fragmented follow-up, and a growing administrative burden linked to regulatory compliance. These factors were found to hinder the development of contextualised learning and adaptive stewardship practices.

Based on insights from that study, the speakers argued that qualitative methods, used alongside quantitative monitoring, can enhance AMS by enabling co-design, stakeholder engagement, and iterative learning. Participants identified these as practical solutions to strengthen decision-making and improve AMS implementation. Bridging the gap between regulation, clinical practice, and education supports a shift from reactive to adaptive AMS, fostering sustainable and responsible antimicrobial use. The work conducted by the invited speakers underscored the value of participatory, trust-based approaches and integrating qualitative insights into AMS policy and practice.

Gabriela and Isabel represented the research team, which consisted of Rita Albernaz-Gonçalves da Silva (IFC, Zootecnia, Brazil), and María J. Hötzel (UFSC, Brazil). They gratefully acknowledged the late Prof. Henry Buller, Prof. Miguel Ángel Moreno Romo, Prof. Ulf Emanuelson, and Prof. Nils Fall for their invaluable contributions and support, as well as all the interview participants, whose insights made the research possible.

3.4 IPC in the animal health sector: spotlight on biosecurity projects in Europe

Dr Ilias Chantziaras, Associate Professor and holder of the Chair of Biosecurity of Animal Production (Faculty of Veterinary Medicine, UGent, Belgium)

Ilias opened the presentation by highlighting the pressing challenges facing the animal health sector today, including the rising risk of disease outbreaks – 60% of which are of zoonotic origin – , the growing threat of AMR, and the urgent need to make livestock farming more sustainable. In an increasingly unstable animal-human-environment interface, biosecurity was presented as a critical part of the solution.

Biosecurity, as defined by the speaker, encompassed management, behavioural, and physical measures that reduce the risk of introduction and spread of pathogens within and between animal populations. He emphasized that IPC in animal health, particularly the objectives of WP7 of EU-JAMRAI2, can synergize with other European biosecurity initiatives.

The speaker showcased three projects:

1. BIOSECURE aims to strengthen stakeholder capacity to understand, prioritize, and implement cost-effective and sustainable biosecurity systems. Project activities to collect existing biosecurity intelligence include podcasts, surveys, and in-depth dialogue through focus groups and workshops. A quantitative farm-level risk assessment model was also presented, estimating the probability of pathogen introduction and evaluating the impact of specific biosecurity measures. The project further explores the socio-economic impact of biosecurity beyond farm level.
2. BETTER (Biosecurity Enhance Through Training Evaluation and Raising Awareness) aims to reduce the risk of infectious disease introduction and spread by improving the implementation of biosecurity measures in animal production systems. To this end, knowledge gaps, facilitators and barriers to biosecurity were identified and whether biosecurity measures are embedded in national legislation across Europe for cattle, poultry and pig sectors. The project also supports the development of a sustainable network for biosecurity research and education (WABA: World Animal Biosecurity Association).
3. EUPAHW (European Partnership on Animal Health & Welfare) supports coordinated projects across key areas such as surveillance, risk assessment, husbandry practices, treatments and vaccination and socio-economic analyses. The initiative underscores an

integrated approach to animal health and welfare with a strong emphasis on IPC and biosecurity.

In conclusion, the speaker stressed that biosecurity should be the foundation of all disease prevention and control programmes. The projects presented demonstrate that both quantitative and qualitative research efforts are actively advancing the field. The integration of scientific knowledge, stakeholder engagement and policy alignment is key to enhancing biosecurity across the European animal health sector.

4 BREAKOUT SESSIONS

The workshop was interactive, with opportunities for in-depth discussions during active sessions with breakout groups, and collaborative brainstorming. During those sessions, various topics, as listed in the below table, were discussed in small groups. Every 30 minutes there was a rotation, allowing everyone the opportunity to discuss multiple topics.

Action Moment I (11h – 12h)	Action Moment II (12h05 – 13h05)
T1A.AMS&IPC stakeholder mapping Defining AMS and IPC in the animal health sector with a One Health perspective, mapping stakeholders and creating a stakeholder network, and identifying a sense of collective responsibility.	**T1B. AMS&IPC in a One Health perspective** One Health as a multi-sectoral approach for developing AMS and IPC programmes: exchange knowledge, experience and cross-sectoral issues.
T2A. Communication, education and training in AMS & IPC Improving awareness and understanding of AMS and IPC through effective communication, education and training, considering behaviour change. Identifying frameworks and programmes to facilitate change and support multisectoral and sustainable implementations of AMS and IPC.	**T2B. Implementation of an AMS & IPC program** A practical experience in using implementation science to enhance AMS and IPC interventions in animal health.
T3A. Barriers & Facilitators to IPC Barriers and facilitators to implementing IPC measures. Identify factors at local, national and international level that contribute to success and understanding one's behavior in relation to antimicrobial use and biosecurity.	**T3B. Sustainability of IPC** Towards sustainable IPC implementation, complemented by a standard process evaluation framework, with relevant indicators. Identify the roles of different actors and how to maintain their engagement. Identify tools to support IPC implementation and discuss self-assessment, monitoring, feedback, audits and control.
T4. Core elements for IPC (part 1) Identifying core elements at the European level on IPC in the animal health sector, in order to create a framework to be used and implementable at national and facility level.	**T4. Core elements for IPC (part 2)** Identifying core elements at the European level on IPC in the animal health sector, in order to create a framework to be used and implementable at national and facility level.
T5. Core elements for AMS (part 1)	**T5. Core elements for AMS (part 2)**

Identifying and ranking core elements at the European level on AMS in the animal health sector, in order to create a framework to be used and implementable at national and facility level.	Identifying and ranking core elements at the European level on AMS in the animal health sector, in order to create a framework to be used and implementable at national and facility level.
T6A. Barriers & Facilitators to AMS Identify barriers (e.g. economics) and facilitators (e.g. policy) for implementing AMS programmes.	**T6B. Indicators for AMS programmes** Reporting, monitoring and surveillance: how to implement, monitor and risk assess of AMS programmes.

4.1 Table 1A: AMS&IPC stakeholder mapping

DEFINING AMS AND IPC IN THE ANIMAL HEALTH SECTOR WITH A ONE HEALTH PERSPECTIVE, MAPPING STAKEHOLDERS AND CREATING A STAKEHOLDER NETWORK, AND IDENTIFYING A SENSE OF COLLECTIVE RESPONSIBILITY

4.1.1 Context

The EU Council Recommendations (2023/C 220/01) encourage Member States to ensure adequate coordination between IPC and AMS programmes to decrease the occurrence and spread of infectious diseases and subsequently reduce the need for antimicrobial use. According to the European Commission guidelines, the control of AMR can only be achieved by combining strong IPC measures (including those targeting healthcare associated infections), and AMS programmes promoting prudent use of antimicrobials.

Developing an EU-JAMRAI expert network on AMS and IPC programmes in animal health will foster interactions and exchange of knowledge between stakeholders from the existing professional networks and public bodies. The generated communication would favour implementation at facility and national level (e.g. in National Action Plans) of AMS and IPC programmes. This network will allow sharing experiences regarding the prudent use of antibiotics to improve farming and veterinary practices.

4.1.2 Objectives of the session

1. To define in a coordinated manner AMS and IPC with a One Health perspective (particularly in animal health).
2. To define the objective for a stakeholder network. E.g. to foster exchange of experiences and models between human, animal and environment specialists; a network who supports AMS/IPC actions; and/or network who further initiates, develops and cooperates (community of practice).
3. To identify the essential participants and stakeholders needed in a stewardship programme in animal health at a European level.
4. To identify each stakeholder role (e.g. educators, policy makers, clinicians) and responsibility in AMS and IPC. To answer the question who is responsible for what?

4.1.3 Outcomes of the session

KEY INSIGHTS

- It was difficult to develop a joint definition for AMS and IPC
- Bridging was encouraged
    - Theory *vs* practice "problem solving focus"
    - Human *vs* animal
- Environment: difficult to implement, new thinking is needed
- Stakeholders must include professional communicators, specialist colleges, farmers, NGOs, and other such as commercial stakeholders

OUTCOMES

Jointly/integrated definition of AMS and IPC

- Important to have development and spread of AMR in the definition
- Do we need a common definition?
- Both are tools for similar things
- In AMR, AMS/IPC coincide but IPC is not only for AMR
- Is AMS part of IPC?
- Issues about the role of preventive use as being part of IPC in humans

Definitions from WHO were also reviewed: AMS as "a coherent set of actions that promote the responsible use of antimicrobials", and IPC as "a practical, evidence-based approach to prevent infectious diseases".

The objectives for a stakeholder network

- Network being the bridge between theory and practice; with a problem solving focus
- Guidelines, reducing variation between them
- Learn from each other, lots of experience in implementation in humans
- Difficulties to bring environment into the network
- Share practices in a very practical way, share data and information in an effective way
- Reach and maintain common understanding
- Topics across countries: e.g. transport, antimicrobial use data collection
- Need to exchange knowledge between professionals and sectors
- Discuss and tackle emerging issues
- Create common networks at EU level with the different governments involved, then adapt locally
- Independent collection of evidence based information to share to the EU Member States

Description of a stakeholder network at European level for AMS & IPC in One Health

- Group 1: Animal, environmental and human health professionals, laboratories, policy makers, educators, farmers associations

- Group 2: Academia, specialist colleges, farmers, NGOs, patient associations, environmental organisations, policy makers, human and animal specialist, commercial stakeholders (?)

Additionally, the discussion group concluded that there's a need for a mandate to represent people for any stakeholder and all sectors should be in a multisectoral coordination group. Structures are required to make a stakeholder network more simple (e.g. core group, working groups, …). Apart from defining stakeholders, it is important to consider the dissemination of information from such networks to both the professionals in the field as the general public.

4.2 Table 1B: AMS&IPC in a One Health perspective

ONE HEALTH AS A MULTI-SECTORAL APPROACH FOR DEVELOPING AMS AND IPC PROGRAMS: EXCHANGE KNOWLEDGE, EXPERIENCE AND CROSS-SECTORAL ISSUES

4.2.1 Context

AMS and IPC are interdependent strategies in the fight against AMR. When combined, they create a synergistic approach that enhances patient safety, preserves antimicrobial effectiveness, and reduces healthcare costs. They are interconnected and require multisectoral collaboration between human health, veterinary health, agriculture, and environmental sectors.

Tackling AMR requires a high level of collaboration across sectors and between countries for effective implementation of One Health AMR policies and actions. This collaboration involves sharing data and information across sectors for a more effective and coordinated response to combating AMR; besides, closer cooperation across these sectors may also lead to financial savings. Thus, the EU Council Recommendations (2023/C 220/01) encourages Member States to enhance the cooperation on AMR between professionals working in human health, veterinary, environment and agronomy sectors and with stakeholders, in order to improve the One Health approach on AMR.

4.2.2 Objectives of the session

1. To identify commonalities for AMS and IPC across human, animal and environment sector.
2. To improve a One Health approach to AMS and IPC from the animal health perspective.
3. To enhance an exchange of knowledge and experience between different partners and stakeholders of the EU-JAMRAI2 project.

4.2.3 Outcomes of the session

KEY INSIGHTS

The group identified five overarching commonalities essential for advancing a One Health approach to AMS and IPC:

- Targeted Education
- Integrated Surveillance
- Diagnostics and Data Sharing
- Joint Research Strategies

- Awareness Building towards the general public and professionals

A key message echoed throughout the discussion was that no single solution exists. Progress requires a multi-stakeholder, systemic approach that integrates behavioral and social science perspectives. Additionally, participants stressed the inclusion of environmental health as a fully recognized and engaged partner in One Health strategies.

OUTCOMES

The discussion group comprised a multidisciplinary mix of veterinarians, pharmacists, doctors, and microbiologists, with veterinarians forming the majority. The participants engaged in a collaborative brainstorming session, using post-it notes and cluster mapping to identify cross-cutting themes. The following seven thematic clusters emerged as commonalities between sectors:

- *Monitoring and Surveillance*
  Participants emphasized the importance of integrated surveillance systems that track antibiotic use, the incidence of infections, and AMR across sectors. A comprehensive approach requires the inclusion and coordination of pharmacological and microbiological data from both human and animal health domains (incl. environmental health where possible). Such systems enable a more accurate understanding of AMR trends and support timely interventions.
- *Infection Prevention, Control and Biosecurity*
  There was strong agreement on the value of shared principles across sectors, including rigorous hygiene practices, effective vaccination programmes, appropriate housing and animal management, and the use of quarantine measures where necessary. Waste management and environmental sanitation practices were also recognized as critical to effective infection control.
- *Guidelines and prudent use of antimicrobials*
  Similar stewardship principles apply across human and veterinary medicine. The group highlighted the need for standardized, evidence-based guidelines that are adaptable to the specific needs of different sectors.
- *Regulatory and Legal Frameworks*
  Aligning legal and regulatory standards across sectors remains a challenge. Harmonizing policies was seen as a key step toward improving implementation and ensuring more consistent control of antimicrobial use.
- *Awareness and Communication*
  Raising public awareness and encouraging behavior change were identified as priorities. Joint campaigns and shared strategies are needed, alongside better messaging on issues like medicine disposal and environmental impact.
- *Collaboration and Joint Actions*
  Participants stressed the importance of joint reports, shared research, and networks to support One Health efforts. Strengthening intersectoral partnerships was viewed as crucial for effective, unified action.
- *Training and Education*

Shared educational content, ongoing professional development, and self-assessment tools were encouraged. Cross-sector learning and knowledge exchange are key to building a collaborative, informed AMR response.

There were additional discussions on benchmarking antimicrobial use among veterinarians and general practitioners and also on harmonizing diagnostic approaches and improving data accessibility across sectors.

4.3 Table 2A: Communication, education and training in AMS & IPC

IMPROVING AWARENESS AND UNDERSTANDING OF AMS AND IPC THROUGH EFFECTIVE COMMUNICATION, EDUCATION AND TRAINING

4.3.1 Context

The EU Council Recommendations (2023/C 220/01) states that education, awareness and training of professionals working on AMR, on IPC and on the One Health approach play an important role in the fight against AMR, due in particular to their roles as advocates for prudent antimicrobial use and educators of patients and farmers. Thus, the Commission encourages EU Member States (1) that national continuous education programmes and curricula include mandatory cross-sectoral training and competence on AMR, on IPC and on AMS, (2) to raise awareness among health professionals on the importance of programmes in the prevention of AMR, (3) and to increase and improve communication and awareness on AMR to promote knowledge and behavioural change, by providing professionals working in veterinary with regularly updated information.

Strengthening AMS and IPC knowledge skills and behaviours across the animal healthcare sector is essential to achieve high-quality and sustainable implementation of AMS and IPC, and reduce the spread and exposure to AMR. Educational curricula and training on AMS and IPC need to be tailored to specific professional roles, include a One Health approach and promote behaviour change.

4.3.2 Objectives of the session

1. To identify gaps and needs in AMS and IPC education in the animal healthcare sector.
2. To discuss education as part of a multimodal strategy for training in AMS and IPC.
3. To define competencies required for AMS and IPC in the animal healthcare sector.
4. To improve communication and awareness on AMR, AMS and IPC training opportunities.

4.3.3 Outcomes of the session

KEY INSIGHTS

During this session participants identified challenges and approaches to tackle gaps in the teaching and learning (education) of AMS and IPC in different settings. Additionally, stakeholders/audiences were identified. Some of the topics discussed included:

- *AMS and IPC in the veterinary curricula*

AMS and IPC need to be included earlier in the veterinary curricula as currently these topics are introduced too late in the programme.

- *Harmonization of veterinary curricula in Europe*
  Veterinary programmes can be very different, making it difficult to standardize core elements. Differences can affect decision-making and overall quality of veterinary education. Additionally, countries with many veterinary universities and schools (e.g. Spain, Italy, Brazil) face additional challenges in standardization. Despite curriculum differences, essential knowledge is present but scattered, leading to skill reinforcement issues (scaffolding).
- *Certification*
  Issue: financial feasibility and stakeholders' willingness to pay for certifications needs to be considered. A potential solution could be a certification for farmers, promoting IPC and AMS education.
- *Bridging the reality gap in veterinary training*
  A couple of issues were identified: (1) skills learnt by veterinary students during their training do not always align with real-world veterinary practice, (2) some universities rely on examples and/or case studies that may not reflect actual clinical scenarios. Solutions proposed included a.o. implementation of real clinical cases/practical scenarios in different settings within the veterinary programmes, as this can significantly improve students' skills and satisfaction. Since students spend at least five years in the vet school but will practice for over 30 years, training should focus on real-life challenges rather than just theoretical frameworks (lifelong learning skills should be targeted)
- *Effective communication between veterinarians and animal owners*
  Identified issues include the fact that veterinarians need to educate animal owners about AMS and IPC but best communication methods remain unclear. Additionally, there's limited time and materials available, further hindering communication efforts. In finding solutions, it is crucial to consider cultural differences when selecting communication strategies. To this end, the sector needs to involve experts in human behavior and communication.
- *Incorporating training in communication and client-veterinarian relationship into the veterinary curricula*
  There's a need to formally integrate communication and client-vet relationship training into veterinary education. However, effective communication requires dedicated time, which can be challenging to accommodate in a busy veterinary practice or curricular programme timetable.

Communication, education and training in AMS and IPC need to target different stakeholders or key target audiences including veterinary medicine students, lecturers delivering content related to AMS and IPC in the veterinary medicine programme, veterinarians, farmers, other food production professions (including those working in slaughterhouses and other critical points of the supply chain), pet owners and those in leadership roles (including university deans, managers, decision-makers who shape education policies).

Participants reflected on the needs of specific stakeholders and the best approach to implement more education/training in AMS and IPC. Data-driven approach is required to inform what motivates each group of stakeholders to engage with AMS and IPC (evidence).

Students

- Should AMS and IPC be mandatory or optional subjects in veterinary education? If the degree is a generic degree, AMS and IPC should be mandatory subjects.
- Need for integration into official credit systems and certification models to ensure recognition.

Veterinarians

- Current learning sources are highly fragmented impacting continuous education.
- Veterinarians often stick to a single source for continuous development, limiting exposure to different training sources/providers.
- Two key challenges: AMS and IPC are not engaging topics for veterinarians and the lack of mandatory training in these areas leads to the prioritization of other areas for continuous professional development (CPD).
- E-learning tools could help, but they need to be well structured, accessible, and engaging.

Managers

- Veterinary managers and decision-makers play a role in promoting AMS and IPC training within professional organizations.

General Public

- AMS and IPC messaging must reach the public through clear and accessible communication channels (communication/education).

Pharmaceutical Industry

- Pharmaceutical industry can support AMS and IPC education through workshops and training initiatives (be aware of conflicts of interest).

The participants also brainstormed on the institutions/bodies responsible for implementing/offering AMS and IPC training to different stakeholders. Legislation, accreditation bodies (both international and national), professional associations, and consultancy groups can play a role, but organization, coordination, and standardization are required. The requirements of each group of stakeholders need to be clearly identified before any training can be implemented. As an example, the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) offers a two-year programme on AMS, however such a high-level course may not be suitable for general practitioners. Training needs to be more accessible and tailored to a broader audience.

Some other points discussed during the session:

- *Provide training for both students and educators*: Teachers also require training in AMS and IPC. One needs to consider veterinary practice varies widely, yet all professionals should

receive AMS and IPC education, regardless of their field. Integrating these core elements across all levels of veterinary education and practice could improve skills.

- *Define the scope of responsibility:* Opinions diverged on who should be responsible for training different professional groups. Some participants do not see educating professionals in slaughterhouses as their role, while others believe in a broad and inclusive approach. It is important to work as a team and promote collaboration to increase the impact.
- *Balancing focus and inclusion:* While all groups of stakeholders need some level of education, prioritizing frontline professionals directly involved in animal health and welfare may be the most effective strategy. This approach ensures efficient use of resources while still fostering interdisciplinary collaboration.
- *The role of interdisciplinary forums (e.g., Focus Groups):* Collaborative groups across different professions can enhance learning and help integrate IPC and AMS practices at multiple levels. Cross-disciplinary discussions allow professionals to learn from each other and create more cohesive strategies.
- *Effective communication:* Right channels, simple messages, inspirational stories.

OUTCOMES

Developing communication, education and training activities in AMS and IPC requires effective communication and for that the audience needs to be identified; there is a need to create opportunities for veterinary students, veterinarians (including specialists) and lecturers at veterinary schools, and also other stakeholders including farmers, managers etc.

The group felt education in AMS and IPC needs to be integrated in the veterinary curricula early in the degree and at different levels, using real case scenarios. It is important to harmonize AMS and IPC communication and training across veterinary professionals and veterinary schools while making competency in AMS and IPC attractive to veterinary students and professionals (perhaps driven by legislation?).

Gaining certification or accreditation by a body (e.g. EAEVE, Day 1 Competences) may be a good driver for change. ESCMID supports AMS training for human health and the development of a module focused on AMS in the veterinary setting is beingconsidered. Other methods or channels to deliver future training were identified; EU Micro Credentials or e-learning courses associated with national veterinary councils/national accreditation bodies/scientific societies however fragmentation may become an issue.

To develop communication/training/educational events in AMS and IPC one needs to involve different stakeholders including experts in behavior-change, education and pedagogy as we move from a curative medicine approach towards a preventive medicine approach.

4.4 Table 2B: The implementation of AMS and IPC programmes

HOW TO MATCH AMS INTERVENTIONS TO RELEVANT BARRIERS / FACILITATORS

4.4.1 Context

If not implemented effectively, AMS and IPC practices risk having little to no impact. While education is a crucial component of multimodal strategies, it alone rarely leads to behavioral change. In the first active session of the workshop (Table 3A and 6A), we identified the key barriers and facilitators in implementing AMS and IPC programmes. Beyond knowledge and skills, which are discussed in Table 2A, we focused here on the other barriers (e.g.: attitude) by providing an example of how to develop an effective intervention using implementation science and offering participants a hands-on experience in designing such an intervention.

4.4.2 Objective of the session

A practical experience in using implementation science to enhance AMS and IPC interventions in animal health.

4.4.3 Outcomes of the session

KEY INSIGHTS

Knowing the barriers and facilitators helps choosing the most appropriate interventions (tailored interventions). Once you know the determinants of practice, only then you can select an intervention to address these determinants, and to successfully change professional behaviour. For example: lack of skills/ knowledge – education, lack of insight into own behavior – feedback and forgetting/ routine behavior – reminders.

OUTCOMES

Determinant: being convinced of their own expertise, not wanting to be taught how to prescribe

- Feedback + self relection; using narratives
- Benchmarking between providers
- Round table discussion among peers (including neutral moderator)
- Linking usage to outcomes (if you have the data)
- Restrictive measures if nothing else works

Lack of knowledge/experience (e.g. about the duration of antibiotic therapy in diarhea in dogs)

- Education and training (interactive, small scale education)
- Add feedback to education
- Peer learning

Inconsistent AMS policies across different governmental agencies and settings, also at EU level

- Challenging because not within the circle of influence
- Legislative control to impose uniformity

Antibiotics are too cheap! Access to diagnostics

- Disagreement between discussion groups
- Cost increase effective dependent on targeted professional (veterinarian/farmer/pet owner) and value of the animal (emotional, financial)

- Facilitate cheap access to rapid diagnostics (money & speed)
- Making alternative options more affordable (combining financing diagnostic and antibiotic)
- Make use of data that we are already collecting (sick animals)

In conclusion, the use of evidence-based theories/models/frameworks was highlighted to develop a specific intervention. With the note to address a problem "in front of you", "start small with success stories and little steps".

4.5 Table 3A: Barriers and facilitators to IPC

BARRIERS AND FACILITATORS TO IMPLEMENTING IPC MEASURES. IDENTIFY FACTORS AT LOCAL, NATIONAL AND INTERNATIONAL LEVEL THAT CONTRIBUTE TO SUCCESS AND UNDERSTANDING ONE'S BEHAVIOUR IN RELATION TO ANTIMICROBIAL USE AND BIOSECURITY

4.5.1 Context

Different levels can be considered in the discussion, targeting both food-producing animal sector (cattle, pig, poultry) – farm environments and national level – and companion animal sector – veterinary practices & clinics, breeding facilities and national level.

4.5.2 Objectives of the session

1. Identify barriers to adopting biosecurity/IPC in the different contexts.
2. Generate ideas, solutions and possible drivers to overcome barriers.

4.5.3 Outcomes of the session

KEY INSIGHTS

In order to address the first objective, the participants outlined all potential barriers to adopting biosecurity/IPC with respect to AMR and both companion animals and food-producing animals. Subsequently, they discussed the rationale, the contributing factors and impact of the identified barriers in the different contexts in view of AMR, which allowed highlighting the barriers of top importance for companion animals and food-producing animals. During the second part, the participants generated ideas, solutions and potential drivers to overcome the barriers of importance.

OUTCOMES

Identified barriers of importance to adopting biosecurity/IPC in the different contexts

Companion animal sector:

- Lack of corresponding training
- Set-up of veterinary practices (e.g. joint waiting rooms, flow, isolation facilities)

Food-producing animal sector:

- Lack of knowledge

- On behaviour change by governments/networks
- General lack of knowledge among farmers

- Non-priority elements for farmers
  - Lack of time for proper biosecurity/IPC
  - Lack of biosecurity/IPC training (including farm workers)
  - Knowledge/attitude – Lack of understanding their crucial role, which might induce inaction until mandatory legislative requirements are imposed
  - Necessary investments to address improper biosecurity/IPC practices (e.g., high-density animal pens in pig farms): a) expenses needed to implement biosecurity measures and practices, and b) expenses to improve poor infrastructures
  - High level of biosecurity/IPC implementation in some countries
- "Forgotten" but important "minor" species, incl. aquaculture
- Poor communication and language constrains (non-national work force)

Other identified barriers to adopting biosecurity/IPC in the different contexts

Companion animal sector:

- Monitoring of administration of antibiotics to dogs
- Poor understanding of the biosecurity/IPC importance/Lack of knowledge on 'One Health' and the consequences for human health (owners/tutors) since pet owners share bacteria with humans
- Lack of knowledge on behaviour change by governments/networks
- Lack of time for proper biosecurity/IPC
- Lack off "official" guidance to implement biosecurity/IPC measures
- Veterinarians' "old habits" on biosecurity/IPC ranging from hand hygiene to utilization of medical devices

Food-producing animal sector:

- Knowledge is kept in silos and there is a lack of exchange between the different actors involved in the management of food-producing animals
- Veterinarians' "old habits" on biosecurity + poor adherence to basic elements as restriction on use of antibiotics
- Guidelines/"strategies":
  - Compliance (do guidelines give meaning to workers?)
  - Lack of "strategies"/harmonized approach/guidance
- Different levels of education – different approaches
- Territorial dimension of farms – large areas, numerous points of entry, wild life, roads (southern Europe)
- Dispersed farming (various farming types)– sector, small farms, backyard farming and hobby farming

The communication channels of available knowledge on biosecurity/IPC and corresponding behavioral change were highlithted as key elements upon which the participants developed the roots of a 'solution tree' consisiting of the following:

- *Peer-to-peer exchange*
  To effectively address AMR, peer-to-peer exchange was suggested as a potential solution as farmers who have seen the benefits of responsible practices are best suited to convince others.
- *Leaders*
  A designated organization should lead the way and receive a (legal) mandate to act accordingly was suggested as a second solution. In this regard, the Belgian AMCRA was cited as a success story, as it coordinates efforts to reduce antibiotic use in animals.
- *Private-public partnerships*
  The importance of partnerships between public and private sectors to solve the biosecurity/IPC problem was addressed. AMCRA was again cited as a success story, along with the example of the United Kingdom, where initiatives to address antimicrobial use began with farmer unions, but then resulted in a public-private partnership. These examples also highlighted the governments roles in creating an environment that supports changes.
- *Clarifying the Cost-Benefit of AMR*
  Clarifying the cost-benefits of good biosecurity/IPC practices not only in terms of animal health but beyond, in terms of 'One Health' by, for example, also including the impact on public health.
- *Making the problem visible*
  Increase the visibility of the issue, for instance, by using more prominent diseases to highlight the importance of IPC and biosecurity measures. Another suggestion was to also communicate more on the direct risks of AMR for farmers and their families.
- *Governmental support to improve infrastructures*
  Governmental support to aid farmers to invest in their infrastructures is necessary in view of the high pertinent costs.
- *Financial incentives for farmers*
  Financial incentives and/or subsidies to encourage farmers to adopt better practices. These options could provide farmers with better incomes while adopting good practices, such as quality labels. However, such solutions require thorough organization to be effective.
- *Benchmarking and Monitoring*
  Benchmarking systems, such as the yellow card system, are crucial drivers of behavioral change as long as they focus on celebrating successes and encouraging positive behavior, rather than penalizing those who fall behind.

The participants concluded the following *potential benefits* of an increased farmers' motivation to change, which were represented as the branches of the generated 'solution tree':

- Fewer diseases & infections
- Increased Farm & family health

- Reduced costs for treating animals
- Reduced animal mortality
- Increased animal welfare
- Less labour (with fewer animals becoming infected, the workload might be reduced a little)
- Increased pride for farmers
- Reduced stigmatisation of farmers (farmers are actively trying to improve farm conditions and prevent issues, rather than farmers being the source of public health scandals)

4.6 Table 3B: Sustainability of IPC

TOWARDS SUSTAINABLE IPC IMPLEMENTATION, COMPLEMENTED BY A STANDARD STRUCTURE/PROCESS/OUTCOME EVALUATION FRAMEWORK, WITH RELEVANT INDICATORS. IDENTIFY THE ROLES OF DIFFERENT ACTORS AND HOW TO MAINTAIN THEIR ENGAGEMENT. IDENTIFY TOOLS TO SUPPORT IPC IMPLEMENTATION AND DISCUSS SELF-ASSESSMENT, MONITORING, FEEDBACK, AUDITS AND CONTROL.

4.6.1 Context

A sustainable IPC refers to the establishment of infection prevention and control practices that are not only effective in the short term but are also consistently maintained and adapted over time to ensure ongoing effectiveness, resilience, and improvement in managing infections. Sustainable IPC practices focus on creating systems, behaviors, and structures that can be maintained over time, without overburdening resources, and that continuously evolve in response to emerging challenges and evidence.

What it could typically involve:

- *Integration into routine practices* with long-term institutional commitment and ongoing staff engagement and behavioral change
- *Adequate resource allocation* with sufficient staffing, ongoing training and education and availability of supplies
- *Evidence-based protocols and guidelines*
- *Continuous monitoring and evaluation* with a data-driven approach, feedback loops and sustainability indicators
- *Strong leadership support and governance* & accountability structures should be in place
- *Collaboration and stakeholder engagement* with a multidisciplinary approach
- *Financial sustainability* with cost-effective solutions and long-term planning

In summary, a sustainable IPC implementation is about creating an infection control system that is long-lasting, adaptable, and integrated into everyday practice. It involves a commitment from leadership, continual training, regular monitoring, and a culture of compliance; emphasizing co-regulation mechanisms.

4.6.2 Objectives of the session

Focus in this session on the following framework necessary to generate sustainability for IPC in animal health: Self-Assessment, Control and Monitoring & Surveillance.

For each of these aspects, we'd like to consider *the actors (WHO)* plays a role and *which elements (WHAT)* is required to support a sustainable implementation of biosecurity/IPC in the different sectors (1st half) and discuss *tools* that could support this (create the ideal tool). Tools could be e.g. software platforms, guidelines or policies.

Note: Tools can only help in implementation of IPC – probably there is no ideal tool as the main variable is the people implementing the IPC practices. We need to create the conditions to make IPC easier – adequate time (tools could help) and motivation (COM-B model).

1. Identify roles and responsibilities of actors for sustainable implementation of IPC in three areas (self-assessment, control, monitoring and surveillance).
2. Discuss how to maintain collaboration and stakeholder engagement.
3. Create the ideal tool to support sustainable implementation of IPC at farm level and in a veterinary clinic.

4.6.3 Outcomes of the session

KEY INSIGHTS

Maintaining stakeholder commitment over time was identified as essential for sustaining collaboration and implementation of IPC. Key enablers include:

- Clearly defined roles and accountability
- Cross-sector collaboration and shared vision
- Continuous education and motivation (e.g. incentives -social and professional- to encourage participation)
- Effective feedback loops to guide and adapt practices
- Integration with existing systems to avoid redundancy (e.g. integration of IPC into broader farm/clinic objectives

Concerning an IPC support tool, the group emphasized that while digital tools abound, most are overly complex or not sufficiently adaptabl,e leading many to prefer building their own. This creates fragmentation and can overwhelm users. Participants agreed on the need for a common IPC framework rather than a one-size-fits-all tool. This framework should be adaptable and supported by a local team, as no single tool will fully apply to every farm or clinic.

OUTCOMES

The group focused on translating the key concepts and principles for sustainable IPC into actionable practices under three pillars: Control, Monitoring & Surveillance and Self-Assessment. Prior to this, key actors for IPC implementation in the food-producing animal sector and companion animal sector were identified.

Food-producing animal Sector – key actors:

- On-farm: farmers (including seasonal workers and managers), transporters, commercial representatives, advisors, suppliers)
- Organizations: Farmer and veterinarian professional organizations
- Authorities; National and local authorities, veterinary services, private and animal health organisations, food safety authorities, regulatory bodies
- Support Services: Laboratories, Cooperatives/Labels, slaughterhouses, educational institutions, traders

Companion animal Sector – key actors:

- Service Providers: veterinary practices, clinics, and hospitals (ranging in size)
- Animal Holders: Boarding kennels, breeders, breeder societies, traders
- Pet Owners
- Organizations and Instutions: Veterinarian professional organizations, official authorities, educational institutes

Key area Control

Objective: prevent and contain infections at the source. Specifically participants discussed what is required to support a sustainable IPC implementation.

Food-producing animal sector:

- Biosecurity and animal welfare practices
- Vaccination and treatment protocols
- Use of diagnostics
- Disease knowledge and awareness

Companion animal sector:

- Similar structure as above, with an inphasis on:
    - Clinic-level biosecurity (e.g. isolation areas)
    - Owner education
    - Specialized veterinary knowledge and roles

Key area Monitoring and Surveillance

Objective: track infection dynamics, evaluate interventions, and adjust practices Shared across sectors:

- Monitor actions taken – actions in place (e.g. biosecurity ,easures, vaccination)
- Monitor outcomes (e.g. infection rates, reduced use of antimicrobials)
- Surveillance of disease
- Track antimicrobial usage (antimicrobial stewardship)
- Economic considerations of monitoring systems (consider economic costs and data collection burdens)

Specific to Companion animal Sector:

- Clinics and breeders often carry the monitoring responsibility
- Discussion included whether owners could be involved (ideas drawn from public health initiatives)

Key area Self-Assessment

Objective: enable actors to evaluate and improve their own IPC performance.

Food-producing animal sector:

- Define and track Key Performance Indicators (KPIs)
- Set thresholds and minimal critical points
- Include cost-efficiency analysis
- Develop and implement operational plans (e.g. 2-year targets)
- Plan and monitor resource allocation
- Create feedback loops involving all relevant actors; cncourage multi-actor feedback sessions to improve cross-sector alignment
- Bridge the gap between animal and human health silos

For the companion animal sector, mostly overlap with food-producing animal sector but less structurally developed. There is though also a need for tailored self-assessment tools and defined indicators. The group also discussed the *characteristics of an Ideal IPC Support Tool* and emphasized that tools can support, but not replace, the human factor in IPC. Not just a tool – a team effort: a successful use of any tool depends on building the right conditions, including time, motivation and staff engagement. Some key characteristics for an ideal tool:

- Simplicity and usability: must be intuitive, easy to implement, and time-efficient
- Tailoring: adaptable to specific countries, sectors, and contexts
- Minimum set of requirements: establish a standardized core, with flexibility to add local priorities
- Focus on Self-Assessment: empower users to review and improve their own practices
- Benchmarking: allow comparisons with similar actors (e.g. “farms like mine”)
    - Highlight progress, not punishment – use benchmark as a motivator, not as a “red card”
- User groups and Networks: facilitate exchange, peer support, and co-learning among similar stakeholders
- Function across both small and large-scale facilities
- Features that could be included:
    - Self-assessment checklists
    - Dashboards for tracking infections and IPC measures
    - Reminders and alers
    - Digital access to guidelines and training
    - Data entry for monitoring medication use
    - Provide incentives (e.g. benchmarking, gamification)
    - Support ulti-stakeholder access (and be accessible offline for rural areas)

- Link to national databases or reporting systems (if applicable)

The discussion made it clear that sustainable IPC depends not only on tools or guidelines but also on people, motivation, and systemic support.

Participants expressed that while European-level standardization could be helpful, strict uniformity is not realistic due to differences in climate, sector practices, and regulatory environments. Instead, tools should promote regional benchmarking within relevant peer groups. A shared digital tool could help – but must be adapted to sector needs, simple to use, and supported by training.

IPC implementation must be systematic, collaborative, and embedded in routine operations. IPC roles and responsibilities must be clear and defined for all actors. Strong leadership, continuous education, and interaction between actors are crucial to overcome silos and maintain long-term engagement.

4.7 Table 4: Core elements for IPC

IDENTIFYING CORE ELEMENTS AT THE EUROPEAN LEVEL ON INFECTION PREVENTION AND CONTROL IN THE ANIMAL HEALTH SECTOR, IN ORDER TO CREATE A FRAMEWORK TO BE USED AND IMPLEMENTABLE AT NATIONAL AND FACILITY LEVEL

4.7.1 Context

Core components of IPC programmes (WHO): The goal of the 2016 guidelines was to provide the most recent evidence-based recommendations and good practice statements on the core components of IPC programmes that are required at the national level (including various levels within the health care structure) and acute health facility level, with the aim of addressing current and preventing future threats, strengthening health service resilience and helping to combat AMR. The 2016 guidelines are also intended to support countries in the development of their own national protocols for IPC and AMR action plans, and to support health care facilities as they develop or strengthen their own approaches to IPC.

4.7.2 Objectives of the session

1. To identify core elements for IPC programs in the animal health sector (sector-specific) (Part 1).
2. Mapping to the WHO IPC Core Element Framework in the human health sector: what can we take from this framework into the development of core elements for IPC in the animal health sector (Part 2).
3. To identify core competencies for professionals to support the core elements and framework (Part 2).

4.7.3 Outcomes of the session (Part 1 and 2)

KEY INSIGHTS

The group started off by free brainstorm and then grouping ideas about core elements into themes. The following were themes identified:

- Biosecurity: a recurrent and main theme that includes hygiene, herd management and very specific measures & categories such as cleaning & disinfection, appropriate housing and animal density. Hygiene is thus an integral part in biosecurity. Biosecurity is related to management of the clinic/farm/…
- Data: the group remarked that companion animal clinics often have software programme's but data is hardly shared.
- Surveillance: level should be considered – how to use effectively the data from early diagnostics in the clinic. And how about monitoring at farm level?
- Training & Education: Very important but should be part of a framework and requires appropriate feedback mechanisms.
- Self-evaluation/assessment: e.g. to give the farmer and veterinarian ownership, intrinsic motivation → think themselves about how they can improve their actions.
- Epidemiology: essential to know how the diseases work, to this end you need good epidemiological data that is stored and shared across relevant stakeholders.
- Vaccination.
- Regulations: legislative framwork is needed.
- Cost model: beyond individual farms, consider nulti-farm or national programs – there needs to be an agreed sharing of the costs and benefits of a disease program. Importantly, if the farmer doesn't have the resources for IPC, any initiative will have no result.
- Awareness building: complex, but very important, adapt according to target audience (e.g. companion animal sector: how to prevent zoonotic diseases, raise awareness on risks of importing diseases).
- Incentives for IPC were also mentioned although not explored in depth. Sidenote was made that providing incentives to e.g. a farmer doesn't always give a good result. If considered, incentives should be a "nice to have and under specific conditions".

The core elements of IPC identified were very similar to those identified by WHO in relation to human medicine (the group cross-checked with the WHO core components at the end of the session).

The following were identified as *essential elements* for any IPC programme:

- Biosecurity
- Education & training, which should be targeted for, and tailored to, all relevant stakeholders. Stakeholders include veterinary personnel, veterinary and veterinary nursing students, farmers, persons transporting animals and the general public
- Surveillance at national level
- Guidelines or tools that should be action focused
  Tailored to each stakeholder, whether that be the farmer, veterinarian, general public or others
- Regulation & legislative framework

- Resources and personnel required for Implementation
- Networking between stakeholders, including between farmers and farm workers

Other elements considered beneficial:

- Vaccination
  This may be an important element of IPC in circumstances where diseases that can be well controlled by vaccination are important in specific regions or countries and would apply to both food-producing and companion animal sector
- Feedback & self-assessment/benchmarking – this could include a database/guide to record, manage, monitor and analyse IPC protocols/strategies
- Cost model of IPC
- Awareness building of the importance of IPC for the general public, including pet owners. There is a need to improve understanding of transmission and epidemiology of disease

There was discussion among the group as to whether implementation of the core elements of IPC should or should not be ensured by legislation/regulation. It was suggested that in the case of food-producing animals, legislation governing elements of IPC should be in place whereas for companion animals, this might not be necessary or feasible; implementation of IPC elements in companion animals would be voluntary. The importance of sufficient, well-trained staff and other appropriate resources for IPC implementation was also stressed.

Although many of the principles of IPC are similar for food-producing and companion animals, the environment in which they are applied is different, being on farm for food-producing animals and usually in a clinical environment for companion animals. For example, the all-in, all-out principle can be easily applied in poultry production but this is not appropriate to the clinical environment in most cases. Furthermore, there are differences in the application of the core elements of IPC depending on the type of farm enterprise, beef, dairy, pig, intensive, organic, etc. In addition, farmers are professionals and IPC is part of their job of managing the farm and while veterinary staff are also professionals, pet owners are not.

The following *core competencies (enablers) of IPC* were identified:

- *Stakeholder engagement* is crucial. The group considered that engagement is contingent on having a plan for IPC that is tailored to the needs of each specific stakeholder group. Trying to have a 'one size fits all' type of plan will not work. Thus, plans should be suited to different contexts such as organic farms or high welfare farms versus conventional intensive units. It was noted that *availability of such tailor-made guidelines is essential* before attempting the behaviour change that is required for their adoption. For example, improving biosecurity of small beef units for which multiple movements in and out of the herd is part of the social context may be extremely difficult. A discussion followed with our IPC colleagues in human medicine on whether there are differences between premises in terms of engagement with IPC. It was acknowledged that some guidelines might not be adopted in smaller clinics. Good communication with staff is essential.

- *Communication and training.* These are core enablers for implementation of IPC and sufficient time must be provided for these to be done well. Discussion groups across all diverse stakeholders are considered useful. Raising awareness among stakeholders also important.
- *The correct elements in the built environment* to facilitate good IPC (isolation facilities, sufficient space to prevent overcrowding etc.). Agreement on gold standard design templates for the main production facilities needs to acknowledge and understand the key similarities and differences between agricultural systems.

OUTCOMES

The table below summarizes the core competencies for IPC in the animal sector and the main stakeholders to whom they apply.

Competency	Farmers	Veterinarians	Others
Communication skills Most important for farmer as they have to work with different actors, not always with the highest education level. Very important Farmers tend to look at the veteterinarian as an authority, they are keen to follow what he/she says. Farmers often also listen to what other farmers do. Both stakeholders need to know how to communicate. Training in the technique of 'Motivational interviewing' likely to be useful.	**X**	**X**	Communication skills are important for all stakeholders including those in companion animal practice.
Immunology, improve **vaccination strategies**		**X**	Researchers
Behavioural science, knowing how to implement change	**X**	**X**	
Working spectra of antibiotics and how to interpret diagnostic tests (competency of WHO = basic microbiology)		**X**	

This is a gap, veterinarians don't know which antibiotics work for which disease.			
Practical and technical skills to implement theoretical knowledge in real life A veterinarian has to understand the situation on the farm and the farmer has to know how to implement advice given/actions decided upon. He/She has to be able to give practical advice.	**X**	**X**	
Leadership competencies The person has to work on behavioural change on the farm. Teach the students soft skills. Motivational techniques- required more for veterinarians but also important for farmers; some farmers are seen by other farmers as leaders (influencer farmers).	**X**	**X**	Policy makers, farmer organisations, educators
Interpretation of data available on the farm There is a large amount of data and information that the farmers and/or veterinarians cannot access. The storage of information and access to this information should be better to encourage usage of the data. Online databases, benchmarking data available in real time are important.	**X**	**X**	Policy makers, farmer organisations, educators
Good management	**X**	**X**	This also applies to staff in companion animal clinics and in shelters
Environment The farm / clinic should have good infrastructure and should be in a good location	**X**	**X**	

Knowledge on IPC The concept of IPC is for some people quite new and it is important that people have knowledge on what constitutes IPC.	**X**	**X**	**X**
Knowledge on hygiene & disinfection	**X**	**X**	This also applies to staff in companion animal clinics and in shelters

4.8 Table 5: Core elements for AMS

IDENTIFYING AND RANKING CORE ELEMENTS AT THE EUROPEAN LEVEL ON ANTIMICROBIAL STEWARDSHIP IN THE ANIMAL HEALTH SECTOR, IN ORDER TO CREATE A FRAMEWORK TO BE USED AND IMPLEMENTABLE AT NATIONAL AND FACILITY LEVEL

4.8.1 Context

Despite current plans and guidelines, European Member States haven not reached the same level of proficiency concerning health policies on AMS. Following the policy recommendations from the first EU-JAMRAI (2017-2021), establishing harmonized core elements and standards at the European level is considered a priority for effective implementation of AMS programmes and a minimum framework to be used by all European Member States. AMS programs are essential initiatives aimed at optimizing the use of antimicrobials to improve patient outcomes and reduce AMR.

In this session, participants have brainstormed key elements of AMS programmes, categorized their ideas, and collaboratively rank the most critical components. The insights from this activity would guide the development of a practical, implementable framework to support AMS in animal health across Europe, at national and facility level, particularly for companion animals (dogs and cats) and food-producing animals (cattle, swine, and poultry).

4.8.2 Objectives of the session

1. To identify the core elements (what) needed for an AMS programme in animal health (companion animals: cats, dogs; and food-producing animals: cattle, poultry, and swine) (Part 1).
2. To prioritize the core elements of AMS programmes into three levels of implementation: basic, advanced, and excellent (Part 1).
3. To recognize the core competencies or skills needed for professionals developing and implementing AMS programmes in food-producing and companion animals (Part 2).
4. To identify the professionals responsible for the implementation of AMS programmes (Part 2).

4.8.3 Outcomes of the session (Part 1)

KEY INSIGHTS

An AMS definition was shared with the expert group. Proposed changes are shown in italics below.

Antimicrobial stewardship is a coordinated set of strategies and actions designed to ensure the proper use of antimicrobial agents (antibiotics, antivirals, antifungals, and antiparasitics) in order to improve treatment outcomes, reduce microbial resistance, and ensure the continued effectiveness of these medicines, protecting *animal and* public health. The proper use of antimicrobials involves selecting the appropriate antimicrobial, through diagnostic tests, respecting the dose, duration, and route of administration, that results in the best clinical outcome for the treatment or prevention of infection, ~~*with minimal toxicity*~~ *reducing adverse reaction*s to the patient and contributing to minimizing the development of resistance *if alternative therapies are available*. These measures are currently being implemented worldwide in the human health sector to combat the rise of antimicrobial resistance, particularly antibiotic-resistant bacteria. Increasing awareness of the need for responsible use of antimicrobials leads to actions such as reducing the number of antimicrobial prescriptions and shortening the duration of their use. AMS is essential in both veterinary and human medicine, presenting itself as a critical One Health key component, as it addresses the impacts of antimicrobial use on animal, human, and environmental health (American Veterinary Medical Association (AVMA), sem data; European Centre for Disease Prevention and Control., 2017; Hibbard et al., 2024; Scott Weese et al., 2013; World Health Organisation, 2021).

The core elements identified in the literature review for food-producing Animals and companion animals were shared with the experts. During the discussion at the expert panel, they were asked to list the core elements they considered important for food-producing and companion animals. Additionally, they were requested to rank each element as basic, advance or excellent level.

List of Core Elements, food-producing animals	BASIC	ADVANCE	EXCELLENT
Recognition of veterinarians as health profession			X
Good guidances	X		
Prevention and biosecurity	X		
Availablility of dianostic tools	X	X	
Harmonization sensibility testing & Standards		X	
Alternatives to Antibiotics and economic impact			X
Availability of vaccines	X		
Housing and management	X		
Reporting, monitoring and surveillance	X	X	
Education and communication and awareness		X	X
Regulation/policies		X	X

Animal trade and movements		X	X
Epidemiological maps on AMR	X		

List of Core Elements, companion animals	BASIC	ADVANCE	EXCELLENT
Surveillance, monitoring and reporting	X	X	
Education, comunication and awareness	X	X	X
Veterinarians involved in antimicrobial use decision making		X	X
Trustness on veterinarians			X
Valorisation of veterinary profession (One Health)			X
Availability of affordable ABS	X		
Availability of diagnostics	X	X	
Access to alternative treatments	X		
Economics	X	X	X
Harmonisation of indicators, sensibility tests, Standards	X		
Good guidances	X		
Animal trades and movements			X

OUTCOMES

Core elements	Sector	Comment
House, management & epidemiology	companion	Not discussed
Economics	food-producing	Not highly recognised in the table=> We realised and we corrected it. Maybe because oft he background of the panel.
Epidemiological maps	food-producing	Key basic core element
Genetics	food-producing	Not discussed

Prudent use	All	Not discussed in the panel. Maybe it is already assumed as basic in the group (again background of the group could provide a bias)
Feed and feed additives	All	Not discussed

4.8.4 Outcomes of the session (Part 2)

KEY INSIGHTS

From the working session, following insights were mentioned:

- The importance of having an open, transparent and continuous communication to build a network of professionals and stakeholders with interest in AMS programs. That communication will favour the transfer of knowledge and encourage working in teams across different animal sectors.
- Two main categories of skills or competences were identified as key factors to develop and implement an AMS program. Those skills included soft and hard skills:
    - Soft: communication (emphaty), creative network, critical thinking, evidence-based thinking, motivation, persuasiveness
    - Hard: diagnostic tools, clinical pharmacology, microbiology, veterinary internal medicine, legislation
- The need of creating a collaborative network of professionals from different levels, such as public sector/administration, health professionals, veterinarians, farmers/owners, and scientists.
- For a One Health perspective, a sense of belonging is fundamental.

OUTCOMES

As summary, two main outcomes were highlighted:

1. *A set of skills/competences needed to develop and implement AMS programmes in animal health, that could be grouped in:*
    - soft skills, such as empathy, motivation, communications, giving advice, creating trust, creating networks with stakeholders, farmers
    - fundamental knowledge and applicable knowledge
2. *A list of professions and sectors that would be responsible for implementing AMS programmes:*
    - academia/science: epidemiologists, microbiologists and clinical microbiologists, data scientists, communication scientists
    - public sector/administration: policy makers, authorities (European and national level)
    - veterinary clinics/hospitals: veterinarian, veterinary nurses, para-veterinarians
    - private sector: industry, food producers entities
    - all of the above supported with the actions carry out by owners of animals, animal care-givers, farmers

4.9 Table 6A (AMS): Barriers & Facilitators to AMS

IDENTIFY BARRIERS (E.G. ECONOMICS) AND FACILITATORS (E.G. POLICY) FOR IMPLEMENTING ANTIMICROBIAL STEWARDSHIP PROGRAMMES

4.9.1 Context

AMS programmes are essential initiatives aimed at optimizing the use of antimicrobials to improve patient outcomes and reduce AMR. Despite their proven benefits, implementing AMS programs can be challenging due to various barriers, such as limited resources, lack of awareness, and insufficient policy support. At the same time, there are facilitators—such as innovative technologies—that can help overcome these obstacles. This table/session aims to provide a platform for the participants of our workshop to identify key barriers and facilitators in the implementation of AMS programs within their contexts.

4.9.2 Objectives of the session

1. To identify and discuss the key barriers (e.g., economic, cultural, logistical) and facilitators (e.g., policies, training, incentives) that impact the successful implementation of AMS programmes.
2. To discuss on how to identify barriers and facilitators (e.g. conduct a risk assessment).
3. To brainstorm practical solutions and strategies for overcoming challenges.

4.9.3 Outcomes of the session

KEY INSIGHTS

The participants identified the barriers of AMS programmes in animal health (on post-its) and identified their most important barrier (by placing a red dot/ sticker). Here you can find a list of the barriers in order of importance. In brackets you can find the number of red dots each barrier received.

- Economic problems: fundings (2)
- Inconsistent AMS policies (2)
- Antibiotics are too cheap (2)
- No or bad connection between national authorities (2)
- Bureaucracy: in communicating with prescriptions (1)
- Conflict of interest of veterinarians (earning from selling antibiotics) (1)
- Lack of integration with human and environmental health (1)
- Lack of knowledge by lack of education and communication (from all people involved, e.g.: farmers, animal owners, veterinarians, other stakeholders) (1)
- Lack of stepwise approaches
- Treatment exceptions
- The feeling of veterinarians that they will lose their autonomy (do not tell me what to do)

- Data collection, analysis, use and harmonization to measure antimicrobial use
- Change of habits at the practical level (routine)
- Lack of responsibility from stakeholders (pharmaceutical companies etc)
- Pigs are weaned very early
- Not enough access to diagnostics
- Detailed feedback of process of use is lacking
- Livestock, at farm level, what need to be prescribed vs what is available in the market
- Vaccins are too expensive and not always available
- Veterinarians and farmers do not (always) believe in positive consequences of AMS programmes (attitude)
- Veterinarians lack the skills the implement the AMS programme in the best way
- The adopters of AMS programme do not believe they can influence the AMU results

In the second part there was a brainstorm for 'magical' facilitators:

- Sharing positives AMS stories including data form indicators about antimicrobial use, management, production (1)
- Networking between silos is a way forward, creating inter sectoral mechanisms (1)
- Move away from quantitively and simplified indicators and use qualitative indicators. It is about trust and really understanding why people use it (1)
- Discuss all ethical dilemmas (1)
- Management: promote courses of what's in for me to workers and owners (1)
- Positive attitude of the public towards reduction ab in animals
- Promote education and training to all involved
- Building relationship
- Seeing it in the context (every country/ situation is different)
- Good guidelines on AMS objectives (indication, duration, dose)
- Good evidence-based AMS programmes
- Using information and experiences from the field to inform approaches to stewardship

OUTCOMES

This could be summarized in these overarching topics that included ideas at the company level/ production level, Europe/national level and Practitioner level / user level.

The role of the veterinarian

Administrative burden, financial compensation, attitude, knowledge, skills, beliefs in own capabilities, self-monitoring/ self-feedback

Siloes work

The disconnection between countries, institutions, departments and colleagues

Magic facilitator: networking between silos is a way forward, creating inter sectoral mechanisms

The ethical dilemma

Should last resort antibiotics in pets/ high value animals be possible or do they need to be saved for humans only. Is it possible to use them for exceptions or will that lead to misuse.

Funding

Increasing cost of production. Treating can be cheaper than prevention. Avoid sick animals. Who is paying for the AMS programs and treatments/ advice that are a result of them.

Quality AMS program

What is a good AMS program. Using indicators to assess/ evaluate AMS programmes. Find a solution for the right context. Qualitative research to find out all the barriers that need to be addressed before the development of the programme. Use theory and evidence for the development (social science).

The facilitators of three identified barriers were discussed further in another breakout group discussion (Table 2B – Implementation of AMS and IPC programmes)

4.10 Table 6B (AMS): Indicators for AMS programmes

HOW TO MONITOR IMPLEMENTATION OF AMS PROGRAMMES

4.10.1 Context

The 2019 Conclusions of the EU Council urged for the development of common guidelines on IPC and AMS based on best practices and for supporting their implementation. Therefore, core elements for AMS programmes must be complemented by a standard structure/process/outcome evaluation framework, with relevant indicators, that could be used both at national and European level if accompanied with quantified achievable targets. Good indicators would allow us to measure and evaluate the level (basic, advanced and excellent) and progress of implementation of AMS programmes in animal health sector (companion animals: cats and dogs, and food-producing animals: cattle, poultry, and swine).

4.10.2 Objectives of the session

To identify and list the relevant indicators for the measurement of implementation of AMS programs in the animal health sector, specifically for the food-producing (cattle, pig, poultry) and companion animal (dog, cat) sector.

4.10.3 Outcomes of the session

KEY INSIGHTS

Understanding the range of indicators used in AMS programmes is vital for effective implementation. These indicators generate the data necessary for monitoring, evaluation, and reporting of antibiotic use in animals. Equally important is the identification of key stakeholders, since this enables targeted interventions and supports the broader effort to combat AMR.

OUTCOMES

A broad range of stakeholders/actors with contributing roles to AMS programmes were identified during the meeting. These include the following:

- Veterinarians and veterinary nurses and technicians
- AMS team (designated roles in clinics/farms)
- Antimicrobial stewardship officer
- Practice management system/software developers
- Owners of veterinary corporate groups
- Farmers and pet owners
- Independent associations
- National competent authorities

Veterinarians are key implementers of AMS practices within farm and clinical settings. The AMS team (including nurses/technicians) can serve as focal points for veterinary products and assist with various aspects of AMS. The practice management system/software developers also contribute, via the development of digital tools to track the use of antibiotics and include relevant artificial intelligence solutions. During the meeting it was also emphasized that every farm/clinic should designate an AMS officer. However, a concern was raised regarding farm settings: should the AMS officer be a veterinarian, or can this role be fulfilled by the farmer? The role of pet owners is applicable only for certain AMS indicators, such as the adherence to prescription guidelines and participation in responsible use of antibiotics.

A comprehensive list of AMS indicators was identified, which is presented within the below-found categories:

Prescription and treatment practices

- Duration of treatment
- Proper dosage of treatment
- Measurement whether a specific animal in a short period of time
- Percentage of appointments where antibiotics are prescribed by the veterinarians
- Percentage of prescriptions that follow established guidelines
- Obligation to justify the use of second- or third-choice antibiotics

These indicators evaluate how antibiotics are prescribed and used for treatment purposes. They help ensure compliance with best practices (e.g., international protocols), detect potential misuse (such as overprescription), and prevent under- or over- dosing.

Guidance of targeted therapy

- Laboratory testing, including antimicrobial susceptibility testing
- Percentage of de-escalation after the antimicrobial susceptibility testing results
- Cross antibiotic use and diagnostic test utilization
- Harmonization of SPCs (summary of product characteristics)

These indicators support evidence-based, targeted therapy. They provide insight into antibacterial resistance patterns, promote the shift to narrow-spectrum antibiotics when appropriate, and ensure consistent product information to prevent misuse.

Antimicrobial use surveillance and benchmarking

- Surveillance of antibiotic sales
- Tracking antibiotic use volumes/quantities (overall consumption)
- Tracking antibiotic use by antibiotic type
- Monitoring antibiotic use by category, dose and reason
- Tracking geographical of antibiotic use (rural vs. urban)
- Longitudinal data analysis and comparison over time
- Monthly measurement the use of critically important antimicrobials (CIAs)
- Benchmarking use of CIAs and non-CIAs
- Benchmarking and trend analysis at the individual veterinarian and farmer level

These indicators enable large-scale evaluation of antibiotic use. They allow for regional and temporal comparisons, support risk assessment, and help identify areas of targeted interventions.

Animal health and production indices, and treatment outcomes

- Feed conversion rates
- Mortality rates
- Monitoring of treatment success or therapeutic failure
- Correlation of antibiotic use with disease prevalence

These indicators assess the effectiveness of antibiotic use and its broader impacts on animal health and productivity, by flagging ineffective treatments or systemic management issues.

Data sharing and digital integration

- Data share indicators (e.g., for respiratory or intestinal infections)
- Centralized data collection for further analysis
- Integration of surveillance tools into animal health management software

These indicators improve data accessibility and usage; they support real-time monitoring, facilitate targeted surveillance of key syndromes, and enable informed, data-driven decision-making.

The group concluded the following:

Diverse Stakeholder Involvement – A wide range of stakeholders contribute to AMS measurements, including veterinarians, farmers, national authorities, software developers, and pet owners. Each plays a role in tracking antibiotic use and antibiotic resistance.

Comprehensive Data Collection – AMS programmes measure various parameters, from treatment duration, dosage, and success rates to surveillance of antimicrobial sales and use. Key indicators include compliance with guidelines, prescription patterns, and CIA usage.

Monitoring and Benchmarking Trends – AMS programmes emphasize tracking antimicrobial use over time, comparing data across regions (rural vs. urban), and benchmarking usage patterns at individual (veterinarian, farmer) and institutional levels.

Integration of Digital Tools – Artificial intelligence, practice management software, and centralized databases facilitate AMS by automating surveillance, tracking prescriptions, and ensuring data-sharing for further analysis.

Antimicrobial Stewardship and Accountability – Programs highlight the importance of stewardship roles (e.g., AMS officers in clinics/farms) and accountability measures, such as explaining second/third-choice antibiotic use, ensuring de-escalation based on antibiograms, and linking antimicrobial use to treatment success and mortality rates.

5 FEEDBACK ON THE WORKSHOP

After the workshop, feedback from all participants was collected via Microsoft Forms. A complete report of the feedback is available in Appendix. Feedback is being considered for further activities in both tasks.

The feedback questionnaire was divided into 5 sections covering all related aspects of the workshop: global evaluation, evaluation of presentations, evaluation of the action moments, evaluation of the group discussion, and specific tips or suggestions for improving our next workshop.

In general the feedback was positive, with good presentations although there were requests for some real-life experiences in AMS/IPC programmes in addition. To address this, we proposed webinars to exchange experiences and engage among participants of EU-JAMRAI T6.2 and T7.2.

Regarding the active sessions, a frequent comment was that discussion time was slightly short for in-depth discussions and it was suggested to have less topics.

6 CONCLUSIONS

The workshop held on 11 March 2025, jointly organized by Task 6.2 AMS in Animal Health and Task 7.2 IPC in Animal Health, can be considered a great success. Core elements and key competencies for the development and implementation of IPC and AMS programmes in the animal health sector were identified and discussed. Participants shared experiences, practices, models, and explored potential synergies between the human and animal health sectors. In total, 76 participants from 50 institutions across 14 Member States /Associated Countries attended the workshop and actively contributed to the group discussions, highlighting strong engagement and collaboration across the region.

APPENDIX

EU-JAMRAI Joint Action Antimicrobial Resistance and Healthcare-Associated Infections

EU-JAMRAI Partners involved in the elaboration of this document:

APPENDIX

Appendix A List of participated institutions
Appendix B Presentations and pictures
Appendix C Feedback Workshop on AMS & IPC in Animal Health – March 11 2025

APPENDIX A

List of participated institutions

Acronym	Full name	Country
AMCRA	AntiMicrobial Consumption and Resistance in Animals	Belgium
DGZ	Animal Health Care Flanders	Belgium
FAMHP	Federal Agency for Medicines and Health Products	Belgium
FPS HFCSE	Federal Public Service Health, Food Chain Safety and Environment	Belgium
FVE	Federation of Veterinarians of Europe	Belgium
ILVO	Flanders Research Institute for Agriculture, Fisheries and Food	Belgium
UGent	Ghent University	Belgium
Ven40	Ven40 Consulting	Belgium
	AnimalhealthEurope	Belgium
DVFA	Danish Veterinary and Food Administration	Denmark
SSI	Statens Serum Institut	Denmark
UCPH	University of Copenhagen	Denmark
RUOKA	Finnish Food Authority	Finland
ANSES	French Agency for food environmental and occupational health & safety	France
INRAE	National Research Institute for Agriculture, Food and Environment	France

INSERM	National Institute of Health and Medical Research	France
WOAH	World Organisation for Animal Health	France
ENVT	National Veterinary School of Toulouse	France
BfR	German Federal Institute for Risk Assessment	Germany
BVL	Federal Office of Consumer Protection and Food Safety	Germany
AUTh-VET	Aristotle University of Thessaloniki	Greece
ACSL	Anvil Consulting Services Limited	Ireland
EC DG SANTE	European Commission DG Health and Food Safety	Ireland
Teagasc	Agriculture and Food Development Authority	Ireland
UCD	University College Dublin School of Veterinary Medicine	Ireland
FAO	Food and Agriculture Organization of the United Nations	Italy
ISS	Italian National Institute of Health	Italy
IZSLT	Experimental Zooprophylactic Institute of Lazio and Tuscany	Italy
BIOR	Institute of Food Safety, Animal Health and Environment	Latvia
MFH	Ministry for Health	Malta
WULS-SGGW	Institute of Veterinary Medicine, Warsaw University of Life Sciences	Poland
CAG	Guadiana Agriculture Cooperative	Portugal
DGAV	General Directorate for Food and Veterinary	Portugal
AEMPS	Spanish Agency of Medicines and Medical Devices	Spain

ANPROGAPOR	Spanish Pig Producers Association	Spain
CSIC	Spanish National Research Council	Spain
FCSAI	State Foundation, Health, Childhood and Social Welfare	Spain
FPS-SAS	Andalusian Health Service	Spain
IACS	Aragon Institute of Health Sciences	Spain
ICO	Catalan Institute of Oncology	Spain
IRTA	Institute of Agrifood Research and Technology	Spain
SALUD-HCUZ	Aragon Health Research Institute	Spain
UCM	Complutense University of Madrid	Spain
UNIZAR	University of Zaragoza	Spain
Vet+i	Vet+i Foundation-Spanish Technology Platform for Animal Health	Spain
UdL	University of Lleida	Spain
ENOVAT	The European Network for Optimization of Antimicrobial Treatment	Sweden
SLU	Swedish University of Agricultural Sciences	Sweden
SVA	Swedish National Veterinary Association	Sweden
Drive AMS	Radboudumc Drive AMS	The Netherlands
UU/FVM	Utrecht University, Faculty of veterinary medicine	The Netherlands
RIVM	National Institute for Public Health and the Environment	The Netherlands

APPENDIX B

Presentations & pictures

EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

11 March

ANTIMICROBIAL STEWARDSHIP & INFECTION PREVENTION AND CONTROL IN ANIMAL HEALTH

Workshop jointly organized by T6.2 and T7.2

Co-funded by the European Union

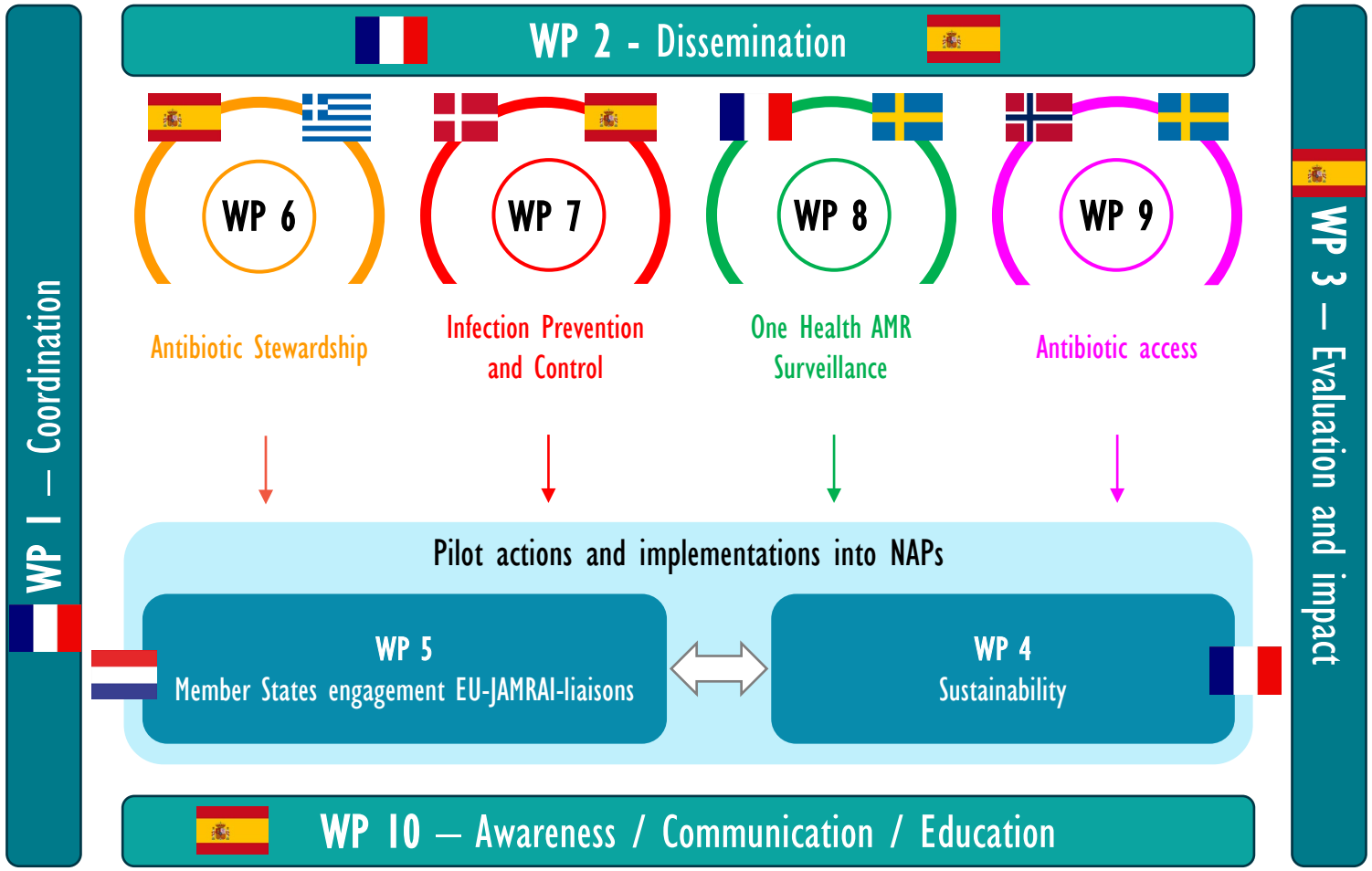
agencia española de medicamentos y productos sanitarios

Utrecht University

DGZ SAMEN VOOR GEZONDE DIEREN

www. eu-jamrai.eu

Introduction to EU-JAMRAI 2



50 million €
30 countries
- 27 MS
- Iceland, Norway, Ukraine

128 institutions
4 years programme: 2024-2027

Introduction to EU-JAMRAI 2

General Objectives

- Provide direct and sizable support to help MS in development and update of their NAP on AMR
- Support the wider uptake of state-of-art IPC for both community-acquired and healthcare-associated infections, as well as AMS strategies in various settings
- Strengthen the responsiveness and coordination of health systems to protect people from AMR in the Union
- Promote the One Health approach
- Make Europe a best practice region

Specific Objective WP6 (Antimicrobial Stewardship; AMS) & WP7 (Infection Prevention & Control; IPC)

- Set up an implement a support programme to help MS/AC in the development and update of their NAP
- Support the development and implementation of core elements and core competencies for AMS and IPC in various settings

Organizers

Co-Leaders

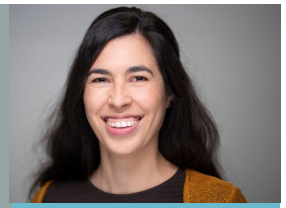
6.2

agencia española de medicamentos y productos sanitarios

Utrecht University

SCIENTIFIC OFFICER

María J. Vilar



SCIENTIFIC OFFICER

Isaura Wayop

WP LEADER

Cristina Muñoz

TASK LEADER

Els Broens

7.2

DGZ

SCIENTIFIC OFFICER

Anne Becker

PROJECT MANAGER

Julie Debouvere

TASK LEADER

Evelyne De Graef

TASK LEADER

Gitte Bekker

EU-JAMRAI

Teamwork

Co-Leaders

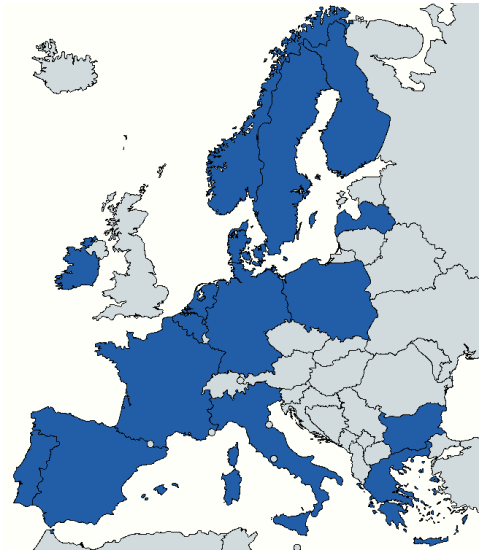
agencia española de medicamentos y productos sanitarios

Utrecht University

DGZ

18 countries

Partners



More than 30 institutions

Stakeholders

World Organisation for Animal Health

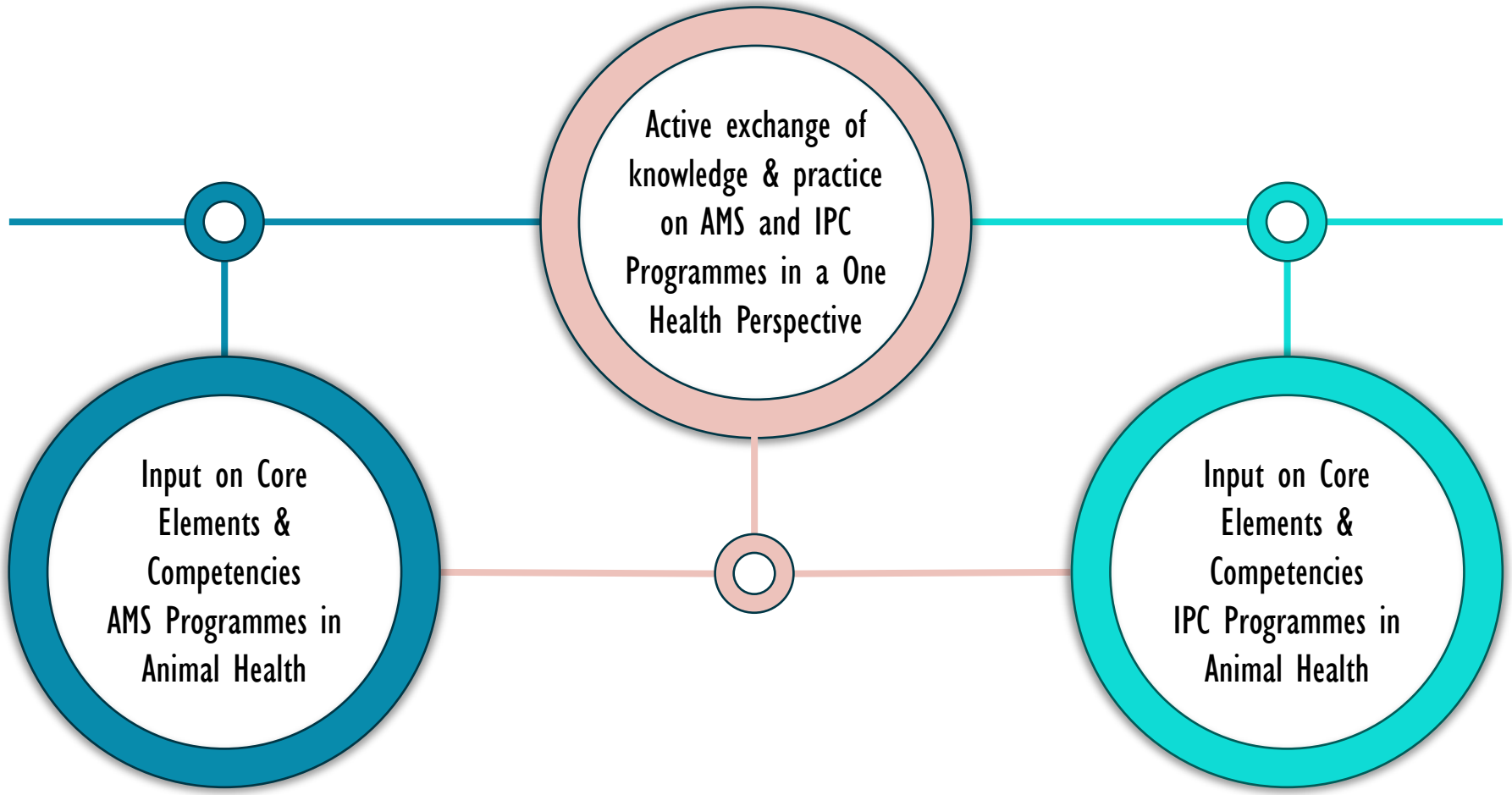
Fundación Vetci

ESCMID

FVE

EU-JAMRAI

Workshop aims



Agenda

8:30 – 9:00 *Coffee and registration*

9:00 – 9:10 Welcome & Housekeeping

9:10 – 9:35 AMS and IPC in a One Health Framework (Tinna Ravnholt, SSI)

9:35 – 9:50 Status update AMS & IPC Literature Review (Gonçalo Portela, FVE & Anne Becker, DGZ)

9:50 – 10:20 Presentation: AMS in the Animal Health Sector (Gabriela Olmos Antillón, SLU & Isabel Blanco Penedo, UdL)

10:20 – 10.30 Instructions for the interactive breakout sessions

10:30 – 10:55 *Coffee break and Networking*

10:55 – 11:00 *Transition*

11:00 – 12:00 Action Moment I: breakout session

12:00 – 12:05 *Transition*

12:05 – 13:05 Action Moment II: breakout session

13:05 – 14:00 *Lunch & Networking*

14:00 – 14:30 Presentation: IPC in the Animal Health Sector (Ilias Chantziaras, UGent)

14:30 – 15:30 Group discussion on the outcomes of breakout sessions

15:30 – 16:00 *Coffee break & Networking*

16:00 – 16:45 Group discussion on the outcomes of breakout sessions

16:45 – 17:00 Conclusions & Closing remarks

17:30 – 18:55 *Social event: Audio-guided tour in the Guggenheim Museum*

19:00 *Dinner: Pintxos Tour*

EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

11 March

ANTIMICROBIAL STEWARDSHIP & INFECTION PREVENTION AND CONTROL IN ANIMAL HEALTH

Co-funded by the European Union

AMS and IPC in a One Health Framework
- a Danish experience with handling LA-MRSA

STATENS SERUM INSTITUT

STATENS SERUM INSTITUT

a partner in

EU-JAMRAI

Tinna Ravnholt Urth, Infection control nurse, MPH

LA-MRSA in a Danish One Health approach

STATENS SERUM INSTITUT

Livestock associated MRSA (LA-MRSA) = CC398, various spa-types (t034), pvl neg

Animals

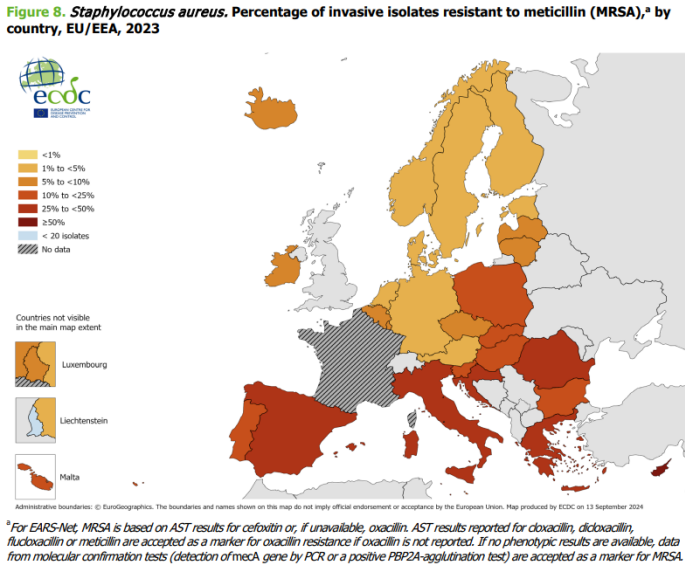
- Produces 30 million pigs/year = 4th highest in Europe
- First positive pig farm with LA-MRSA in 2008
- MRSA incidens in slaughterpigs: 98% in 2021
- 10.000 employees (staff turnover of approximately 2000 persons year)

Humans

- 5.8 million people
- Notifiable disease since 2006 (epidemiological information for 40.000 cases)
- MRSA low prevalent country (1.5 % in 2023)
  - ✓ Initial antibiotic treatment: Narrow spectrum antibiotic (β-lactamase)
- First human case with LA-MRSA in 2007

Problem

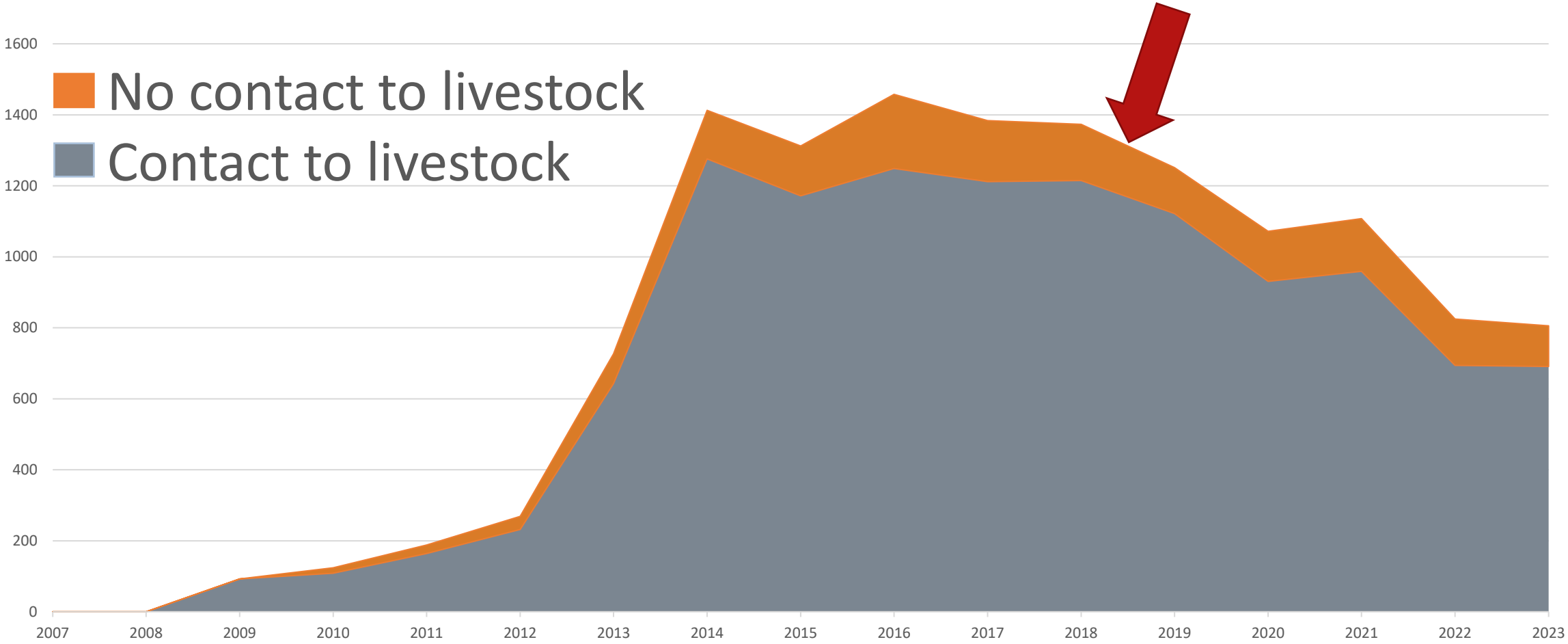
- How do we prevent increased MRSA incidence in humans so that we can continue with narrow-spectrum antibiotics as initial treatment?



one more problem…..

STATENS SERUM INSTITUT

10-15% of cases with LA-MRSA have no contact to livestock



and one more problem…..

STATENS SERUM INSTITUT

Dangerous abscess bacteria spread

Patients with MRSA are placed in isolation

Life-threatening infections come from pigs

Pork is filled with dangerous bacteria

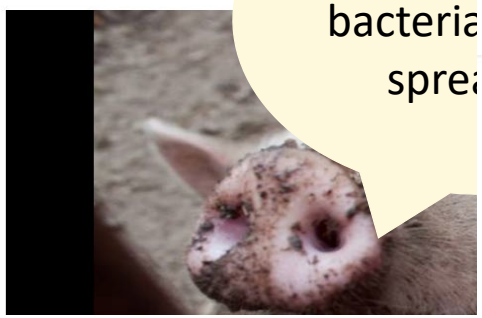
Scientists warn: Keep people away from pigs

Increased risk of Pig-MRSA if you are a neighbor of a pig farm

Farlig byldebakterie breder sig stadig

Antallet af danskere, der bliver ramt af stafylokokbakterier fra grise bliver ved med at stige

Af: Ritzau /forbrug



Norsk professor advarer mod svinekød

Svine-MRSA på danske slagterier får norsk professor til at opfordre til at undgå dansk svinekød

Af: Ritzau /Nyheder

SYGDOM 25. AUG. 2014 KL. 11.16

Forsker advarer: Væk fra svin

Børn og familier bliver

FARLIGT. Selv om MRSA ikke nødvendigvis er farligt for det smittede barn selv, kan et besøg hos en syg

MRSA-eksperter: Det er ude af kontrol og farligt

6. JAN. 2015 KL. 07:10

MRSA-patienter lagt i isolation

Øget risiko for svine-MRSA, hvis du er nabo til en svinefarm

ort set alle danske svinefarme er ramt af MRSA. Billedet er et arkivfoto, og det er ikke taget i en dansk svinestald. llustration: Guido Gerding og Wikimedia Commons)

Rettet: En ny dansk undersøgelse dokumenterer en klar sammenhæng mellem stafylokok-smittede folks bopæl og svinefarme. Forskerne vurderer dog, at smitten ikke sker gennem luft eller gylle.

UNDERVISNING

POLITIKEN | VIDEN | DANMARK | KULTUR | DEBAT | INTERNATIONALT | SPORT | FORBRUG OG LIV | IBYEN | POLI | MENU | Log ind

88 procent af de danske slagtesvinsbesætninger blev i 2016 testet positive for den multiresistente MRSA-bakterie, der også kan sprede sig til mennesker. (arkivfoto)

VIDEN 7. JUN. 2017 KL. 08.28

CHRISTIAN NOBEL
Journalist

Ny undersøgelse: Livsfarlige MRSA-infektioner kommer fra svin

Rapport fra Statens Serum Institut viser, at svinebesætninger

mener eksperter.

ALT DU BEHØVER MORGENSTU

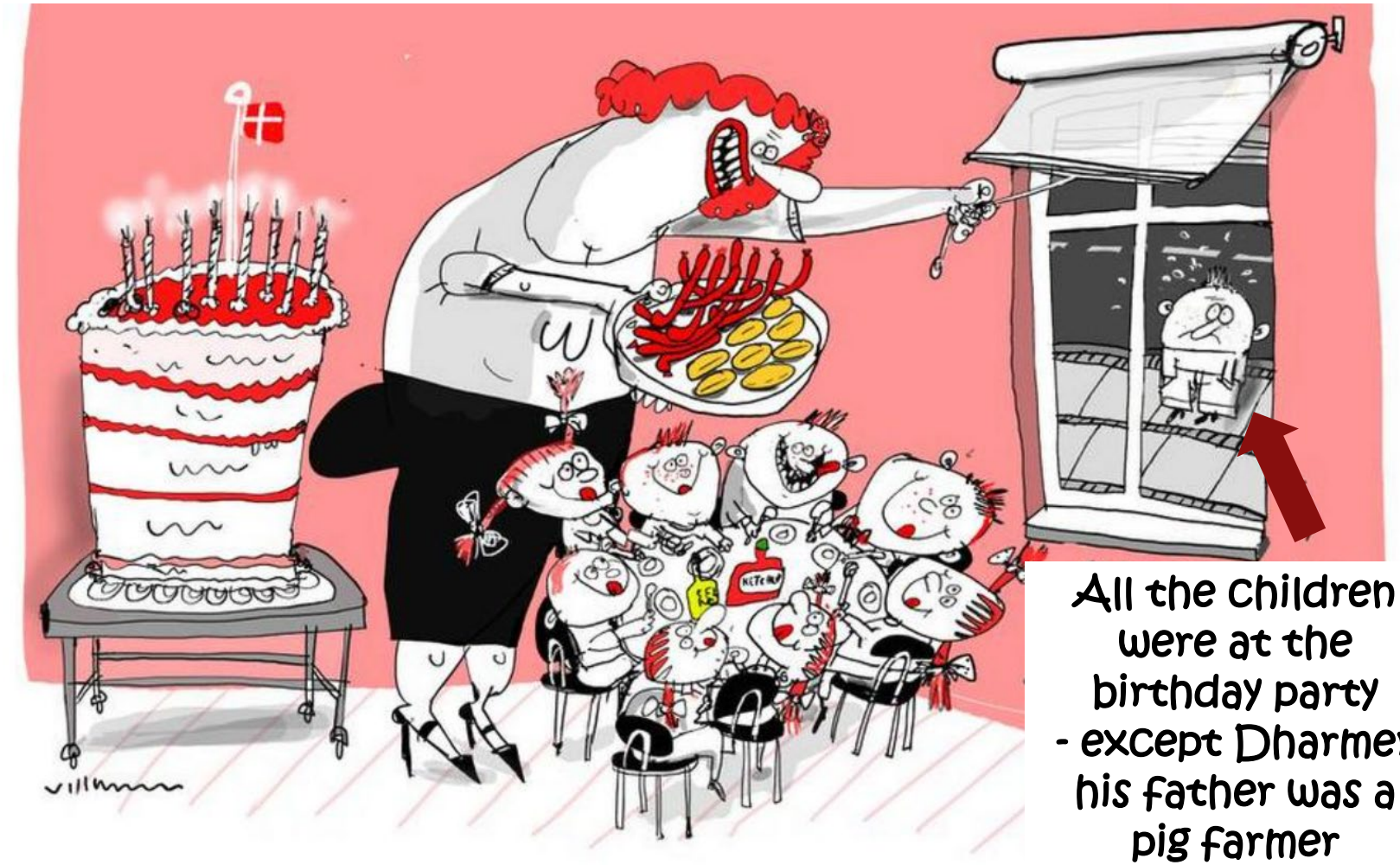
Tilmeld dig vores morg og lad os give dig en god med et håndplukket ov væsentligste ny

Indtast din email

Follow @wwwjv.dk

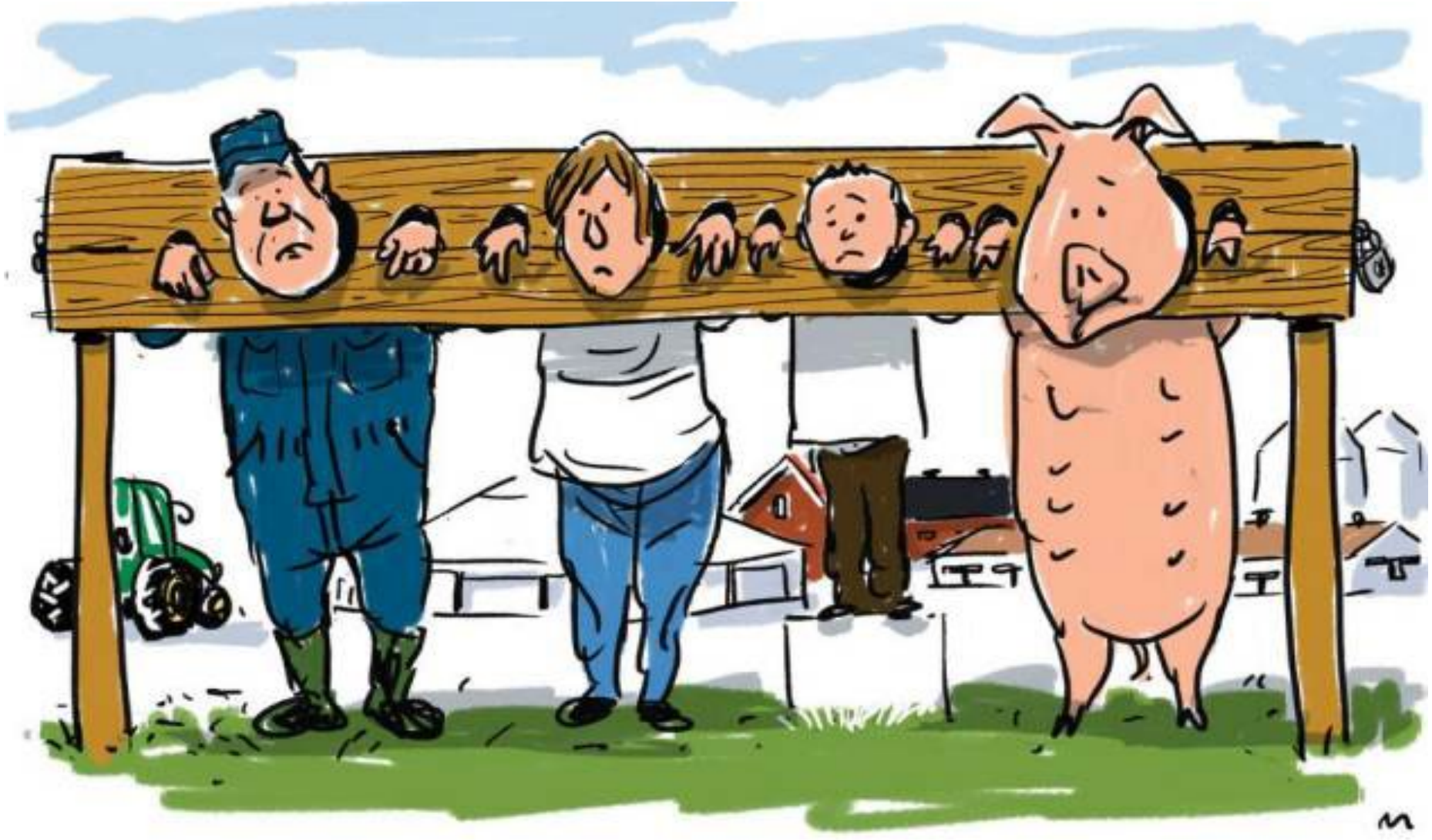
SMITTE. Julie Jensen med den snart toårige søn Oliver på armen. Begge er de smittede med den resistente

Stigmatization



All the children were at the birthday party - except Dharmer his father was a pig farmer

Stigmatization



ge?

- We have the knowledge
- IPC is universal and can be implemented everywhere
- make your knowledge available

We need
a One Health approach

STATENS ERUM UT

Communication

- Public
- local communities
- Press

Knowledge

- Establish national data on what we

Advice

- Citizens
- Governmental bodies

Establish an Advisory services on LA-MRSA

Establishment of an Advisory Service on LA-MRSA

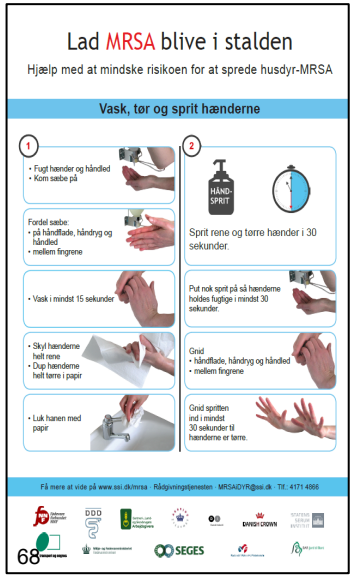
STATENS SERUM INSTITUT

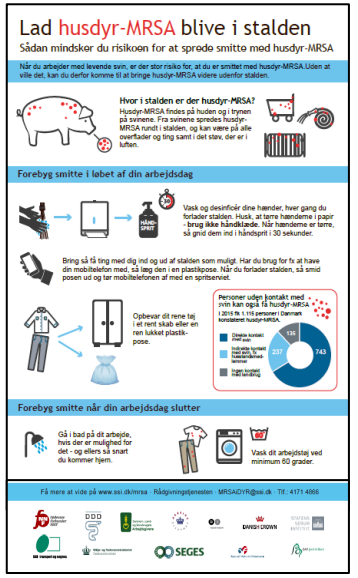
Our Goal is

- All persons handling live pigs have the knowledge and skills to prevent LA-MRSA from spreading to the community
- All HCWs have the knowledge and skills to handling patients with MRSA in the healthcare system
- All neighbors have access to information about LA-MRSA

Motto

Let MRSA stay in the barn



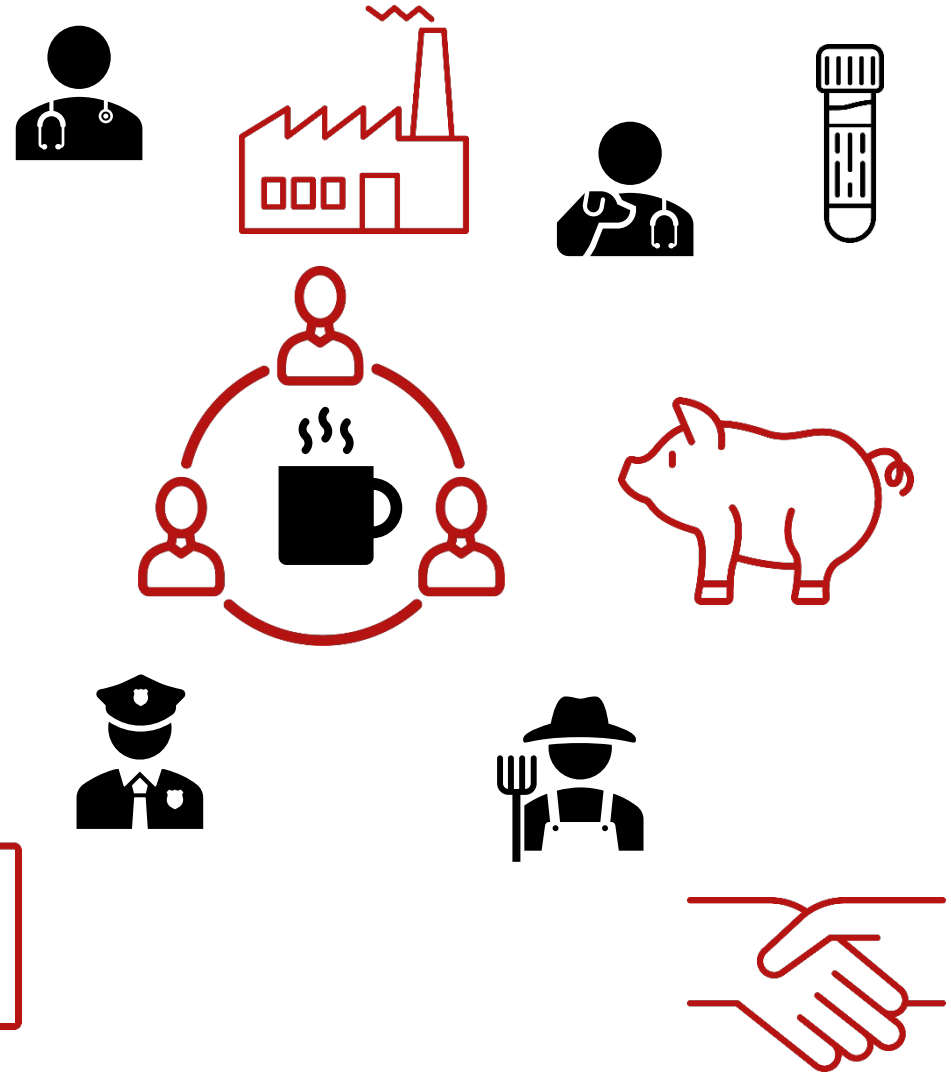


Going after the goal and communicate

Place the Advisory services in an recognized and respected organization

Find your Stakeholders

- The farmers, the truck drivers and the butchers
- Veterinarians
- The Unions for employers and employees
- Danish Veterinary and Food Administration
- National Board of Health
- Danish Agriculture & Food Council
- Researchers
- Agricultural schools
- And not least our colleagues = Infection control units



Be a familiar face

Going after the goal and collecting knowledge

STATE
SER
INSTIT

Toghe[r] [Our stakeholders know the studies because they provided the data] [s]takeholders we have done a lot of research for example:

Prevalence of LA-MR[S] [h] drivers, household members, family dogs and cats

Association between biosecurity and [t]ion of LA-MRSA to household members

Investigation of the human nasal microbiome in per[s] [a]nd short-term exposure to LA-MRSA

Host adaptation and transmission of LA-MRSA CC398 from pigs into [h] institutions

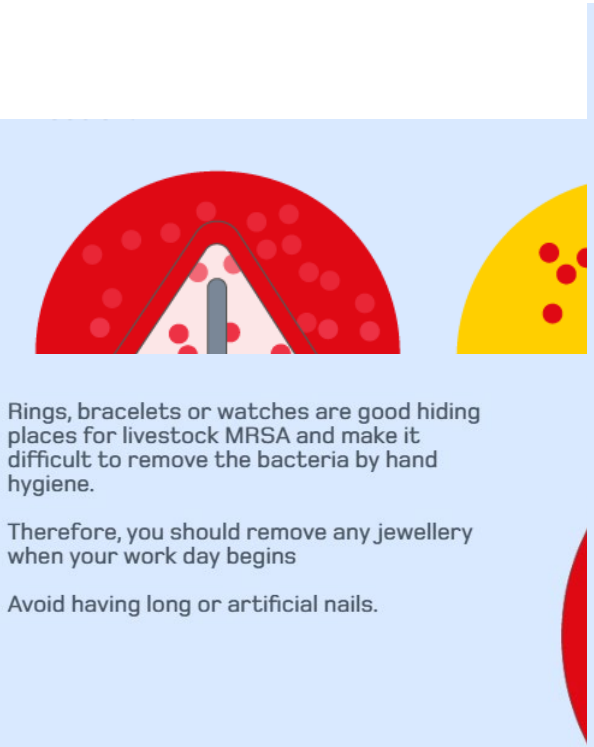
Controlling Transmission of MRSA to Humans by using Dust Mask

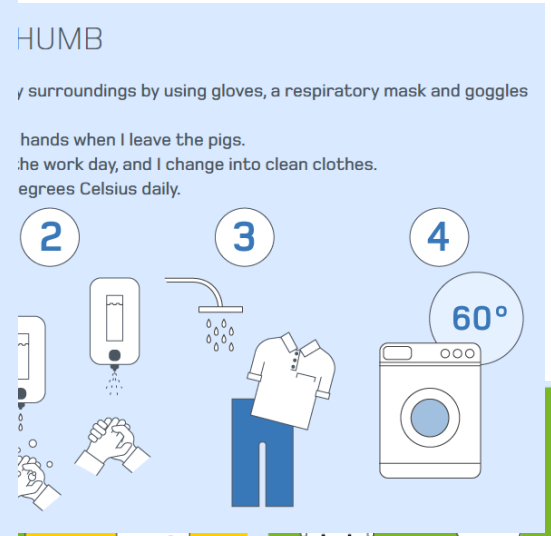
Transmission of livestock-associated methicillin-resistant Staphylococcus aureus CC398 in a survey [a]l Danish hospital

Epidemiology of methicillin-resistant Staphylococcus aureus carrying the novel mecC gene in Denmark

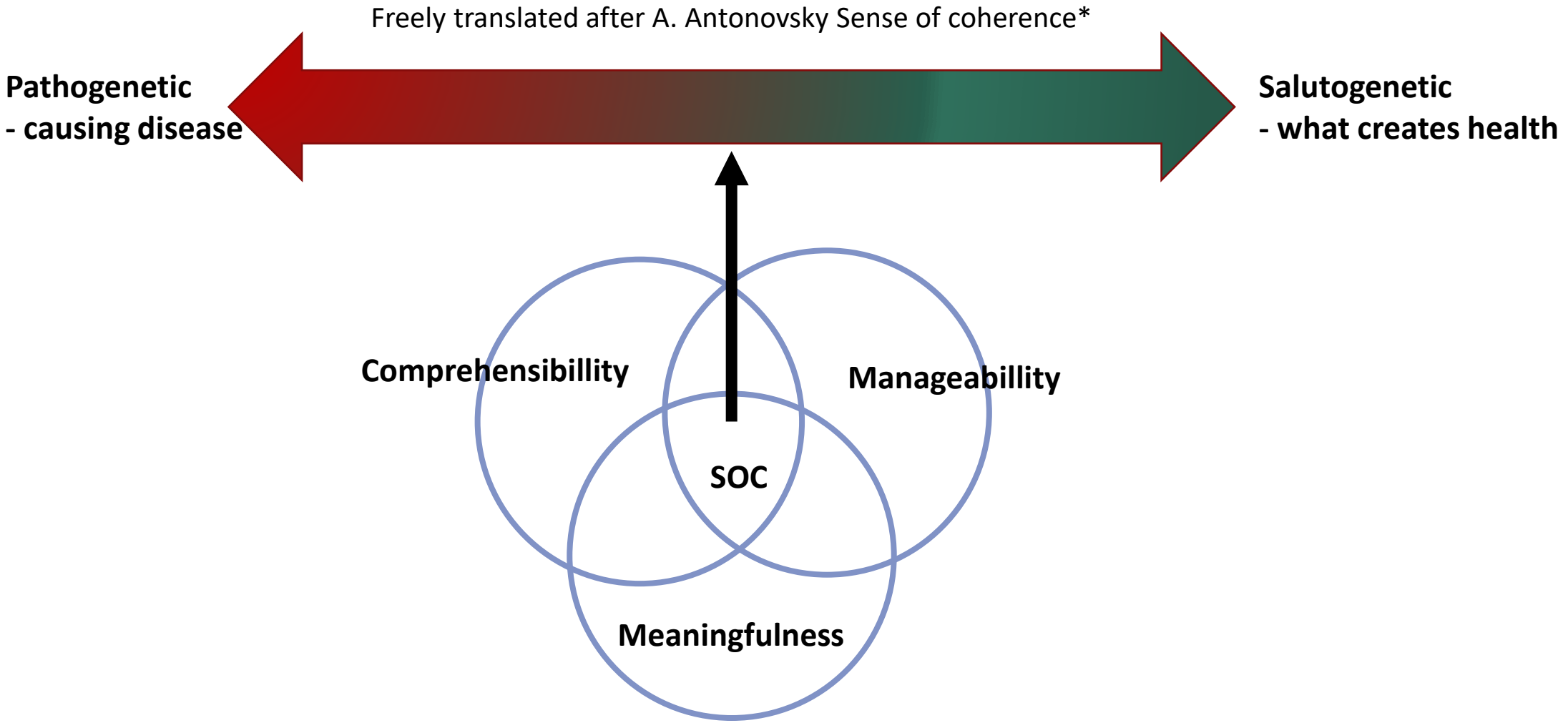
Going after the goal and support with information

A mandatory e-learning program on infection prevention





Going after the goal - Sense Of Coherence



*Antonovsky A. *Unraveling the mystery of health: how people manage stress and stay well* New Jersey: Jossey-Bass; 1987.

Going after the goal - Sense Of Coherence

STATENS SERUM INSTITUT

My job is to support people's Sense of coherence*

A challenge is:

- Comprehensible if you have access to **knowledge**, education
- Manageable if you have access to **resources** e.g. Personal Protection Equipment (PPE) and training
- Meaningful if you have influence and you are **motivated**

Motivation is the most important element. If you feel you have a role in keeping MRSA in the barn and you have influence on formulating the guidelines, you are more likely to be motivated and thereby compliant

Implementing IPC:

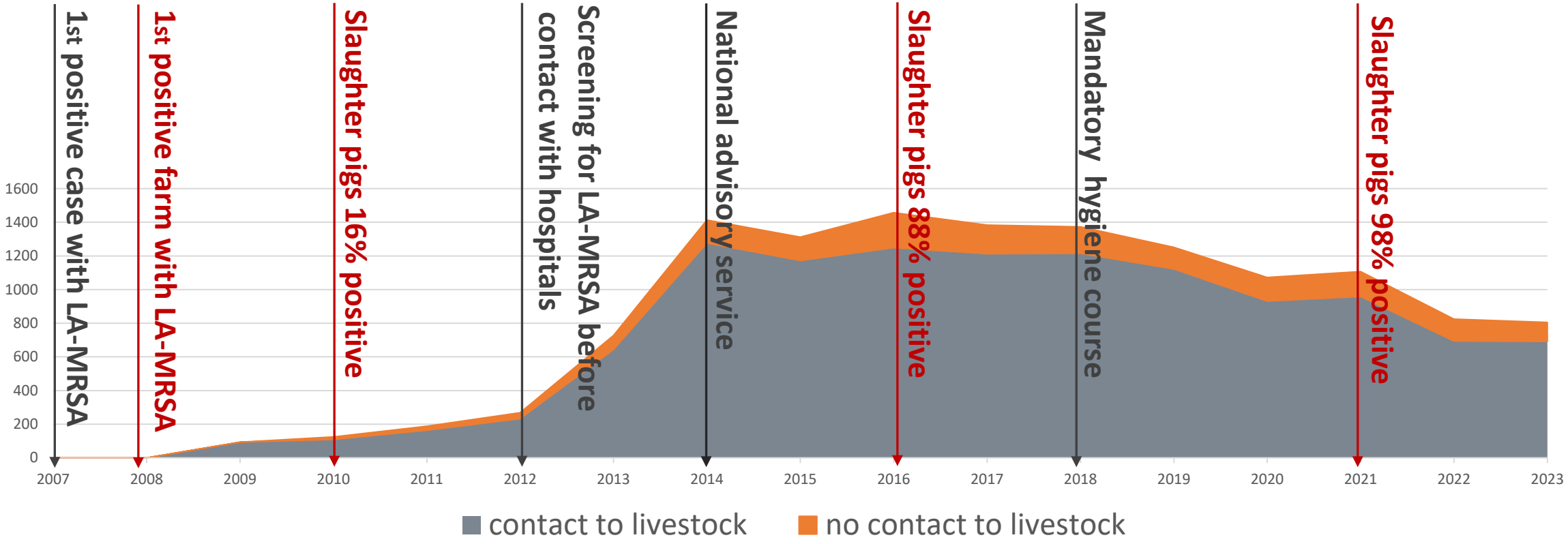
Knowledge

Education

Training

*Antonovsky A. *Unraveling the mystery of health: how people manage stress and stay well* New Jersey: Jossey-Bass; 1987.

Have we succeeded?

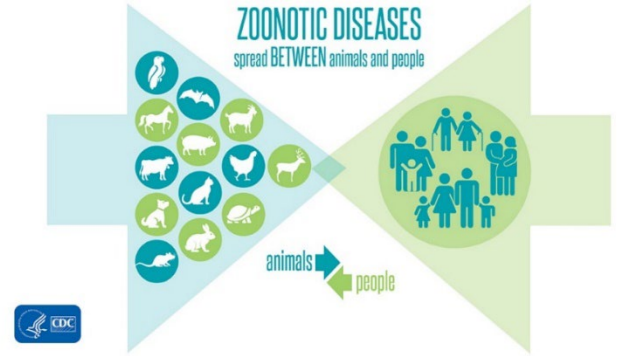


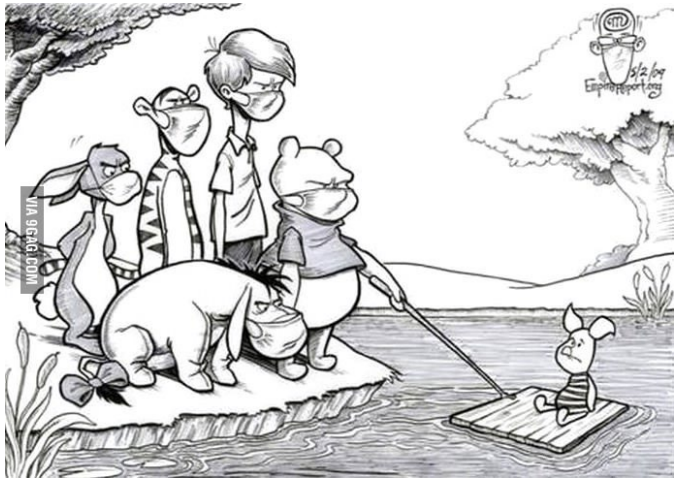
Despite 30 million MRSA-positive pigs, we have not seen increased spread to the community, and we can still use narrow-spectrum antibiotics as initial treatment

Future perspective

- Three out of four new infectious diseases comes from animal
- The goal of future training is not to bring zoonotic microorganism out of the barn
  - LA-MRSA from pigs, cattle, horses, …..
  - CoVid-19 from mink, ……
  - Avian Influenza from poultry, cows, mink, …..
  - Swine Influenza from pigs

E-learnings program on infection prevention may be useful





Take home message

- A One Health approach can prevent the spread of zoonotic microorganisms from livestock to humans
  - ✓ thereby reducing antibiotic consumption
- Make sure you have the political mandate
- Know your stakeholders, creating and maintaining networks
- Sense of coherence is a possible approach to implementing IPC

*"be a midwife for a question before you become a lawyer for an answer"**

*Sundhedsfremme i teori og praksis. Jensen TK, Johnsen TJ. Philosophia i 2000

Acknowledgement

Dept. Infectious Disease, Epidemiology & Prevention

- Brian Kristensen
- Asja Kunøe
- Jette Holt
- Anne-Katrine Rosenkrantz De Lasson
- Mette Bar Ilan

Dept. Bacteria, Parasites & Fungi

- Anders Rhod Larsen
- Andreas Petersen
- Jesper Larsen
- Øystein Angen

STATENS
SERUM
INSTITUT

Thank you for your time

EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

11 March

ANTIMICROBIAL STEWARDSHIP & INFECTION PREVENTION AND CONTROL IN ANIMAL HEALTH

Co-funded by the European Union

www. eu-jamrai.eu

Overview T6.2 & T7.2 Activity: Literature Review on AMS and IPC

Guidelines, Protocols, Programmes and Tools

March 11, 2025 – Bilbao, Spain

Anne Becker (DGZ)

Gonçalo Portela (FVE)

Joint actions to bridge AMS & IPC

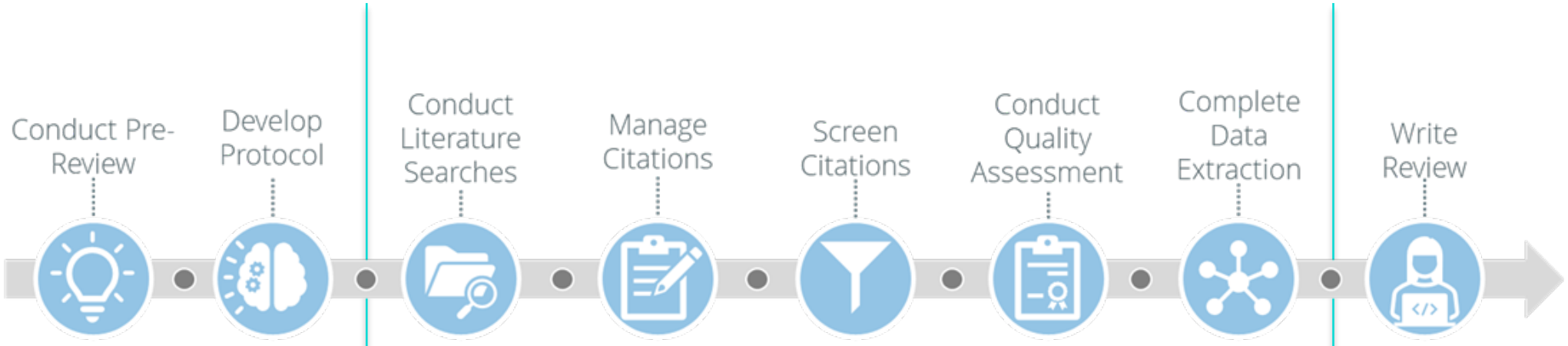
To define **core elements** for AMS and IPC programmes in animal health

Questionnaire
30 partners, 17 countries

Literature Review
AMS - IPC

Workshop Bilbao
AMS & IPC in Animal Health

Literature Review Process



Define goals
PCC(OT) framework

PRISMA-ScR
reporting guidelines

Search Syntax
WoS, EuropePMC, Scopus

Title & Abstract
Screening

Full Text
Screening

Objectives

1. Identify **veterinary** AMS and IPC guidelines, protocols, and programmes **available** to the companion animal (CA) and food-producing animal (FPA) sector in European countries and worldwide.

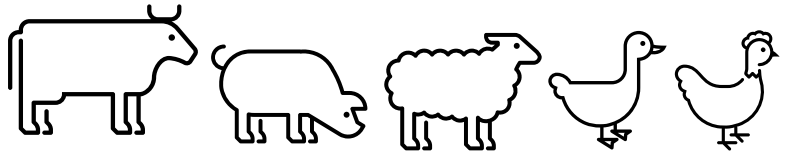
2. Identify **AMS & IPC** practices and tools implemented **and used by veterinary healthcare and animal husbandry professionals** in the animal health sector (CA and FPA).

3. Identify core elements **defining AMS & IPC programmes** (protocols/guidelines/practices/tools).

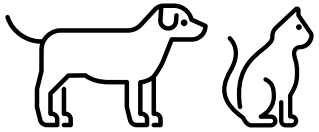
4. Identify core competencies (areas of expertise) in AMS & IPC programmes.

Results from the AMS Literature Review

- Results for Food-producing animals (FPA)

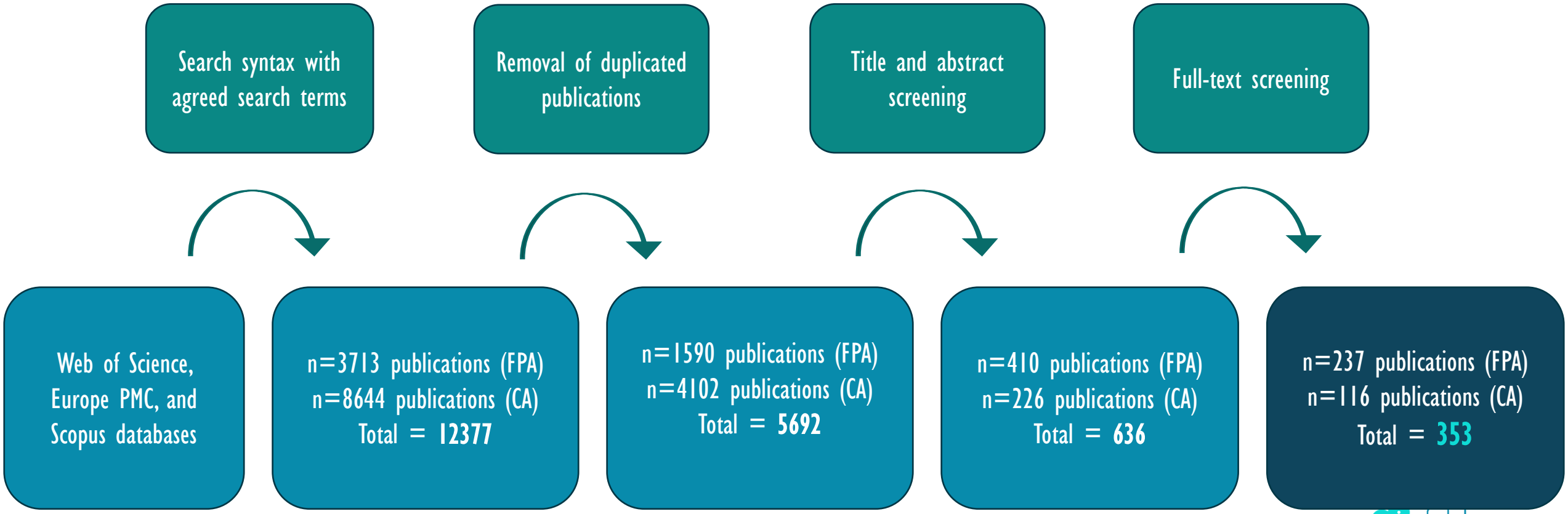


- Results for Companion animals (CA)

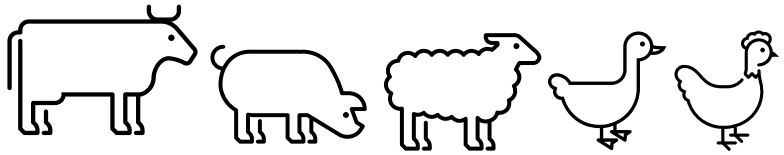


- Comparison between both sectors

Search Syntax Results for CA and FPA



Search syntax (FPA)



Records identified before de-duplication

n=3713

Records identified after de-duplication

n=1590

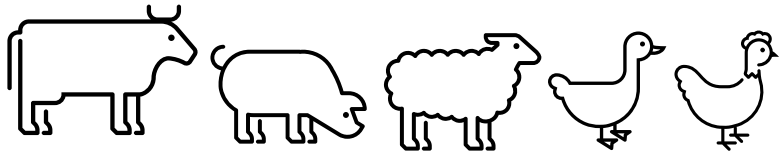
Records identified after title and abstract screening

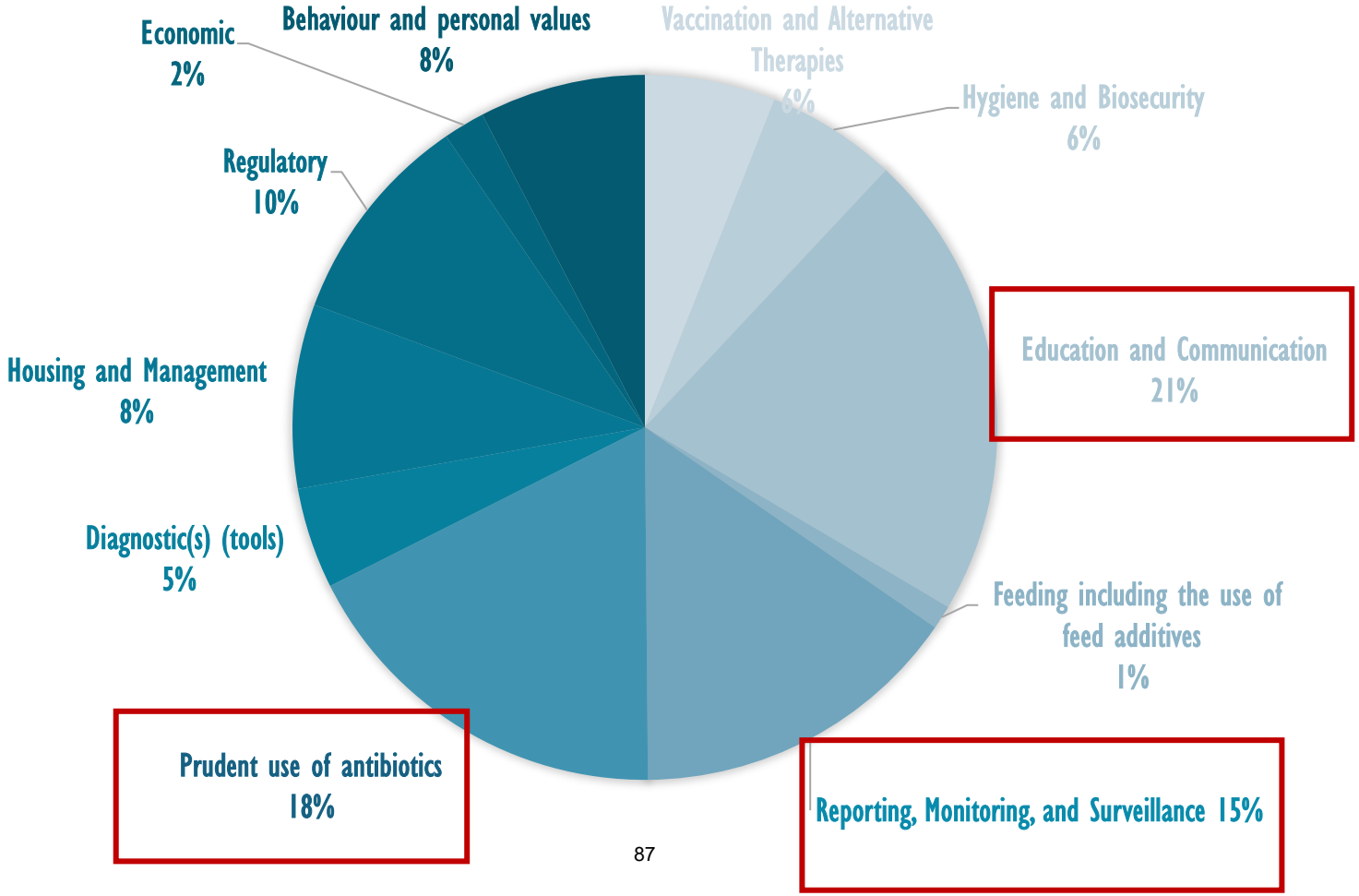
n=410

Records identified after full-text article review

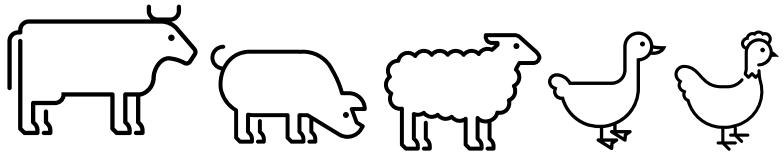
n=237

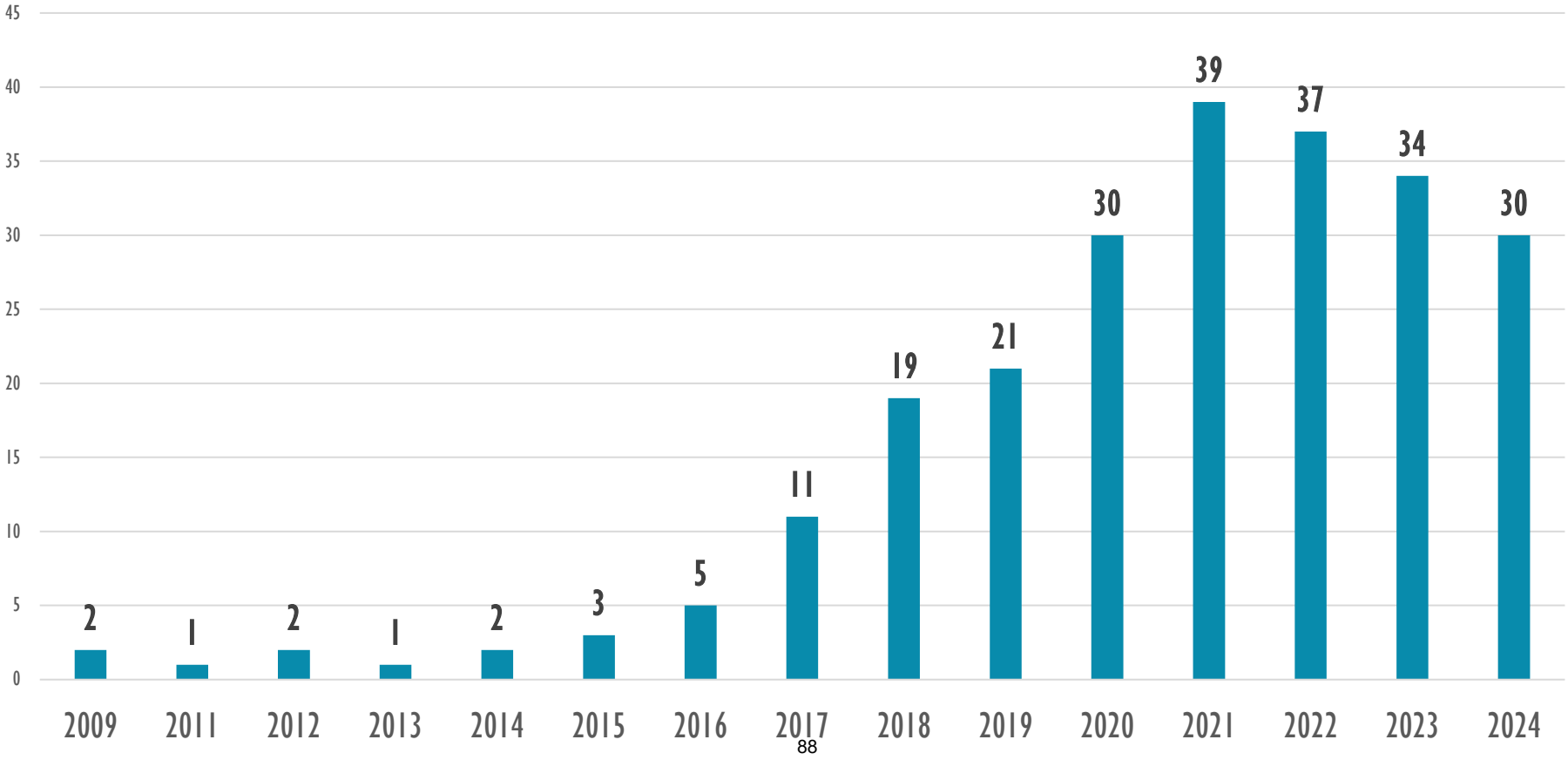
Core elements (FPA)



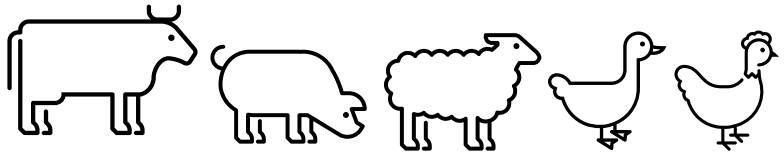


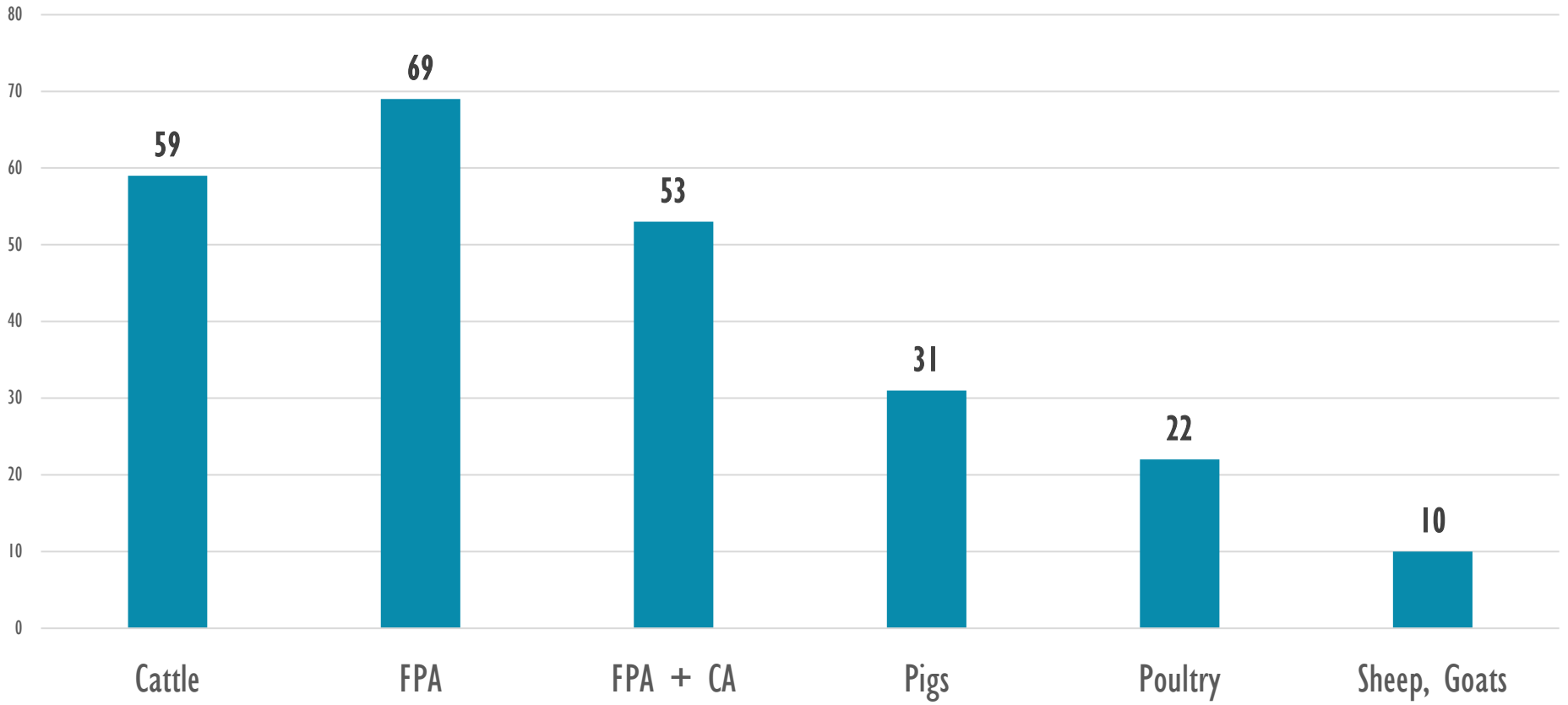
Year of publication (FPA)



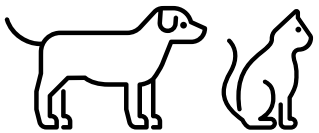


Animal Species/Group (FPA)





Search Syntax (CA)



Records identified before deduplication

n=8644

Records identified after deduplication

n=4102

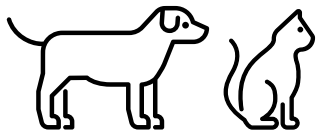
Records identified after title and abstract screening

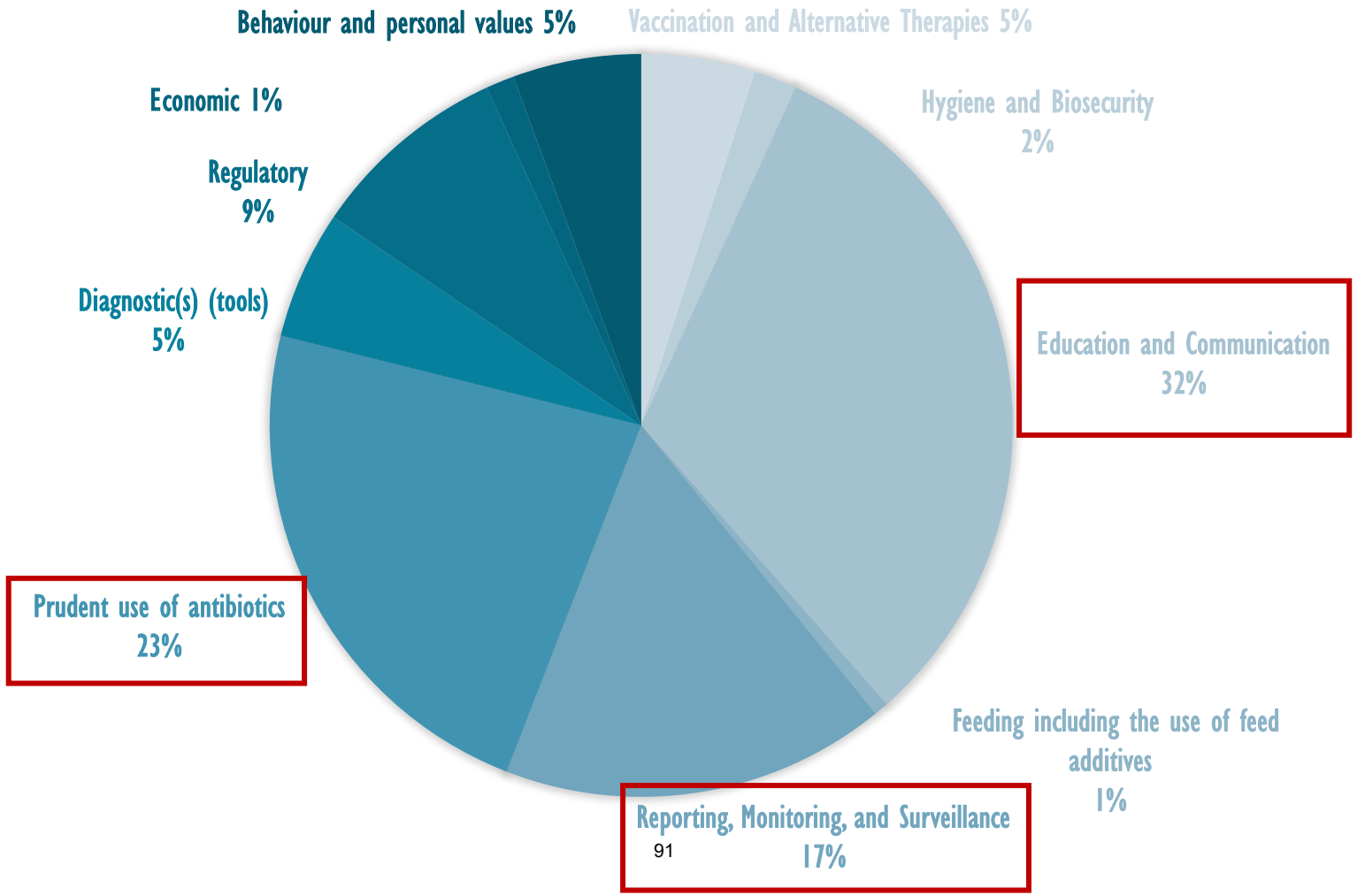
n=226

Records identified after full-text article review

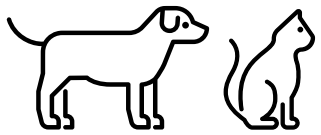
n=116

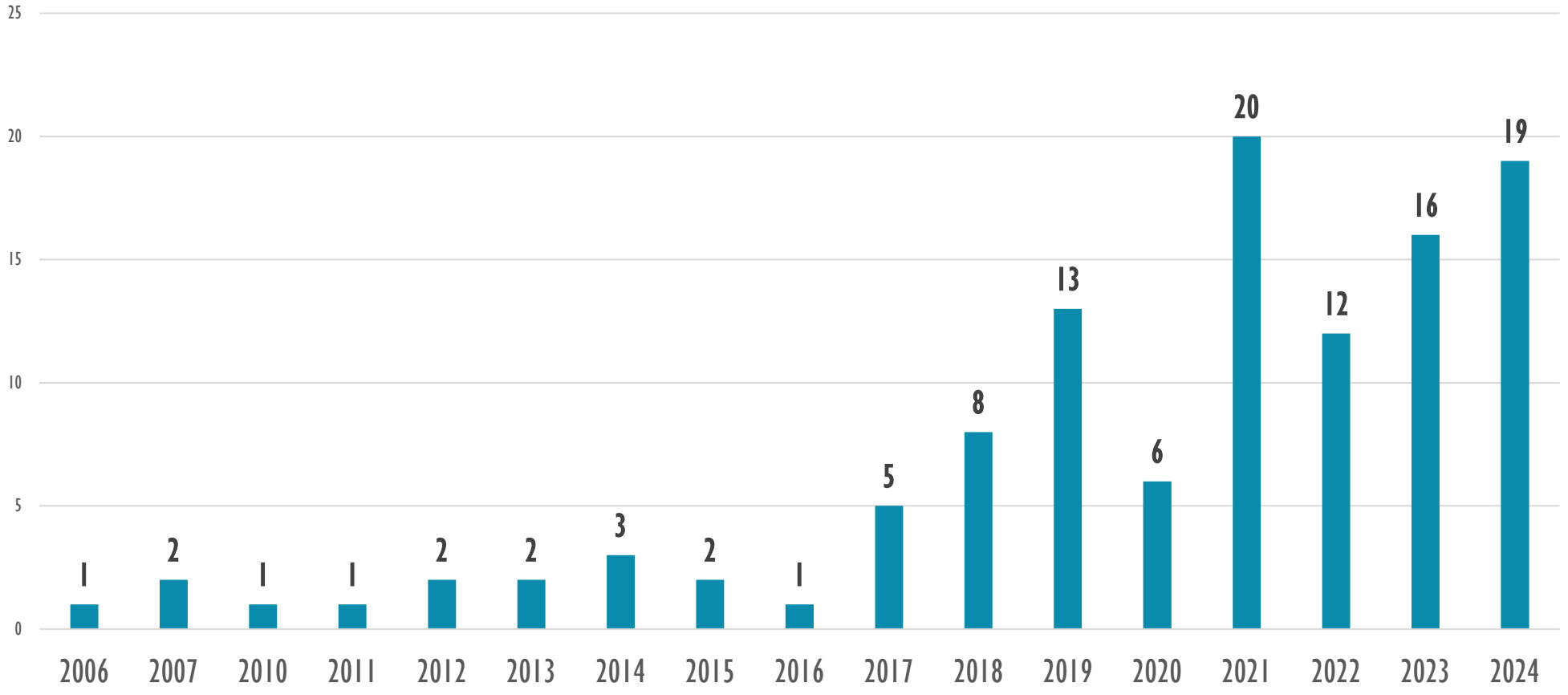
Core elements (CA)



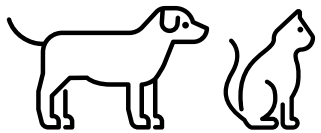


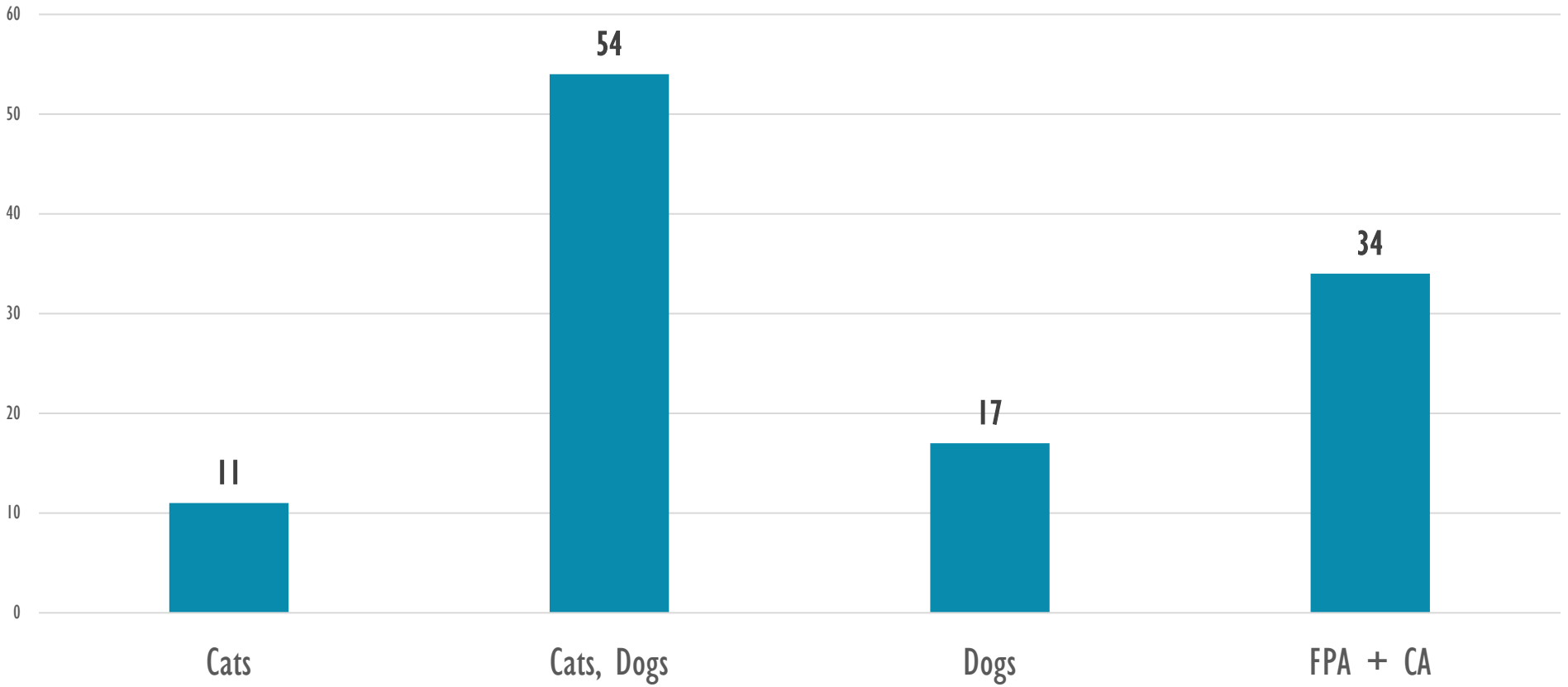
Year of publication (CA)



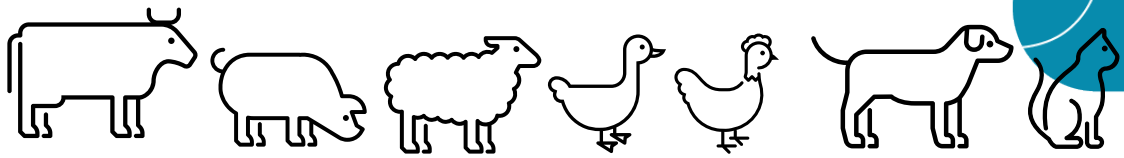


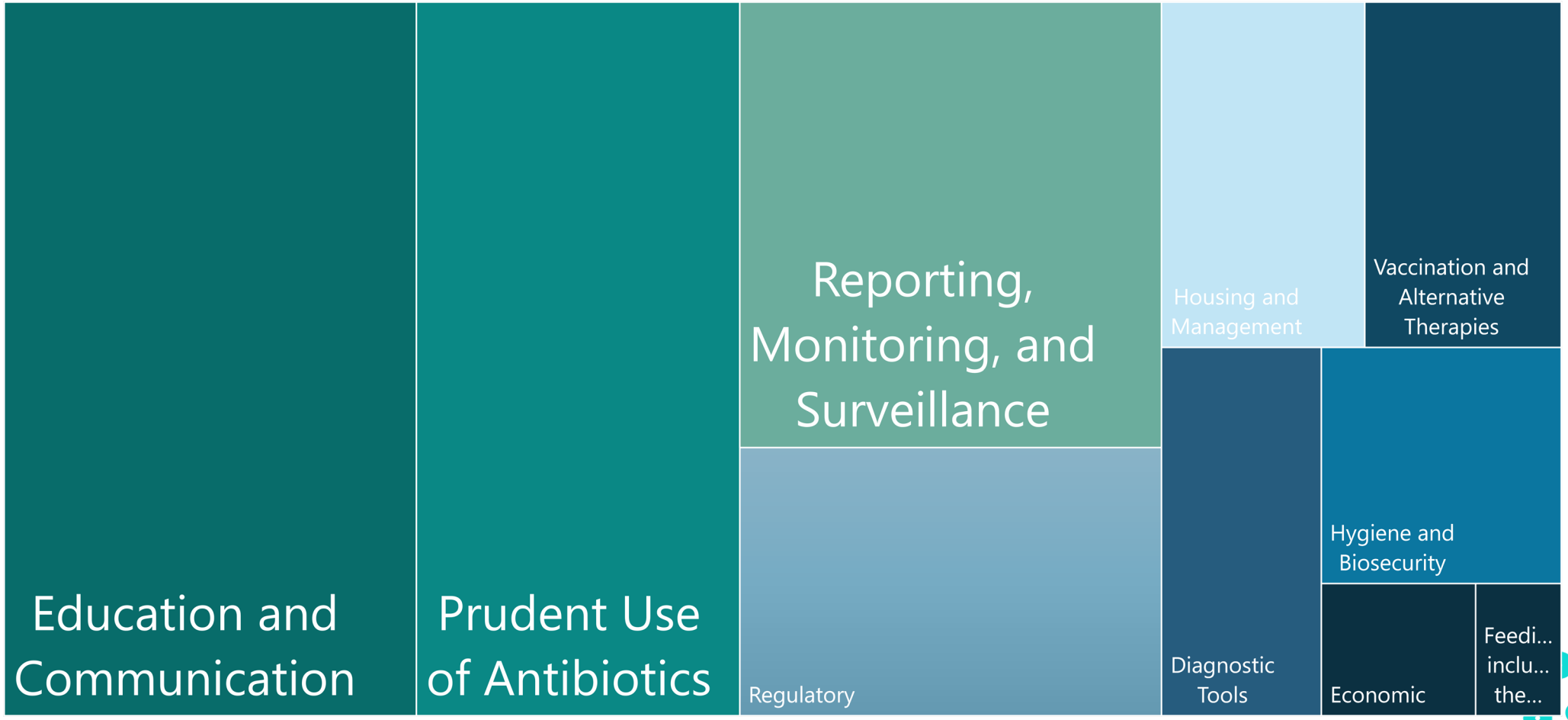
Animal species/group (CA)



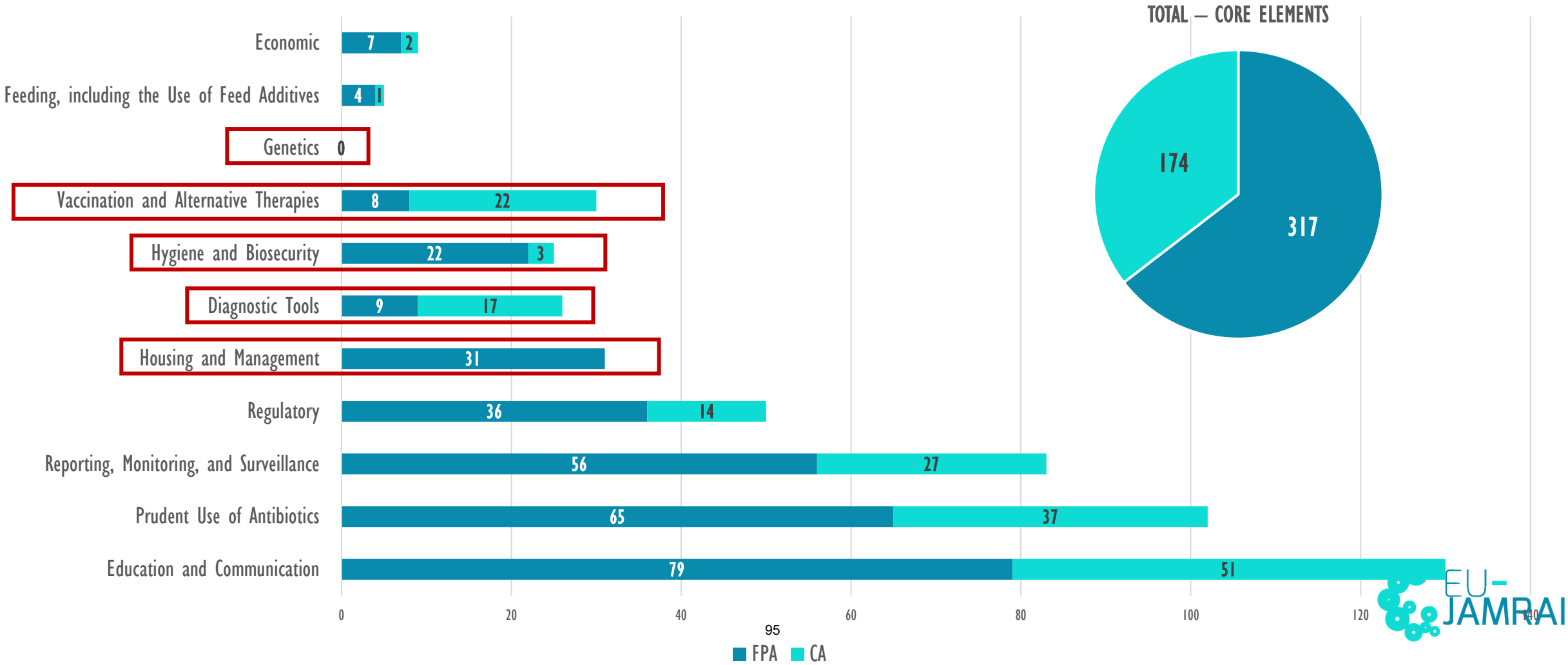


Core elements in both CA and FPA





Core elements – comparison between CA and FPA



Looking ahead: translating data into next steps

1. Write AMS and IPC literature review **reports**, respectively, and **scientific publications**. Identify avenues to **distribute information more widely** for impact, to different stakeholders and target audiences in the sectors.

2. To write **guidelines** for the development of **AMS and IPC programmes in animal health**, with core elements providing a basic **framework for implementation**

3. To develop **peer-to-peer activities**, create and optimize **educational programmes** to address the set of **minimum competencies and expertise** required for different AMS and IPC professionals

4. (7.2) Focus groups with veterinarians and **practice-oriented case studies** at farm level to evaluate core elements and diagnostic tools of IPC/biosecurity.

EU-JAMRAI Joint Action Antimicrobial Resistance and Healthcare-Associated Infections

Co-funded by the European Union

Thank you!

Anne Becker (DGZ)

Gonçalo Portela (FVE)

i.y.a.wayop@uu.nl

mvilar_externo@aemps.es

e.m.broens@uu.nl

cmunoz@aemps.es

anne.becker@dgz.be

goncalo@fve.org

julie.debouvere@dgz.be

nancy@fve.org

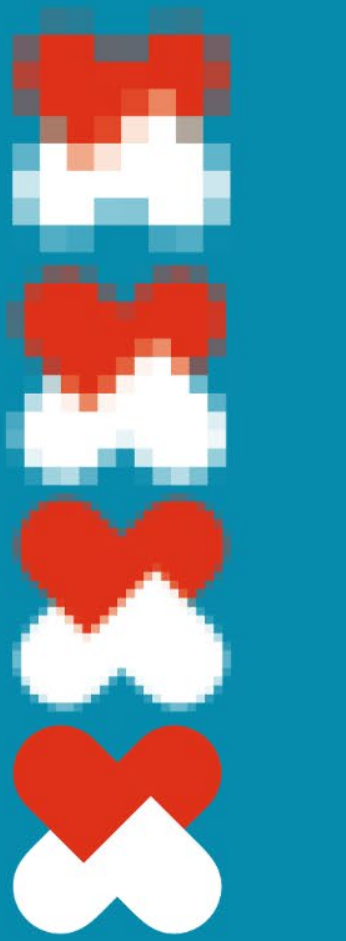
Utrecht University

agencia española de medicamentos y productos sanitarios

DGZ SAMEN VOOR GEZONDE DIEREN

FVE FEDERATION OF VETERINARIANS OF EUROPE

Funded by the European Union. 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 Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them.



BUILDING A ONE HEALTH WORLD

to reduce Antimicrobial Resistance (AMR)

EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

11 March

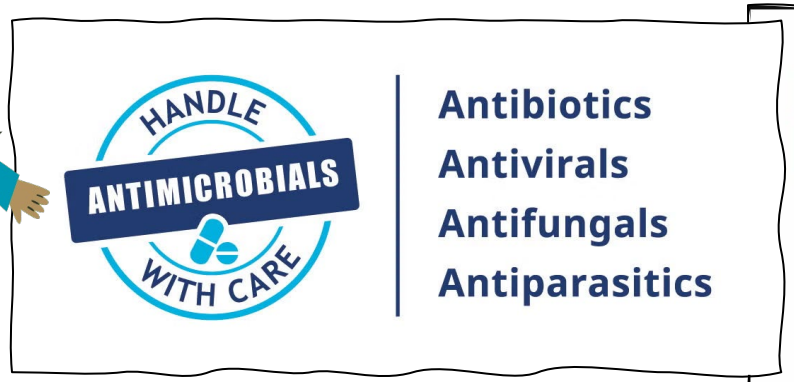
ANTIMICROBIAL STEWARDSHIP & INFECTION PREVENTION AND CONTROL IN ANIMAL HEALTH

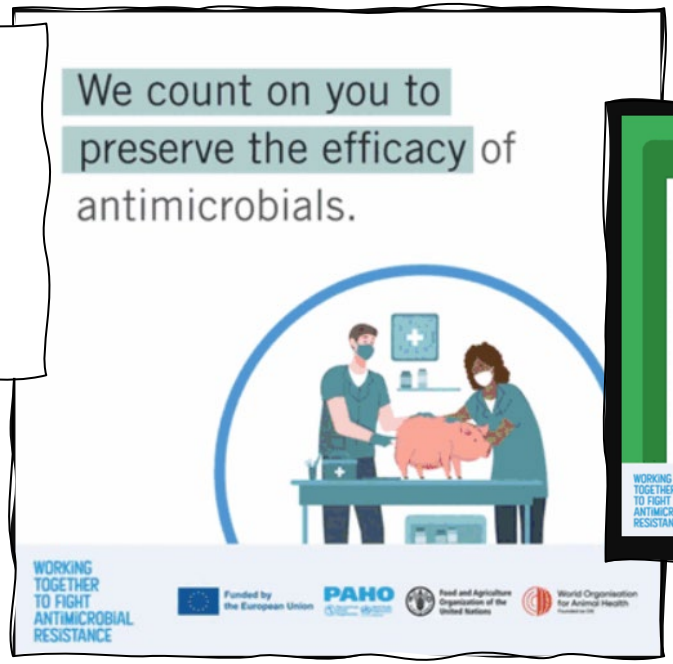
Co-funded by the European Union

Untangling Meanings, Competencies and Materials around

AMS in the Animal Health Sector

Gabriela Olmos Antillón &
Isabel Blanco-Penedo


HANDLE
ANTIMICROBIALS
WITH CARE
Antibiotics
Antivirals
Antifungals
Antiparasitics


We count on you to preserve the efficacy of antimicrobials.
WORKING TOGETHER TO FIGHT ANTIMICROBIAL RESISTANCE
Funded by the European Union
PAHO


All antimicrobial prescriptions should include:
Name and presentation
Antimicrobial dose
Route and mode of administration
Duration of treatment
Withdrawal time
WORKING TOGETHER TO FIGHT ANTIMICROBIAL RESISTANCE
PAHO


2022 AAFP/AAHA ANTIMICROBIAL STEWARDSHIP GUIDELINES
ANTIMICROBIAL RESISTANCE THREATENS ANIMAL & HUMAN HEALTH
WHAT IS ANTIMICROBIAL RESISTANCE?
BACTERIA NATURALLY DEVELOP WAYS TO AVOID BEING KILLED OR INJURED BY ANTIBIOTICS
THIS PROCESS HAPPENS FASTER WHEN ANTIBIOTICS ARE BEING USED FREQUENTLY OR USED FOR ILLNESSES THAT ARE NOT BACTERIAL
THE BACTERIA THAT ARE NOT RESISTANT DIE OFF, LEAVING BEHIND A MORE HIGHLY RESISTANT POPULATION
WHY SHOULD WE WORRY ABOUT ANTIMICROBIAL RESISTANCE??
RESISTANT BACTERIA CAN INFECT AN ANIMAL OR PERSON AND CAUSE SERIOUS DISEASE
THERE MAY BE NO TREATMENT AVAILABLE, OR THE ONLY AVAILABLE DRUGS MAY CAUSE SERIOUS SIDE EFFECTS
VETERINARIANS ARE IMPORTANT FOR SAFEGUARDING OUR ANTIBIOTICS
THE WHOLE VETERINARY TEAM CAN BE INVOLVED IN ANTIMICROBIAL STEWARDSHIP:
USE ANTIBIOTICS ONLY WHEN NECESSARY
PRACTICE GOOD PREVENTIVE CARE
TEACH CLIENTS ABOUT GOOD ANIMAL CARE AND HYGIENE
IDENTIFY RISK FACTORS FOR INFECTIONS TO PREVENT THEM BEFORE THEY HAPPEN
USE ALTERNATIVE TREATMENTS LIKE BATHING AND TOPICAL DRUGS
USE DIAGNOSTIC TESTING TO DIRECT TREATMENT
CONSIDER "WATCHFUL WAITING" TO SEE IF A CONDITION NEEDS ANTIBIOTICS
AAHA
AAHA.ORG/ANTIMICROBIALS


Utiliza los antibióticos de forma prudente
Clínica VETERINARIA
Permite al profesional seleccionar el antibiótico, la dosis, vía de administración y la duración del tratamiento.
Ni menos, ni más ¡Tú decides!
Plan Nacional Resistencia Antibióticos

Theoretical framework - Shove´s (2012) **Social Practice Theory**

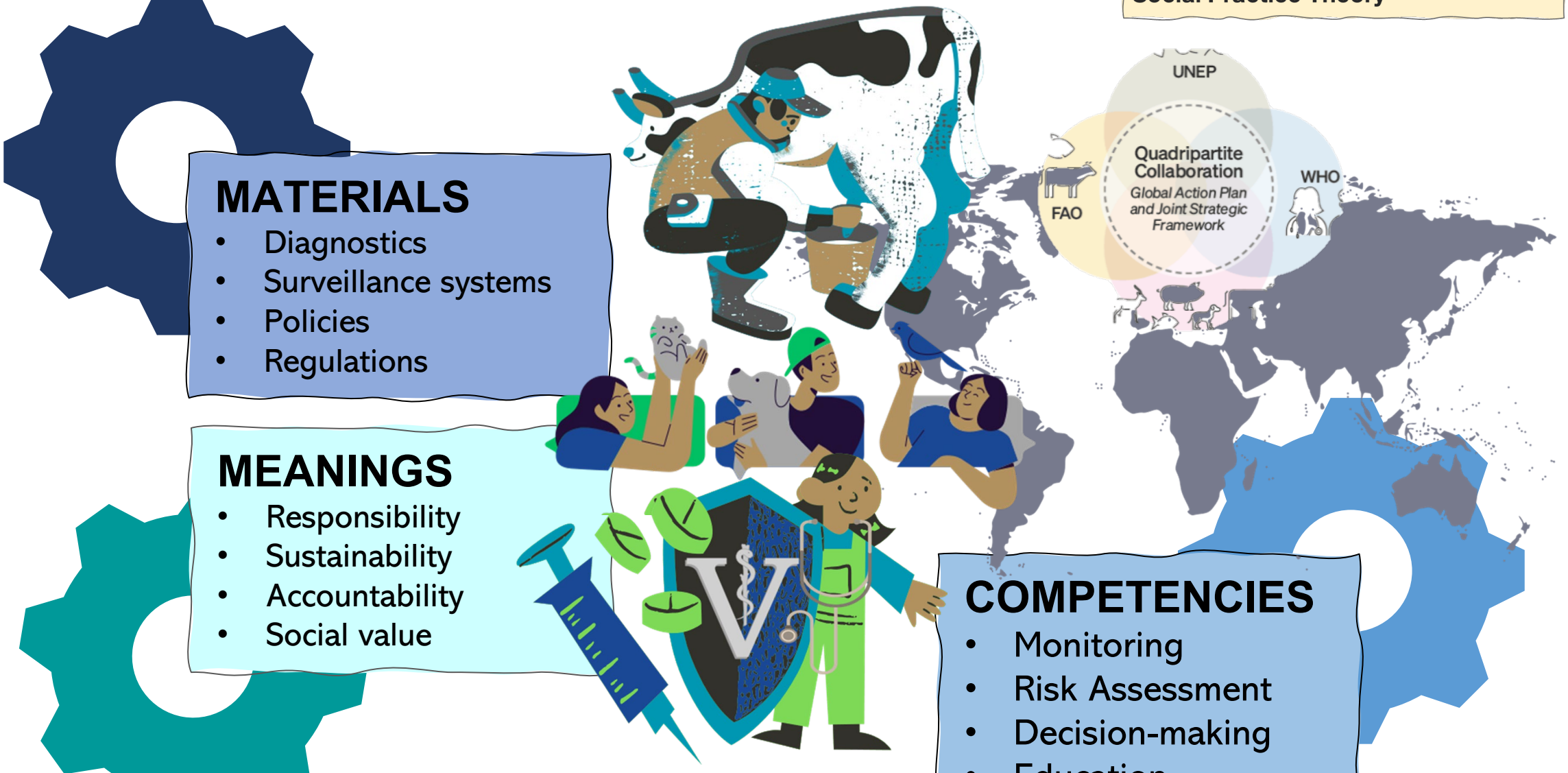
Antimicrobial Stewardship in practice

What are the elements that promote using antimicrobials responsibly?

Theoretical framework - Shove´s (2012)
Social Practice Theory

MATERIALS
- Diagnostics
- Surveillance systems
- Policies
- Regulations

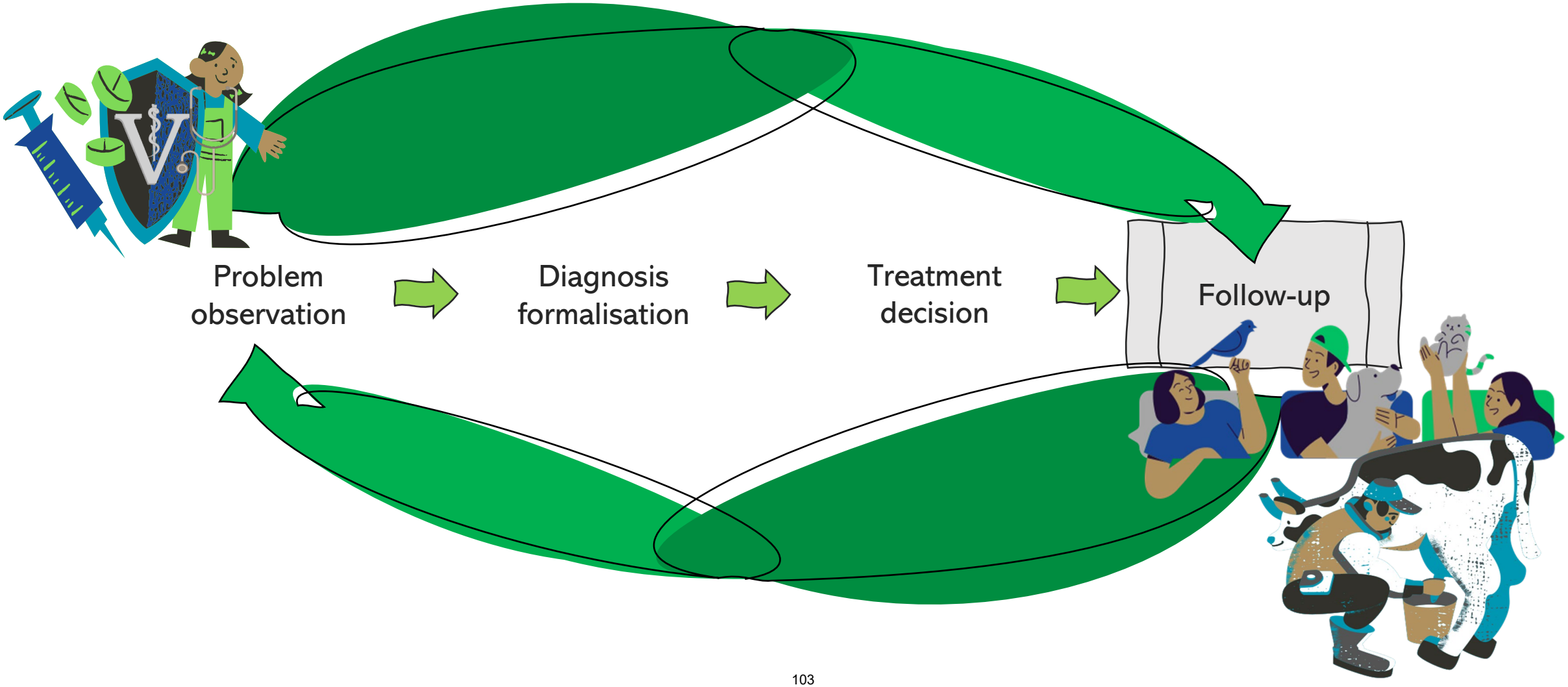
MEANINGS
- Responsibility
- Sustainability
- Accountability
- Social value

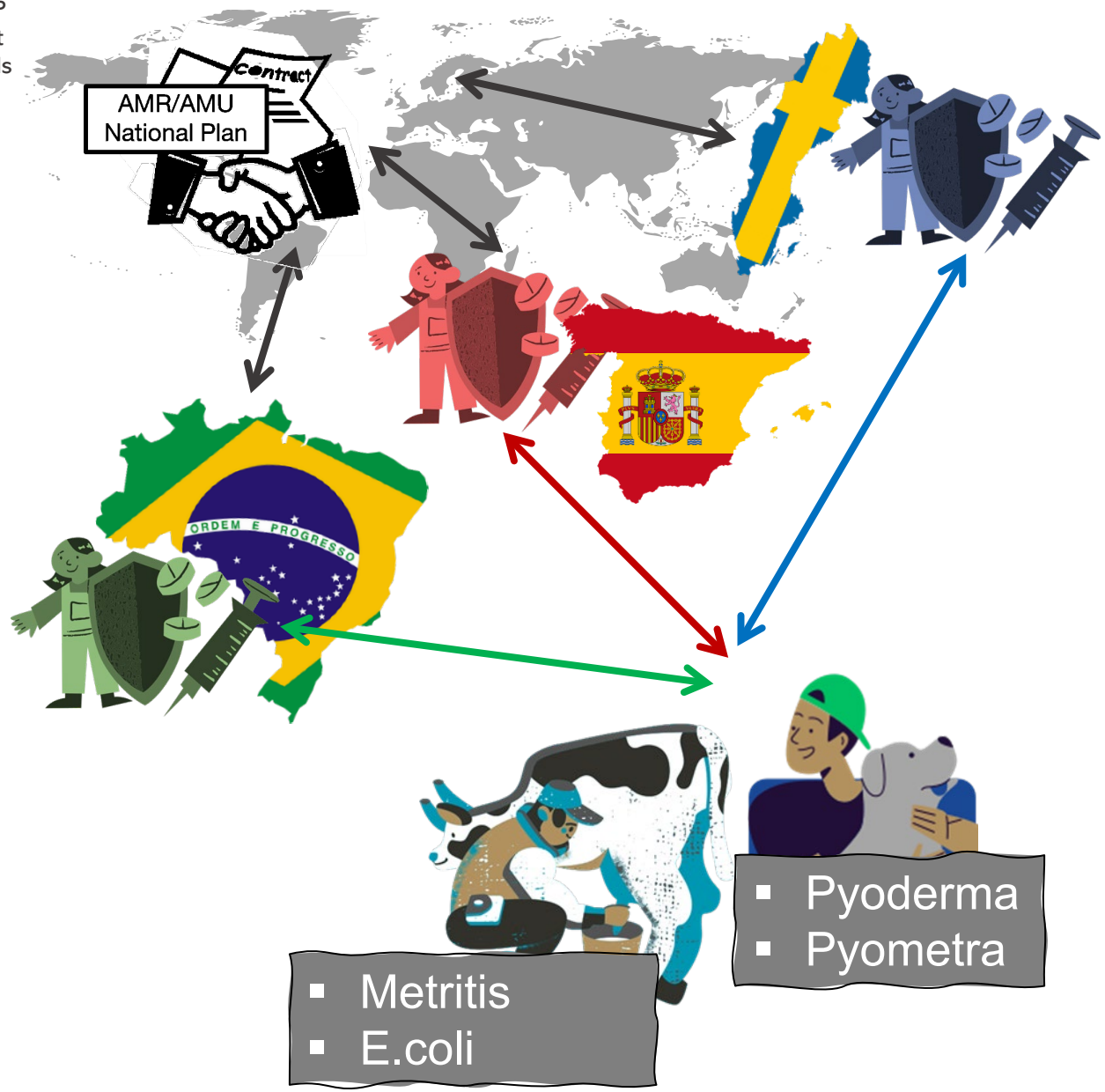


COMPETENCIES
- Monitoring
- Risk Assessment
- Decision-making
- Education
- Policy development

102

Methodology centred around the **Veterinary-Client-Animal relationship key process**



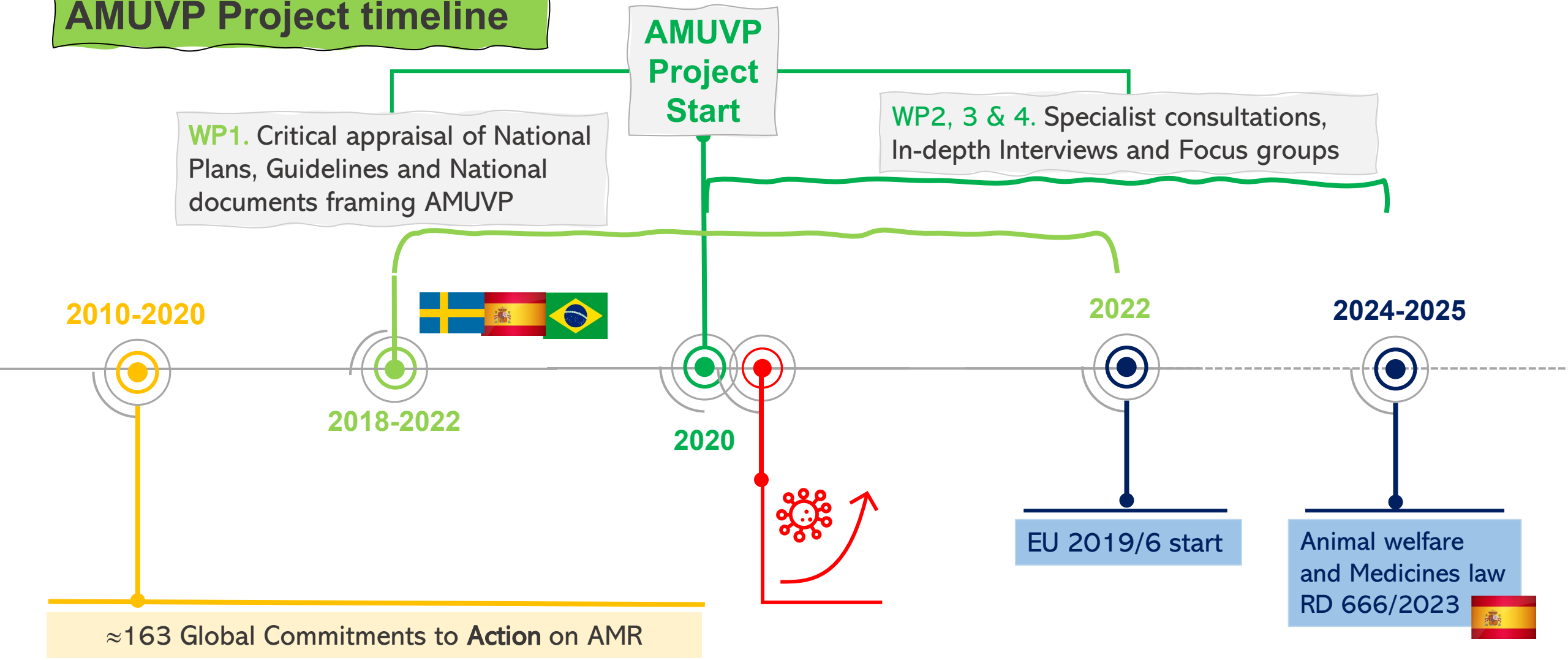


Data collection and analysis

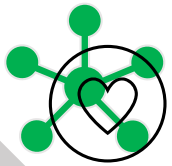
- **In-depth interviews (n=156)** with dairy cattle and dog veterinarians, veterinary students, dairy farmers and dog tutors across countries
- **National Plans, legislation and guidelines** framing Veterinary AMU were critically appraised
- **Reflective Thematic Analysis** (Braun and Clarke 2022) framed by the "social practice theory" focusing on in-practice:
  - MATERIALS
  - PRACTICAL KNOW-HOW / COMPETENCIES
  - MEANINGS

104

Global action on AMR and **AMUVP Project timeline**



Identified key elements for responsible AMU in Clinical Veterinary Practice: **Challenges and Gaps** across countries

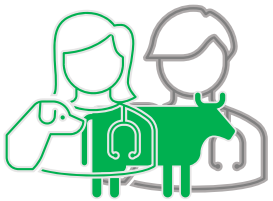


Ban of growth promoters

Regulations of prophylactic use

Support of Single vs. Group treatment

Regulation on group of AMU in veterinary sector



AMU basic principles

Social Awareness

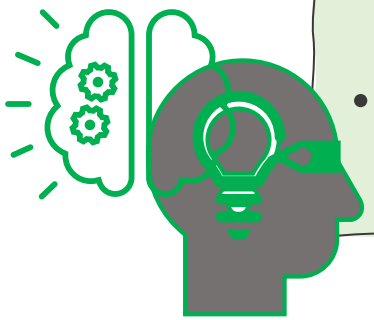
Sales / National level records

Herd / Clinic level records

Detailed Animal Level Records of AMU/No-AMU success

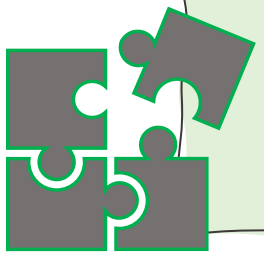
AMR surveillance

106



Key insight "A need to move beyond numbers"

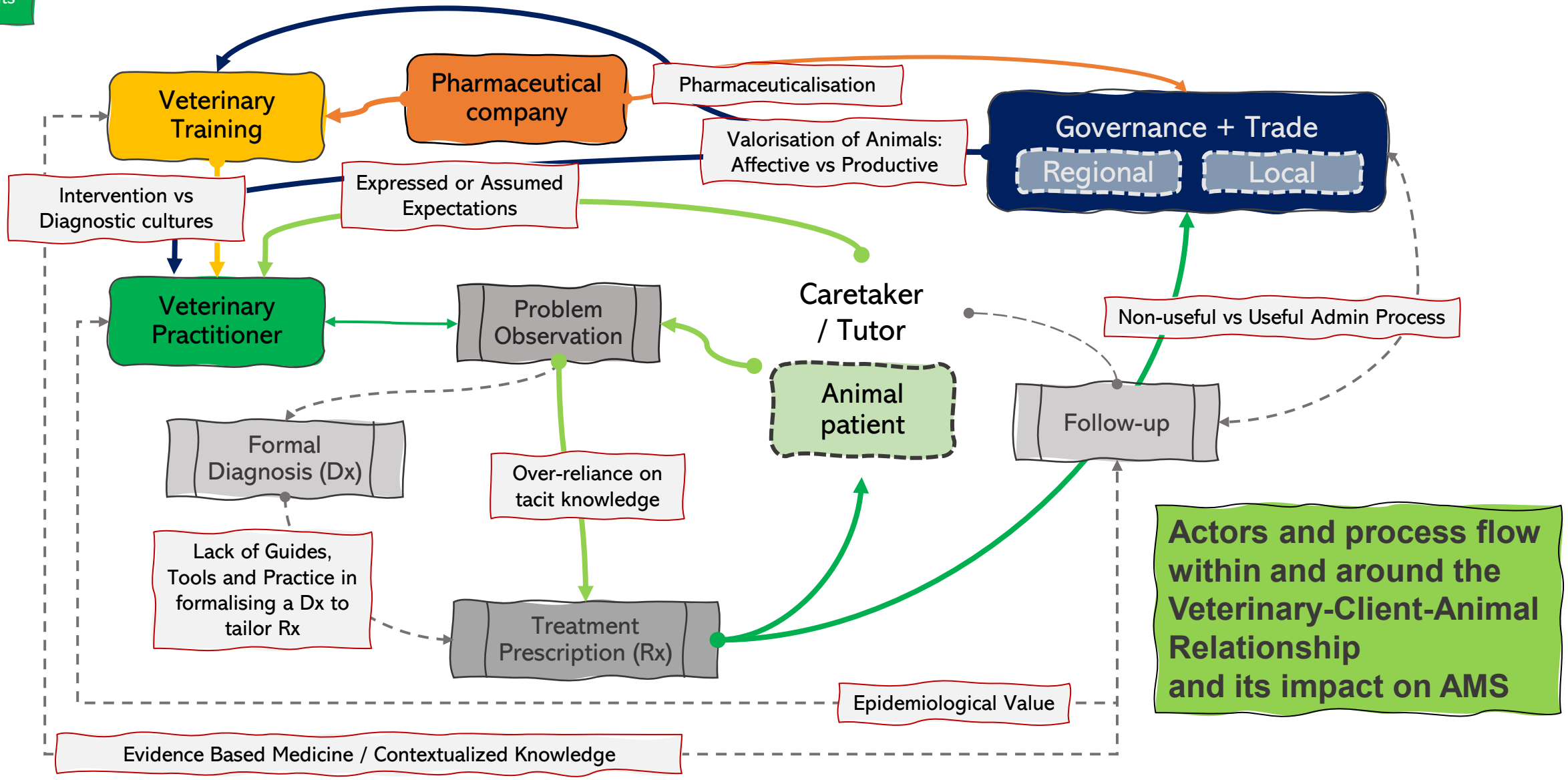
- Current stewardship efforts focus on **tracking usage by dosage, prescriber, or species**
- Our findings provide **evidence from practice**—showing that this approach alone is insufficient



What's missing? The **connection between diagnosis, treatment decisions, and follow-up**

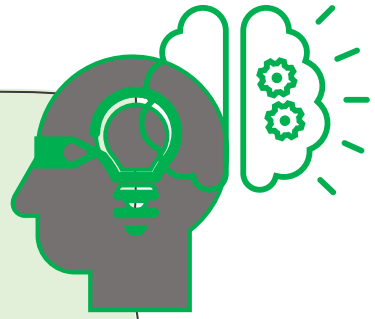
- **Integrating contextualised evidence from clinical decisions,** to create opportunities for learning and improvement in AMU, fostering the development of an adaptive, evidence-based approach to stewardship

AMUVP Project Results



Actors and process flow within and around the Veterinary-Client-Animal Relationship and its impact on AMS

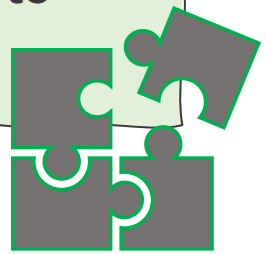
Key insight: "A lack of diagnostic formalisation in daily decision-making"



- **Reliance on tacit knowledge** without structured diagnostic reasoning
- As **follow-up procedures are weak** or absent, they prevent the creation of contextualized knowledge
- **Community expectations (expressed or assumed) reinforce treatment-first approaches,** sidelining the diagnostic (Dx) culture

What is needed? "To move AMS from reactive to adaptive" by:

- **Developing structured Dx frameworks** to guide decision-making
- **Embedding Dx training** in veterinary education
- Creating opportunities for learning and improvement in AMU, **fostering an adaptive, evidence-based approach to stewardship**



In-depth interviews evidence of **broken process of follow up and the capacity of creating knowledge** from the daily practice

‘We do the lab work. **We do not follow up** on the animals’
(Pet vet)

‘I created a group to discuss cases. We got surprised by the differences in treatments for similar diagnosis. It was encouraging to try using less. But you can do so only for hospitalized. **As for the other cases is difficult to know how things worked**; unless you really try’
(Pet vet / AMS Hospital rep)

‘I think the **training around follow-up has been a little bit lacking sort of.** It's been a bit like ‘let me know if it doesn't get better’ and stuff like that’
(Vet student)

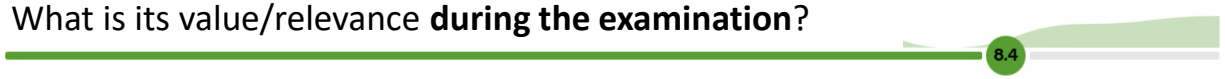
‘Unless I need to update a treatment for the cow, I wait for the farmer to call me for any further issues. **No call means the cow recovered. There is no time to call each time**, lots of paper-work to do already to add this’
(Dairy vet)

AMUVP Project Results

Evidence on the **limited perceived value of records by veterinarians**

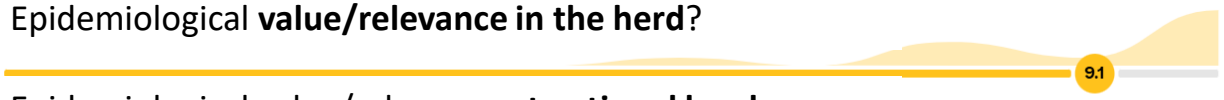
Dairy vets

What is its value/relevance **during the examination**?



What value/relevance does it have **for the clinical record**?

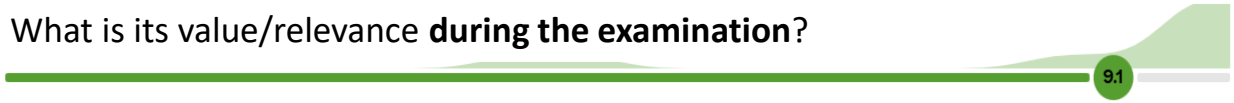
Epidemiological **value/relevance in the herd**?



Epidemiological value/relevance **at national level**

Pet vets

What is its value/relevance **during the examination**?



What value/relevance does it have **for the clinical record**?

Epidemiological **value/relevance in the clinic**?

Epidemiological value/relevance **at national level**

‘**We need an easy and practical national platform linked to management programmes** with associated training on how to use them’ (Pet vet)

‘**Extracted data does no provide info** on days treated or what type of problem got treated for ’
(Dairy vet and researcher)

‘**Data should be easily accessible** to us the health professionals’
(Pet vet)

‘**The data format for me is the most limiting aspect**, data sheets are totally out of date ’ (Pet vet)

111

Evidence of **preasure to navigate regulatory shifts and the unshared burden of compliance**

‘I understand the change of regulations, but **there is a lack of gradualness**, you can't change from 0 to 100 in 15 days’ (Farmer)

‘Things are **always better understood with pedagogy and good-nature** formats’ (Farmer)

‘**The regulation is there to help, but it worries us a lot**’ (Farmer)

‘With the **new rules, veterinarians had complained of the increased and un-needed pharmacist scrutiny** and control on prescription. We know **pharmacist should have no bearing on vet decision-making** is not their position to do so’ (Medicine agency officer)

‘**New rules have allowed me to regain professional value**, but this depends on the working culture you are in. **I had to leave my work as I was pressured to prescribe** unnecessarily to keep people happy’
(Dairy Vet)

Evidence of **disconnect between veterinary education, antimicrobial use (AMU) preparedness, and real-world practice**

‘Seeing how antibiotics have been used, **I'm afraid of making the wrong decisions**’

‘you should be sparing in use but ... you should use it when it's needed … But sometimes I can also experience that you are almost **a little too scared … Because it almost feels like something a bit forbidden**’

‘there's nothing stopping you from learning how to stick a horse [with a needle] in year one. … **I thought the practice would be more woven in from the beginning**’

‘The reality of the field is very different. **It is very idyllic** what they explained at the University but **there is no money to do all those tests**’ (Vet student)

‘We are responsible for maintaining animal health also human’

Untapped potential for fostering active learning around AMU

AMUV Project: Lessons learned

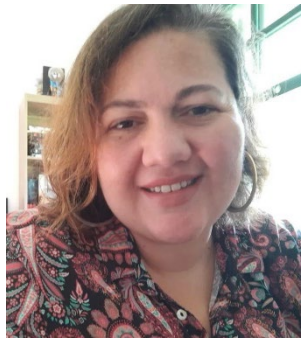
- Our project fostered a deliberate and authentic space to interact, discuss, listen and negotiate - **Build trust and Collective efforts**
- We aim to build authentic relationships among actors involved in AMS – **See tensions as productive niches to co-create knowledge**
- We observed a desire for veterinarians to be seen as part of the health service providers community by **Strengthening the community valorisation of the veterinarian profession**

Including Qualitative methods as a pathway for improved AMS

- **Co-design, piloting and implementation are crucial steps in AMS** – Iterative reflection adjustments help refine ideas. Actors buy-into collective reflections as a needed space of interaction before full-scale implementation
- **An hybrid approach towards policy design and implementation strategies calls for** Top-down and Bottom-up strategies
- **AMS needs Qualitative and Quantitative metrics** – to improve transparency and EBM knowledge creation
- **AMU benchmarking should be an integrative** (Qualitative and Quantitative metrics) process to provide value in administrative process

Sustainable and Responsible AMU

115



Rita de Albernaz Gonçalves da Silva

Maria J Hötzel

Sándor Belák

Ulf Emanuelson

Henry Buller
(1956 -2023)
Saudade infinita!

Miguel A. Moreno

Jo Hockenhull

Ragnvi Hagman

Kerstin Bergvall

Funded by

FORMAS

Thanks you for listening on behalf of the team !!

Contact us at:

gabriela.olmos.antillon@slu.se

isabel.blancopenedo@udl.cat

EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

11 March

ANTIMICROBIAL STEWARDSHIP & INFECTION PREVENTION AND CONTROL IN ANIMAL HEALTH

Co-funded by the European Union

www. eu-jamrai.eu

IPC IN THE ANIMAL HEALTH SECTOR: SPOTLIGHT ON BIOSECURITY PROJECTS IN EUROPE

Ilias Chantziaras

CHALLENGES TODAY

Risk of outbreaks

Italy culls tens of thousands of pigs to contain African swine fever

Outbreaks in the Lombardy 'pork belt' were extinguished, say experts, but wild boar could act as a reservoir

NEWS

U.S. Bird Flu Cases Continue in Poultry. Here's Where HPAI Is Spreading in March 2025

By **Noah Rohlfing** | Published on March 3, 2025

Avian ir

In This Article

- **The Latest**
- What Producers Can Do
- Rising Worries About Human Cases

Belgium - Bird flu detected in two cats of poultry keeper in Saint-Gilles-Waes
Yesterday, 12:30 PM

Translation Google

Bird flu: two cats of a poultry keeper infected, a first in Belgium

ZOONOTIC DISEASES

Animal disease events Africa since 1/01/2024 (WOAH, 2024)

GHENT UNIVERSITY

CHALLENGES TODAY

Risk of outbreaks

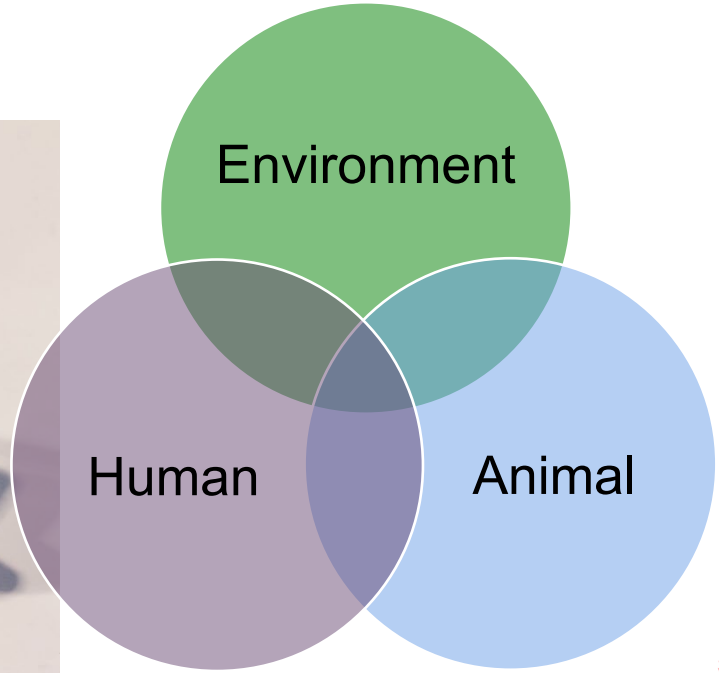
Reduction of antimicrobial use

GHENT UNIVERSITY

CHALLENGES TODAY

Risk of outbreaks

Reduction of antimicrobial use ~ AMR threat



GHENT UNIVERSITY

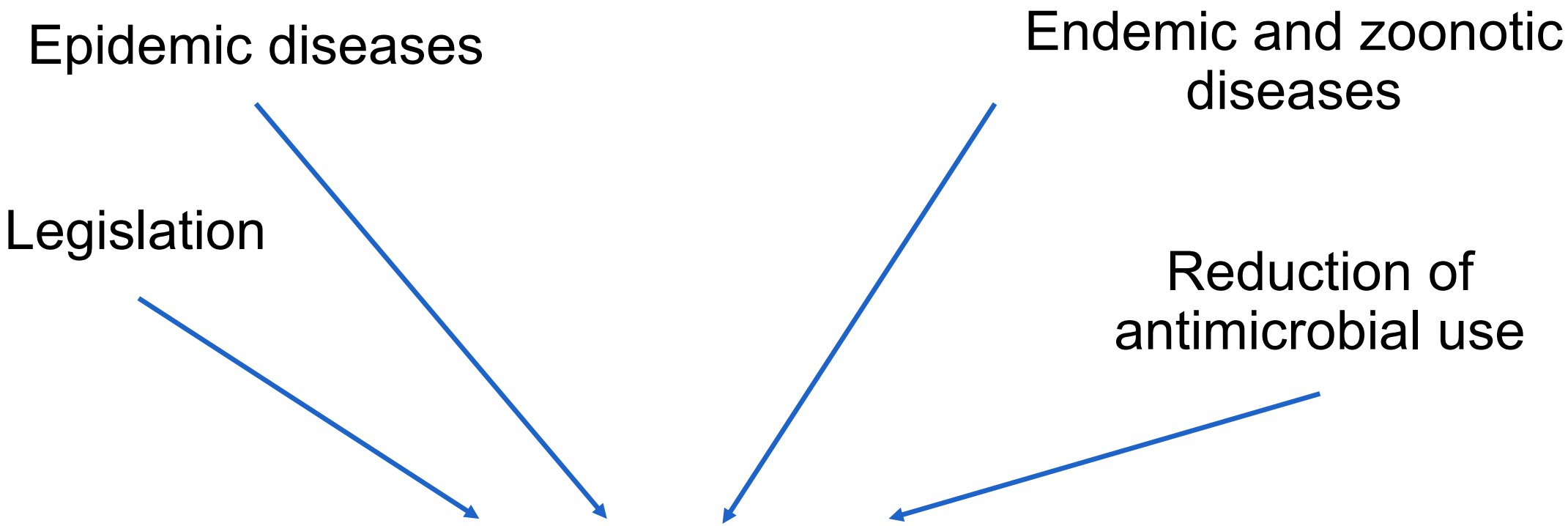
CHALLENGES TODAY

Risk of outbreaks

Reduction of antimicrobial use

Livestock farming sustainability

GHENT UNIVERSITY

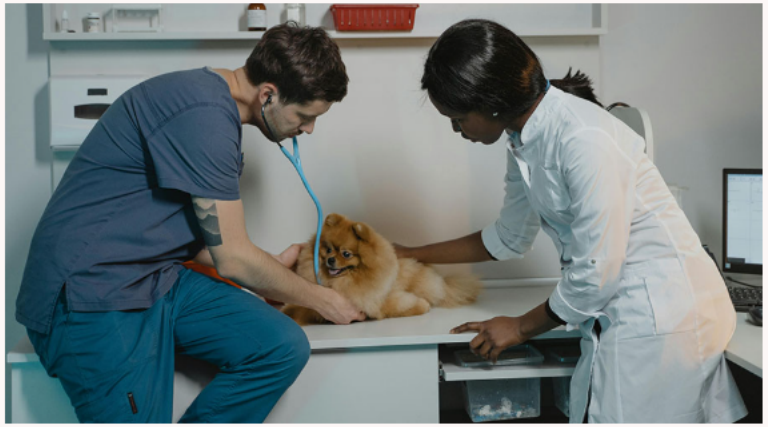


Biosecurity helps to address all these challenges

GHENT UNIVERSITY

IDENTIFYING YOUR AIMS…

EU-JAMRAI



IPC in Animal Actions

- Develop an EU-JAMRAI expert network on IPC/biosecurity in animal healthcare to perform a comprehensive review of veterinary IPC protocols, practices, and diagnostic tools.
- Identify key components of EU-standards for IPC/biosecurity in veterinary medicine according to animal species and husbandry across EU countries.
- Determine key health and biosecurity measures in animal husbandry to reduce AMC at the farm level.
- Create educational programs to facilitate knowledge dissemination and information exchange between IPC professionals.

GHENT UNIVERSITY

…ALIGNING WITH OUR INVOLVEMENTS

- BIOSECURE
- BETTER
- EUPAHW

GHENT UNIVERSITY

HORIZON EUROPE

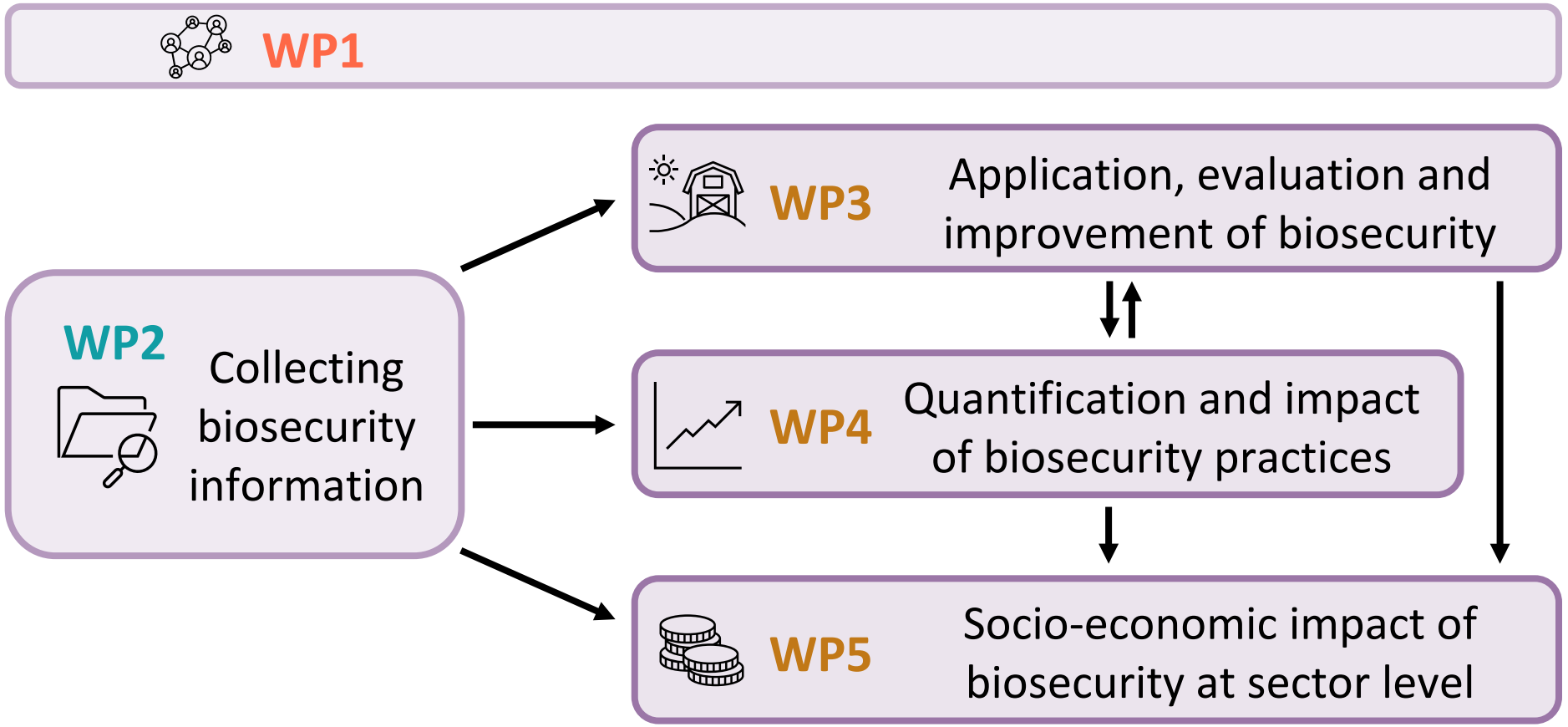
FARM2FORK Project
Enhanced and cost-effective biosecurity in livestock production

GHENT UNIVERSITY

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or REA.
Neither the European Union nor the granting authority can be held responsible for them.

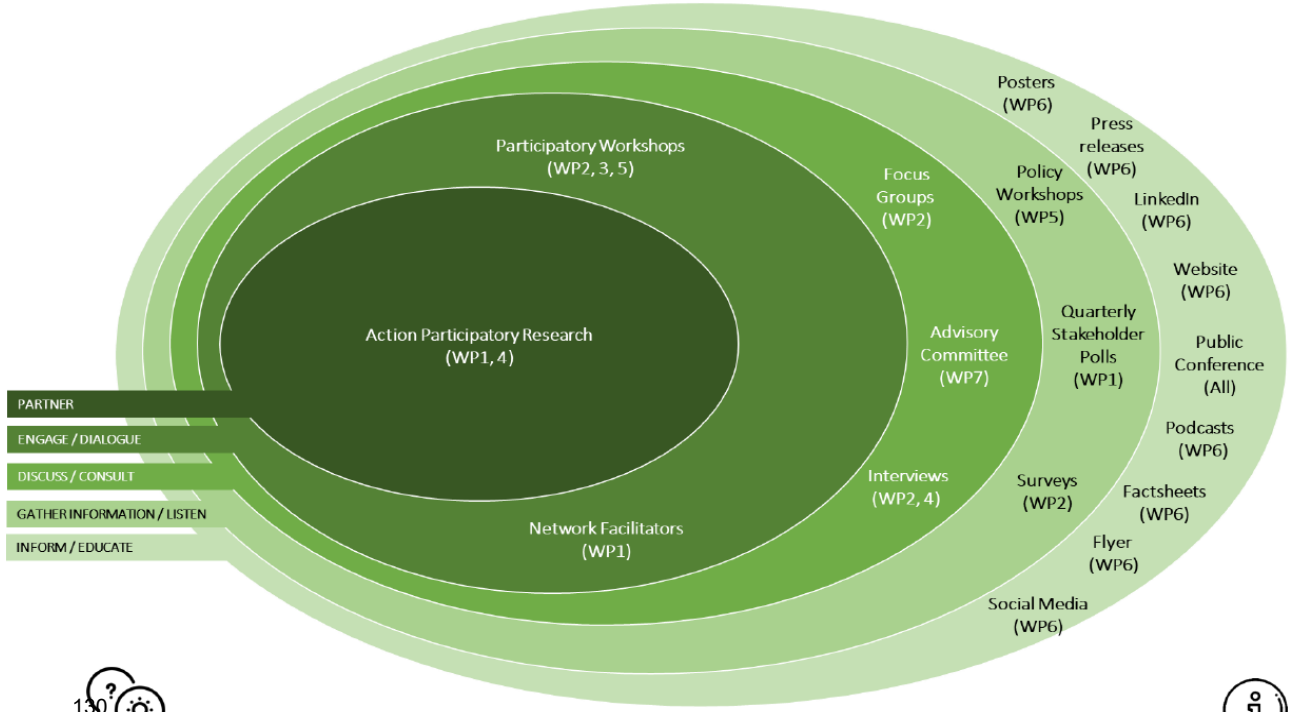
BIOSECURE

BIOSECURE WP STRUCTURE



GHENT UNIVERSITY

WP1: MULTI ACTOR APPROACH



GHENT UNIVERSITY

WP1: MULTI ACTOR APPROACH

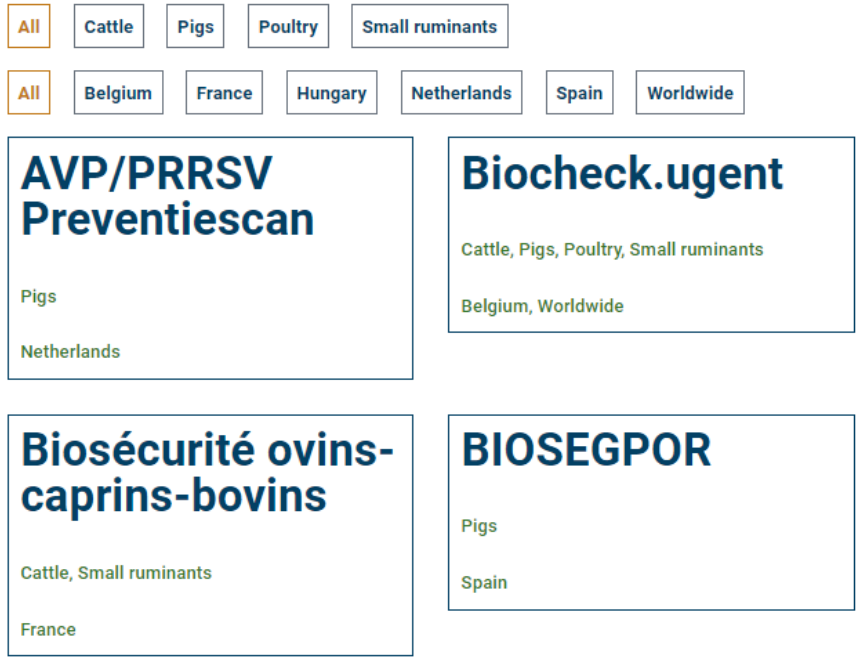
4. Biosecurity is a set of practical measures to prevent the spread of disease on and between farms. How do you perceive each of the following statements? (Please place a tick ✓)				
I think biosecurity measures are worth implementing				
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
○	○	○	○	○
Implementing biosecurity measures will improve the health of farm animals				
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
○	○	○	○	○
Implementing biosecurity measures will improve the welfare of farm animals				
Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
○	○	○	○	○

GHENT UNIVERSITY

WP2: COLLECTING BIOSECURITY INFO

Objective

Collect existing biosecurity intelligence throughout the livestock production chain



compliance database)

GHENT UNIVERSITY

WP3: QUANTIFYING BIOSECURITY PRACTICES

Objective

Quantify the impact of biosecurity practices on infection prevention and economics

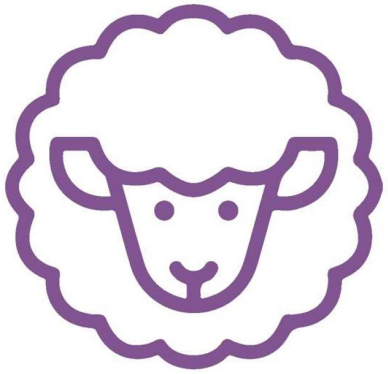
Some results

Three new tools were developed to assess the level of biosecurity on livestock farms

- commercial outdoor pig production
- commercial dairy small ruminant farms
- commercial small ruminant farms for meat production

BIOCHECK SMALL RUMINANTS

Intensive dairy production



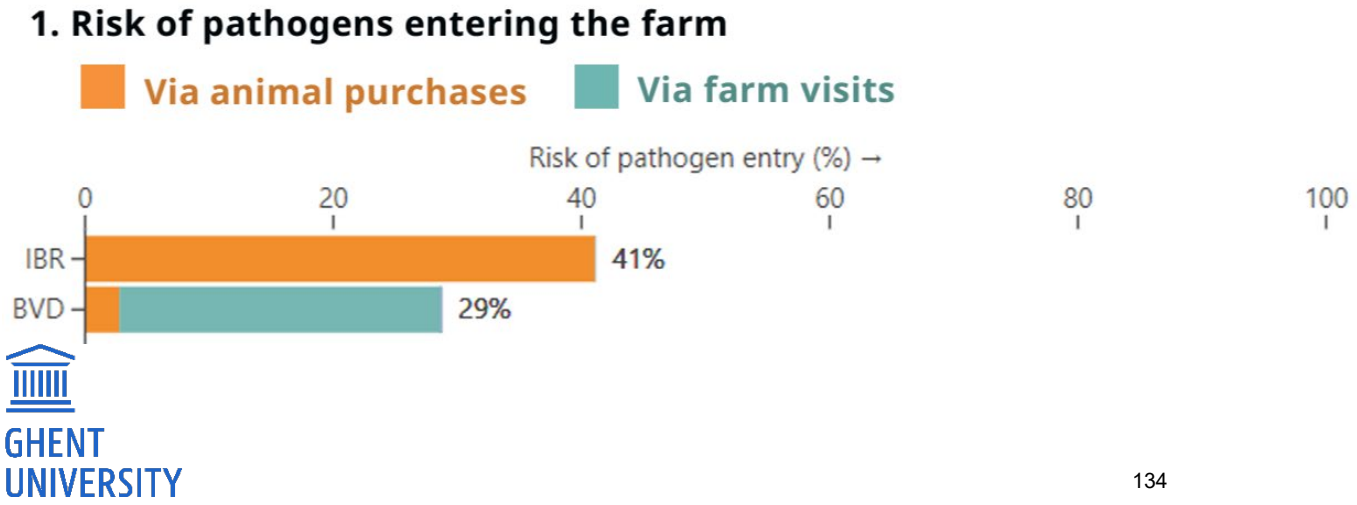
GHENT UNIVERSITY

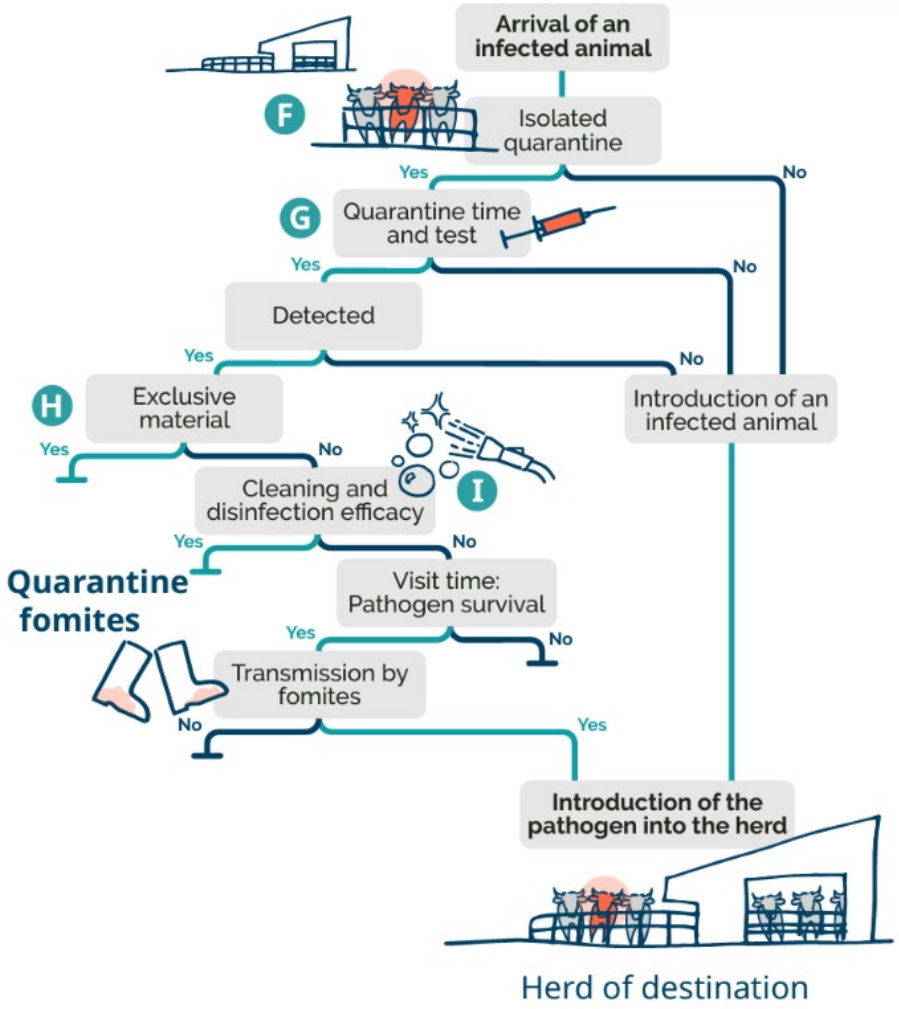
WP3: QUANTIFYING BIOSECURITY PRACTICES

Some results

Farm-level risk assessment models:

probability of pathogen introduction to cattle farms through animal movements of farm visits and the impact of biosecurity measures.





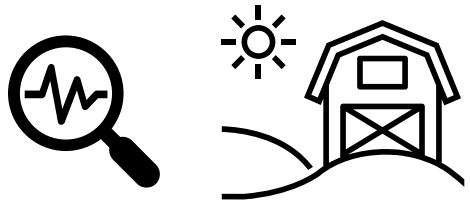
Ciria et al., poster, Cost Action BETTER meeting 2023, Tirana

GHENT UNIVERSITY

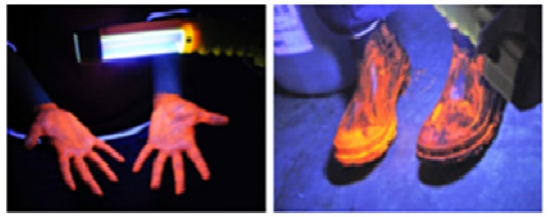
WP4: BIOSECURITY FIELD WORK

Objective

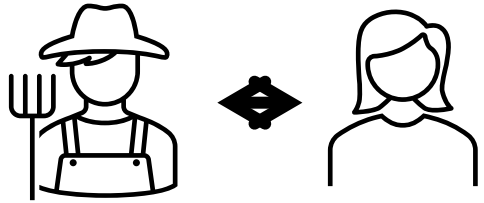
Enhancement of biosecurity measures through quantitative and qualitative field studies and experiments



Effectiveness of biosecurity measures



Julien and Thomson, 2011

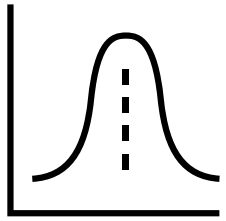


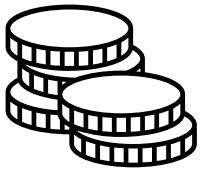
Biosecurity coaching

WP5: BIOSECURITY BEYOND FARM LEVEL

Objective

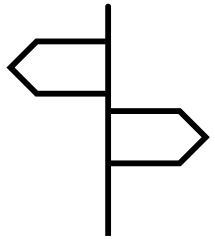
Assess the socio-economic impact of biosecurity measures beyond farm level





Economic impact of policy scenarios

Evaluating business models



Guidelines and policy scenarios at sector level

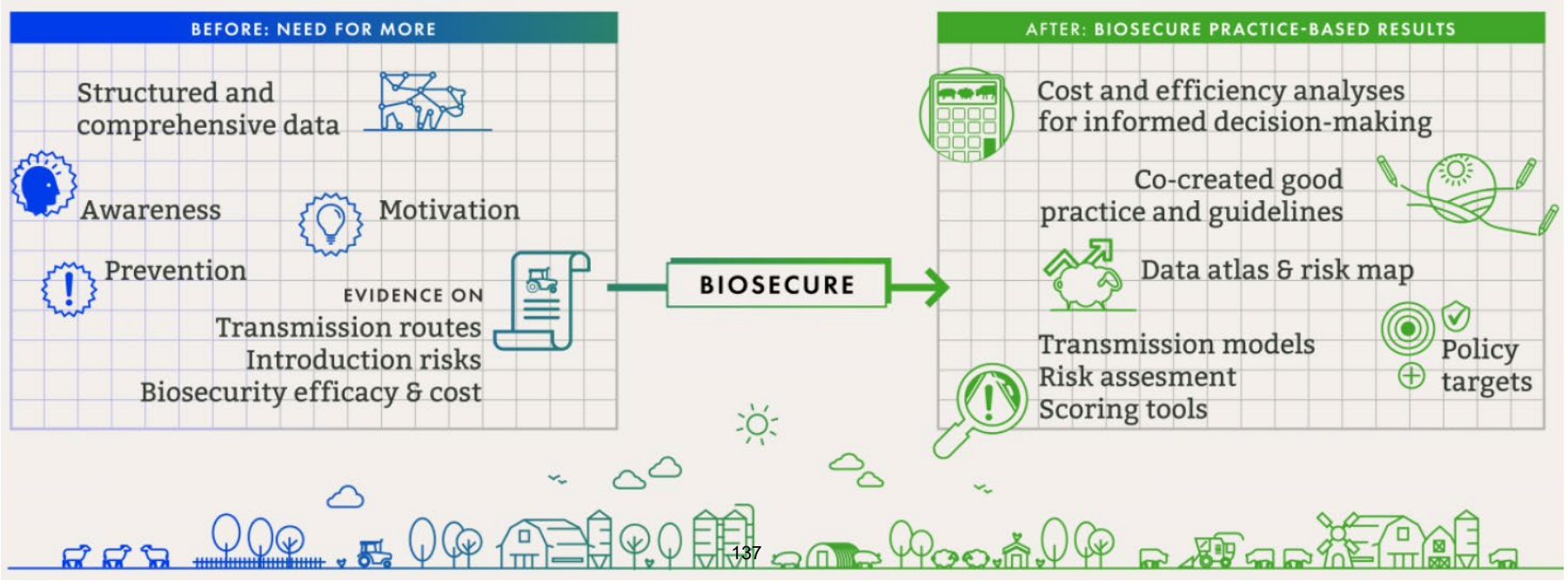
GHENT UNIVERSITY

IMPACT OF BIOSECURE

Biosecurity-specific impact

Improving the capacity to prioritize and implement biosecurity measures

Better understanding of costs and efficiency of biosecurity measures



Biosecurity Enhanced Through Training Evaluation and Raising Awareness

Alberto Allepuz
Chair
Autonomous University of Barcelona
Spain

Illias Chantziras
Vice-Chair
Ghent University
Belgium

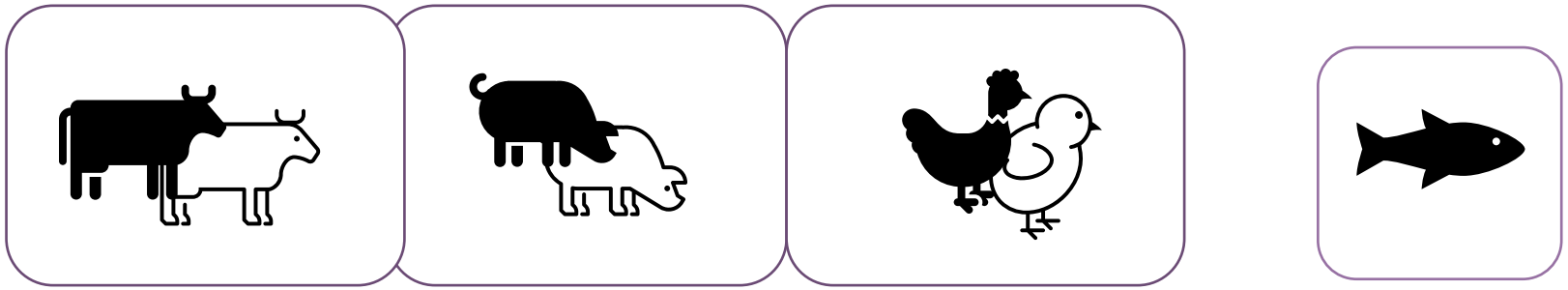
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

BETTER

Funded by the European Union

Our main aim is to reduce the risk of infectious disease introduction and spread by **improving the implementation of biosecurity measures** in animal production systems

The project is mostly focused on cattle, pigs and poultry, but there is also some work being conducted in small ruminants and aquatic animals



GHENT UNIVERSITY

Biosecurity Enhanced Through Training Evaluation and Raising Awareness

Starting point

- Need to improve (especially outdoor systems)
- Enhance communication
- Diversity of methodologies to assess
- Lack of professionals trained in biosecurity

BETTER

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

BETTER consists of 4 working groups

WG1

Mapping biosecurity measures applied on farms and transport across Europe

WG2

Scaling-up the knowledge and experience of stakeholders and of the general public

WG3

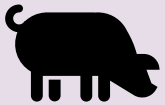
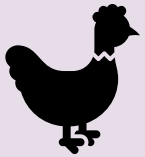
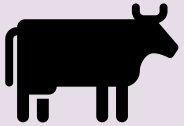
Methods for evaluation of biosecurity and benefits of its implementation

WG4

Training and dissemination

WG1 MAIN INVOLVEMENT OF UGENT

Identify which biosecurity measures were addressed in the national legislation of European countries for the three main intensive animal production categories

Biosecurity other than regulation (i.e., industry)

- Compulsory by other than law

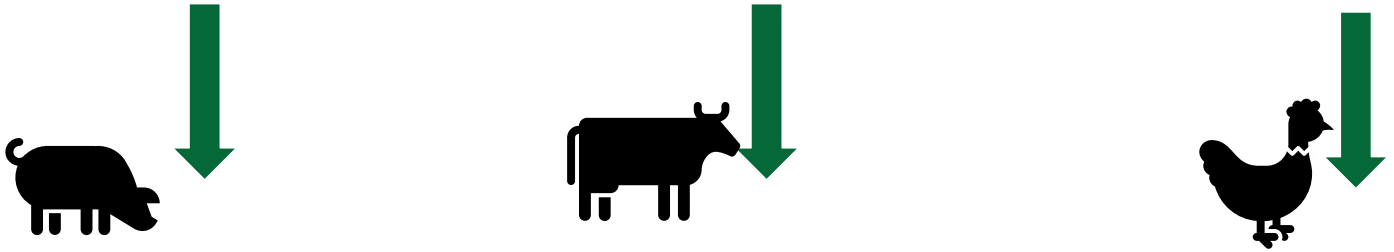
Biosecurity compliance

- Percentage (%) of implementation according to national literature or existing databases

WG1 questionnaire

Questionnaire send to representatives of 38 countries

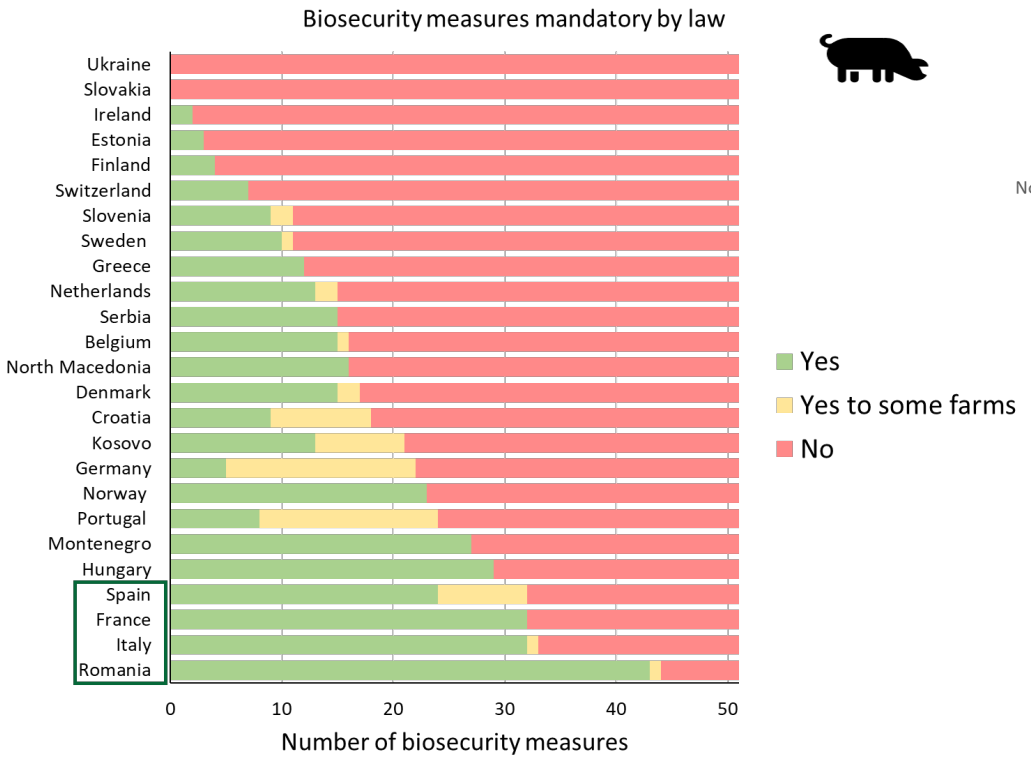
Nr of biosecurity measures differed per animal species

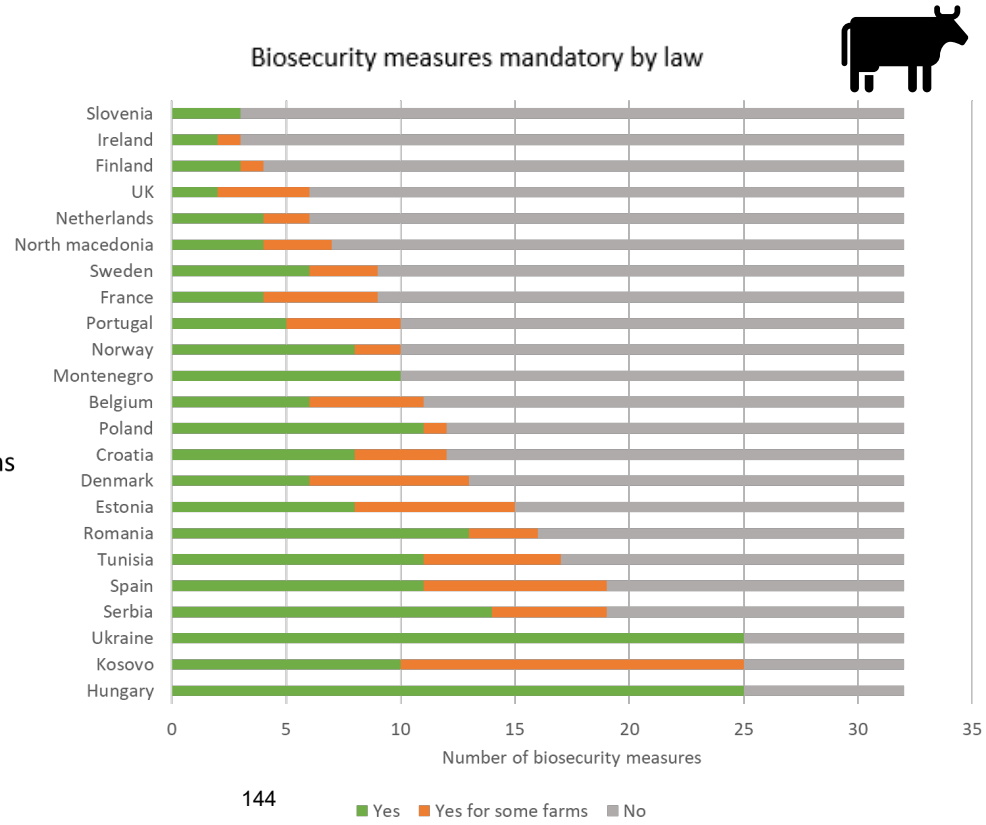


51 32 56

WG1 results

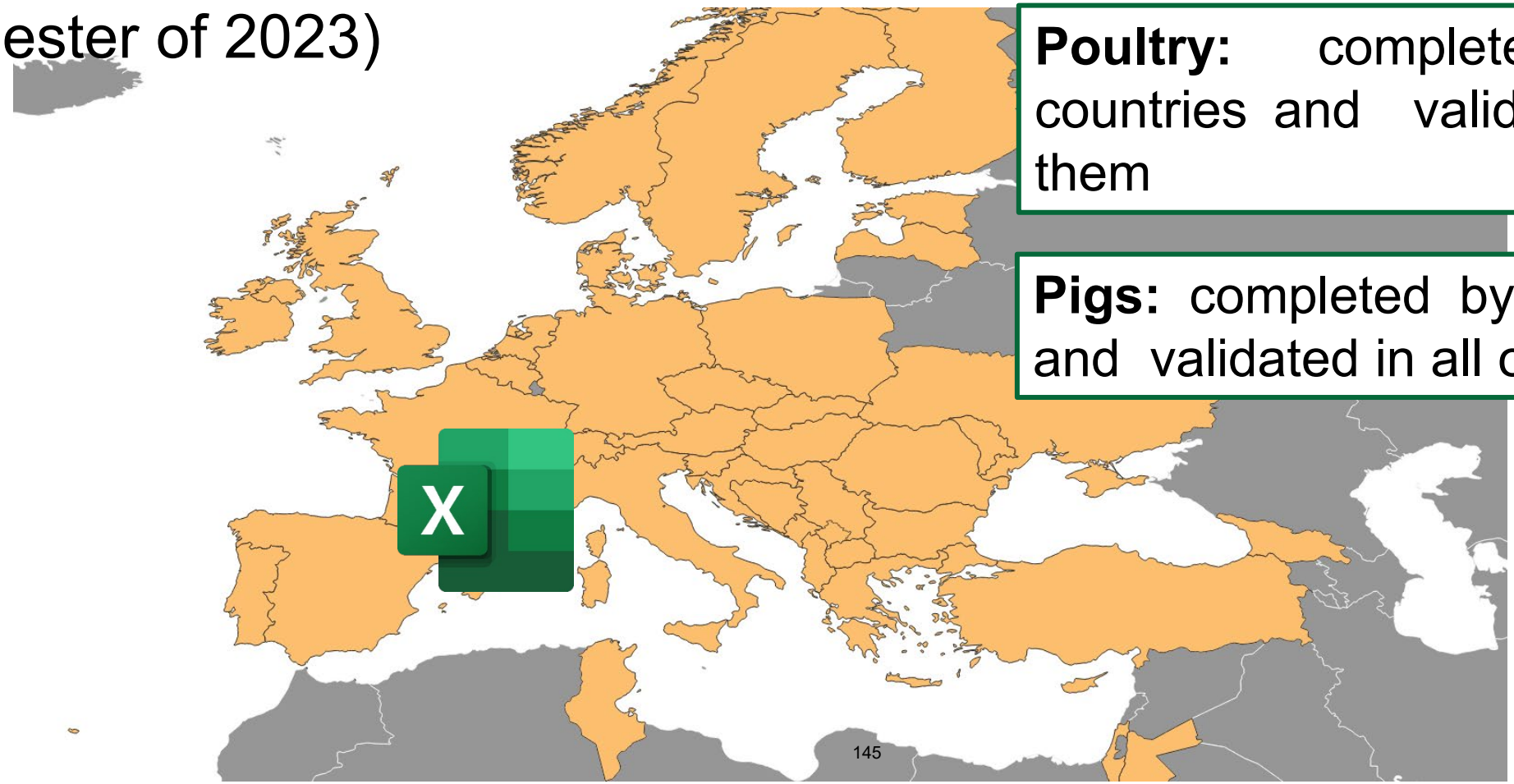
- There is large variation in the number of measures considered as compulsory in the national laws of the different countries
- Some countries have the strategy to enhance biosecurity through national laws and others might enforce their implementation by a different approach.





WG1 Data collection

Country focal point coordinators: in charge to collect data in each country (data collected during the first semester of 2023)



Cattle: completed by 23 countries and validated in all of them

Poultry: completed by 24 countries and validated in 22 of them

Pigs: completed by 25 countries and validated in all of them

Selected results by the other WGs

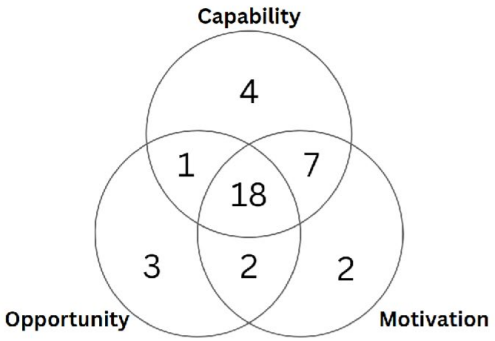
BETTER

What Does The General Public Know About Biosecurity & Disease Spread In Livestock?

Have you ever heard of the word "biosecurity"?

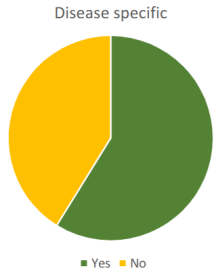
Review of social, economic and psychological factors affecting decision making around biosecurity

COM-B model

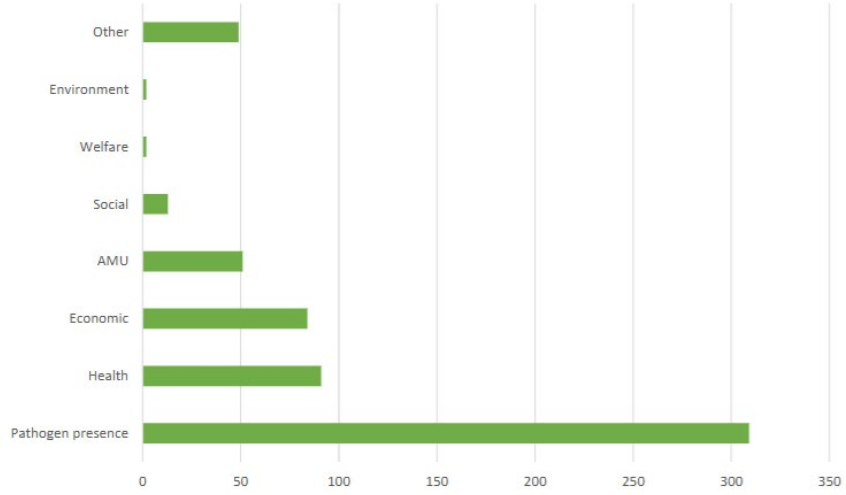


Exploring the impact of biosecurity – a scoping review

Biosecurity is studied in disease and species specific context



Areas of impact investigated



Organized participative actions during face to face meetings

Ghent general meeting

Padua meeting

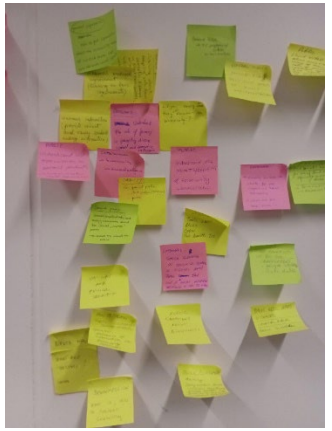
October

Ghent: February 2023

Padua: February 2024

tob er

World cafe in training needs and design of a training on biosecurity



Organized workshops and training schools on biosecurity

(14th – 18th of November 2022)

A training school has been performed in ULiege (Belgium). The training lasted 4 days and covered aspects related to the design, implementation, and assessment of biosecurity standard operating procedures (SOPs) in the Faculty of Veterinary Medicine.

Funded by the European Union

COST Action
"Biosecurity Enhanced Through Training Evaluation and Raising Awareness"
(Acronym: BETTER)
CA20103

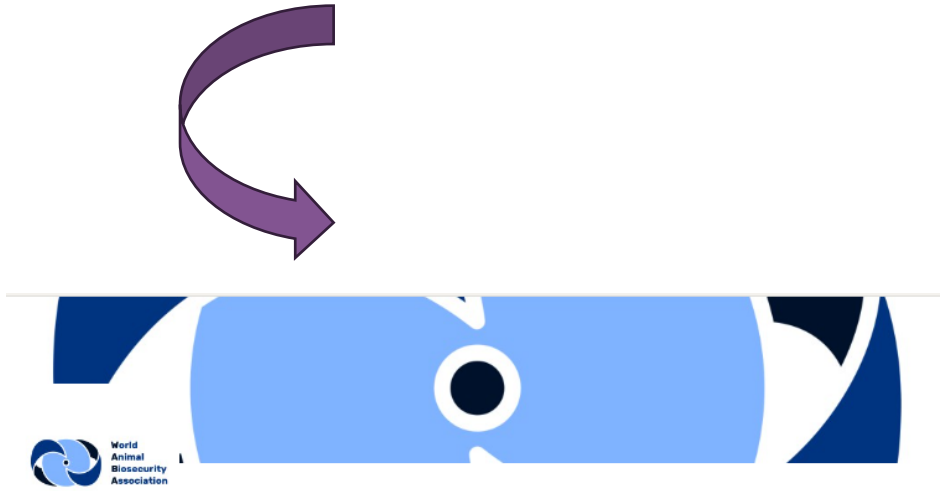
Second training school
18-19 March 2024 at the Swedish University of Agricultural Sciences (Sweden)

"Biosecurity Assessment and Motivational Interviews"

Deadline for registration: January 12, 2024
Deadline for selection: January 30, 2024
Training school: 18-19 March 2024

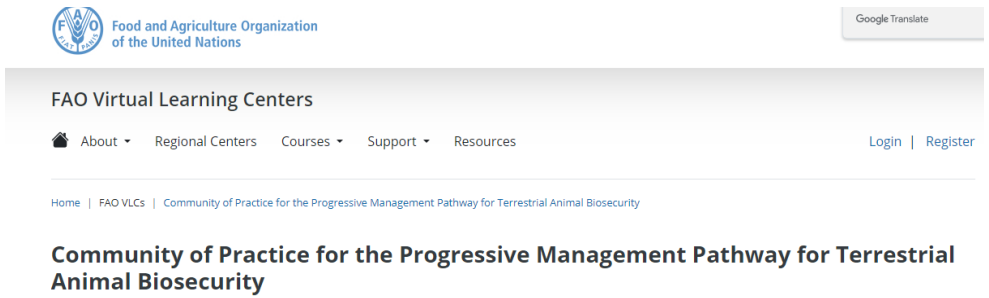
How to continue after the project finishes?

We created a sustainable network for the promotion of research, education and application of biosecurity measures globally…join us!



World Animal Biosecurity Association (WABA)

WABA aims at connecting everybody involved in research, communication, and enhancement of biosecurity in animals



ABOUT EUPAHW

GHENT UNIVERSITY

EUROPEAN PARTNERSHIP ON ANIMAL HEALTH & WELFARE

90 partners
56 Research Performing Organizations (RPO)
30 Funding Organizations (FO)
Some other entities EFSA, EMA, Authorities
From 24 EU and non-EU countries
Duration 7 years (+3)
Expected total budget: 360 MEUR
Coordinated by

GHENT UNIVERSITY

Co-funded by the European Union

17 joint internal projects (Sets Of Activities) have been initiated by January 2024 based on actions from the Strategic Research and Innovation Agenda

Surveillance and risk assessment

1.Design and harmonize surveillance and monitoring systems for AH&W 4 SOAs

2.Adapt risk assessment and alert communication to the new needs in AH&W, 1 SOA

Procedures, methodologies and tools

3.Develop diagnostic procedures, methodologies and tools to support the surveillance of AH 2 SOAs

4.Develop diagnostic procedures, methodologies and tools to support the monitoring of AW 2 SOAs

Management and husbandry

5.Develop guidelines and preventive tools to fight against AID on farm and during transport 2 SOAs

6.Develop guidelines , prototype solutions to advance AW on farm, during transport and at the end of life, 1 SOA

Treatments and vaccines

7.Develop new interventions and treatments or improve existing ones against specific priority AID, 2 SOAs

8.Develop new vaccines, or improve existing ones, including adjuvants and immuno-modulators, 2SOAs

Transversal area

9.Integrated approach, including socio-economic aspects of AH&W, 1 SOA

PROJECTS

EUP AH&W European Partnership on Animal Health and Welfare

Priority area:
SURVEILLANCE / MONITORING SYSTEMS AND RISK ASSESSMENT FOR ANIMAL HEALTH AND WELFARE

OO1	**Contribute to design and harmonize surveillance and monitoring systems for animal health and welfare**	
SOA6	A European wildlife network for terrestrial and aquatic mammals and bird	(OO1 Action 2)
SOA7	Wildlife and diseases of aquatic organisms: A European perspective	(OO1 Action 2)
SOA8	Surveillance of pathogens of veterinary importance and their antimicrobial resistance profiles	(OO1 Action 4)
SOA9	Knowledge platform in the EU with the objective to collect, analyse, share and use integrated scientific and technical data on AW	(OO1 Action 6)
OO2.	**Contribute to adapt risk assessment and alert communication to the new needs in animal health and welfare**	
SOA10	Rapid Risk Assessment: Improvement of epidemic intelligence methodologies	(OO2 Action 1)

GHENT UNIVERSITY

PROJECTS

EUP AH&W European Partnership on Animal Health and Welfare

OO5.	**To develop guidelines and preventive tools to fight against animal infectious diseases on farm and during transport**	
SOA15	Biosecurity measures to prevent and control AID on farm and during transport taking into account effects on AW	(OO5 Action 1)
SOA16	Reinforcement of animal resilience	(OO5 Action 4)
OO6.	**To develop guidelines and prototype solutions that advance animal welfare on farm, during transport and at the end of life**	
SOA17	Sustainability aspects of AW-promoting livestock systems	(OO6 Action 1)

GHENT UNIVERSITY

BIOSECURITY

Priority area	Operational objective
Management of farm, during transport, at slaughter, and at sea	Develop guidelines and preventative tools to fight against AID on farm and during transport

Main aim: to identify effective biosecurity measures

✓ applicable for several infectious diseases among terrestrial and aquatic animals

Specific objectives (selected):

- Establishment of a network of experts and identify research priorities on biosecurity to identify effective biosecurity measures
- Improvement of basic knowledge on biosecurity and local knowledge (focus on outdoor animal production systems)
- Assessment of on-farm real time monitoring for early detection of infected animals to limit spread of pathogens on farm

BIOSECURITY

Priority area	Operational objective
Management of farm, during transport, at slaughter, and at sea	Develop guidelines and preventative tools to fight against AID on farm and during transport

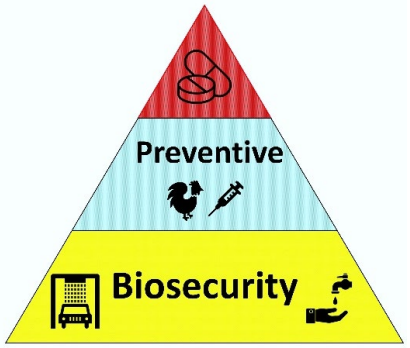
Some of UGent's activities:

- Review knowledge and (meta-review) and identify gaps
- Collect and disseminate research proposals on basic knowledge and innovative ideas on external and internal biosecurity
- Use participatory research to test selected protocols in the Balkans
- Make comprehensive biosecurity plans

Final aim: Integration of IPC measures for on-farm control

CONCLUSIONS

- ✓ Biosecurity is (should be) the basis of any disease control program



- ✓ Research efforts to adress biosecurity are up and running!
  - ✓ Use of quantitative & qualitative research

GHENT UNIVERSITY

FACULTY OF VETERINARY MEDICINE
accredited by EAEVE

Thank you for your attention!

Ilias Chantziaras

Professor (Assoc.)

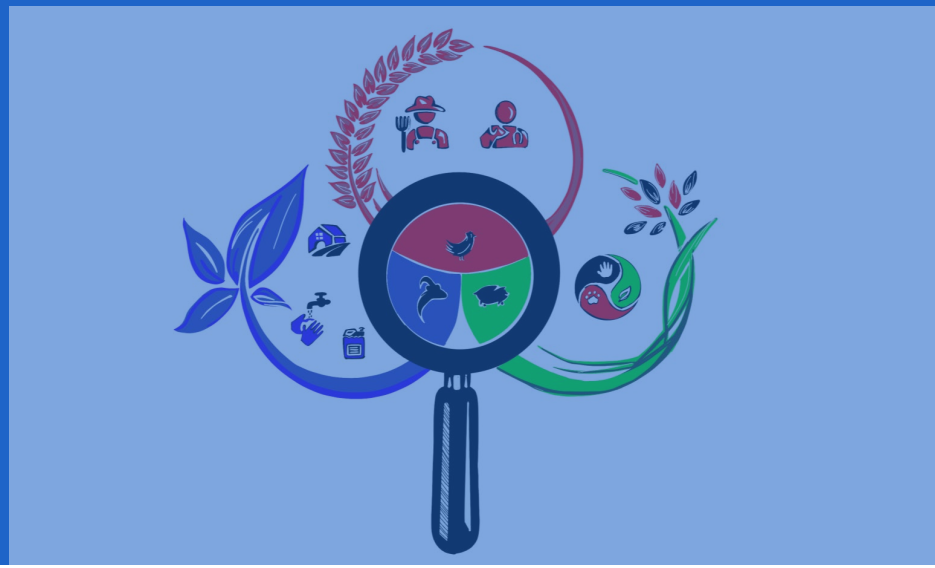
Chairholder of Biosecurity in Animal Production

Department of Internal Medicine, Reproduction and Population Medicine

E ilias.chantziaras@ugent.be

T +32 9 264 75 48

www.ugent.be



GHENT UNIVERSITY

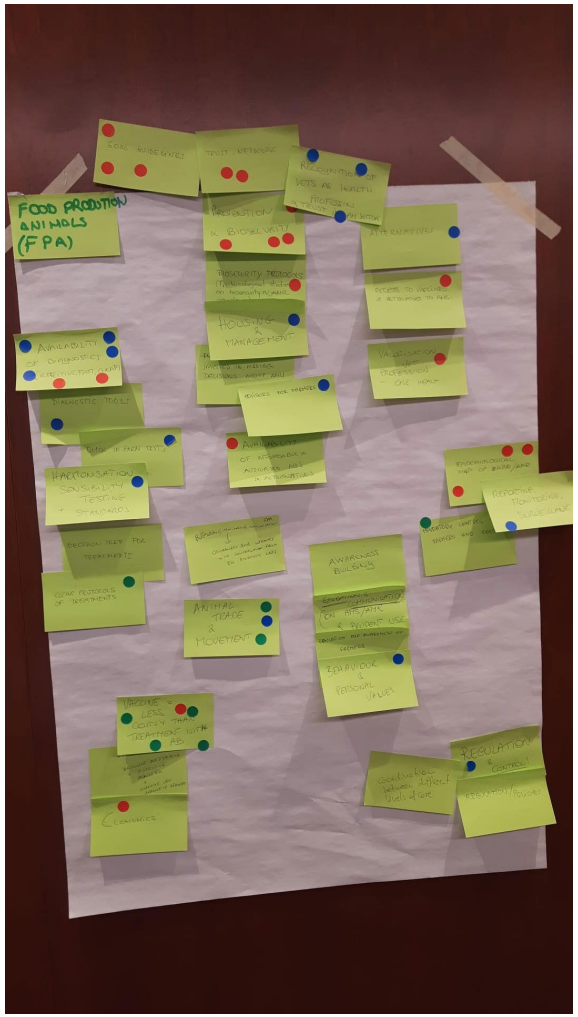
EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

11 March

ANTIMICROBIAL STEWARDSHIP & INFECTION PREVENTION AND CONTROL IN ANIMAL HEALTH

Co-funded by the European Union

Pictures



Pictures

Pictures

Pictures


EU-
JAMRAI
Joint Action
Antimicrobial Resistance and
Healthcare-Associated Infections


EU-
JAMRA
Joint
Antimicrobial Resista
Healthcare-Associated In

EU-JAMRAI Joint Action Antimicrobial Resistance and Healthcare-Associated Infections

Co-funded by the European Union

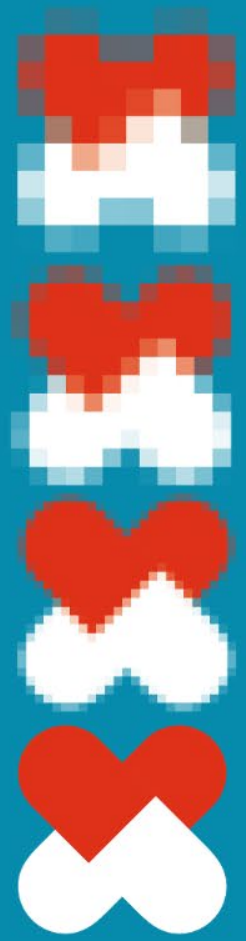
Thank you!

i.y.a.wayop@uu.nl
mvilar_externo@aemps.es
E.M.Broens@uu.nl
cmunoz@aemps.es
anne.becker@dgz.be
julie.debouvere@dgz.be
evelyne.degraef@dgz.be
gitte.bekker@dgz.be

Utrecht University

agencia española de medicamentos y productos sanitarios

DGZ SAMEN VOOR GEZONDE DIEREN



BUILDING A ONE HEALTH WORLD

to reduce Antimicrobial Resistance (AMR)

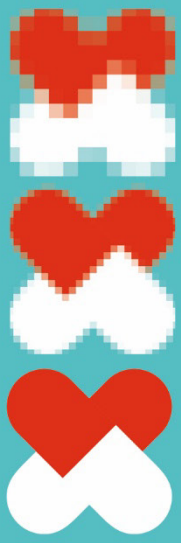
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them.

EU-JAMRAI
Joint Action
Antimicrobial Resistance and Healthcare-Associated Infections

Co-funded by the European Union

APPENDIX C

Feedback Workshop on AMS & IPC in Animal Health – March 11 2025



BUILDING A ONE HEALTH WORLD

to reduce Antimicrobial Resistance (AMR)

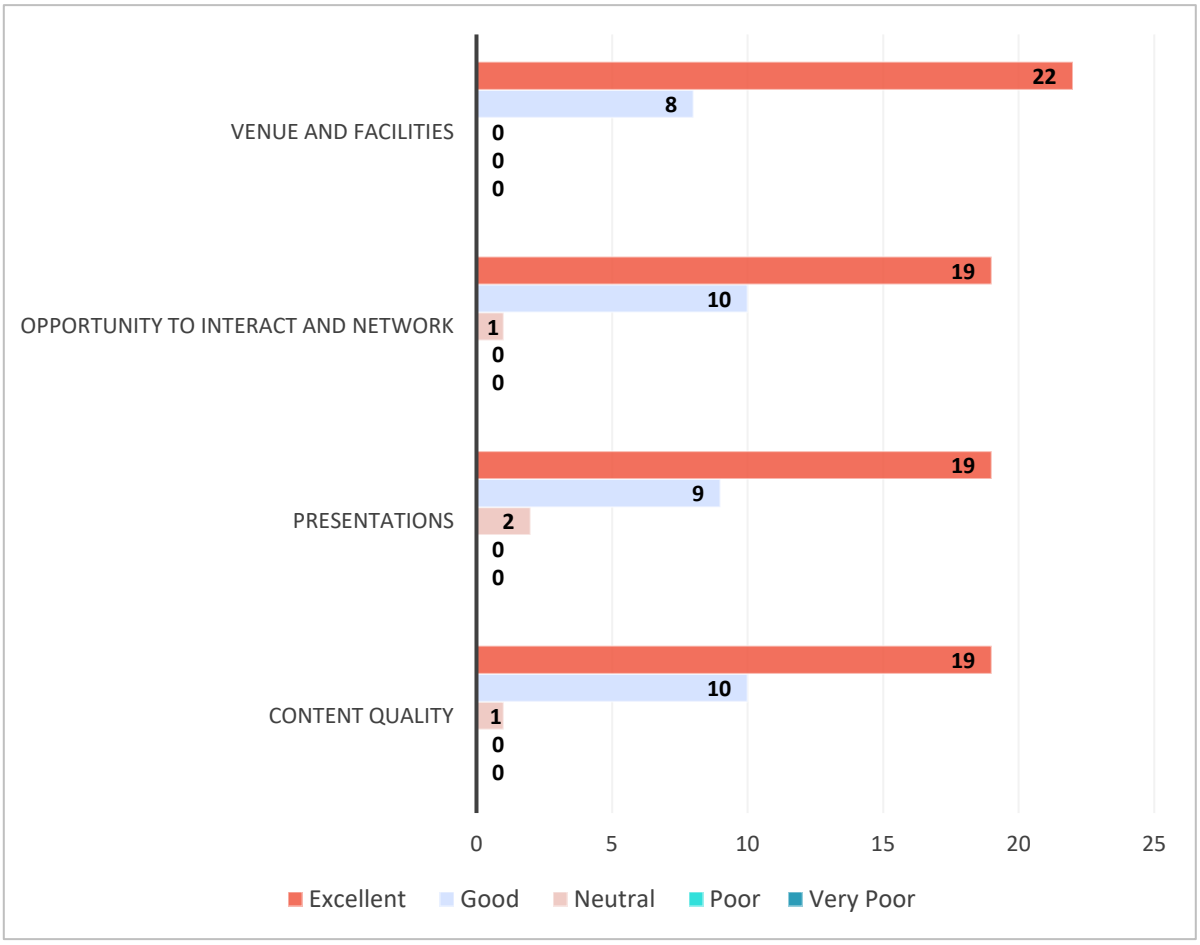
6.2 Task Leaders – AEMPS & UU
7.2 Task Leaders - DGZ

This document originates from the European Joint Action on Antimicrobial Resistance and Healthcare Associated Infections 2 project (EU-JAMRAI 2).

TABLE OF CONTENT

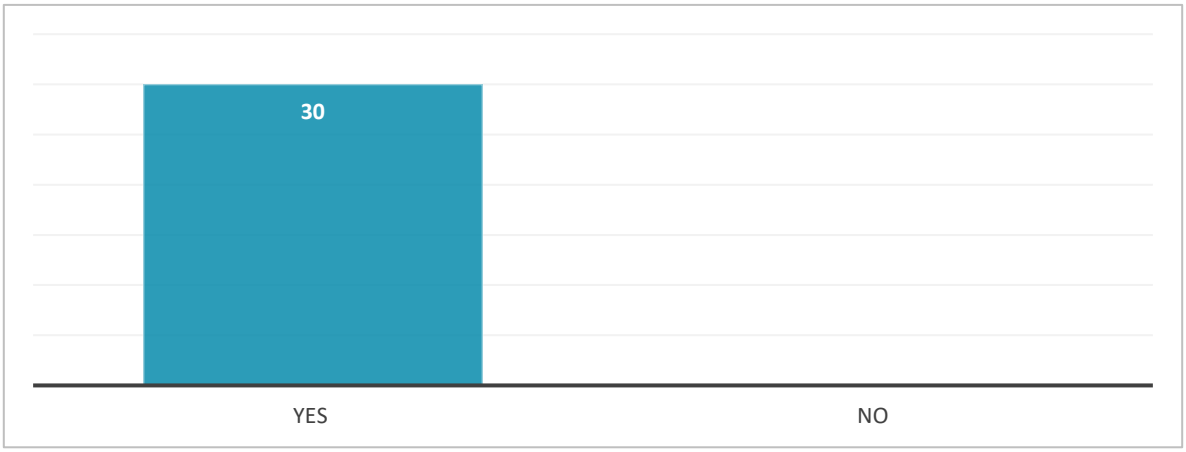
1 GLOBAL EVALUATION

1.1 Evaluation of different aspects of the workshop



2 EVALUATION OF THE PRESENTATIONS

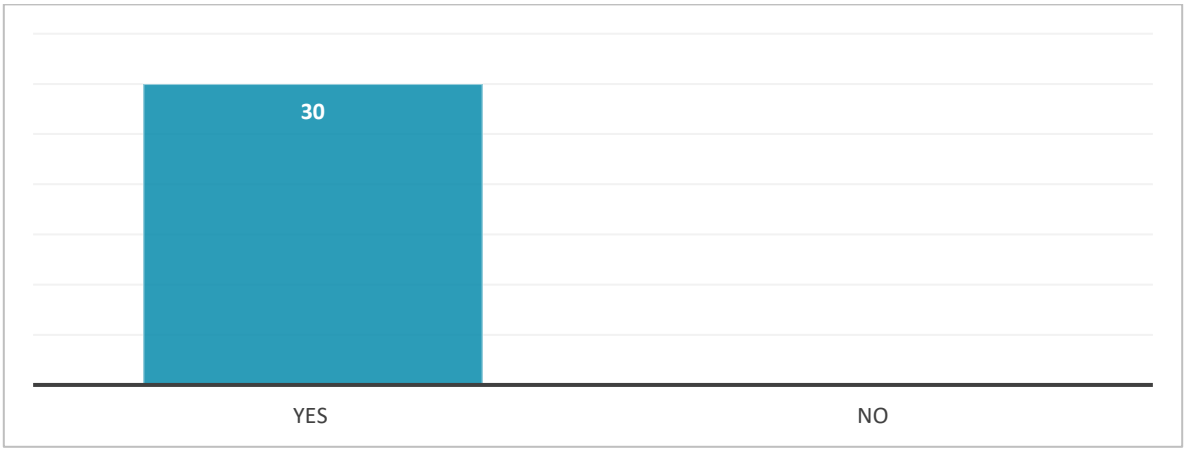
2.1 Did you find the presentations relevant for the workshop's objectives and adequate in providing the necessary context for both the workshop and, by extension, the project's tasks?



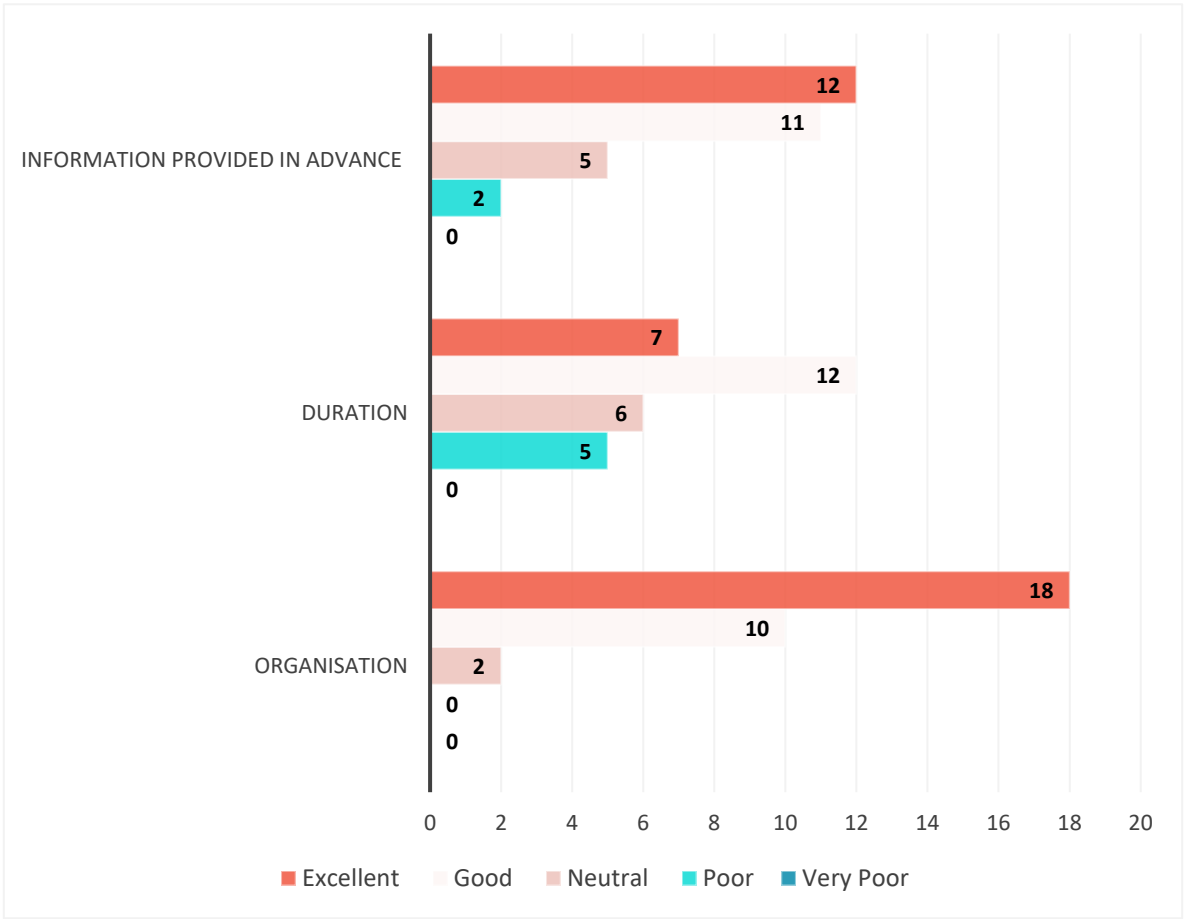
2.2 Further comments or feedback on the presentations:

- Discussions differed in quality. Table 4 was really Sheryl, table 5not. Table 1b was too general
- Congratulations!!
- Sound organisation, great work!
- Too less time for discussion
- Would have need more time, but excellent event! Great Job!!
- Excellent organization! Fruitful discussions, personal involvement. Thanks to Maria Vilar!!! And her excellent team!!!
- Need more focus and depth in the discussions
- I would have liked longer group discussions.
- Presentations were great but some real life experiences of ams and ipc programs would have been a nice addition
- The talks were a bit general but good. A bit more detail on examples would be good next time.

3 EVALUATION OF THE ACTION MOMENTS



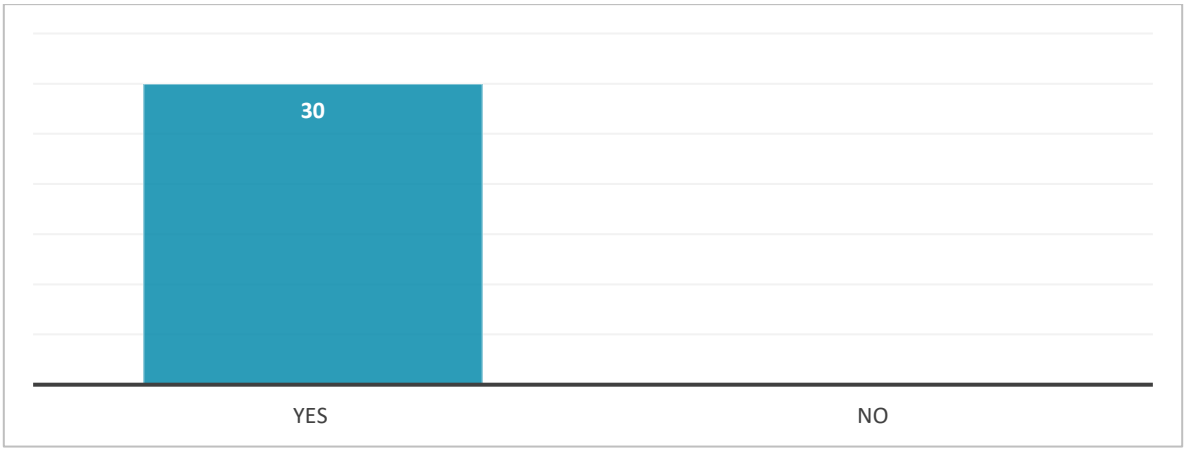
3.1 Evaluation of different aspects of the action moments



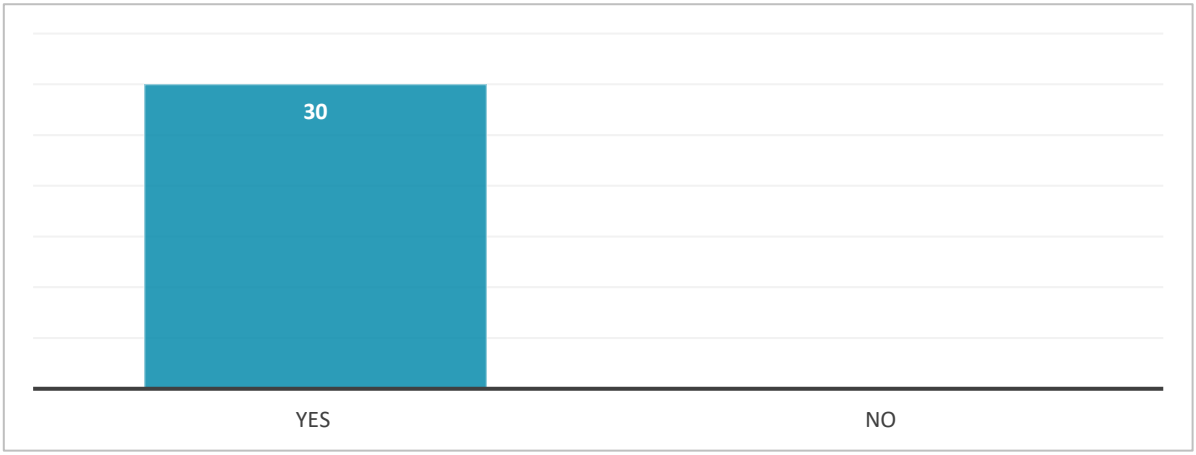
3.2 Further comments or feedback on the action moments:

- The sessions were a little bit too short, especially the one for the barriers
- Too less time for discussion
- More depth needed in the discussion
- Maybe I missed this since there was a lot of information but I felt the participants were not well prepared for the discussions and it took some time to explain the task
- I know it is difficult, but it would have been nice to have a little extra time (+15 minutes) to discuss/agree on what the group is going to present.
- I would have preferred to have a longer time for discussion even if this meant covering less topics - otherwise I found the discussion was often cut off too early for an in-depth discussion. I also think the moderator made a big difference to the experience - I really appreciated the groups where we had a moderator who had come prepared with materials, and made an effort to ensure that everyone in the group had a chance to speak. I think also that having more information in advance of the action moments would have helped save time during the discussions themselves. But overall I really enjoyed these sessions, as it meant we had the chance to engage with others at the conference in meaningful discussion.
- Maybe narrower subject with more focus
- Recursos/tecnología actuals

4 EVALUATION OF THE GROUP DISCUSSION



4.1 Did you find the group discussion relevant for the workshop's objectives and adequate in providing the necessary context for both the workshop and, by extension, the project's tasks?



4.2 Further comments or feedback on the group discussion:

- Perhaps a bit more time for discussion between all delegates

5 SPECIFIC TIPS OR SUGGESTIONS FOR IMPROVING OUR NEXT WORKSHOP

- More face to face meetings and collaboration with stakeholders
- Allow more time for group work if possible.
- Thank you!
- More focus on lived experiences and less abstract ideas
- Keep up the good work and the synergy! It is very inspiring to see how well IPC and AMS Vet team works together.
- I would consider running the workshops with slightly smaller groups (so that everyone can actively participate in the discussion) and leaving more time in each session (even if it means each participant only covers two topics at most).

EU-JAMRAI

Joint Action
Antimicrobial Resistance and
Healthcare-Associated Infections

EU-JAMRAI Partners involved in the elaboration of this document:

EU-JAMRAI 2 receives funding from the European Union's EU4Health programme under grant agreement No 101127787. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or HaDEA. Neither the European Union nor the granting authority can be held responsible for them.