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SCAR AH&W – SRIA Workshop
Breakout session 1 – Subgroup 1

“Surveillance and diagnostics”

Rapporteurs: Dolores Gavier-Widen and Florence Tardy

10/11/2022

Agenda: Breakout session 1
Members' view: planned activities

- Two other parallel thematic subgroups: farm practices, treatments and vaccines
- Two parts
  - PART1 : "To what extent will the EUP PAHW contribute to a list of broad areas of work". **~30min**
  - PART2: "Classify a selection of 'Research & other needs' of the SRIA into categories, i.e. external open calls, internal research calls, Research calls (external open or internal), reference and integrative activities or joint actions.
- Lunch break 12h30-13h30

- Wrap-up 14h30 before a coffee break and presentation to a plenary session (15h00)

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Surveillance and diagnostics_ BOS1_Part1

- Starting from the broad areas of work that have been identified, we want to know whether you (RPOs, FOs and authorities) think that the activities that will be performed in the EUP PAHW will contribute to these domains, and to what extent (give a score between 0 to 10)

- Selected broad areas
  - One Health approach
  - Big data
  - Social science
  - Bridging Health and Welfare

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Surveillance and diagnostics_ BOS1_Part1
One Health approach

- **(CDC definition) One Health** is a collaborative, multisectoral, and transdisciplinary approach—working at the local, regional, national, and global levels—with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment.

How to implement One Health to surveillance and diagnostics of animal health/disease and how does it relate to the rapidly growing One Welfare movement? What would need to be done? How would networking integrating different One Health sectors and actors contribute? Is it critical/necessary/beneficial for achieving the aims of EUP AH&W? - how-why?

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Surveillance and diagnostics_ BOS1_Part1
Big data

RESEARCH ARTICLE

What is your definition of Big Data? Researchers' understanding of the phenomenon of the decade

Maddalena Favaretto*, Eva De Clercq, Christophe Olivier Schneble, Bernice Simone Elger
Institute for Biomedical Ethics, University of Basel, Basel, Switzerland

- Many definitions. "Big Data is like teenage sex: everyone talks about it, nobody really knows how to do it, everyone thinks everyone else is doing it, so everyone claims they are doing it . . ." @Dan Ariely, 2013

- Consensus: "Big data refers to large, diverse sets of information that grow rapidly. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered ("three v's")".

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What do we mean by big data in the EUP PAHW?
How is it/can be applied to surveillance, diagnostics?
What are the main challenges of working with big data?

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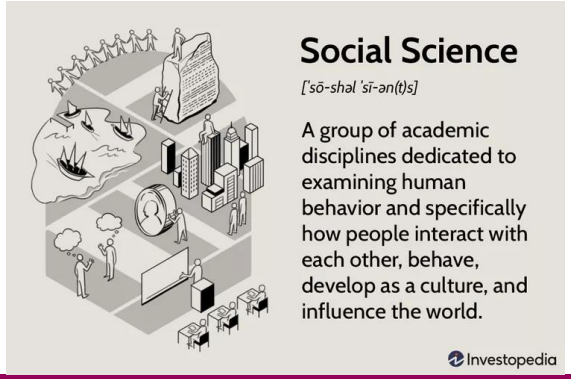
Surveillance and diagnostics_ BOS1_Part1
Social science

- Definition: social sciences (Anthropology, Economics, Political science, Sociology, Social psychology) examine the relationships between individuals and societies as well as the development and operation of societies
- How does EUP AH&W work with social sciences? Why?
- E.g. Acceptability of some surveillance systems, consumers' willingness to pay for AW improvements, incentives and barriers to adopting innovations and practices such as welfare labelling schemes, perception of health risks and improve dialogue and collective governance of the management of crisis situations in a process of health democracy…



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Surveillance and diagnostics_ BOS1_Part1
Bridging AH and AW

- Why do we have AH and AW in this Partnership together? Synergies, benefits, challenges?
- Poor health leads to poor welfare. The reverse is also true: poor welfare (stress, low resilience, aggression and injuries) will promote infectious and non-infectious health challenges.
- Good welfare helps to reduce health problems.
- The principles of animal disease surveillance and diagnostics are well developed, and applied at EU level. This knowledge can help to better understand and standardise EU wide animal welfare assessment and monitoring.

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Surveillance and diagnostics_ BOS1_Part2

- Classify a selection of research & other needs into types of activities

Research and other needs (SHORT NAMES)	External call	Internal call	Ext or Int call	Reference activity	Integrative activity	Joint action	No suggesti
Global preparedness to animal infectious diseases							
Wildlife watch (pathogen detections) for early warning							
Integrated big data (genomic, clinical and epidemiological data)							
AMR surveillance for veterinary pathogens							
Progress prediction models for animal infectious diseases							
Understanding host-pathogen interactions							
Development of diagn. tools in both vectors and animal hosts							
High-throughput technologies in diagnostics							
Field diagnostics and welfare assessment							
Sampling methodologies							
Assessing the risks and consequences of animal H&W issues							
Tools for an efficient monitoring of animal welfare							

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Categories of activities (reminder)

- **External open research**
  - Allow to include external RPO and/or private partners to bring **in new technologies and additional expertise** that is not available in the partnership consortium, and to facilitate uptake by industry.
- **Internal research**
  - Research for which **the technologies and expertise are available within the consortium**; to **reinforce the cooperation among the partners**, to strengthen their tasks for the authorities through setting up integrative research calls: capacity building, data sharing and risk assessment; policy driven research ('preparedness').
- **Reference and Integrative activities**
  - All **non-research actions** (dealing with reference tasks or not) that support cooperation between partners to strengthen their duties to the authorities.
- **Joint actions**
  - Thematic networking, education & training (summer schools, workshops, PhD, etc.), support regulatory processes, etc.

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Global preparedness to AID

- OO1. To design and harmonize surveillance and monitoring systems for animal health and welfare

  - Action 1. **Optimize and extend** to other countries current surveillance systems for animal health and zoonotic infections and to **develop new ones**, where needed

    - Selected research need (years1&2)
      - Improvement of surveillance and preparedness for emerging and “exotic” diseases.
      - Improvement includes the integration of NGS protocols in the surveillance allowing to estimate the impact of genetic diversity of pathogens and animals on the likelihood of emergence of AID

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Wildlife watch (pathogen detections) for early warning

- OO1. To design and harmonize surveillance and monitoring systems for animal health and welfare

  - Action 2. Set up a European wildlife network (both terrestrial and aquatic animals), based on existing wildlife disease surveillance and reporting systems, to coordinate and expand their activities, to analyse wildlife populations in Europe, and to analyse what specific data with reference to potential threat to animals and humans are needed
    - Selected research need (years1&2)
      - Develop methods/tools for the design of efficient wildlife surveillance systems for early warning, early detection, monitoring of pathogen diversity, frequency and animal health implications

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Integrated big data (genomic, clinical and epidemiological data)

- OO1. To design and harmonize surveillance and monitoring systems for animal health and welfare

  - Action 3. Create networks that bring together bio-informatics and epidemiology, to harmonise metagenomic data and data collection methods, to integrate genomic, clinical and epidemiological data, applicable to both livestock/aquaculture and wildlife

    - Selected research need (years1&2)

      - Manage Big data, GIS, NGS; progress bioinformatics, improve sharing data integration and better use of existing data; interoperability of existing data bases and systems (building functional interfaces allowing exchange).

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AMR surveillance for veterinary pathogens

- OO1. To design and harmonize surveillance and monitoring systems for animal health and welfare

  - Action 4. Monitor pathogens of veterinary importance (that are not covered in One Health calls) and their antimicrobial resistance profiles.

    - Selected research need (years1&2)
      - Surveillance of pathogens of veterinary importance and their AMR in connection with measuring animal health and welfare indicators
      - In order not to forget about the need of AMR surveillance of pathogens of veterinary importance (not covered in one health).

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Progress prediction models for AID

- OO1. To design and harmonize surveillance and monitoring systems for animal health and welfare

  - Action 5. Build networks, develop FAIR data and implement FAIR principles for the monitoring of (re)emerging animal health and welfare issues, and to develop a hazard monitoring and early warning service.

    - Selected research need (years1&2)

      - Progress prediction methods to identify new and emerging diseases and when they may become a threat to Europe in relation to international trade, global warming and climate change (e.g. new diseases, transboundary and vector borne diseases)

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Understanding host-pathogen interactions

- OO2. To develop diagnostic procedures, methodologies and tools to support the monitoring of animal health

  - Action 1. Gain knowledge on priority pathogens (i.e. bacteria, parasites, viruses, fungi, prions including resistance patterns) responsible for important economic losses or high risk of transmission to humans and their detection methods, including metagenomics approaches, molecular markers of interest, etc

    - Selected research need (years1&2)
      - Deepen understanding of host-pathogen-microbiome interactions, co-infections and mechanisms by which emerging pathogens transgress species barriers

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Development of diagn. tools in both vectors and animal hosts

- OO2. To develop diagnostic procedures, methodologies and tools to support the monitoring of animal health

  - Action 2. Development, optimisation and standardisation of reliable, faster, potentially automatable and/or scalable direct antigen/genome amplification/detection and indirect detection/immune response assessment tools/technologies; tools for the rapid detection of drug-resistant bacteria, viruses, fungi or parasites; on-farm, pen-site diagnostics for pathogens and antimicrobial resistance; focus on priority pathogens and those that do not have EURL.

    - Selected research need (years1&2)
      - Develop, optimise, apply and harmonise diagnostic tools enabling the early detection and reliable monitoring of infections, in both vectors and vertebrate hosts

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High-throughput technologies in diagnostics

- OO2. To develop diagnostic procedures, methodologies and tools to support the monitoring of animal health

  - Action 2. Development, optimisation and standardisation of reliable, faster, potentially automatable and/or scalable direct antigen/genome amplification/detection and indirect detection/immune response assessment tools/technologies; tools for the rapid detection of drug-resistant bacteria, viruses, fungi or parasites; on-farm, pen-site diagnostics for pathogens and antimicrobial resistance; focus on priority pathogens and those that do not have EURL.

    - Selected research need (years1&2)
      - Develop and apply high-throughput technologies (metagenomics, sequencing, machine learning and bioinformatics) for unbiased non-targeted, multi-target and quantitative diagnostics

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Field diagnostics

- OO2. To develop diagnostic procedures, methodologies and tools to support the monitoring of animal health

  - Action 2. Development, optimisation and standardisation of reliable, faster, potentially automatable and/or scalable direct antigen/genome amplification/detection and indirect detection/immune response assessment tools/technologies; tools for the rapid detection of drug-resistant bacteria, viruses, fungi or parasites; on-farm, pen-site diagnostics for pathogens and antimicrobial resistance; focus on priority pathogens and those that do not have EURL.

    - Selected research need (years1&2)
      - Develop and apply new, cheap, accurate, rapid and easy-to-use field diagnostic tests and diagnostic techniques, including pen-side diagnostics for the early detection of pathogens

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Sampling methodologies

- OO2. To develop diagnostic procedures, methodologies and tools to support the monitoring of animal health

  - Action 5. Development of non or less invasive and more convenient sample collection methods, including new matrices as well as transport, storage, treatment strategies and corresponding diagnostic tools, also suitable for the detection of diseases in free-ranging or wild animals.

    - Selected research need (years1&2)
      - Develop new sampling methodologies and strategies

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Assessing the risks and consequences of animal H&W issues

- OO4. To adapt risk assessment and alert communication to the new needs in animal health and welfare
  - Action 1. Enhance rapid risk and consequence assessment methodologies, to assess the economic, social, environmental and cross sectoral consequences of animal health and welfare issues.

    - Selected research need (years1&2)
      - Investigation into and application of science-based AH and AW risk assessment criteria in real life and under different husbandry conditions

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Tools for an efficient monitoring of animal welfare

- OO4. To adapt risk assessment and alert communication to the new needs in animal health and welfare

  - Action 6. Develop animal welfare surveillance and its evaluation, develop indicators and alarm levels, produce factsheets and any relevant digital infrastructure that enable risk assessment of any breach in animal welfare

    - Selected research need (years1&2)
      - Develop animal welfare monitoring and its evaluation

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Thank you for your attention

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