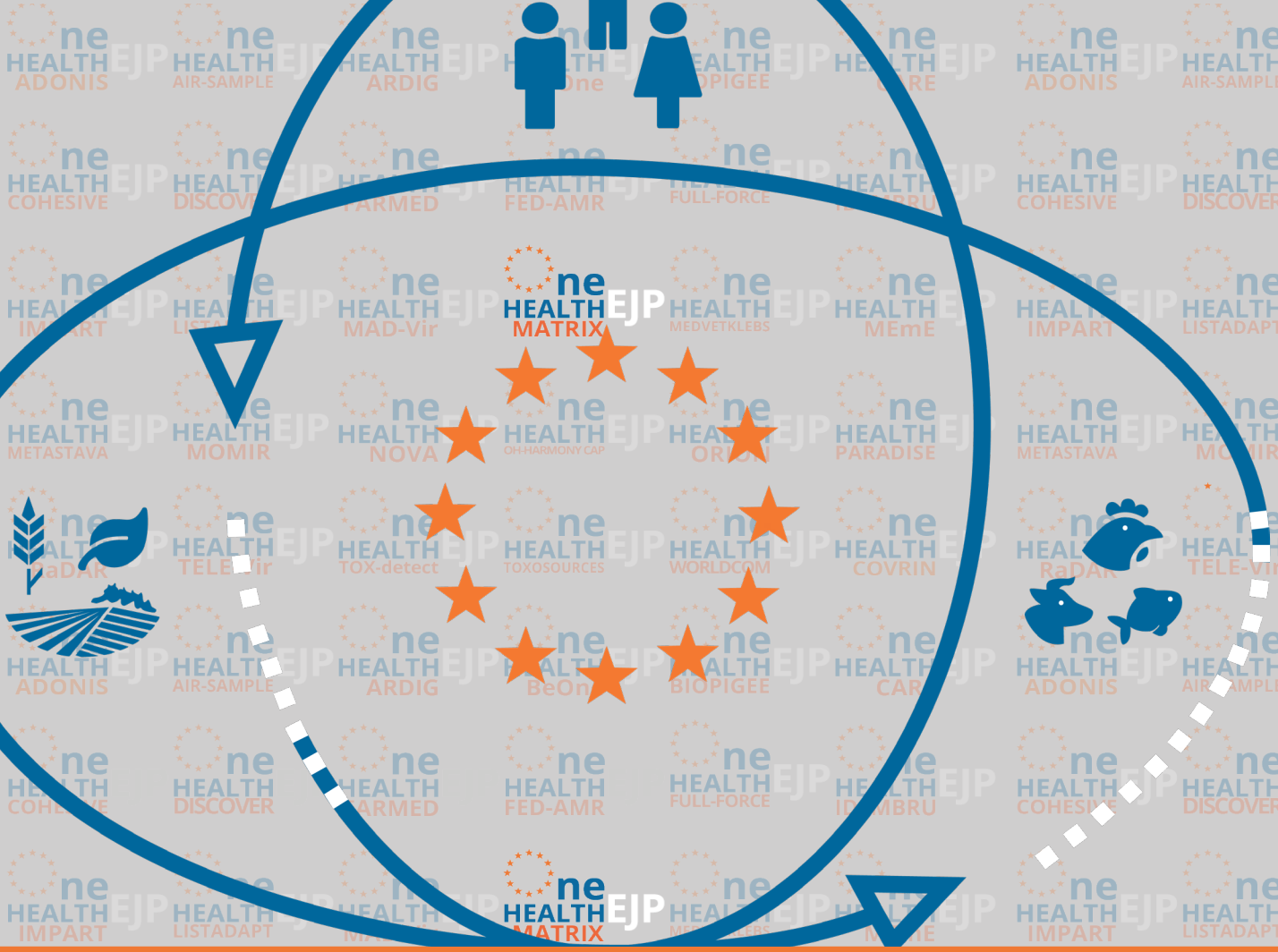

OHEJP PROJECT OUTCOMES

MATRIX

Connecting dimensions in One-Health surveillance

August 2023

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WHAT IS ONE HEALTH SURVEILLANCE? HOW CAN IT BE ADVANCED?

At the end of 2021, the One Health High Level Expert Panel (OHHLEP), which is an advisory panel created by the Food and Agriculture Organisation of the United Nations (FAO), the World Organisation for Animal Health (WOAH), the United Nations Environment Programme (UNEP) and the World Health Organisation (WHO), proposed a new definition of One Health: 'One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development'.

Traditionally, systems for disease surveillance gather information, which is then transformed into actions to solve a public health problem e.g. information 'for making public health decisions', 'for disease prevention, detection, and control'.

Recently, advancements have been made to recognise and apply the One Health approach to the surveillance of diseases and hazards, however relevant sectors are too often distant, remaining discipline- and pathogen-oriented (Bordier 2020). 'Embracing a One Health approach means sharing a mutual responsibility with other sectors in the health arena. All relevant sectors can collaborate and be actively involved in the detection, assessment and response of a zoonotic threat. However, collaborations are not always easy. For example, considering a specific pathogen, the public health, animal health and food safety sectors might have different objectives and therefore different response strategies to address surveillance and outbreaks. They might report to different authorities and stakeholders, and have different funding sources. Additionally, their data systems might not be aligned, making the exchange of information difficult, if not impossible' (OHEJP CPD Module 2022).

The One Health EJP uses its unique position to facilitate a collaborative approach between institutes to deliver important multisectoral research and attain optimal health and wellbeing outcomes for humans, animals and the environment. We bring together 43 acclaimed European scientific institutes and the Med-Vet-Net Association working together on 47 research projects to address potential and existing risks that originate at the animal-human-environment interface.

THE MATRIX PROJECT AND ITS OUTCOMES

The MATRIX project consists of 19 partner institutes from 12 European countries: National Institute for Agricultural and Food Research and Technology (INIA) in Spain; National Health Institute Dr. Ricardo Jorge (INSA) in Portugal; Statens Serum Institut (SSI) and the Technical University of Denmark (DTU) in Denmark; Agency for Food, Environmental and Occupational Health & Safety (ANSES) in France; University of Surrey (UoS) and Animal and Plant Health Agency (APHA) in the United Kingdom; The Swedish National Veterinary Institute (SVA) and the Public Health Agency of Sweden (FoHM) in Sweden; The Norwegian Institute of Public Health (NIPH) and the Norwegian Veterinary Institute (NVI) in Norway; the Friedrich-Loeffler-Institut (FLI) and the German Federal Institute for Risk Assessment (BfR) in Germany; the Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise (IZSAM) and the Istituto Superiore di Sanità (ISS) in Italy; the National Veterinary Research Institute (PIWET) in Poland; the Finnish Food Safety Authority (RUOKA) in Finland; the National Institute for Public Health and Environment (RIVM) and the Wageningen Bioveterinary Research (WBVR) in The Netherlands. There was also one external partner, the University of Copenhagen (UCPH) in Denmark.

With these partnerships between animal health (AH), public health (PH) and food safety (FS) institutes, the MATRIX project aimed to advance the implementation of One Health Surveillance (OHS) in European countries, by identifying and extending existing cross-sectoral programmes.

MATRIX created solutions for European countries to support and advance the implementation of OHS, also known as the MATRIX Solutions for One Health Surveillance. They are:

- OH-EpiCap Tool – an interactive tool to evaluate the capacities and capabilities for the OHS of a hazard of choice, identifying strengths and opportunities for improvement. Additionally, the tool allows the bench marking of surveillance capacities and capabilities for comparison. More information is available here: OH-EpiCap tool flyer and OH-EpiCap tool user guide.
- Roadmap to develop national OHS – a guideline that countries can use to develop OHS according to their needs and resources. The roadmap expanded the work of the OHEJP COHESIVE project and is available at www.ohras.eu/page/home
- Manual for OHS Dashboards – an online dashboard inventory and practical manual to facilitate the design and implementation of OHS dashboards using open-source tools. More information is available here: Dashboard Information Centre.
- Guidelines and checklists:
    - An interactive guide to facilitate the development of multi-sectoral OHS frameworks from existing animal health, public health and food safety surveillance systems. A beta version is available here.
    - Best-practices to operationalize cross-sectoral collaborations with a focus on data collection, data sharing, data analysis, and the dissemination of surveillance results – available here.
    - A guide to design, implement, and evaluate official controls within the food safety sector using output-based standards – available here.

MATRIX also promoted and expanded:

- The OHS Codex: The Knowledge Integration Platform – a framework to integrate various resources that help to implement OHS in all sectors.
- Food Safety Knowledge Exchange (FSKX) Format – a format that supports the One Health community in sharing and re-using mathematical models as well as data analysis procedures.

The problem-oriented approach of the project was reflected in the creation of hazard-specific tracks to ensure that the MATRIX Solutions for One Health Surveillance were relevant to specific pathogens. In actuality, MATRIX meant 'a frame of solutions and hazards'. The hazards were chosen based on the operational priorities of MATRIX partner institutes and their One Health relevance. They were *Listeria*, *Salmonella*, *Campylobacter* and emerging threats, including antimicrobial resistance, viruses and parasites.

MATRIX invited European institutes working in the animal health, public health and food safety sectors to consider the opportunity to adopt these solutions and to further build upon them.

SCIENTIFIC PUBLICATIONS

The OHEJP MATRIX project worked towards the creation of solutions to support and advance the implementation of One Health Surveillance in European countries.

Rivers, S., Kochanowski, M., Stolarek, A., Ziętek-Barszcz, A., Horigan, V., Kent, A. J. & Dewar, R. (2023). A framework for the design, implementation, and evaluation of output-based surveillance systems against zoonotic threats. *Frontiers in Public Health*. 11, 1129776. DOI: https://doi.org/10.3389/fpubh.2023.1129776

Amato, L., Benedetti, G., Di Giuseppe, P., Hénaux, V., Lailler, R., Nordeng, Z., Scharffenberg, T. A. Z., Skjerdal, T. & Cito, F. (2023). Mapping food surveillance chains through different sectors. *Frontiers in Public Health*. 11, 1129851. DOI: https://doi.org/10.3389/fpubh.2023.1129851

Tegegne H. A., Bogaardt C., Collineau L., Cazeau G., Renaud Lailler R., Reinhardt J., Taylor E. L., Prada J. and Hénaux V. OH-EpiCap: a semi-quantitative tool for the evaluation of One Health epidemiological surveillance capacities and capabilities. *Frontiers in Public Health*. 11, 2023. DOI: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1053986/abstract

Rodríguez, A., Iglesias, I., de la Torre, A. (2022). Prioritisation tool for targeting the monitoring of veterinary pharmaceuticals at national level: the case of Spain. *European Journal Soil Sciences*. 73(4): e13268. DOI: https://doi.org/10.1111/ejss.13268

Swanson, D., Koren, C., Hopp, P., Jonsson, M.E., Rø,G. I., White, R. A., Grøneng, G. M. (2022). A One Health real-time surveillance system for nowcasting *Campylobacter* gastrointestinal illness outbreaks, Norway, week 30 2010 to week 11 2022. *Euro Surveillance*. 27(43): 2101121. Available at: https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.43.2101121

Sundermann, E. M., Correia Carreira G., Käsbohrer, A. (2021). A FSKX compliant source attribution model for salmonellosis and a look at its major hidden pitfalls. *Food Modelling Journal*. 2: e70008. DOI: https://doi.org/10.3897/fmj.2.70008

Sundermann, E. M., Nauta, M., Swart, A. (2021). A ready-to-use dose-response model of *Campylobacter jejuni* implemented in the FSKX-standard. *Food Modelling Journal*. 2: e63309. DOI: https://doi.org/10.3897/fmj.2.63309

Image: libreshot

MEET THE TEAM

Each of the One Health EJP projects creates a unique network of institutes across Europe with wide ranging expertise to achieve objectives using a One Health approach.

The MATRIX project worked collaboratively to achieve its aims and to create solutions for One Health Surveillance which could benefit scientists and policy makers across the globe.

Leading partners of the MATRIX Solutions for One Health Surveillance were:

- Agency for Food, Environmental and Occupational Health & Safety (ANSES), France. **Viviane Henaux**, leading partner on OH-EpiCap Tool;
- University of Surrey (UoS), United Kingdom. **Joaquin Prada**, leading partner on OH-EpiCap Tool;
- The Swedish National Veterinary Institute (SVA), Sweden. **Mia Holmberg** and **Estelle Ågren**, leading partners on the Roadmap to develop national One Health Surveillance, and **Wiktor Gustafsson**, leading partner on the Manual for One Health Surveillance Dashboards;
- The Norwegian Institute of Public Health (NIPH), Norway. **Gry Marysol Groneng**, leading partner on the Manual for One Health Surveillance Dashboards;
- Friedrich-Loeffler-Institut (FLI), Germany. **Johanna Dups-Bergmann** and **Carola Sauter-Louis**, leading partners on the Interactive guide to developing multi-sectoral surveillance systems;
- German Federal Institute for Risk Assessment (BfR), Germany. **Matthias Filter**, leading partner on the One Health Surveillance CODEX: The Knowledge Integration Platform and Food Safety Knowledge Exchange (FSKX) Format and Yvonne Mensching;
- Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, Italy (IZSAM). **Francesca Cito** and **Laura Amato**, leading partners on the Best practices to operationalize cross-sectorial collaborations.
- Animal and Plant Health Agency (APHA), United Kingdom. **Verity Horigan**, leading partner on the guide to design, implement, and evaluate official controls within the food sector using output.
- National Veterinary Research Institute (PIWET), Poland. **Maciej Kochanowski**, leading partner on the guide to design, implement, and evaluate official controls within the food sector using output.
- Statens Serum Institut (SSI), Denmark. **Guido Benedetti**, MATRIX project leader, Caroline Eves and Stine Kjær Lefèvre.