

The further need for strengthening One Health collaboration at national level

Moderator:

Annemarie Käsbohrer

BfR

Dolores Gavier-Widén

SVA

“A success and challenges story from Portugal”

Monica Oleastro

OHEJP Scientific Steering Board member, INSA





A success and challenges story from Portugal

M. Oleastro, A. Botelho (INSA & INIAV, Portugal)

One Health EJP Final Meeting

Paris, 11-12 September 2023



OH EJP Partners from Portugal

INSA, National Health Institute (Infectious Diseases & Dep.)



INIAV, National Institute of Agrarian and Veterinary Research, National Reference Laboratory for Animal Health





OH EJP Partners & Projects from Portugal

INSA, National Health Institute (Infectious Diseases & Dep.)



3 JIP

MATRIX
OH-HARMONY-CAP
COVIRIN

10 JRP

EMERGING THREATS

IDEMBRU
MEME
TELE-VIR

FOODBORNE ZOOSES

DISCOVER
TOXOSOURCES
ADONIS
BEONE

ANTIMICROBIAL RESISTANCE

FULL-FORCE
WORLDCOM
FED-AMR

INIAV, National Institute of Agrarian and Veterinary Research, National Reference Laboratory for Animal Health



3 JIP

COHESIVE (1st call)
OH-HARMONY-CAP
COVIRIN

6 JRP

EMERGING THREATS

IDEMBRU
MEME
PARADISE

FOODBORNE ZOOSES

DISCOVER
TOXOSOURCES
ADONIS

ANTIMICROBIAL RESISTANCE

GENERAL OUTCOMES

- OH EJP raised awareness at the national level regarding OH concept

Institute Level

- Scientific Progress (**scientific papers, thesis**)
- Technical progress - **New Diagnostic/Surveillance Tools**
 - reference databases of bacterial strains and genomes
 - harmonised procedures
 - validated metagenomics methods and guidelines
 - new molecular tools
 - handbooks
 - surveillance-oriented tools
- Capacity building for researches - **Short Term Missions**
- This consortium enrolled teams with different skills that are still collaborating and exchanging experiences after the conclusion of the OHEJP projects
- Hiring specialized human resources in bioinformatics / microbial genomics that are now part of the INSA's team.



GENERAL OUTCOMES- capacity building

SHORT TERM MISSION (2022) in the frame of DISCOVER project (DTU)

Surveillance and source-attribution of AMR based on metagenomic analysis

- Dataset of 34 metagenomes from aquaculture sediments from Portugal



Antimicrobial resistance determinants
in aquaculture environments

- ✓ Implementation of these new approaches in INIAV
- ✓ Establishment of collaboration and improvement of scientific and technical capacity

SOURCE ATTRIBUTION OF ANTIBIOTIC RESISTANCE GENES IN ESTUARINE AQUACULTURES: A MACHINE LEARNING APPROACH

GENERAL OUTCOMES

Organizations / country level



- FAILURE to share National databases
- FAILURE to implement ONE HEALTH system involving different levels of organizations
- To some extent, FAILURE to translate suggestions and outputs into practice at national level.

WEAKNESS

- The AH and PH institutes prioritized different projects to participate in; the collaboration between both institutes was not as fruitful as desired
- Failure to engage the Programme Owners (the representatives of the ministries)
- **Unable to set up a national mirror group** that could have helped at enhancing collaboration and promote dissemination at a national level on progress of the project.

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Further need to strength One Health collaboration at national level



Further need to strength One Health collaboration at national level

- Establishment of a **One Health system** dependent on a proactive approach, focusing on “**prevent-detect-respond**”, rather than a reactive approach
- Development of a **standardized system** for the joint assessment of zoonotic disease risks;
- Creation of a **common database for building sustainable mechanisms of communication**, collaboration, and aligned local, regional, national, and international strategies
- **Put in practice national level polices**, beyond each institution, supporting collaboration, creating social, cultural, and educational environments that could reduce the gap between AH and PH
- **Changes in cultural, social, and institutional practices** within the country’s organizational system
- **Daily** multisectoral and transdisciplinary collaboration
- **Science-policy translation and political will**

ONE HEALTH IN PRACTICE: LESSONS FROM A NATIONAL / INTERNATIONAL COLLABORATION

COHESIVE: One Health Structure In Europe

- ❖ Development of a practical guideline (**OHRAS**) to help countries organizing the risk-analysis of emerging zoonoses in a One Health fashion (<https://master.daf3qs583gvkb.amplifyapp.com/>)
- ❖ Map of the current national (Portugal) situation: a pilot tool (workshop) bringing together key actors involved in the risk analysis of zoonoses was held at INIAV.
 - ❖ **The Portuguese participants agreed on the following suggestions:**

Raise awareness across sectors, generating cross-sectoral perspectives, and building on trusting relationships.

Establish a national OH community of practice, strengthening communication and data sharing across sectors, thus enabling signals to result in action across sectors.

Identification of gaps as well as strengths of already existing OH systems, enhancing the use of existing resources.

ONE HEALTH IN PRACTICE: LESSONS FROM A NATIONAL / INTERNATIONAL COLLABORATION - **SimEx**

Instituto Nacional de Saúde
Doutor Ricardo Jorge



Instituto Nacional de
Investigação Agrária e
Veterinária, I.P.



NATIONAL EXERCISE LEADER
LOCAL EXERCISE LEADER

Food-borne disease expert



LOCAL EVALUATORS



Public Health
Doctors



Veterinaries



Laboratory personnel
Epidemiologists



Clarification regarding the
roles and functions of
available systems

Need of harmonization
and data sharing

Need of political and
organizational
willingness and
commitment

Constraints of existing
legislation

Figure 1. Portuguese SimEx participants

TRIGGER OF TECHNICAL-SCIENTIFIC ADVANCEMENTS AND THEIR TRANSLATION INTO THE INSTITUTIONAL CONTEXT



Instituto Nacional de Saúde
Doutor Ricardo Jorge



João Santos, PhD, Population Genomic Analysis, Bioinformatics, multiple model organisms

“The TELEVIR project has given me the opportunity to develop my own skills while exploring the exciting worlds of microorganisms and health alongside a motivated and hard-working team. As a OHEJP fellow I integrated an international network collaborating to produce cutting edge and impactful research. It has been a rewarding experience to foster these connections and see my work benefit the important tasks of genomic surveillance and diagnostic at home and internationally.”



2021 – INSA, Department of Infectious Diseases

Postdoc: TELEVIR - Point-of-incidence toolbox for emerging virus threats

<https://onehealthjep.eu/projects/emerging-threats/jrp-tele-vir>

TELEVIR toolbox

virus metagenomics detection and routine
genomic surveillance

Wet-lab component

(field deployable: both RNA and DNA virus)

Bioinformatics component

(user-oriented, online, free)

Available at protocol.io:

<https://www.protocols.io/private/07351F8EB59811ECB1480A58A9FEAC02>

Fomsgaard, A. S et al. Viruses, 15(6), 1399.

<https://doi.org/10.3390/v15061399>.

Available at :

<https://insaflu.insa.pt>



Motivation: the implementation of metagenomic virus diagnostics and routine genomic surveillance can be particularly challenging due to the lack of bioinformatics infrastructures and/or expertise to process and interpret next-generation sequencing (NGS) data.

The screenshot displays the INSaFLU-TELEVIR web interface. On the left, a 'Quality Control' box lists the inputs: a sample metadata table (direct upload in tsv/csv format) and NGS data (just Drag&Drop fastq.gz reads). It notes compatibility with Illumina, Ion Torrent, and Oxford Nanopore, and mentions user-defined software parameters for traceability. The main interface shows three modules: 'Virus Detection' (TELEVIR) with a 'Projects' button, 'Reference-based genome assembly' (INSaFLU) with a 'Projects' button, and 'Nextstrain' with a 'Datasets' button. Brackets below the interface group the Virus Detection module as a 'New virus detection module' and the other two as 'Genome-based surveillance-oriented modules'.

Outcome: INSaFLU-TELEVIR (<https://insaflu.insa.pt/>) is web-based (also locally installable) platform that handles read sequence data (ONT, Illumina and Ion Torrent), enabling the identification of both RNA and DNA viruses, while providing multiple surveillance-oriented features towards mutations detection, consensus generation, lineage/genotype classification, alignments, “genotype-phenotype” screening, phylogenetics, and integrative phylogeographical and temporal analysis.



<https://insaflu.insa.pt>

IMPACT of INSaFLU-TELEVIR platform

- It has been crucial for genomics surveillance of influenza, SARS-CoV-2 and mpox in Portugal.
- The default tool for viral metagenomics at INSA, with bacterial metagenomics applications currently under testing.
- It captured the attention of the international scientific community and key stakeholders in the field of public health (presented in several WHO, ECDC meetings).
- It has been enrolled in multiple national and international training activities to support the capacity building of several countries/laboratories in virus metagenomics detection and genomic surveillance:
 - ECDC programme - AURORAE project - to support microbiology-related activities and capacity building focusing on COVID-19 and influenza in the EU/EEA, the Western Balkans and Turkey”
 - ECDC GenEpi-BioTrain programme in genomic epidemiology and public health bioinformatics.
 - MediLabSecure (<https://www.medilabsecure.com/project.html>) workshops to improve the surveillance and monitoring of emerging zoonotic diseases of viral origin in the Mediterranean, Black Sea and Sahel regions
 - Collaboration actions with African countries of Portuguese official language (namely Guinea-Bissau, Angola, Cape Verde, etc) towards INSaFLU-TELEVIR training and/or implementation in emerging genomic surveillance systems

Dissemination:

OHEJP Webinar on “New tools in the Surveillance/Risk Assessment areas – demonstration of One Health outputs” (28 March, 2023) EJP

OH EJP Stakeholder Conference (19-21 June, 2023)





FINAL BALANCE:

We achieved the Major Aim of the OH EJP -
**IMPROVE OUR
PREVENT-DETECT-RESPONSE CAPACITY**



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**Looking forward for
the OH EJP V2.0!**

Thank you for your
attention!



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