Activities of the WOAH-FAO scientific network on animal influenza (OFFLU)

Gounalan Pavade (OFFLU Secretariat)

Amelia Coggon (OFFLU Scientist)

- Second meeting of the GF-TADs Standing Group of Experts on Avian Influenza (SGE-AI), Mexico

(19- 21 April 2023)

Food and Agriculture Organization of the United Nations

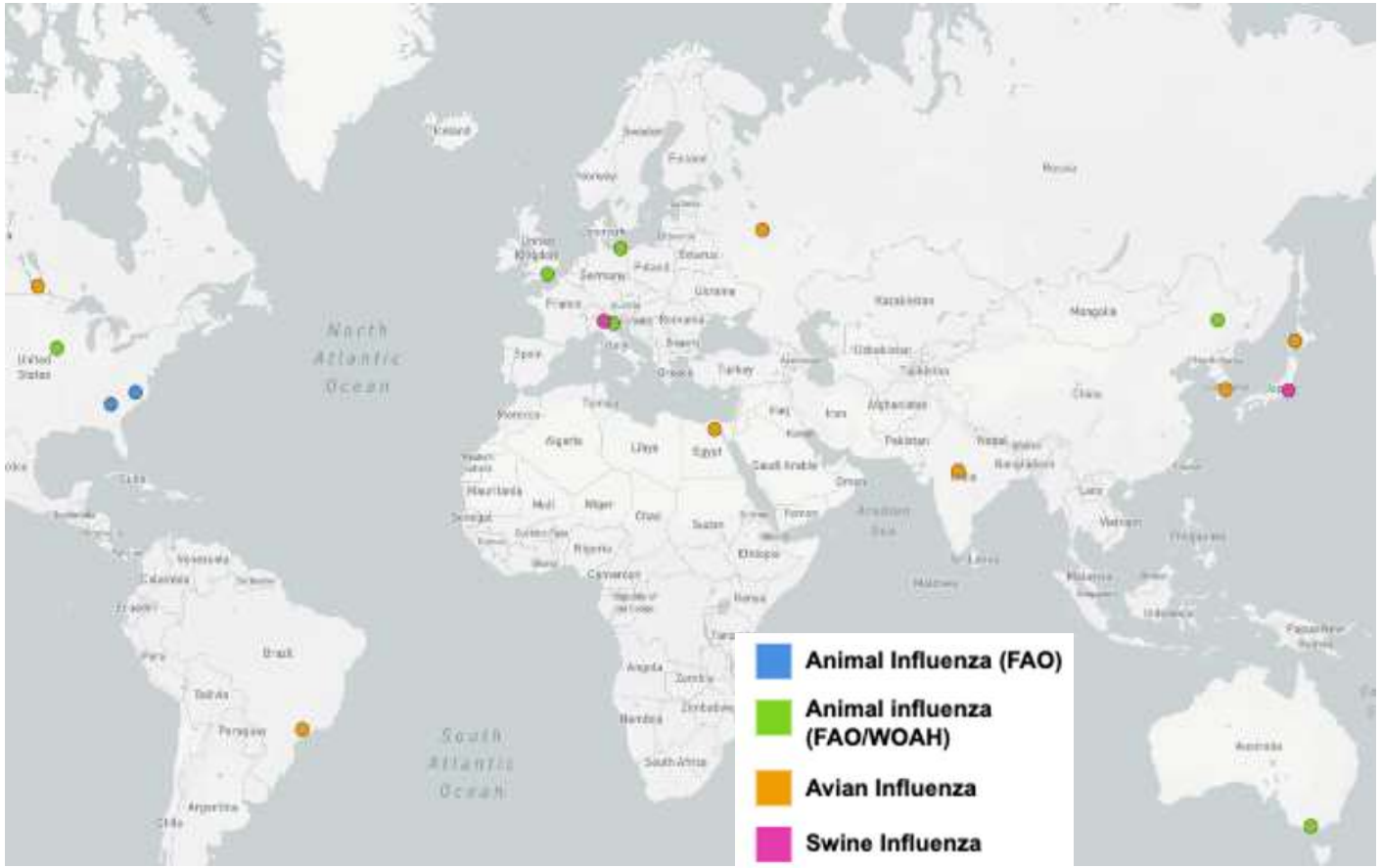
World Organisation for Animal Health

Founded as OIE

The OFFLU network

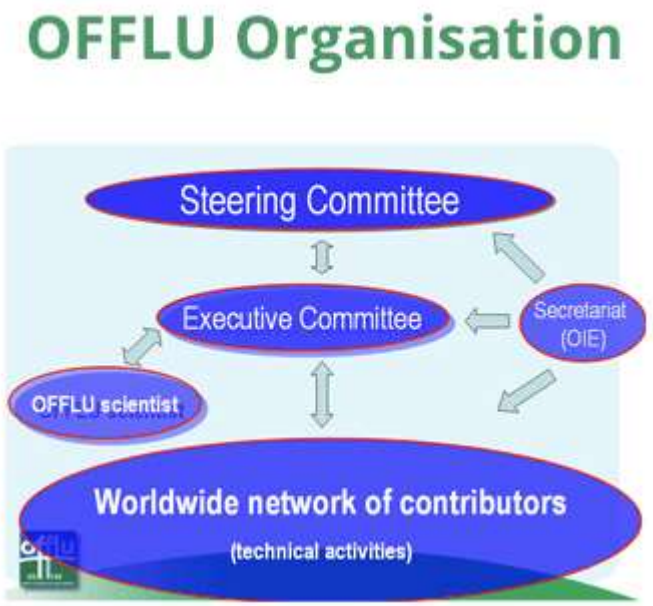
- OFFLU's work covers several themes through its technical working groups
- Avian influenza
- Equine Influenza
- Swine influenza
- Wildlife
- Applied epidemiology
- Human animal Interface
- Protocols and Guidance
- Trainings

OFFLU contributing Laboratory Network



OFFLU steering committee

OFFLU Steering and Executive Committee meetings are held regularly to review the outputs of various ongoing technical activities, provided recommendations for follow ups and approved new technical activities (https://www.offlu.org/index.php/technical-meetings-2/)



Avian Influenza Technical activity

Group Lead: Frank Wong (ACDP, Australia)

- Teleconferences – Share real time epi, molecular, research data (www.offlu.org) – Posted in news and publications
- Risk assessments https://cdn.who.int/media/docs/default-source/influenza/avian-and-other-zoonotic-influenza/h5-risk-assessment-dec-2022.pdf?sfvrsn=a496333a_1&download=true
- https://www.woah.org/app/uploads/2022/05/h3n8-human-ra.pdf
- https://www.offlu.org/wp-content/uploads/2022/06/OFFLU-H3N8-Technical-Statement.pdf
- Influenza A cleavage site document (https://www.offlu.org/wp-content/uploads/2022/01/Influenza-A-Cleavage-Sites-Final-04-01-2022.pdf)
- OFFLU statement on HPAI H5N1 (https://www.offlu.org/wp-content/uploads/2023/03/offlu-one-pager-for-publication_final_V3.pdf)

Influenza A Cleavage Sites version 4th January 2022

Background:

As specified by the OIE **Terrestrial Manual**, for determining pathogenicity of an influenza A virus, the following criteria have been adopted.

- A high pathogenicity influenza A virus is any influenza A virus that is lethal for six, seven or eight of eight 4- to 8-week-old susceptible chickens within 10 days following intravenous inoculation with 0.2 ml of a 1/10 dilution of a bacteria-free, infective allantoic fluid or any influenza A virus that has an intravenous pathogenicity index (IVPI) greater than 1.2;
- For all H5 and H7 viruses of low pathogenicity in chickens, the amino acid sequence of the connecting peptide of the haemagglutinin molecule (HA0) (i.e. the cleavage site) must be determined. The presence of several basic amino acids, inserts of cellular or viral nucleic acids or loss of specific glycosylation sites in the HA0 cleavage site is the genotypic standard for HPAI strains; therefore, if the isolate being tested has an HA0 cleavage site motif identical to previous HPAI viruses, it should be designated as HPAI irrespective of a low or high pathogenicity determined by pathotyping in chickens (see the table that lists all the reported haemagglutinin proteolytic cleavage sites of HA0 protein for H5 and H7 LPAI and HPAI viruses based on deduced amino acid sequence, which can be found on the OFFLU site (see footnote 2). Furthermore any isolate with a new motif must be tested in vivo by IVPI. In case of difficulties in the interpretation of the cleavage site motif, OIE and/or FAO reference laboratories should be consulted

OFFLU proficiency testing

Coordinated by the Australian Centre for Disease Preparedness (ACDP)

Received by WOAH/FAO Reference Centers

Why?

Assess the capability of the laboratories to detect and characterize representative widely circulating lineage of H5, H7 and H9 subtype avian influenza viruses.

Facilitate international testing proficiency

- Test panels are designed to be challenging to allow laboratories the opportunity to fine tune their diagnostic capability.
- Laboratories with results divergent from the expected will investigate the causes as required under their quality assurance system accreditation.

OFFLU Avian Influenza Matching (AIM)

OFFLU scientists are developing new data for matching currently used poultry vaccines to contemporaneously circulating H5 HPAI viruses and will make the outputs publicly available

Sera

- Generation of a panel of standardised poultry sera - **December 2022 – APHA/ISZSVe**
- Isolates *similar* to vaccine seed strains and contemporary H5 clade 2.3.4.4b

HI

- Selection of representative contemporary viruses – **February 2023 APHA/IZSVe**
- Harmonised antigenic characterisation between reference laboratories

Cartography

- Results mapped using antigenic cartography **– Ongoing – RVC**

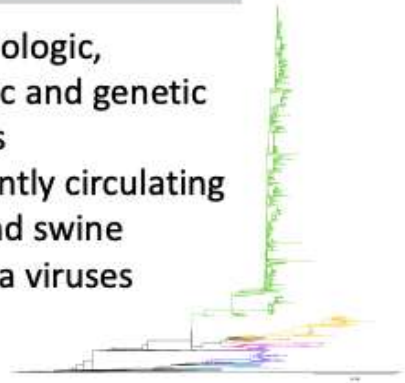
Report

- Summary report presenting the antigenic diversity of currently circulating H5 viruses
- Shared with stakeholders through OFFLU website Soon

OFFLU-AIM-Pilot-Feb23.pdf

Pandemic Preparedness: WHO VCM

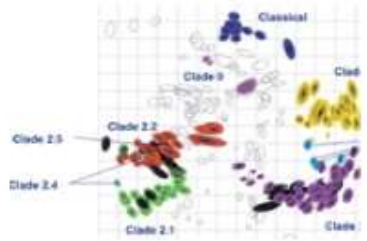
Epidemiologic, antigenic and genetic analyses of currently circulating avian and swine influenza viruses



Evaluation of genetic changes of significance compared to candidate vaccine viruses (CVV) for pandemic preparedness

World Health Organization

- OFFLU datapackage presented
- Bi annual zoonotic VCM consultation
- WHO and OFFLU VCM zoonotic report
- Updates to CVVs



Antigenic properties of viruses quantitatively assessed using harmonized protocols in OFFLU contributing laboratories

https://www.offlu.org/wp-content/uploads/2023/03/OFFLU-Summary-F23.pdf

Swine Influenza Group

Group Lead: Janice Zanellla (Brazil) and Amy Vincent (USA)

- Swine influenzas continued to circulate globally with sporadic spill overs into humans reported in several countries.
- The swine influenza virus group contributes invaluable information to the WHO vaccine composition meeting for influenza prepandemic preparedness. A new candidate vaccine virus was proposed in February 2022 for A(H1) 1A1.1 lineage viruses.
- OFFLU experts contributed to a TIPRA exercise which was initiated due to the wide geographical detection in swine populations and reported of human cases by swine influenza A(H1) 1C lineage viruses since 2017.
- The OFFLU swine influenza group met virtually in June 2022 and shared data about the global swine influenza situation in pig populations by providing regional and country-specific reports from Asia, Europe, Africa and Americas. Participants included scientists conducting influenza surveillance and/or performing influenza research or diagnoses in swine and at the human-swine interface.

OFFLU/WHO One Health collaboration

Activities

- Enhance collective knowledge on risk factors, potential prevention and preparedness measures
- Experts from OFFLU network, FAO, WOAH and WHO
- Mapping Gaps in Avian Pandemic Risk activities
- OFFLU contributing laboratories Laboratories generating reagents

Outputs

- Recommendations on real time risk assessment of pandemic and zoonotic risk
- Operational framework for coordination between the tripartite for risk assessment
- Sharing reagents within the network for use in OFFLU/WHO activities
- Manuscript in progress towards improving pandemic risk assessment

Wildlife influenza technical activity

Lead by Dr Andrew Breed (Australia)/ Dr Thijs Kuiken (Netherlands)

Teleconferences:

- to update on H5N1 events in wild birds in Canada, UK, Israel and other European countries and round table discussion (https://www.offlu.org/wp-content/uploads/2021/12/OFFLU-statement_Newfoundland__H5N1.pdf)
- Improve understanding of the current situation and share initial findings and experiences on the most recent wave of outbreaks in poultry and wild birds in different countries (https://www.offlu.org/wp-content/uploads/2022/12/OFFLU-AI-situation_final_Dec2022.pdf)
- Update of the situation in mammals including molecular analysis, virus dynamic in mammals (pathogenesis, transmission, adaptation, risks), surveillance approaches in mammals, risk to public health, highlight knowledge gaps https://www.offlu.org/wp-content/uploads/2023/03/OFFLU-call-AI-mammals-Mar2023.pdf
- Contributing to scientific task force convened by Convention on Migratory Species (CMS) and the United Nations Food and Agriculture Organization (FAO) https://www.cms.int/sites/default/files/uploads/avian_influenza_0.pdf
  - statement on H5N1 Highly Pathogenic Avian Influenza in poultry and wild birds
  - focus on mass mortality of wild birds in UK and Israel
  - Inform stakeholders about appropriate responses
  - Recommendations and a guide to existing guidance

Applied Epidemiological working group

Coordinated by Professor Dirk Pfiffer

Experts from various institutions give inputs and reviews on a number of documents:

- FAO environmental sampling guidelines for AI surveillance (published later in 2023).
- FAO guiding principles for the design of AI risk-based surveillance in Asia https://www.fao.org/3/cc2005en/cc2005en.pdf
- FAO EMPRES 360 animal health newsletter on information improving effective interventions https://www.fao.org/3/cc2775en/cc2775en.pdf

GUIDING PRINCIPLES FOR THE DESIGN OF AVIAN INFLUENZA ACTIVE SURVEILLANCE IN ASIA

Designing active, comprehensive, risk-based avia

REVIEWERS

Guillaume Fournié – Royal Veterinary College, London, the United Kingdom
Timm Harder – Friedrich-Loeffler Institute, Greifswald, Germany
Youn-Jeong Lee – Animal and Plant Quarantine Agency (OIE reference laboratory for avian influenza), Ministry of Agriculture, Food and Rural Affairs, Gimcheon-si, Republic of Korea
Leslie Sims – Asia Pacific Veterinary Information Services, Melbourne, Australia

PERSPECTIVE

Avian influenza: information must improve effective interventions

Equine Influenza group

Group Lead: Prof. Ann Cullinane (Ireland)

Expert surveillance panel meeting for EI vaccine recommendations

- The Expert Surveillance Panel of Equine Influenza comprising OFFLU and WHO influenza experts met virtually in July 2022
- Reviewed the Equine Influenza virus activity characteristics of the viruses isolated and vaccine performance.
- Since April 2020, outbreaks of EI were reported in Africa, Asia, North and South America, the Middle East and Europe. Equine influenza A(H3N8) viruses were isolated and/or characterised from outbreaks in China, France, Ireland, Israel, Sweden, the United Kingdom (UK), Canada, and the USA.
- The panel recommended that vaccines for the international market should contain both clade 1 and clade 2 viruses of the Florida sublineage.
- The recommendations remain unchanged from previous years.

World Organisation for Animal Health
Founded as OIE

Expert surveillance panel on equine influenza vaccine composition

8th July 2021 and 7th July 2022 by Videoconference

Conclusions and Recommendations

Influenza activity – April 2020 to July 2022

Since the previous meeting in April 2020, outbreaks of equine influenza were reported in Africa, Asia, North and South America, the Middle East and Europe. Equine influenza A(H3N8) viruses were isolated and/or characterised from outbreaks in China, France, Ireland, Israel, Sweden, the United Kingdom (UK), Canada, and the United States of America (USA).

https://www.woah.org/app/uploads/2022/10/expert-surveillance-panel-on-equine-influenza-vaccine-composition.pdf

GF-TAD Avian influenza Strategy

GF-TADs
GLOBAL FRAMEWORK FOR THE PROGRESSIVE CONTROL OF TRANSBOUNDARY ANIMAL DISEASES

Food and Agriculture Organization of the United Nations

World Organisation for Animal Health

offlu
WOAH FAO
network of expertise on animal influenza

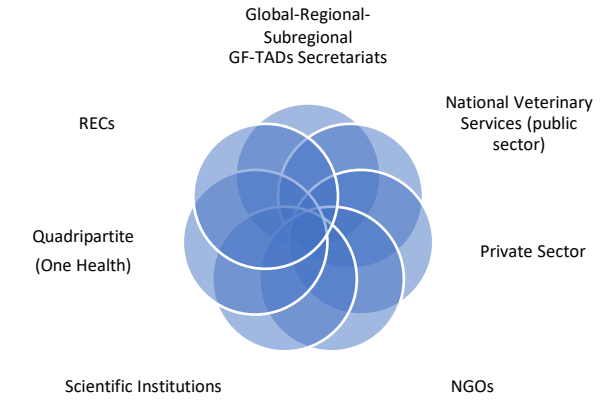
GF-TAD Avian influenza task force established in June 2022, with main task to update/redraft of the Global FAO/WOAH AI Strategy.

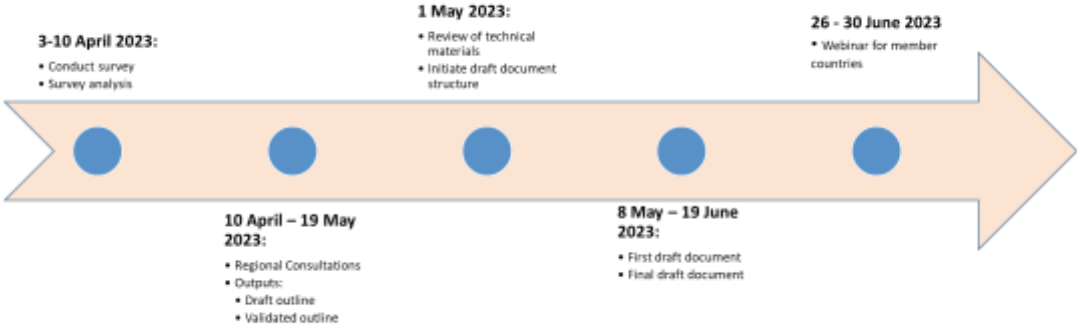
General Objective:

Revise the avian influenza global strategy for a variety of contexts, to support national, regional, and global strategic plans.

Specific Objectives:

1. Ensure ownership, multicentric and transparent governance
2. Align and adapt the revised global strategy with current evidence
3. Provide a pathway to operationalize the Global Strategy at national, regional, and global levels





Knowledge gaps regarding HPAI

- OFFLU is currently building a list of knowledge gaps regarding HPAI, on those published in an article in EMPRES 360 on factors that could affect the quality of risk assessments and modelling (https://www.fao.org/3/cc2775en/cc2775en.pdf)

- OFFLU experts are also collaborating with STAR-IDAZ for developing research road maps on animal influenza based on identified research gaps (https://www.star-idaz.net/app/uploads/2022/05/Animal-Influenza-Research-Review-25-April-2022.pdf)

Several key questions remain unanswered regarding the current epidemic including, but not limited to:

- What is the main species of wild bird responsible for the long distance and local transmission of the current H5N1 virus and identification of underlying factors associated with increased range of wild bird species affected and relevance for future disease epidemiology?
- Why has this virus been able to spread to a wider geographic range of countries and to continue circulating and causing outbreaks in the northern hemisphere summer (unlike earlier strains)?
- What is the extent of and results from existing surveillance programmes in wild birds and poultry especially in newly affected countries and continents?
- Will the H5N1 HPAI viruses circulating in wild birds remain endemic or will they self-extinguish as has been the case with HPAI viruses that have crossed over and spread in wild birds in the past (e.g. virus in wild birds in North America in 2014-2015 and in Europe from 2005 to 2008)?

OFFLU urge the scientific community to:

- Monitor AI events in animals and report to WOAH
- Deposit and share sequences
- Coordinate studies to better understand pathogenesis, transmission and adaptation of virus linages and share the results with OFFLU
- Provide support to national risk managers

OFFLU WILL CONTINUE TO SUPPORT THE ACTIVITIES OF ITS PARENT ORGANISATONS (FAO and WOAH) and partners (WHO) IN ENSURING THAT SCIENTIFICALLY SOUND INFORMATION IS AVAILABLE ON STRAINS OF VIRUS THAT ARE DETECTED IN POULTRY AND ABERRANT HOSTS

THANK YOU

We thank you for your attention

OFFLU would like to thank colleagues and contributors for continued support to OFFLU

The OFFLU website has regular updates on OFFLU and parent organisations' publications, technical advice, protocols and many other useful links. For any questions please contact: secretariat@offlu.org

- Please visit: www.offlu.org for more information