OFFLU Annual Report 2014

In 2014, avian influenza (AI) outbreaks continued to threaten both animal health and public health worldwide. Twenty countries experienced highly pathogenic avian influenza (HPAI) outbreaks during 2014 and the year also saw the emergence of new strains of AI subtypes H5N8, H5N6 and H5N3 in East and South East Asia, H5N8 in Europe, and H5N8, H5N2 and H5N1 in North America. These outbreaks continue to have a significant impact on animal health and productivity (with millions of birds having died as a result of disease or control measures to prevent further spread) and trade. The constant emergence and mixing of influenza viruses continues to pose a risk for the emergence of a pandemic virus. Although years of capacity building appear to be paying off, with more sensitive animal influenza surveillance, scientists have made little progress in interpreting surveillance data to understand which viruses may be a greater threat to human health.

OFFLU has a proven track record of mounting a rapid response to emerging influenza viruses (including H5N1, pandemic H1N1, variant H3N2 and H7N9). In 2014 OFFLU's response to the emergence of H5N6 and H5N8 demonstrated the network's value in rapidly generating and widely disseminating critical research data needed to inform surveillance and control policies, and in building technical partnerships with countries. OFFLU held teleconferences bringing together OFFLU experts who shared epidemiological and experimental data, diagnostic protocols and information on control methods being applied. The data and protocols shared on the new viruses helped international laboratories internationally to be equipped with the knowledge and reagents to rapidly detect these strains of virus. OFFLU and WHO have been in regular communication to share public health and animal health data so that risk assessment can continually be updated. This on-going dialogue ensures that any trends of concern will be detected and communicated quickly allowing necessary action to be taken. However to perform accurate risk assessment there is a need to develop a better understanding of the determinants of risk to human health.

http://www.offlu.net/index.php?id=317   http://www.offlu.net/index.php?id=302
http://www.who.int/influenza/human_animal_interface

OFFLU and STAR IDAZ collaborate to develop global animal influenza research agenda

OFFLU and STAR-IDAZ (Strategic Alliances for the Coordination of Research on the Major Infectious Diseases of Animals and Zoonoses) joined forces to develop a strategic agenda for animal influenza research. Sixty key experts from the fields of animal and human influenza were invited to a consultation in April 2014, at the OIE Headquarters in Paris. These experts came from a broad range of institutions, interests and research areas, including animal health and public health; animal production and trade (poultry, eggs and pork); the pharmaceutical sector; equine sports; policy; and research-funding bodies.

The consultation took a global perspective and, by engaging carefully selected representatives, it aligned the priorities of the key stakeholders with interests in funding research, conducting research, and benefiting from the outputs of research. The experts were assigned to working groups and used the feedback from a survey sent out before the consultation to develop a consensus vision and establish a consolidated list of priority topics.

The experts agreed that their collective vision was 'global coordinated research to minimise animal and human health risks and maximise social, economic and environmental outcomes' and identified six priority areas for research namely surveillance and risk assessment; diagnostic development;

prevention and control interventions; vaccine development and delivery mechanisms; host pathogen interaction; and socio-economics and policy.

OFFLU STAR-IDAZ participants, Paris

In general, three themes emerged from the consultation:

- research is needed to identify the multifactorial determinants of health risk from influenza viruses and to support risk assessment, surveillance and intervention strategies

- integrated approaches to influenza research and surveillance should be undertaken across species (at the interface between animals and humans, and between animal species) and surveillance findings should be shared swiftly
- there is a need to improve technologies to develop more effective and universal influenza vaccines and diagnostics.

Since the meeting the outputs of the research agenda consultation have been used to develop and inform other funding and research strategies.

http://www.offlu.net/fileadmin/home/en/meeting-reports/pdf/offlu_star_idaz/OFFLU_STAR-IDAZ_Executive_Summary_final.pdf

Swine influenza experts generate global antigenic cartography maps

The OFFLU swine influenza group met for its fourth annual technical meeting in March 2014 at the University of Minnesota, Minneapolis, USA, and shared data about the global swine influenza situation in pig populations by providing regional reports. Participants included scientists conducting influenza surveillance and/or performing influenza research or diagnosis in swine.

The meeting highlighted that there is increasing scientific evidence from surveillance and genetic analyses internationally to suggest that human seasonal influenza viruses and their variants have historically been introduced to pig populations by humans and are still circulating in different swine populations worldwide.

Guidance on diagnostic tests currently available for detecting influenza infections in pig populations was presented along with guidance on different approaches to sampling. The document describes approaches which may increase the sensitivity of detecting a positive pig or several pigs within an epidemiological unit when it was positive.

Furthermore the group had generated antigenic cartography maps illustrating the antigenic relationship between different swine influenza viruses within and between different regions of the world where SIV surveillance data were available. The global antigenic cartography map illustrated multiple and distinct H1 and H3 clades currently circulating in pigs world-wide. At the human and swine interface, at least 35 separate introductions of human H3 into pigs have been identified by phylogenetic analysis.

A proposal for a new global phylogenetic cluster naming system for the global influenza A virus genetic dataset of influenza A viruses isolated from swine and humans was presented. The system was based on criteria adapted from AI H5 genetic diversity as developed by the WHO/OIE/FAO H5 Evolution group. The new system aims to harmonise communication about the genetic relationships between

influenza viruses circulating in swine among different geographic regions and also between swine and human seasonal influenza viruses, and to provide a benchmark to monitor and identify significant genetic evolution of the influenza virus HA gene in the future.

The group continues to build a set of viruses and hyper immune sera to assist with preliminary subtyping of influenza viruses detected in swine; develop serologic panel needed to generate data for viral antigenic cartography; harmonize laboratory diagnostic protocols; to update the OFFLU algorithm for influenza virus detection and characterization; and to publish the proposed phylogenetic cluster naming system for the naming of influenza viruses circulating in pig populations.

Swine influenza group meeting participants, Minnesota

http://www.offlu.net/fileadmin/home/en/meeting-reports/pdf/SIV_Minnesota_2014/Summary_SIV_meeting_March_2014_final_version.pdf

http://www.oie.int/en/for-the-media/press-releases/detail/article/evaluating-the-relationship-between-human-and-animal-influenza-viruses/

Contribution of avian influenza data for pandemic preparedness

Every six months OFFLU coordinates inputs from OIE/FAO Reference Centres and national veterinary laboratories to provide AI virus data to the WHO Vaccine Composition Meeting. These data are needed to update pre-pandemic candidate vaccine viruses for human vaccines in case AI viruses emerge to become disease threats in humans.

In the February 2014 meeting, 18 virus genetic sequences (H5N1, H9N2 and H7N2) collected from Australia, Bangladesh, Bhutan, Nepal, Egypt, India, Libya and Saudi Arabia were provided by OFFLU to the WHO. In the September 2014 meeting, 46 virus genetic sequences (H5N1, H5N6, H5N8 and H9N2) from Bangladesh, China, Egypt, Lao PDR, Libya and

Nepal were provided to support this core WHO activity. Importantly in the September 2014 meeting, OFFLU also contributed antigenic data for H5N1 viruses from Egypt and Bangladesh and H5N6 from Lao PDR. The antigenic characterization performed by OIE/FAO Reference Centres, using ferret antisera provided by WHO Collaborating Centres, assessed antigenic divergence amongst isolates taken from animals and compared them with available human vaccine seed strains. OFFLU acknowledges the laboratories of Australia, Bangladesh, Bhutan, China, Egypt, India, Libya, Lao PDR, Nepal and Saudi Arabia for their timely submissions of AI virus data for this meeting and towards the ongoing global zoonotic influenza surveillance efforts. Many of these data are generated with the support of FAO AI projects.

OFFLU was awarded an Association of Public Health Laboratories (APHL) - US Centers for Disease Control and Prevention (CDC) grant to support development of platforms through collaborative efforts and leverage international

influenza network resources to enhance and strengthen communication and increase information sharing among influenza networks for enhancing global capacity and preparedness to respond to the next influenza pandemic. The aim of the OFFLU proposal was to improve the OFFLU contribution to the selection process for human vaccine candidate viruses for prepandemic preparedness purposes. The main outputs of this project include generation and distribution of ferret sera against animal viruses with pandemic potential, analysis of animal viruses with pandemic potential and data sharing within the OFFLU network and with WHO and WHO Collaborating Centers and improving animal data presentation at the WHO Vaccine Composition Meeting.

http://www.who.int/influenza/vaccines/virus/201402_h5h7h9h10_vaccinevirusupdate.pdf?ua=1

http://www.who.int/influenza/vaccines/virus/201409_zoonotic_vaccinevirusupdate.pdf?ua=1

OFFLU proficiency test (PT) reaches out to a greater number of veterinary laboratories in more countries

OFFLU carried out a third annual proficiency test among veterinary laboratories in 2014. The goal was to test the ability in international reference laboratories (and some national and regional laboratories) to detect and characterize AI viruses from both the Eurasian and American hemispheres with the aim of improving accurate global detection and characterization of influenza in birds. Twenty laboratories from as many countries participated, including 9 OIE/FAO Reference Centres and 11 national/regional laboratories. The OFFLU proficiency test technical activity developed a test panel representative of H5 and H7 AI viruses from both the Eurasian and American hemispheres and isolated from a variety of poultry species and wildlife. Each laboratory received the panel for evaluation using molecular assays. Results were reported to the technical activity for data compilation and statistical analysis, which showed that most

OIE/FAO Reference Centres successfully detected and subtyped AI viruses from their respective hemispheres. All these Reference Centres performed pathotyping, with some inconsistencies in their results. Problems were encountered with detection of viruses from opposite hemispheres e.g. some laboratories in the Northern hemisphere had problems with viruses from the southern hemisphere, vice versa. Most national/regional laboratories reported satisfying real time PCR results. Five of eleven national/regional laboratories also performed pathotyping, which is a notable increase over 2013. (Participation in PT in support of continuous improvement in testing ability is a requirement of laboratories with accredited quality assurance systems and this OFFLU activity provides an essential international service.)

Guidance on Influenza A cleavage sites

OFFLU scientists developed a guidance document to provide information about influenza A cleavage sites which will assist with differentiation of low pathogenicity and high pathogenicity AI viruses through molecular analyses. This document includes molecular sequences for consistent multi-basic cleavage sites of HPAI H5N1 viruses from Asia, Africa and Europe; previously reported multi-basic cleavage sites of other HPAI viruses (H5 and H7); and a list of 2-3 rare residue multi-basic cleavage sites.

http://www.offlu.net/fileadmin/home/en/resource-centre/pdf/Influenza_A_Cleavage_Sites.pdf

OFFLU Strategy meeting

In October 2014, the OFFLU Steering and Executive Committees met at the OIE Headquarters to develop a strategic agenda and implementation plan. The meeting determined the key areas of activity which OFFLU could address during the next five years, and conversely identified what is outside the scope of OFFLU.

The scope of OFFLU activities includes, becoming a one stop shop for information on influenza in animals; continuing to develop already successful lab network activities; promoting more effective targeted ('smarter') surveillance in animals; increased submission of data and virus isolates to Reference Centres; and timely analyses of such data to underpin public health (WHO) and animal health (effective veterinary vaccines) objectives. Strategic challenges may include reconciling network structures of OIE, FAO and OFFLU; encouraging sharing of data and isolates; and building the epidemiology and socio-economic expertise.

Equine influenza experts update vaccine recommendations

Equine influenza (EI) is a respiratory disease of horses and has the potential to disrupt major equestrian events. EI can be controlled by vaccination but it has been demonstrated in the field that antigenic drift impacts on vaccine efficacy. The Expert Surveillance Panel of EI comprising of OIE and WHO influenza experts met at the OIE Headquarters in March 2014 and reviewed the EI virus activity, characteristics of the viruses isolated and vaccine performance. Based on the latest information available, the panel made recommendations that vaccines for the international market should contain both clade 1 and clade 2 viruses of the Florida sublineage.

http://www.oie.int/en/our-scientific-expertise/specific-information-and-recommendations/equine-influenza/

Future activities

OFFLU is holding its next technical meeting on 15th April, 2015 at University of Georgia, Athens, USA in conjunction with the 9th International symposium on Avian Influenza. The objective of the meeting is to review the outcomes of the ongoing technical activities, networking and plan future activities.

OFFLU has created a new wild bird influenza surveillance technical activity comprising a mixture of wildlife experts, ecologists, people who work with wildlife in the field and lab experts. This activity will serve as a platform for discussion, coordination and data sharing between key wildlife experts involved in influenza surveillance and research. It also aims to develop smarter and more sustainable approaches to international influenza surveillance in wild birds.

The technical activity on OFFLU epidemiological group is being broadened with new technical expertise to work on topics such as risk assessment, animal influenza surveillance and approaches on applied molecular influenza surveillance.

Under the Vaccination technical activity, OFFLU is working to create a technical group to provide recommendations and assistance to countries on selection of seed viruses for AI poultry vaccines (subtypes H5, H7 and others).

http://www.georgiacenter.uga.edu/uga-hotel/conferences-events/register/9th-international-symposium-on-avian-influenza

Acknowledgements

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