In 2013, the OFFLU network continued to meet its objectives of providing technical advice, training and improving the capacity of veterinary laboratories to assist in the prevention, diagnosis, surveillance and control of animal influenza. Achievements included an extension of collaboration with the WHO for pandemic preparedness, improvement of accurate global detection and characterisation of influenza in birds through proficiency testing among national and reference laboratories, OFFLU meetings for sharing influenza data, developing recommendations and updating guidelines for avian influenza vaccines and vaccination.

The emergence of zoonotic H7N9 avian influenza in China in March 2013 highlighted the need to detect and report all influenza viruses in animal species to better understand the risk of zoonotic infections and possible pandemics as well as potential implications for veterinary health. OFFLU responded quickly by providing the international community with guidelines for diagnosis and surveillance including validated diagnostic protocols to meet this new threat.

Response to Avian influenza A (H7N9)

OFFLU has a proven track record of mounting a rapid response to emerging influenza viruses (including H5N1, pandemic H1N1 and variant H3N2). In March 2013 OFFLU’s response to the emergence of H7N9 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. Unlike previous emerging influenza, H7N9 in poultry posed particular challenges for surveillance and control because infection does not result in clinical disease in poultry.

The OFFLU response to H7N9 in 2013 included the following actions:

- Research: Within days of the H7N9 virus being made available, OFFLU laboratories were performing infection studies in different bird species. These studies provided vital data on susceptibility, pathogenesis, virus shedding and transmission of H7N9 in different species of birds. The results of these studies were a key to informing clinical surveillance, risk assessment, and explaining the epidemiology of the disease.
OFFLU organized a three day technical meeting from 4 to 6 December 2013 in Beijing, China, to review lessons learned over the past six years and produce updated recommendations and guidance on vaccines and vaccination against HPAI. The meeting reviewed the successes and failures linked to developing and implementing effective HPAI surveillance and vaccination, their impact on control programs and proposed improvements to vaccination strategy. Government representatives from affected countries including China, Egypt, Vietnam, Indonesia, Mexico, India, Bangladesh and Nepal and Delegates from OIE, FAO, WHO as well as the International Egg Commission (IEC), the International Federation for Animal Health (IFAH) and OFFLU experts participated in this meeting. The members of the OFFLU Technical Activity on vaccination acted as the scientific and organizing committee for this meeting.


Conclusions were that live bird markets play a significant role in maintenance and amplification of H7N9 infections. The team also worked in close collaboration with a WHO mission.

- Human-animal interface: Since March 2013 OFFLU and WHO have been in regular communication to share public health and animal health data so that risk assessments can continually be revised and kept up to date. This on-going dialogue ensures that any trends of concern will be detected and communicated quickly allowing necessary action to be taken.

- Communication: Through press releases and ‘questions and answers’, both OFFLU partner organisations and WHO kept the international community informed about the latest H7N9 disease situation and on the latest science. The OFFLU SIV group provided a statement on the potential role of pigs.

OFFLU updates the avian influenza vaccine recommendations

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A similar meeting took place in Verona, Italy in 2007, the recommendations from which are still mostly valid today. However, many of the countries participating in the Beijing meeting, in particular China, Egypt, Vietnam, Indonesia and Mexico, as well as FAO, have since gained large amounts of experience in the field of vaccination against HPAI. The experts shared and discussed the experience and progress made at national and regional levels in vaccination against HPAI and drew up updated recommendations for countries considering a vaccination programme, including the need for an overall control strategy. They also developed a list of research priorities for vaccines and vaccination. The OFFLU technical working group noted that it is crucial to have updated vaccines to match the occurrence of new strains of HPAI or antigenic variants of existing strains. The group is also working to publish a practical handbook on vaccination against HPAI. The book will cover the planning, implementation, costing and monitoring of a vaccination strategy and will be intended for poultry farmers, poultry production companies and vaccine manufacturers.
**Contribution of avian influenza data for pandemic preparedness**

Every six months OFFLU coordinates inputs from OIE/FAO Reference Centres and national labs to provide avian influenza virus data to the WHO Vaccine Composition Meeting to update candidate vaccine viruses for human vaccines in case avian influenza viruses in animals emerge to become disease threats in humans. In 2013 OFFLU provided WHO with 140 HPAI H5N1 and 60 H9N2 virus genetic sequences to support this core WHO activity. The epidemiological, genetic and antigenic data of the HPAI H7N7 outbreak in Italy was also shared in this year.

http://www.who.int/influenza/vaccines/virus/201302_h5h7h9_vaccinevirusupdate.pdf?ua=1

Importantly, OFFLU also contributed with antigenic data for HPAI H5N1 viruses, providing information on 21 isolates recently detected in various countries. The characterization performed by OIE/FAO Reference Centres, using ferret antisera provided by WHO Collaborating Centres, assessed antigenic divergence of isolates from the animal health sector and compared them with available human vaccine seed strains. OFFLU would like to thank the Veterinary Services of Austria, Bangladesh, Bhutan, China, Democratic People’s Republic of Korea, Egypt, India, Italy, Indonesia, Jordan, Nepal, UK, and Vietnam for sharing important data and biological material and the OIE/FAO Reference Centres for contributing to this most important process.

http://www.who.int/influenza/vaccines/virus/201309_h5h7h9_vaccinevirusupdate.pdf

Given the success of this mechanism, the OIE, FAO and WHO have signed a new agreement allowing the extension of their cooperation on the contribution of animal health data to the WHO human influenza vaccine virus selection process for an additional period of five years from January 2014 to December 2018.

**Experts share global swine influenza data**

The world’s leading swine influenza experts met in April 2013 in FAO Headquarters, Rome and shared data about the global swine influenza situation in pig populations from all over the world. The meeting was attended by key experts who are currently generating swine influenza surveillance data, and performing cutting-edge research or diagnostics in this field. The experts discussed the progress on action items from the previous meeting and set tasks for developing a better understanding of the global implications of influenza infection in swine for animal health and at the human-animal interface. The group drafted a question and answer document to clarify that there was no evidence to suggest that pigs were playing a role in H7N9 infections in humans and poultry in China. Since the 2013 meeting, the experts have been working on a standardized system for cluster and lineage designation for influenza viruses in pigs and they have found scientific evidence, through genetic analyses, that transmission of influenza viruses from humans to swine (reverse zoonosis) is much more frequent than swine to human transmission. Work continues to define a reference panel of sera, to produce a document listing reference influenza viruses and diagnostic tests by region, to harmonize laboratory diagnostic protocols, to update diagnostic chapters in the OIE manual and to generate the first regional and global antigenic maps and phylogenetic trees for these viruses.


**OFFLU project validates LAMP assays**

This project funded by OIE was completed and submitted its final report in October 2013. The project studied the scientific validation of a sample of modern diagnostic tools (“robust tests”) for sensitive and specific detection of influenza A viruses, in particular a promising simple technology called loop mediated isothermal amplification (LAMP). The project evaluated several diagnostic tests including LAMP, rapid immunochromatography lateral flow devices and realtime PCR kits for their suitability in laboratories in low resource settings. Furthermore, the project explored modifications to existing and internationally recommended methods for avian influenza diagnosis which can save resources.

During the course of the project, several workshops were organized for researchers of Nigeria, Iran and Kazakhstan at Friedrich Loeffler Institute, Germany, to impart training on novel technologies including LAMP for the diagnosis of avian influenza. As a result of this project several papers will be published which will aim to provide practical and cost effective methods for sample preparation (RNA extraction) and diagnostic testing.


**Veterinary laboratories participates in the OFFLU proficiency testing**

OFFLU carried out a second round of proficiency testing among veterinary laboratories in 2013. The goal of the ring trial was to test and document the ability to detect and characterize notifiable avian influenza viruses from Eurasian and American hemispheres with the aim of improving accurate global detection and characterization of influenza in birds in reference and national laboratories. Twenty labs from 19 different countries, including 9 OIE/FAO Reference and Collaborating Centres and 11 national/regional laboratories participated in this exercise. The OFFLU proficiency test technical working group developed an avian influenza ring trial panel consisting of a variety of inactivated viruses. Each laboratory received one panel for evaluation using molecular assays. The panels included type A influenza viruses (IAV) for identification of H5 and H7 by real time PCR detection and sequence analysis. Results were reported back to the technical working for data compilation and statistical analysis. The results of the ring trial showed that there is a substantial improvement by labs in the accurate detection of IAV of various subtypes and lineages but some national/regional labs face challenges in the subtyping and pathotyping.

**Acknowledgements**

OFFLU expresses its sincere gratitude to all OFFLU experts for their exceptional efforts and enthusiasm and the Chief Veterinary Officers of countries who support these experts and share data for the global health benefits.