OFFLU activities at the Human-Animal interface

Gwenaelle DAUPHIN, OFFLU focal point in FAO
Keith Hamilton - OFFLU focal point in OIE
Mia Kim and Bhudipa Choudhury - OFFLU scientists (FAO and OIE)
Ilaria Capua - member executive committee
Steve Edwards - chairman

OIE/FAO Animal Influenza Network (OFFLU)

• Created in April 2005
• www.offlu.net
OFFLU objectives

- exchange scientific data and biological materials
- offer technical advice and veterinary expertise to member countries
- collaborate with the WHO influenza network
- support avian influenza research
Main on-going OFFLU achievements

- **Active collection of strains.** Bridge between the field, FAO/EU/other funded projects and the scientific community, including medical virologists.

  - OIE Resolution - *Sharing of avian influenza viral material and information in support of global avian influenza prevention and control*

RESOLUTION No. XXVI

*Sharing of avian influenza viral material and information in support of global avian influenza prevention and control*

Endorsed by 172 OIE country members

1. OIE Members reporting outbreaks of avian influenza **should agree to share animal avian influenza viral material and information about avian influenza viruses through OFFLU** with the international scientific community.

2. OIE Reference Laboratories must actively encourage sharing of material and data with the international scientific community, and as a **minimum deposit genetic data within 3 months of receiving an isolate** into a public database designated by the OFFLU Steering Committee, which will manage scientific relations with the WHO.

3. To enhance cooperation and transparency, the actions taken by countries must be recognised in subsequent publications and other benefits arising from the use of biological material or data that they have submitted to OIE Reference Laboratories.
Main on-going OFFLU achievements

- Active collection of strains

- 7 OFFLU technical groups:
  - commercial kits evaluation, applied epidemiology, biosafety, vaccination, proficiency testing, human-animal interface, common standards sera/RNA
Main on-going OFFLU achievements

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- 7 OFFLU technical groups
- Contribution to establishment of a Unified Nomenclature System for H5N1 influenza viruses based on HA gene phylogeny (WHO/FAO/OIE, 2007)

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- Contribution to establishment of a Unified Nomenclature System for H5N1 influenza viruses based on HA gene phylogeny (WHO/FAO/OIE, 2007)
- Evaluation of a new publicly accessible platform (EpiFluDB) in link with WHO
As of 7 Oct 08:
3,475 isolates (avian and human) submitted
+ 18,508 isolates uploaded from Genbank
= 21,983 isolates (72,848 sequences)

- **Organization** of the data at the isolate level, instead of the segment
- **Curation** of existing sequences
- **Searchability** of most of the data fields
  i.e. type, H/N-types, host, location, collection/submission dates, min. sequence length, isolate name, passage history, ID, sequence submitter lab
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- Evaluation of a new publicly accessible platform (EpiFluDB) in link with WHO
- OFFLU projects on vaccination in Indonesia and Egypt (implemented by FAO)
OFFLU national projects in Indonesia and Egypt

Purpose:

**Assessment of vaccine efficacy**

- virus characterization
- challenge tests
- selection of vaccine strains
- engineering of RG vaccine strain

OFFLU project in Indonesia
Vaccine Efficacy?

**AAHL and USDA/SEPRL**

- **Selection of 3 challenge viruses**
- **Selection based on phylogeny**
  - A/ck/WJ/PWT-WIJ/06 9/06
  - A/ck/WJ/SMI-HAMD/06 5/06
  - A/ck/Papua/TAS/06 7/06

**Collaborative Vaccine Efficacy Project:**

Vaccinated 1d (tFP-H5-AIV) and 3wks (Legok/03), or 3 wks (17 OE Vaccine); IN challenged 6 wks, 106 EID50 IN of A/WJ/PWT-WIJ/06 (H5N1) HPAI virus, HI serology vax strain

- Excellent protection = WIJ (Challenge control)
- Good protection = 19
- Marginal protection = 11, 12, and 18 (all H5N1 Eurasian lineage)
- No association between HI serology (Vax strain) and survival
OFFLU project in Indonesia

- 250 new viruses characterized (sequences to be deposited in public domain)
- Evaluation of antigenic cartography
- H5N1/H5N9 RG strain engineered and tested under the project. To be donated to Indonesian MoA
- Review of national vaccination strategy by the OFFLU group
- First experience. Should be applied to other countries
Main on-going OFFLU achievements

- Active collection of strains. Bridge between EU/FAO/other funded projects, the field and the scientific community including medical virologists
- 7 OFFLU technical groups:
  - Contribution to establishment of a Unified Nomenclature System for H5N1 influenza viruses based on HA gene phylogeny (WHO/FAO/OIE, 2007)
  - Evaluation of a new publicly accessible platform (EpiFluDB) in link with WHO
  - OFFLU projects on vaccination in Indonesia and Egypt (implemented by FAO)
- Key role in this joint technical consultation on avian influenza at the human-animal interface

Example of good animal-human interface

- Kingdom of Saudi Arabia
  - Detection of specific mutations for humans in avian viruses (IZSVe)
    - e-mail from ISZVe to FAO CVO/OIE DG
    - information forwarded to WHO ADG
    - publication (in press)
Typical amino-acid signatures of human influenza viruses observed in KSA strains

<table>
<thead>
<tr>
<th>Position (aa)</th>
<th>Residue</th>
<th>Mutation (Drug resistance)</th>
<th>Mutation (Species)</th>
<th>Allelic variants (Subject)</th>
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<tr>
<td>121</td>
<td>92</td>
<td>R to K</td>
<td>K</td>
<td>All strains analyzed in this study</td>
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**H5N1 in Africa (11 African countries)**

- Strong correlation btw genetic clustering and area of origin
- Unique molecular signatures
- Reassortments in Nigeria
- Aa substitutions specific to human infections/drug resistance

**Genome Analysis Linking Recent European and African Influenza (H5N1) Viruses**

Steven L. Sedberry, Paul Ingleson, Gary G. Swayne, David J. Spiner, David A. Jones, and Mark Meissner.

**Evidence of Infection by H5N2 Highly Pathogenic Avian Influenza Viruses in Healthy Wild Waterfowl**


**Reassortant Avian Influenza Virus (H5N1) in Poultry, Nigeria, 2007**

Isabella Momee, Tony M. Acasuso, N. Alice Fram, and B. B. O. Badejo.

**Table 5: Typical amino-acid signature of human influenza observed in the Asian strains**

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OFFLU at the animal-human interface

- Efforts made to communicate with the human side (information sharing, tripartite projects, emergency missions)
- Informal communication already in place but need to formalize it
- OFFLU group to improve mechanisms of key information sharing on viruses with human side (WHO-OFFLU staff)
- Efforts will be directed towards the recommendations of this meeting

Acknowledgements

David Swayne and coll. (SEPRL)
Peter Daniels and coll. (AAHL)
Ilaria Capua and coll. (IZSVe)
Ian Brown and coll. (VLA)
Ron Fouchier (Erasmus univ.)
Elly Sawitri Siregar (CMU, Indonesia)
FAO teams
Thank you for your attention!

Strengthening OFFLU governance

- Executive Committee created
- Scientific Committee dissolved
- Open list of scientific contributors created
- Secretariat transferred to OIE
- OFFLU dedicated staff
  - 2 focal points: FAO (Sept 2006) and OIE (July 2007)
  - 2 OFFLU scientists: VLA (OIE, Nov 2007) and FAO (April 2008)
  - 1 secretariat