AI-NDV
SUBCOMMITTEE REPORT

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Report is based on OIE, FAO, WHO, ProMed, published manuscripts and personal research
H7N9 Human Cases

- First HPAI reported
- Vaccination Started
- H7N2 HPAI
Two divergent lineages emerged from initial outbreak in 2014 (Yangtze and Pearl River).

All H7N9 viruses were low pathogenic until late 2016 with emergence of Highly Pathogenic Avian Influenza (HPAI).

The HPAI emergence was in Yangtze River lineage by 4 aa insert at cleavage site.

LPAI cleavage site PKG----R/G

HPAI cleavage site  PKRKRTAR/G

Some reassortant viruses have been detected (H7N6, H7N2, internal genes).

Positive Poultry Samples by Chinese Province

Data through July 25, 2018

FAO H7N9 Situational Update Updated August 7, 2018
Location of Positive Samples

October 2016 and 25 July 2018

LPAI POSITIVE SAMPLING LOCATIONS (N=246)

HPAI POSITIVE SAMPLING LOCATIONS (N=43)

FAO H7N9 Situational Update Updated August 7, 2018
Poultry Sample Origin

LPAI POSITIVE SAMPLE ORIGIN (N=280)

- CHICKEN: 153
- Other Poultry: 103
- ENVIRONMENTAL: 6
- PIGEON: 2
- DUCK: 16

HPAI POSITIVE SAMPLE ORIGIN (N=49)

- CHICKEN: 38
- ENVIRONMENTAL: 9
- DUCK: 2

October 2016 and 25 July 2018

FAO H7N9 Situational Update Updated August 7, 2018
Chinese Broiler Farmers Control Measures

<table>
<thead>
<tr>
<th>Adoption of Practice</th>
<th>Out of 331 surveys</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adoption of HPAI vaccination</td>
<td>286</td>
<td>86.4%</td>
</tr>
<tr>
<td>Adoption of antiviral medication</td>
<td>296</td>
<td>89.4%</td>
</tr>
<tr>
<td>Adoption of farm cleaning</td>
<td>280</td>
<td>84.6%</td>
</tr>
<tr>
<td>Adoption of farm disinfection</td>
<td>289</td>
<td>87.3%</td>
</tr>
<tr>
<td>Adoption of all 4 practices</td>
<td>193</td>
<td>58.3%</td>
</tr>
</tbody>
</table>

- Farmers surveyed in 3 Northern and 3 Southern provinces
- Conducted June-August 2015
- Farm experience positively correlated with preventive measures
- 28.4% of respondents refused to use government designated vaccines

## Biosecurity Practices of Poultry Farmers of Jiangsu Province

<table>
<thead>
<tr>
<th>Biosecurity Preventive Behaviors</th>
<th>Percentage of 297 respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check for dead or sick chickens daily</td>
<td>99%</td>
</tr>
<tr>
<td>Prevented contact neighbor’s poultry</td>
<td>94.9%</td>
</tr>
<tr>
<td>Conducted all in and all out method</td>
<td>93.6%</td>
</tr>
<tr>
<td>Pay attention to the nutrition balance of poultry</td>
<td>87.5%</td>
</tr>
<tr>
<td>Quarantined new purchase of poultry</td>
<td>85.9%</td>
</tr>
<tr>
<td>Closed doors and windows all the time in winter</td>
<td>77.1%</td>
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<tr>
<td>Prevented poultry contact wild poultry</td>
<td>66.3%</td>
</tr>
<tr>
<td>Disinfected staff, vehicles, and goods entering the poultry house</td>
<td>39.1%</td>
</tr>
<tr>
<td>Continuously disinfected with chickens in cage 2-3 times weekly</td>
<td>7.1%</td>
</tr>
<tr>
<td>Frequently cleaning floors and chicken cages</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

Control Measures for H7N9

• Closure of LPMs was credited for reduction in human cases
• LPM system is slowly being replaced with centralized slaughter facilities (infrastructure more developed in Northern China)
• Some large cities permanently banned LPMs
• Principals of Biosecurity are well known, but often poorly applied
• Because of the spike in human cases and the mutation from LPAI to HPAI, vaccination became the government mandated option
Vaccine for H7N9

- Vaccine was made by reverse genetics with the H7 gene from 2013 virus and the PR8 internal gene cassette
- Killed vaccine with adjuvant-A/pigeon/Shanghai/1069/2013
- Laboratory and clinical trials reported as having good results
- 2 doses of vaccine needed to stimulate immunity in ducks and geese
- Vaccine was made as bi-valent vaccine to include the re-8 H5 vaccine
- Government provides the vaccine for free
- Mass vaccination program started in September 2017
- Targeted to layers and slow growing chickens with high use of vaccine (73%)
- Vaccine credited with reducing both human and poultry cases

Hualan Chen, Animal Influenza Laboratory of the Ministry of Agriculture and National Key Laboratory of Veterinary Biotechnology, Harbin Veterinary Research Institute
Conclusion

- Virus continues to circulate with two unique antigenic lineages, with the Yangtze lineage having both LP and HP variants
- No evidence of wild bird involvement in spread of the virus
- China remains an epicenter for emerging avian influenza viruses
- Vaccination has provided a marked reduction in reported human and animal cases
- Because of large LPM system and questionable biosecurity practices, eradication of H7N9 is unlikely
H5N6-Europe

- Multiple wild bird introductions in late 2017-2018 in Netherlands, England, Denmark, Sweden, Finland, Ireland, Switzerland
- Clade 2.3.4.4b
- Commercial outbreaks in Netherlands in ducks and chickens and backyard poultry Germany
H5N6-Asia

- Multiple wild bird introductions in 2017-2018
- South Korea, Vietnam, Japan, China
FAO Sub-Saharan Africa HPAI situation update (Oct 10, 2018)

H5N1 reports from 2018
- Togo

H5N8 reports from 2018
- Nigeria
- Democratic Republic of Congo
- South Africa