Experiences and Thoughts on H7N9 Control

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Outline

1. Control measures in the past
2. Current control measures
3. Thoughts for future improvement

H7N9 Control
1. Control measures in the past

H7N9 situation
1. Control measures in the past

Disease situation
- Human cases of H7N9

Legend

<table>
<thead>
<tr>
<th>Human Cases</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Grey</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Pink</td>
</tr>
<tr>
<td>3 - 6</td>
<td>Orange</td>
</tr>
<tr>
<td>7 - 33</td>
<td>Red</td>
</tr>
<tr>
<td>34 - 46</td>
<td>Red</td>
</tr>
</tbody>
</table>

- Shandong (2)
- Fujian (5)
- Henan (4)
- Anhui (4)
- Hunan (2)
- Jiangxi (6)
- Jiangsu (27)
- Shanghai (33)
- Zhejiang (46)
- Beijing (2)
- Taiwan (1)
Disease situation
- Animal positives of H7N9

1. Control measures in the past

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of Positive Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shandong</td>
<td>3</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>13</td>
</tr>
<tr>
<td>Shanghai</td>
<td>20</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>10</td>
</tr>
<tr>
<td>Fujian</td>
<td>1</td>
</tr>
<tr>
<td>Henan</td>
<td>2</td>
</tr>
<tr>
<td>Anhui</td>
<td>1</td>
</tr>
<tr>
<td>Jiangxi</td>
<td>1</td>
</tr>
<tr>
<td>Guangdong</td>
<td>2</td>
</tr>
</tbody>
</table>

Legend
- Virus
  - 0
  - 1
  - 2 - 3
  - 4 - 13
  - 14 - 20

Map showing the distribution of animal positives of H7N9 across different provinces in China.
Major control measures implemented

1. Cross-sector collaboration
2. Raised the level of emergency response temporarily
3. Surveillance and Epidemiology Investigation Plan for Animal H7N9 Avian Influenza
4. Animal H7N9 Emergency Response Guideline
5. Strengthen supervision of live bird markets (LBMs)
Emergency, risk based surveillance

H7N9 Control Zones
- Ordinary Surveillance Area
- Core Surveillance Area
- Major Surveillance Area

1. Control measures in the past
Emergency, risk based surveillance

Surveillance Areas

- Core Surveillance Area: 78.4%
- Key Surveillance Area: 9.7%
- Ordinary Surveillance Area: 11.9%

899,758 samples in 42,107 sites

1. Control measures in the past
Emergency, risk based surveillance

1. Control measures in the past
Emergency, risk based surveillance

- Species distribution of samples

1. Control measures in the past

- Virological
- Serological
Emergency, risk based surveillance

- Distribution of sampling sites

1. Control measures in the past

42,107 sites in total

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>LBM</td>
<td>7236</td>
</tr>
<tr>
<td>Poultry slaughterhouses</td>
<td>1181</td>
</tr>
<tr>
<td>Poultry farms</td>
<td>30325</td>
</tr>
<tr>
<td>Wild birds and their habitats</td>
<td>661</td>
</tr>
<tr>
<td>Swine farm and slaughterhouses</td>
<td>864</td>
</tr>
<tr>
<td>Environment</td>
<td>1840</td>
</tr>
</tbody>
</table>
Emergency, risk based surveillance

- Positive samples from different sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Species</th>
<th>Virological Positive No.</th>
<th>Serological Positive No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBM</td>
<td>Duck</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pigeon</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chicken</td>
<td>33</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td>Carrier Pigeon</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Farm</td>
<td>Chicken</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>53</td>
<td>35</td>
</tr>
</tbody>
</table>
## Emergency, risk based surveillance

### - Other surveillance results

<table>
<thead>
<tr>
<th>Institute</th>
<th>Supplies to HK</th>
<th>Samples</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQSIQ</td>
<td>746,212</td>
<td>51,876</td>
<td>0</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>120/day</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
- Key Findings

• **H7N9 viruses have not been found in pig and other animals**
  - Only isolated from chicken, duck and pigeon

• **Most of H7N9-positive animals (52/53) were found from the LBMs**

• **The infection range was very limited**
  - Positive samples were only found in 18 markets out of the sampled 7,264 markets

• **Risk of H7N9 infection was very low at poultry farms**
  - Samples had been collected from 30,200 poultry farms in 31 provinces, and no virologically positive samples were confirmed
Research progress in etiology of H7N9

- National AIV Reference Laboratory

- Virus strains isolated from chicken, duck and mammals (mice) show no pathogenicity (IVPI=0).
- Virus strains isolated from human has a far high pathogenicity to mammals than those isolated from poultry.
- H7N9 virus can transmit among chicken horizontally, but low transmission among ducks
Research progress in etiology of H7N9

- Some findings from OFFLU experts

Infection in other hosts

➢ Apparent susceptibility
  – Chicken > Muscovy > Pekin > Geese > Pigeon

➢ Pigs
  – Infects but does not appear to transmit

➢ Ferrets
  – Infects and transmits but aerosol route needs further testing

- Prof. Ian Brown, OIE expert on AI/ND
Summary of Observations in Poultry Studies

➢ No clinical signs reported in any study in any avian species

➢ Shedding mainly from the respiratory tract, less so from cloaca

➢ Quail excrete to a very high titer, chickens less so, and pigeons to a comparatively low level.

➢ Ducks and geese have shown only low shedding and no direct transmission
Summary of Observations in Other Animal Studies

- Infected ferrets have shown mild clinical signs with recovery.
- Virus recovered to high titre from the respiratory tract up to 7 days PI
- Highly efficient transmission by direct contact observed, less efficient airborne transmission
- Mice given a high challenge dose have succumbed
- Infection of pigs showed excretion via respiratory tract for up to 6 days, no pig – pig transmission
1. Control measures in the past

H7N9 Control

2. Current control measures

3. Thoughts for future improvement
Follow-up surveillance

• Continuously conducting surveillance and early warning at all levels
• So far, **230,000** samples have been tested and all are Negative
Risk-based management

- Re-open live bird markets based on risk assessment

- Animal health criteria for re-opening live bird markets
- Whole-sale bird markets are forbidden in urban areas
Risk-based management

- Live birds movement
  - Prohibition of inter-province movement of commercial live birds
  - Movement of birds with animal health certificates
  - Breeding poultry or day-old breeding birds: strictly sold farm to farm
  - Slaughtering live birds at the closest slaughterhouse encouraged
  - Consumption of frozen or/and fresh poultry meat encouraged

2. Current control measures
2. Current control measures

National policy for poultry industry rehabilitation

- Allocated ¥600 million to support poultry industry
  - Subsidies for grand-parents breeding bird ¥50/bird
H7N9 Control

1. Control measures in the past

2. Current control measures

3. Thoughts for future activities
Engagement of national and local governments

• Good coordination for rapid response
• Allocated ¥ 56.83 million to carry out H7N9 emergency surveillance and epidemiological investigation
• Allocated more than ¥ 30 million to support scientific research on H7N9
Close cross-sector collaboration required

• Close cross-sector collaboration on H7N9 control
  Ministry of Agriculture, Ministry of Health, SFA, AQSIQ …

• One-Health approaches
Competent professional teams required

- Laboratory
- Epidemiology
- Emergency management
3. Thoughts for future improvement

Timely information disclosure required

• Information publicity
• Media conference
• Interview
Good international cooperation required

FAO / OIE / WHO...

3. Thoughts for future improvement
Plan for the future

• Enhance risk-based surveillance
  1. Market chain analysis
  2. Regular targeted surveillance

3. Thoughts for future improvement
Plan for the next
-----Improve biosecurity for LBM

3. Thoughts for future improvement

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slaughter room
live birds

selling counter
Plan for the next public awareness and consumption habits change
Thank you