Integrated Information Platform for Avian Influenza

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Background of avian influenza

1. Three times of human influenza prevalence in the world during the 20th century

2. Human infection cases of avian influenza

3. Ecological status of birds in the epidemic of influenza
1. Three times of human influenza prevalence in the world during the 20th century


- 1957-1958, Asian influenza: H2N2 {human H1N1/ AIV (HA, NA and PB1 of AIV replaced human’s corresponding genes)}

- 1968-1969, Hong Kong influenza: H3N2 (reassortant of human IV and AIV (HA, and PB1 of AIV replaced Human’s corresponding genes)

The last two prevalence caused almost 1000 thousand deaths
2. Human infection cases of avian influenza

- 1997, Hong Kong, 6 deaths out of 18 infections with H5N1 HPAIV;
- 1999, Hong Kong, and mainland China, 2 children in Hong Kong and 6 adults in mainland China infected with H9N2 AIV;
- 2003, Netherland, H7N7 HPAIV, 80 infections with 1 veterinarian dead;
- Ever since 2003 some countries of Asia like, Korea, Vietnam, Thailand, etc, 34 Vietnamese, 12 Thailanders infected and 1 Combordian dead with H5N1.
3. Ecological status of birds in the epidemic of influenza
Spokesman, Peter Cottinry of West Pacific Headquarters of WTO:

The two factors that WHO considers avian flu is more deadly than SARRS:

① Human body hardly has any immunity for newly epidemic diseases
② Human flu is far more epidemic than SARRS in spreading speed

A certain experts: If avian influenza spread among humans, 20% of the world population will be affected, 30 million will be in hospital and ¼ of whom will die,
Avian influenza virus research has been carried on in three institutes: molecular virology, interaction between host and avian influenza, diagnose, prevention and cure of AI

Key laboratory, BSL-3 laboratory, China Conservation Center of Virus, The biggest bank of virus species in Asia

Long term cooperation with foreign countries such as Japan and England: Wisconsin University, US, Tokyo University of Japan, Britain Imperial University of Science and Technology

Ministry of Science and Technology: Platform for the research on the pathogens of outburst Diseases and information platform for animal diseases

China Agricultural Ministry: information publication system of avian influenza

Database of avian influenza virus and hosts
Major items

1. Integrating basic data from each institute
2. Investigation and study on epidemiology of avian influenza
3. Setting up the system of comprehensive analysis of biological information
4. Setting up forecast and warning system
5. Setting up network for international cooperation
6. Setting up information publication system
7. The related system of IT
1. Basic data base integrating avian influenza

- 1. Standard of the data base:
  - (1) Model and standard of the data base
  - (2) Resources and original data criteria and descriptive language

- 2. Data resources in the data base
  - (1) Resource data base
  - (2) Genetic resource data base
  - (3) Historical epidemic data base
  - (4) Dynamic observation data base
  - (5) Host area and ecological environment data
  - (6) Literature data base
  - (7) Data base of nucleic acid
  - (8) Data base of international research results
2. Investigation and study on epidemiology of avian influenza

wild birds, water birds, domestic poultry, mammals, their ecologic behaviour, infectiveness of bird influenza, highly infectiveness on species of animal hosts, allocation and ecology.
Investigation of the epidemic source and building and application of data base

- Epidemic sources and birds’ migration areas
- Sampling
- Wild, domestic birds and mammals
- Setting up virus bank
- Isolation and identification
- History of bird–animal contact, source
- Distribution of natural hosts
- System of supervision warning
- Molecule evolution, genome analysis
- Epidemic source of wild hosts, access of epidemic spreading, information platform
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- History of bird–animal contact, source
- Distribution of natural hosts
- System of supervision warning
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- Epidemic source of wild hosts, access of epidemic spreading, information platform
3. To form a system of comprehensive analysis of biological information on avian influenza

- 1）. Virological genomic analysis and molecule evolution

- 2）. Virological Proteome and interspecies transmission
4. To form forecast and warning system for AI

- The forecast and warning system: using IT together epidemic research;

- Forecasting the range of avian flu according to the data gathered in the recent years on basis of the difference of characters, types, etc;

- Perfecting the spreading model of bird flu through cooperative research.
Forecast and warning system

- Forecast
- Epidemic source investigation
- Spreading mode of Bird flu
- Investigation data of winter epidemic source
- Bird trading venue
- Infection force
- Source data
- Related date
- Evaluation system
- Data base
- Store
- Verification
5. To Form internet connection for cooperation on bird flu research

- 1. To form net service system for the avian flu research;
- 2. To publish and share information on basic data of avian flu research in the form of data base via internet;
- 3. To provide researcher with information service on general analysis and forecast of avian flu information;
- 4. To form cooperation platform, including video net-meetings, multimedia information exchange etc.
Technical route for cooperation in avian influenza research

1. To form highly efficient hardware environment for cooperation on avian flu research;

2. To form related soft-ware platform for cooperation on avian flu research;

3. To provide interface for common visits.

4. To provide unified information service;

5. To provide an integrated security software and related service for database platform;

6. To form video net-meeting to connect international institutions;
6. To set up information publication system

- 1. To set up website for dissemination of research results on avian flu.

- 2. To collect information of up-to-date information and research results on epidemic situation and development of research.

- 3. To become major information gateway of avian-flu research in our country.
7. The related system of IT

- Data confirmity and integration
- Gridding
- Metadata
- WEBGIS
- Video conference
- Interface for common visit
### Amount of samples and sampling coverage in 2004

<table>
<thead>
<tr>
<th>number</th>
<th>province</th>
<th>Main regions</th>
<th>samples数量（个体）</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anhui</td>
<td>Hefei, Ma an shan, Guangde, Fuyang, Jieshou</td>
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<tr>
<td>2</td>
<td>Zhejiang</td>
<td>Yongkang</td>
<td>70</td>
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<td>3</td>
<td>Henan</td>
<td>Pingyu, Zhumadian, Suyahu</td>
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<tr>
<td>4</td>
<td>Hubei</td>
<td>Wuxue, Macheng, Ezhou, Honghu, Xiangpan, Nanping, Yichang, Putuan, Heqia, Liangzi lake</td>
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</tr>
<tr>
<td>5</td>
<td>Hunan</td>
<td>Wugang, Dengyuantai, Xiangxinanjia, Longhui, Yuanjiang, Chenzhou, Suzhou, Pinjiang</td>
<td>369</td>
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<tr>
<td>6</td>
<td>Gansu</td>
<td>Lanzhou, Gaolan, Jingyuan, Dongchuan, Anning, Liujiabao</td>
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<tr>
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<td>Shanxi</td>
<td>Huayin, Chang an</td>
<td>172</td>
</tr>
<tr>
<td>8</td>
<td>Jiangsu</td>
<td>Nanjing, Shanghai, Sihong, Haimen</td>
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Highly Pathogenic H5N1 Influenza Virus Infection in Migratory Birds

J. Yang, J. Zhao, G. Wang, J. G. Feng, J. K. Li, X. Deng, and G. Chen

BREVIA

In this issue of BREVIA, we highlight the latest research on highly pathogenic H5N1 influenza virus infection in migratory birds. The virus was first identified in poultry in China in 2003 and has since spread to other countries, causing outbreaks in humans and animal populations. Researchers are working to understand the virus's transmission dynamics and develop effective control strategies.

Recent studies have shown that migratory birds play a crucial role in the dissemination of the virus, as they act as vectors spreading the virus across different geographical regions. The image above illustrates the global distribution of H5N1 outbreaks, with high-risk areas highlighted in red. Understanding the migration patterns of these birds is essential for effective surveillance and control measures.
Thanks a lot!