Infectious Disease in China

Yi Zeng

1. China CDC
2. Beijing University of Technology
## Historical records of infectious disease in China (Before 1949)

<table>
<thead>
<tr>
<th>Dynasty</th>
<th>The year of start and stop</th>
<th>No. of years with epidemic</th>
<th>No. of years with severe epidemic</th>
<th>No. epidemic/years</th>
<th>Death/cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before of Zhou Dynasty</td>
<td>256B.C.</td>
<td>17</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qin Dynasty</td>
<td>255-205B.C.</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Han and Three Kingdoms</td>
<td>206-265B.C.</td>
<td>62</td>
<td>27</td>
<td>1/7.6</td>
<td>(4<del>5)/10</del>(8~9)/10</td>
</tr>
<tr>
<td>Jin</td>
<td>266~580</td>
<td>65</td>
<td>25</td>
<td>1/4.9</td>
<td>(2<del>3)/10</del>(8~9)/10</td>
</tr>
<tr>
<td>Tory Dynasty</td>
<td>581~960</td>
<td>58</td>
<td>13</td>
<td>1/6.5</td>
<td>(2<del>3)/10</del>(8~9)/10</td>
</tr>
<tr>
<td>Song Dynasty</td>
<td>960~1279</td>
<td>100</td>
<td>18</td>
<td>1/3.19</td>
<td>(2<del>3)/10</del>(8~9)/10</td>
</tr>
<tr>
<td>Yuan Dynasty</td>
<td>1279~1368</td>
<td>38</td>
<td>12</td>
<td>1/2.3</td>
<td>5/10~9/10</td>
</tr>
<tr>
<td>Ming Dynasty</td>
<td>1368~1644(157)</td>
<td>156</td>
<td>90</td>
<td>1/1.77</td>
<td>(6<del>7)/10</del>(8~9)/10</td>
</tr>
<tr>
<td>Qing Dynasty</td>
<td>1644~1911(267)</td>
<td>217</td>
<td>114</td>
<td>1/1.23</td>
<td>5/10~9/10</td>
</tr>
<tr>
<td>R. China</td>
<td>1912~1949</td>
<td>38</td>
<td>33</td>
<td>1/1.00</td>
<td>8.6/10(plague)</td>
</tr>
<tr>
<td>total</td>
<td>753</td>
<td>337</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prof. Wenbo Li  2004
After the founding of the new China in 1949, the Chinese government emphasized the prevention and control of severe epidemics and developed policies putting prevention first. During this period (1950s) many severe epemics became well controlled, including schistosomiasis, malaria, filariasis, smallpox, measles, T.B, STD and other bacterial related disease.
After the Culture Revolution, the government concentrated on economic development and markedly neglected public health preventive medicine. The era of newly emerging and reemerging infection began, such as drug resistant variants of T.B and malaria, rapidly spread around the globe. New infectious disease appeared such as HIV/AIDS, SARS, human avian flu at al.
SARS originated in November 2002 in China and subsequently spread to more than 30 countries, infected 8000 individuals with a fatality rate about 10 percent. SARS severely influenced economic development. Soon the Chinese government realized that SARS was not only a severe infectious disease, but also a severe social and economic problem. The SARS epidemic presented a significant challenge to the Chinese public health system. The Chinese government has learned a lot of lessons from the SARS epidemic and has strongly responded by establishing and strengthening a public health system to ensure an effective and rapid response to any future epidemic.
Global summary of the AIDS epidemic (2005)

<table>
<thead>
<tr>
<th>Number of people living with HIV</th>
<th>Total</th>
<th>40.3 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>38.0 million</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>17.5 million</td>
</tr>
<tr>
<td></td>
<td>Children</td>
<td>2.3 million</td>
</tr>
<tr>
<td></td>
<td>under 15</td>
<td>2.3 million</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>People newly infected with HIV</th>
<th>Total</th>
<th>4.9 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>4.2 million</td>
</tr>
<tr>
<td></td>
<td>Children</td>
<td>700 000</td>
</tr>
<tr>
<td></td>
<td>under 15</td>
<td>700 000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AIDS deaths</th>
<th>Total</th>
<th>3.1 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>2.6 million</td>
</tr>
<tr>
<td></td>
<td>Children</td>
<td>570 000</td>
</tr>
<tr>
<td></td>
<td>under 15</td>
<td>570 000</td>
</tr>
</tbody>
</table>
HIV/AIDS Epidemic History in China

1982  HIV transmitted to China (Factor VIII from USA)
1983  HIV infected 1st Chinese from factor VIII
1985  First American AIDS patient from USA
1986  First Chinese AIDS patient from USA
1989  Drug users infected with HIV in Yunnan
1994  Blood donor infected with HIV in Henan
### HIV/AIDS cases in China (2005)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative reported number of people living with HIV/AIDS</td>
<td>144,089</td>
<td></td>
</tr>
<tr>
<td>AIDS</td>
<td>32,886</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>8,404</td>
<td></td>
</tr>
<tr>
<td>Estimated number of people living with HIV/AIDS</td>
<td>650,000</td>
<td></td>
</tr>
<tr>
<td>AIDS</td>
<td>75,000</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>2005 New HIV infection</td>
<td>70,000</td>
<td></td>
</tr>
<tr>
<td>Each year New infection</td>
<td>60,000-70,000</td>
<td></td>
</tr>
</tbody>
</table>
Transmitted Route

1. Drug user HIV/AIDS
   - 288,000 (44.3%)
   - 7 provinces (Yunnan, Xinjiang, Guangxi, Guangdong, Guizhou, Sichuan, Hunan) HIV/AIDS > 10,000 cases (89.5%)

2. Blood Donor, blood transfusion and using blood product
   - HIV/AIDS
   - 69,000 (10.7%)

3. Sexual transmission
   - Prostitutes, clients
     - HIV/AIDS
     - 127,000 (19.6%)
   - MSM
     - HIV/AIDS
     - 47,000 (7.3%)

4. Spouse and general population
   - HIV/AIDS
   - 109,000 (16.7%)
The Spreading of HIV/AIDS Epidemic in China
Accumulative Total of Reported HIV Infections in China, by Administrative Division (1985-2005.7)
The Divide-Up by Transmission Modes of the Accumulative Total of the HIV Infections in China, 2005

- Blood or Blood Products: 21.0%
- Intravenous Drug-taking: 51.2%
- Sex (Homo- or Hetero-): 7.5%
- Unknown: 18.1%
- Blood Collection: 1.8%
- Mother-to-child: 0.4%
The distribution of subtype A, D, F, and G HIV-1 and HIV-2.

The distribution of subtype B and B' HIV-1.

The distribution of subtype E HIV-1.

The Distribution of Subtype C and B'/C recombinant HIV-1.

The distribution of subtype A, D, F, and G HIV-1 and HIV-2.

Geographic Distribution of HIV Subtypes in China by Clades.
HIV Molecular Epidemiology Research in China
The Annual HIV Prevalence amongst Intravenous Users in China

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>Xinjiang* (n = 509)</th>
<th>Guangxi* (n = 500)</th>
<th>Sichuan# (n = 333)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnical Distribution:</td>
<td>46% Uigur 40% Han 10% Muslim</td>
<td>94% Han 6% Zhuang</td>
<td>66% Han 34% Yi and the Others</td>
</tr>
<tr>
<td>Average Age Group:</td>
<td>29.3 (18 – 59)</td>
<td>25.8 (18 – 51)</td>
<td>28.8(18-45)</td>
</tr>
<tr>
<td>Education: High School and Above</td>
<td>19 %</td>
<td>1 %</td>
<td>16%</td>
</tr>
<tr>
<td>Occupation: Unemployed</td>
<td>63 %</td>
<td>49 %</td>
<td>60%</td>
</tr>
<tr>
<td>Prevalence at Cohort Follow-up</td>
<td>29%</td>
<td>25%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Participation Rate of the 12 Month Cohort</td>
<td>93%</td>
<td>87%</td>
<td>70%</td>
</tr>
<tr>
<td>Annual HIV Incidence of the 12 Month Cohort</td>
<td>8.8 %</td>
<td>3.1 %</td>
<td>3.2%</td>
</tr>
</tbody>
</table>
HIV/AIDS remains on the rise in China. New HIV cases are being transmitted primarily through injection drug use and sex. There are about 60,000 to 80,000 new cases in each year. HIV has spread widely, but there is significant geographic variation in the epidemic. More people are developing clinical AIDS, and AIDS-related deaths are on the rise. The epidemic is spreading from high-risk group to the general population and there is a potential risk that the epidemic will spread further.
Progress in HIV/AIDS Prevention, Treatment and Care in China

Government at all levels attaches great importance to HIV/AIDS prevention and control

◆ President Hu Jintao and Premier Wen Jiabao have given important instructions on AIDS prevention and care, and visited people living with HIV/AIDS and patients. The State Council established the State Council AIDS Working Committee, issued State Council Document No. 7 which set out a comprehensive policy framework for HIV/AIDS prevention and control, held a national meeting on HIV/AIDS prevention and control, developed and implemented Four Frees and One Care Policy.

◆ The provinces and related sectors earnestly carried out and put into effect various strategies and policies, established and strengthened HIV/AIDS leadership coordination mechanisms, mobilized societal support for HIV/AIDS responses.

◆ The foundation has been laid for a government-led prevention and care responses with multisectoral cooperation and strong societal participation.
Various measures are strengthened

- The provinces and related sectors have strengthened the capacity building of on HIV/AIDS prevention and control, make great efforts on increasing investment, instituted a broad range of mass media education activities, strictly banned illegal blood donation and vigorously strengthened HIV surveillance and testing.

- Currently China has created a positive situation in HIV/AID prevention and control which has provided a solid foundation for the further responses.
Avian flu is spreading rapidly in many countries including in China. It has killed millions of chicken and severely damage regional and national economies.
Poultry outbreaks in China in 2004 (16 provinces, 50)

<table>
<thead>
<tr>
<th>省份</th>
<th>起数</th>
</tr>
</thead>
<tbody>
<tr>
<td>湖北</td>
<td>11</td>
</tr>
<tr>
<td>广东</td>
<td>9</td>
</tr>
<tr>
<td>安徽</td>
<td>5</td>
</tr>
<tr>
<td>湖南</td>
<td>5</td>
</tr>
<tr>
<td>云南</td>
<td>5</td>
</tr>
<tr>
<td>江西</td>
<td>3</td>
</tr>
<tr>
<td>广西</td>
<td>2</td>
</tr>
<tr>
<td>陕西</td>
<td>2</td>
</tr>
<tr>
<td>甘肃</td>
<td>1</td>
</tr>
<tr>
<td>河南</td>
<td>1</td>
</tr>
<tr>
<td>吉林</td>
<td>1</td>
</tr>
<tr>
<td>上海</td>
<td>1</td>
</tr>
<tr>
<td>西藏</td>
<td>1</td>
</tr>
<tr>
<td>新疆</td>
<td>1</td>
</tr>
</tbody>
</table>

合计 50

数据来源：农业部

动物种类：家禽
Poultry outbreaks in China since 2005
(14 provinces, 37)

<table>
<thead>
<tr>
<th>省份</th>
<th>起数</th>
</tr>
</thead>
<tbody>
<tr>
<td>新疆</td>
<td>11</td>
</tr>
<tr>
<td>辽宁</td>
<td>4</td>
</tr>
<tr>
<td>内蒙古</td>
<td>3</td>
</tr>
<tr>
<td>湖北</td>
<td>3</td>
</tr>
<tr>
<td>安徽</td>
<td>3</td>
</tr>
<tr>
<td>湖南</td>
<td>2</td>
</tr>
<tr>
<td>山西</td>
<td>2</td>
</tr>
<tr>
<td>青海</td>
<td>3</td>
</tr>
<tr>
<td>西藏</td>
<td>1</td>
</tr>
<tr>
<td>宁夏</td>
<td>1</td>
</tr>
<tr>
<td>云南</td>
<td>1</td>
</tr>
<tr>
<td>江西</td>
<td>1</td>
</tr>
<tr>
<td>四川</td>
<td>1</td>
</tr>
<tr>
<td>贵州</td>
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</tbody>
</table>

合计 37

数据来源：农业部
Influenza Surveillance Network. China

DDC, MOH → WHO

US CDC ↔ China CDC

DCER office → Provincial CDC

Provincial CDC → Prefecture CDC

Prefecture CDC → County CDC

NIC → Lab → Lab

Sentinel Hospital
Expansion Surveillance Coverage: 198 Sentinel Hospitals in 31 provinces, from Oct 2005
Laboratory Network in China
63 labs

- National Influenza Center
- Province CDC’s Flu lab
- Specific city CDC’s Flu lab
- Province capital CDC’s Flu lab
# Human avian Flu reported by WHO (July.26.2006)

<table>
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<tr>
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<tbody>
<tr>
<td>Azerbaijan</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>8</td>
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<tr>
<td>Cambodia</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>6</td>
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</tr>
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<td>China</td>
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<td>11</td>
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<td>13</td>
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<td>13</td>
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</tr>
<tr>
<td>djibouti</td>
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<td>0</td>
<td>14</td>
<td>6</td>
<td>14</td>
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</tr>
<tr>
<td>Indonesia</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>37</td>
<td>54</td>
<td>42</td>
<td>42</td>
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<tr>
<td>Iraq</td>
<td>0</td>
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<td>0</td>
<td>2</td>
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<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Thailand</td>
<td>0</td>
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<td>17</td>
<td>5</td>
<td>23</td>
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<td>Turkey</td>
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<td>0</td>
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</tr>
<tr>
<td>Vietnam</td>
<td>3</td>
<td>3</td>
<td>29</td>
<td>61</td>
<td>93</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>3</td>
<td>3</td>
<td>46</td>
<td>95</td>
<td>234</td>
<td>134</td>
<td>134</td>
<td>134</td>
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</tr>
</tbody>
</table>
Human H5N1 confirmed cases in mainland of China since Nov, 2005
<table>
<thead>
<tr>
<th>age</th>
<th>Male(%)</th>
<th>female(%)</th>
<th>total(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium (range)</td>
<td>21 (6-34)</td>
<td>26 (8-41)</td>
<td>26 (6-41)</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6—9</td>
<td>2 (40)</td>
<td>2 (15)</td>
<td>4 (22)</td>
</tr>
<tr>
<td>10—19</td>
<td>0 (0)</td>
<td>1 (8)</td>
<td>1 (6)</td>
</tr>
<tr>
<td>20—29</td>
<td>1 (20)</td>
<td>6 (46)</td>
<td>7 (39)</td>
</tr>
<tr>
<td>30—41</td>
<td>2 (40)</td>
<td>4 (31)</td>
<td>6 (33)</td>
</tr>
<tr>
<td>total</td>
<td>5 (28)</td>
<td>13 (72)</td>
<td>18 (100)</td>
</tr>
</tbody>
</table>
## Incubation time

**time between the illness onset and the exposure history**

<table>
<thead>
<tr>
<th></th>
<th>First exposure</th>
<th>Last exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cases (%)</strong></td>
<td>12 (67)</td>
<td>9 (50)</td>
</tr>
<tr>
<td><strong>Not clear (%)</strong></td>
<td>6 (33)</td>
<td>9 (50)</td>
</tr>
<tr>
<td><strong>medium (range)</strong></td>
<td>7 (4—22)</td>
<td>3 (0—5)</td>
</tr>
</tbody>
</table>
Exposure history

- Died poultry in case’s home (9 cases)
  - Active surveillance (1 case)
  - Human cases found first, then poultry outbreak confirmed (3 cases)
  - Other died poultry (5 cases)
- Died poultry in neighbor's home (1 case)
- Contact with apparent healthy poultry (2 cases)
- no died poultry contact history, but died poultry environment exposure (2 cases)
- Market exposure (4 cases)
Summary

- All genes are avian derived
- Receptor binding specificity is still avian virus specificity
- Connecting peptide is still polybasic AA
- Sensitive to adamantine and neuraminidase inhibitors drugs
- All human isolates until now are very similar, belonging to the same group
Thank you!