Epidemiology of Avian Influenza A(H5N1) in Cambodia

Dr. Sowath Ly
For influenza taskforce at IPC

Epidemiology and Public Health Unit
Institut Pasteur in Cambodia
lsowath@pasteur-kh.org

Asia-Pacific Workshop on Surveillance, Prevention and Control of Zoonotic Influenza
Paro, Bhutan
29-31 August 2016
Kingdom of Cambodia

- Population: ~ 15 Million
  - 80% in rural area
- Rainy season: May-October
- Temperature: 21-35°C
Poultry Raising and Trading in Cambodia

- Backyard poultry husbandry: 80%
A(H5N1) Human Cases in Cambodia

- 56 human cases since 2005
  - 26 (46%) in 2013 alone
- 38 deaths (67.9%)
- Female: 51.8%
- Age
  - Median: 6 yrs; Means: 11 yrs
  - Min-max: 0.7 – 58 yrs

![Graph showing case count by year and age group]
Circumstance of Detection of Human Cases in Cambodia

- Most samples from Kuntha Bopha children hospital (Kuntha Bopha foundation)
- By community-based surveillance of ILI (NAMRU-2)
- Around major traditional festivals of the year
- Many times, detection of human cases before notification of poultry die-off in the community
# Response to Occurrence of Human Case

## Coordination
- Communicable Disease Control Department (CDC-MOH)
- National Veterinary Research Institute (NaVRI-MoA)
- Institut Pasteur du Cambodge (IPC)
- WHO and FAO

<table>
<thead>
<tr>
<th>Focus</th>
<th>Laboratory</th>
<th>Epidemiology in human</th>
<th>Epidemiology and Controls in poultry</th>
<th>Case Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tasks</strong></td>
<td>Confirmation Drug resistance Serology Virus characterization</td>
<td>Contact tracing Surveillance and active case finding Seroprevalence</td>
<td>Poultry mortality survey Surveillance Control measures</td>
<td>Treatment and Quarantine</td>
</tr>
<tr>
<td><strong>Key actor</strong></td>
<td>NaVRI NIPH-MoH IPC</td>
<td>CDC-MoH IPC WHO</td>
<td>NaVRI FAO</td>
<td>CDC-MoH Referral hospitals</td>
</tr>
</tbody>
</table>
Role of Institut Pasteur in Cambodia

- National Influenza Centre (NIC)
- WHO H5 Reference Laboratory (H5RL)
- Involve in the Cambodian ILI/SARI network
  - Monitoring for human seasonal influenza viruses and the emergence of zoonotic influenza viruses in humans
- 4 laboratories submit samples to IPC (NIC/H5RL) for confirmation and virus characterization
A(H5N1) Clade 1.1.2 reassortant

- Reassortant first detected in January 2013
- Emergence coincided with a dramatic increase in human cases
  - Increased transmission to humans?
  - Increased transmission between poultry?
  - Improved awareness and surveillance?

Slide: Virology Unit, IPC
Contact Tracing

- To detect human-to-human transmission and additional symptomatic cases
- Identification and biological sampling
  - Blood
  - Nasopharyngeal swab in presence of ILI symptoms
- Screening by National Institute of Public Health (NIPH), MoH
- Confirmation by IPC
Contact Tracing

- Since 2005
- More than 500 contact people screened
- No evidence of human-to-human transmission
Seroprevalence Surveys

- To assess the extend of transmission among at-risk population

- Test all people living in the same village as the confirmed Index Case

- 2 blood samples with an interval of 4 weeks
Seroprevalence Surveys

- 7 seroprevalence surveys in Cambodia during 2005-2014
- Tested 5,729 people
- 37 positive = 0.6% (range: 0.5-0.9%)
Surveillance in Live Bird Markets (LBMs)

- Study by IPC and NaVRI-MAFF
  - In 2011 (Horm et al., Emerg Infect Dis, 2013)
  - In 2013 (Horm et al., Emerge Microbes Infect, 2016)
  - In 2015 (analysis ongoing)

In 2013 (Horm et al., Emerge Microbes Infect, 2016)

- In 4 markets
- Weekly specimen collection in environment and poultry
- Seroprevalence in poultry workers
  - 4 sequential blood samples to monitor the risk of infection by A(H5N1), A(H9N2) and A(H7N9)
Surveillance in LBMs

Slide: Virology Unit, IPC

Duck swabs

Chicken swabs

Discarded feathers

Poultry drinking water

Carcass wash water

Soil/mud around cages or holding areas
In 2013, 45% of environmental and poultry specimens found positive for influenza A (tested n=1,048)

- 35% positive for A(H5N1) virus, all Clade 1.1.2 reassortant
- At least 9 low pathogenic avian influenza viruses co-circulated

In a cohort of 125 poultry workers, serology testing found antibodies

- 4.5% to A(H5N1)
- 1.5% to A(H9N2)
Seasonality of A(H5N1) Circulation in Human, Poultry, LBMs in Cambodia
Conclusion

- Low transmission of A(H5N1) to human in Cambodia
- No evidence of human-to-human transmission
- Surveillance of SARI at hospitals is important for cases detection
  - Example of Kuntha Bopha children hospital
- Surveillance of poultry mortality would lead to early detection of virus circulation, thus better prevention of transmission to human
  - But difficult in a setting with 80% as backyard poultry husbandry
  - Newcastle disease causes confusion with same high poultry mortality
Conclusion

- High co-circulation of A(H5N1) and other AI viruses in LBMs
  - Potential for emergence of new strains with high impact on human and animal health
  - Intervention needed and to be maintained

- Testing of environmental samples in LBMs is very efficient to detect avian influenza circulation

- Other research activities are ongoing.
Acknowledgements

Funding:

Collaborations:
Thank You
For Your Attention!