HPAI Surveillance on Live Bird Markets in Cambodia

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Organization Chart of General Directorate of Animal Health and Production (GDAHP)
NAHPRI is a core laboratory for animal health and production in Cambodia. There are 8 laboratories, 1 office and 1 research station.
Livestock production

- Livestock plays a dual role in addressing the increasing demand of an expanding population for animal products as well as in achieving the Millennium Development Goal of poverty reduction and food security.

- Animal production is also a source of savings for Cambodian farmers.

- Livestock population in 2022
  - Cattle: 3 million
  - Buffalo: 0.54 million
  - Swine: 2 million which 86% is back yard production
  - Poultry: 27.3 million which 81% is back yard production
AVIAN INFLUENZA

HPAI in Cambodia

- HPAI was first reported in 2004, in Phoum Pong Peay, Sangkat Phnom Penh Thmey, Khan Tuol Kok, Phnom Penh. **There were 56 confirmed human cases with 37 deaths.**

- To date there were confirmed 59 outbreaks reported with over 0.5 million poultry died and destroyed.

- Most of reported human cases to have contacted with sick and dead poultry and/or reported of poultry died-off in the village.

- Cambodia has been categorized as endemic country with sporadic outbreaks (ASEAN, 2012).
HPAI mapping in Cambodia
Experience learned from HPAI outbreaks

- Difficult to identify the source of the outbreak

- Movement of people and poultry/poultry products is complex, particular in the villages with backyard system

- Frequent interaction with middlemen

- Roles of middlemen, poultry transporters/trucks, animal feed and vet drug companies

- Low reporting of poultry mortality (obligation, to whom...)

- Collaboration between human and animal health sectors (information sharing 115 and hotline)

- Financial contribution to field officers to involve in outbreak investigation and response
LBM surveillance in 2010-2022

-LBM surveillance conducted in the provinces where outbreaks of HPAI reported

-NAHPRI-FAO (Blue)
Battambang, Kampong Cham
Kampong Chhnang, Kampong Thom
Kampot, Mondulkiri, Siem Reap, Svay Rieng

-NAHPRI-IPC (Yellow)
Kandal, Phnom Penh, Prey Veng, Takeo

-NAHPRI-NIPH (Green)
Kampot, Kandal and Svay Rieng

-Part of the USAID and USCDC LBM surveillance
Monitor HPAI in chickens and ducks in high risk areas contributed to the control and eradication of the disease.

- Risk based surveillance to identify the HPAIV
- Monitor HPAI circulated in poultry (revolution and genetic mutation)
Sample collection and Transportation

- 20 chickens and ducks from the markets in each province.
- Tracheal and cloacal swabs from each selected chicken and duck.
- Samples were collected within a set schedule (10-17 sampling)

1. Swab sample place in VTM tube
2. Absorption cotton fill full to container
3. Container kept cool in polystyrene box and cover carton box at outer side
Laboratory Analysis

- Sample received and kept in freezer

- Samples were pooled for nucleic acid extraction (5 samples per pool)

- Virus were detected by molecular biology technique (qRT-PCR)
  - M-gene
  - HA-gene (H5, H7 and H9)
  - NA-gene (N1, N2, N6, N8 and N9)

- Sample that positive for M-gene was further tested for subtype.
Characteristic of LBM

- No live poultry sold at the market in Kampong Cham
- A few live poultry sold at the market in Prey Veng
- Characteristic of LBMs are quite similar
  - Live poultry are sold along the pavement
  - Hot stove
  - Defeathering machine or by hand
  - Waste disposed in the rubbish bin
Sources of Poultry

Different districts in the province

Other provinces

From neighboring country
HPAI in Cambodia

- 2004: H5N1 clade 2.1
- 2014: H5N1 clade 2.3.2.1
- 2015: 2015
- 2017: H7N3
- 2018: H7N4
- 2019: H5N6, H7N6
- Now: H5N1 clade 2.3.2.1
- 2021: H14N2
# HPAI in Cambodia

<table>
<thead>
<tr>
<th>Month</th>
<th>Data Count</th>
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<tbody>
<tr>
<td>Jan</td>
<td>300</td>
</tr>
<tr>
<td>Feb</td>
<td>600</td>
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<td>Mar</td>
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<td>Jan</td>
<td>300</td>
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<tr>
<td>Feb</td>
<td>600</td>
</tr>
</tbody>
</table>

![Graph showing HPAI cases by month and year](image-url)

The chart above illustrates the distribution of HPAI cases by month and year for H5+, H7+, and H9+ strains. The data shows the percentage of cases for each strain over the months of 2020 and 2021.
HPAI in Cambodia

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>H5+</th>
<th>H7+</th>
<th>H9+</th>
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<tbody>
<tr>
<td>2020</td>
<td>3640</td>
<td>0.055%</td>
<td>0.192%</td>
<td>6.731%</td>
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<td>2021</td>
<td>2860</td>
<td>1.748%</td>
<td>1.538%</td>
<td>11.538%</td>
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<td>2022</td>
<td>1800</td>
<td>1.167%</td>
<td>0.056%</td>
<td>4.778%</td>
</tr>
</tbody>
</table>

### Chicken, n=4840
- H9+ Tra: 12.211%
- H7+ Tra: 0.021%
- H5+ Tra: 0.207%

### Duck, n=3460
- H9+ Tra: 2.023%
- H7+ Tra: 1.474%
- H5+ Tra: 1.821%
**Conclusion**

- HPAIV detected included H5, H7, H9, N1, N2, N6, N8
- HPAIV isolated from both chicken and ducks
- Mostly detected during festive seasons
- Biosecurity at LBMs is a major concern and may pose a risk to highly exposure population including poultry traders and butchers
There are some activities to improve Biosecurity

- Obsess illegal transport animal
- Quarantine station sterilize
- Enhance size of active surveillance
- Stick poster avoid of avian influenza
- National vaccination program
- Outbreak investigation
Thanks for paying attention