Canada’s Inter-agency Wild Bird Influenza Survey

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On behalf of federal, provincial and territorial environment, agriculture, and public health; and university partners

Background
- Canada’s Inter-agency Wild Bird Influenza Survey was initiated in 2005 with a survey of live ducks. Late in 2005 the survey was expanded to include year-round sampling of wild birds found dead.
- 2 survey components:
  1. Seasonal sampling of live birds
  2. Year-round testing of birds found dead
- Since 2007 a greater emphasis has been placed on collection and testing of birds found dead in order to enhance detection of highly pathogenic avian influenza (HPAI).
- The survey is a collaborative effort between federal, provincial organizations, Canada’s five veterinary colleges and international partners
- Survey objectives:
  - Enhance detection of HPAI
  - Inventory and characterize avian influenza viruses circulating in Canadian wild birds
  - Complement surveillance activities in the United States and Mexico
  - Develop coordinated field, laboratory and communications across jurisdictions.

Sampling and Testing Methodology
- Live birds:
  - Primarily captured as part of routine banding activities
  - Species: Anseriformes and Charadriiformes
  - Samples have been tested positive by RRT-PCR
  - Tested upon submission to a diagnostic lab (criteria for submission of carcasses is determined by the individual province or territory)
  - All birds
  - Combination oropharyngeal and cloacal swabs are collected and placed together in a single vial of transport medium. This is tested as a single sample.

Results to date
- Since the survey started more than 30,000 live and dead birds have been tested for the presence of avian influenza virus (Table 1).
- In each year of the survey, the proportion of birds tested that were found dead has increased (Figure 3).
- All viruses detected to date have been of low pathogenicity (≤2%).
- All H5 or H7 PCR positive samples are immediately shipped to the National Centre for Foreign Animal Disease in Winnipeg for virus isolation and characterization.
- 2005-2006 virus isolation was attempted on all matrix PCR positive samples. Since 2007, only H5 and H7 PCR positive samples have undergone further testing.

Table 1: Birds tested by survey component and number (%) positive by RRT-PCR, 2005-2008

<table>
<thead>
<tr>
<th>Survey Component</th>
<th>Year</th>
<th>Birds Tested N(%)</th>
<th>RRT-PCR Results N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds Found Dead</td>
<td>2005</td>
<td>4268</td>
<td>1572 (37) 208 (5) 0</td>
</tr>
<tr>
<td>Live Wild Ducks</td>
<td>2006</td>
<td>3843</td>
<td>1173 (31) 82 (2) 4 (&lt;1)</td>
</tr>
<tr>
<td>Other Live Birds</td>
<td>2007</td>
<td>5488</td>
<td>1342 (25) 41 (&lt;1) 8 (&lt;1)</td>
</tr>
<tr>
<td>Live Wild Ducks</td>
<td>2008</td>
<td>1445</td>
<td>33 (2) 1 (&lt;1) 4 (&lt;1)</td>
</tr>
<tr>
<td>Other Live Birds</td>
<td>2005</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Live Wild Ducks</td>
<td>2006</td>
<td>5763</td>
<td>327 (6) 8 (&lt;1) 0</td>
</tr>
<tr>
<td>Other Live Birds</td>
<td>2007</td>
<td>1200</td>
<td>6 (1) 2 (&lt;1) 0</td>
</tr>
<tr>
<td>Live Wild Ducks</td>
<td>2008</td>
<td>634</td>
<td>20 (12) 5 (3) 0</td>
</tr>
<tr>
<td>Other Live Birds</td>
<td>2006</td>
<td>2683</td>
<td>105 (4) 3 (&lt;1) 0</td>
</tr>
<tr>
<td>Live Wild Ducks</td>
<td>2007</td>
<td>3354</td>
<td>43 (1) 2 (&lt;1) 2 (&lt;1)</td>
</tr>
<tr>
<td>Other Live Birds</td>
<td>2008</td>
<td>3014</td>
<td>45 (1) 1 (&lt;1) 0</td>
</tr>
</tbody>
</table>

Figure 1: Canada’s avian influenza laboratory network

Figure 2: Pathway from sample collection to final virus characterisation

Summary and Conclusions
- Avian influenza is commonly detected in a wide variety of Canadian wild bird species from across the country.
- Since 2005, avian influenza virus has been detected in 27% of live ducks, 4% of other live bird species, and 2% of birds found dead.
- Most virus has been detected among Anseriformes that were apparently healthy and caught alive.
- All viruses detected to date have been of low pathogenicity and North American lineage.
- The survey has become progressively more focused on birds found dead. This trend will continue in 2009.
- Preliminary investigation revealed no trends or differences in cause of death between wild birds that tested positive for avian influenza and those that tested negative.
- The survey has enabled and facilitated working collaborations among public health, agriculture and wildlife agencies across all levels of government and with Canada’s veterinary colleges. It has also strengthened the national laboratory network.

Acknowledgements
- ALL SURVEY PARTICIPANTS AND PARTNERS:
  - Primary Federal Participants: Canadian Food Inspection Agency, Environment Canada, Public Health Agency of Canada
  - Primary Provincial Participants: Provincial/territorial departments responsible for Agriculture (animal health), Wildlife, and Public Health
  - Primary Non-government Participants: Canadian Cooperative Wildlife Health Centre (Canada’s veterinary colleges), Centre for Coastal Health (Vancouver Island University, Nanaimo, BC), Ducks Unlimited Canada
  - International Participants: United States Department of Agriculture, United States Department of Interior, Wildlife Influenza Institute, United States National Institute of Allergy and Infectious Diseases

Figure 3: Number of birds sampled by survey component by year (% of survey capture by submission of dead birds is indicated)