Surveillance For z-H$_5$N$_1$

Passive
Active
Human
Animal
White lines represent 1000 mile reference zones using Hong Kong as the source point.

**Cumulative H5N1 Outbreaks 1996 to 2003**
Cumulative H5N1
Outbreaks Jan.04 - June 04
Cumulative H5N1 Outbreaks Jan.04 - Dec.04
Cumulative H5N1 Outbreaks Jan.04 - June 05
65% of the World Poultry Population lives in China or Europe
Nations with Confirmed z-strain H₅N₁, Feb 2007
Leading States for Broiler Production

Leading States in Broiler Production (1995)

- CA (California)
- TX (Texas)
- AR (Arkansas)
- GA (Georgia)
- AL (Alabama)
- NC (North Carolina)
- MS (Mississippi)
- MD (Maryland)
- DE (Delaware)
- VA (Virginia)
- Other States

Million birds/yr:
- CA: 1200
- TX: 800
- AR, GA, AL, NC: 600
- MS, MD, DE, VA, CA: 200

Delmarva States

Southern States

Other States
Turkeys

- **44.5 million** Minnesota
- North Carolina (36.0 million),
- Arkansas (29.0 million),
- Virginia (21.0 million),
- Missouri (20.5 million) and
- California (15.1 million).
- These six states together account for about 65 percent of U. S. turkeys produced
Top 10 States All Feather Production
HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI) CASES IN WILD BIRDS IN 2006
NOTIFIED BY MEMBER STATES TO
THE ANIMAL DISEASES NOTIFICATION SYSTEM (ADNS)

748 HPAI cases in wild birds notified by MS to ADNS in 2006
Overview number of cases per week

<table>
<thead>
<tr>
<th>Months</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Febr. (200)</td>
<td>116</td>
</tr>
<tr>
<td>March (362)</td>
<td>83</td>
</tr>
<tr>
<td>April (162)</td>
<td>75</td>
</tr>
<tr>
<td>May (18)</td>
<td>61</td>
</tr>
<tr>
<td>June (0)</td>
<td>80</td>
</tr>
<tr>
<td>July (1)</td>
<td>78</td>
</tr>
<tr>
<td>Aug (1)</td>
<td>75</td>
</tr>
<tr>
<td>Sept (0)</td>
<td>38</td>
</tr>
<tr>
<td>Oct (0)</td>
<td>12</td>
</tr>
<tr>
<td>Nov (0)</td>
<td>1</td>
</tr>
<tr>
<td>Dec (0)</td>
<td>2</td>
</tr>
</tbody>
</table>
HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI) CASES IN WILD BIRDS IN 2007
NOTIFIED BY MEMBER STATES TO
THE ANIMAL DISEASES NOTIFICATION SYSTEM (ADNS)

(0) HPAI cases in wild birds notified by MS to ADNS in 2007
Overview number of cases per week
748 HPAI cases in wild birds notified by MS to ADNS in 2006
Overview number of cases per bird species

Swans (62,7%) 121
Ducks (16,2%) 33
Geese (4,4%) 29
Birds of Prey (3,9%) 96
Others (12,8%)
2007 Hungary and the UK
99.96% similarity of the RNA sequences of the genomes of the H۵N۱ avian influenza viruses isolated from turkeys in the UK and from geese in Hungary,
..there is little evidence to support the hypothesis that wild birds are the source of this outbreak.
Areas with confirmed human cases of H5N1 avian influenza since 2003

166 Human Deaths/272 Cases (Feb 7th)

- **Turkey**: Cases: 12, Deaths: 4
- **Azerbaijan**: Cases: 8, Deaths: 5
- **Iraq**: Cases: 3, Deaths: 2
- **Egypt**: Cases: 19, Deaths: 11
- **Djibouti**: Case: 1, Death: 0
- **China**: Cases: 22, Deaths: 14
- **Viet Nam**: Cases: 93, Deaths: 42
- **Thailand**: Cases: 25, Deaths: 17
- **Cambodia**: Cases: 6, Deaths: 6
- **Indonesia**: Cases: 80, Deaths: 62

* All dates refer to onset of illness
H5N1 outbreaks in 2005 and major flyways of migratory birds
Situation on 30 August 2005

“cross-over” zones where multiple bird flyways overlap

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Data sources: AI outbreaks: OIE, FAO and Government sources.
Flyways: Wetlands International
WATERFOWL FLYWAYS OF NORTH AMERICA
<table>
<thead>
<tr>
<th>Sample Collection Region*</th>
<th># Tested</th>
<th># With Influenza Virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>815</td>
<td>237</td>
</tr>
<tr>
<td>British Columbia</td>
<td>800</td>
<td>187</td>
</tr>
<tr>
<td>Manitoba</td>
<td>600</td>
<td>42</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>889</td>
<td>151</td>
</tr>
<tr>
<td>Newfoundland And Labrador</td>
<td>904</td>
<td>86</td>
</tr>
<tr>
<td>Northwest Territories</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>449</td>
<td>115</td>
</tr>
<tr>
<td>Nunavut</td>
<td>1784</td>
<td>31</td>
</tr>
<tr>
<td>Ontario</td>
<td>600</td>
<td>0</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>281</td>
<td>65</td>
</tr>
<tr>
<td>Quebec</td>
<td>1911</td>
<td>485</td>
</tr>
<tr>
<td>Total</td>
<td>9033</td>
<td>1399</td>
</tr>
</tbody>
</table>

All viruses detected were North American strains with LOW or NO potential to cause disease in domestic chickens.

* No collections were made in the Northwest Territories, Nunavut, Saskatchewan, or Yukon
Feb 15th  95,510 samples tested negative to z-H₅N₁ almost 20,000 from Alaska
Why Do Surveillance?

- **Wild Bird**
  - Early warning system to tighten security in domestic flocks
  - Prevent transmission from wild to domestic

- **Domestic Poultry**
  - Identify the initial flock infected and prevent infection of the second and subsequent flocks.
Wild Field Sample Collection

- Cloacal swabs from live caught and banded birds
- Cloacal swab from hunter kills
- Whole birds from dead bird surveys
Laboratory Process

1. Local Lab does PCR for Matrix protein Identifies all Influenza A
2. Local Lab tests for H$_5$ and H$_7$, if positive the sample goes to the NCFAD lab on Arlington Street
3. NCFAD tries to grow the virus under High Containment
   1. Sometimes grow nothing
   2. Sometimes grow multiple influenza viruses
Canada Surveillance

- **Wild Bird Surveillance**
  - 2006 Communications was a problem
  - December 2006 low path H$_5$N$_1$ in PEI Duck

- **Domestic Poultry Surveillance**
  - CFIA in negotiations
  - Commercial and Backyard Poultry communications even more sensitive
Long Term Plans

- Wild Birds
  - CFIA will continue to do the typing testing
  - CCWHC Ted Leighton looking at the annual plan
  - Sample size per population is always in discussion
  - Look at what the USA is looking at in Alaska
  - Be sure we sample all the populations of birds
  - Dead bird surveillance is more sensitive than Live Bird Sampling
2007 -

- Review 2006 data is there a better way to sample the same populations of birds and get the same quality of information
Questions

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