High Pathogenic Avian Influenza

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HPAI History

• 2 Groups of Proteins:
  – hemagglutinin or “H” proteins
  – neuraminidase or “N” proteins
  – 17 Different Possible “H” proteins (H1-H17)
  – 10 Different Possible “N” proteins (N1-N10)
  – Many Combinations- Subtypes
  – Species subtypes
  – H5 and H7 of concern for poultry
  – (HPAI Subtypes)
HPAI HISTORY

• 4 Categories of Domestic Poultry Population:
  – Large-volume **commercial** poultry industry
  – Small-volume/high-value **commercial** poultry industry
  – Live-Bird Marketing System
  – Backyard poultry flocks
Reports of H5 HPAI subsided in the region during summer 2014. Then in September, outbreaks of H5N1, H5N2, H5N6, H5N8 HPAI occurred in China.

Original H5N8 outbreak occurred January-April, 2014, most intensely in S. Korea and Japan. After 5 months with no reported cases, H5N8 was detected again, 24 September, in S. Korean commercial poultry. It was detected again in Japan in November.

H5N2, H5N3, H5N8 outbreaks occurred in Taiwan in early 2015.
Western Europe

H5N8 was first isolated 4 November 2014 from commercial poultry in Germany; also isolated in November from a wild duck.

By mid-December, H5N8 was isolated from commercial poultry in The Netherlands, United Kingdom, and Italy.

Eastern Asia

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H5 HPAI reports from Europe, Middle East, and Africa November 2014 through February 2015 (OIE)
Migratory aquatic birds – likely mode for H5N8 HPAI virus spread to Europe in fall 2014

Several migratory flyways overlap extensively in northern Eurasia during the breeding season. H5N8 virus carried there from East Asia in the spring could have been transferred to other birds that migrate south into Europe in the fall.

H5N8 may be better suited for long-distance dispersal than most strains of HPAI.

H5 HPAI reports from Europe, Middle East, and Africa
November 2014 through February 2015 (OIE)
H5 HPAI reports from North America November 2014 through February 2015 (OIE)

North America

H5N2 first isolated 30 November 2014 from commercial poultry in British Columbia; outbreak continues into 2015.

H5N8 first isolated 10 December 2014 from captive wild birds in Washington; later isolated from backyard poultry in Oregon. Similarly, H5N2 identified in US wild birds and backyard poultry.

H5N1 first isolated 29 December 2014 from wild duck in Washington.

H5N8 isolated 19 January 2015 from commercial turkey farm in California.

H5N2 detected in commercial turkeys in Minnesota, Missouri & Arkansas during March 2015.

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Migratory aquatic birds – also the likely mode for H5N8 HPAI virus spread to North America

Eurasian (EA) H5N8 was likely carried to Alaska by infected birds migrating on the East Asia / Australia Flyway. Within 3 months, HPAI viruses were detected in the Pacific Americas Flyway and the Mississippi Americas Flyway.

EA H5N8 underwent gene reassortment with low pathogenicity avian influenza (LPAI) strains endemic to North American wild birds. This means a bird was co-infected at some point with the H5N8 and an American (AM) LPAI strain, enabling the 8 gene segments to be mixed and matched in new combinations.

EA/AM H5N1 and EA/AM H5N2 isolates in the western and central US were reassortants that contained genes of North American and Eurasian origin.
Initial HPAI Detections in the US

• December 14 confirmation of HPAI H5 avian influenza in Whatcom County, Washington and in Winston, Oregon.

• In Washington, two separate virus strains were identified:
  – HPAI H5N2 (01/03/15 Backyard Flock)
  – HPAI H5N8 (12/4/14 Captive Wildlife)

• In Oregon, the HPAI H5N8 strain was found. (12/19/14 Backyard Flock)

• These viruses contain the Asian-origin H5 part of the virus, which is highly pathogenic to poultry.

• No human cases with these viruses have been detected in the United States, Canada, or internationally.
Subsequent HPAI Detections

- January 23, 2015 confirmation of HPAI H5N8 in a Commercial Turkey Flock in Stanislaus County, California.
- Facility quarantined
- Joint Incident Command (State/Federal)
- Prevent the Spread of Disease.
- Inventory/Foam Depopulation/Composting/C&D
- Surveillance
Currently

- We continue to deal with detections of HPAI, related to occurrences of the virus in wild birds.
- Since the previously stated detections, HPAI has also been detected in the Mississippi and Central flyways.
- We have had Commercial Turkey Flocks infected in *California (2), Minnesota (1), Missouri (2) and Arkansas (1).

*CA -1 flock was turkey, Ducks
Confirmations as of March 11
<table>
<thead>
<tr>
<th>Date</th>
<th>State</th>
<th>County</th>
<th>HPAI</th>
<th>Type</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-Mar</td>
<td>AR</td>
<td>Boone</td>
<td>H5N2</td>
<td>Turkey Flock</td>
<td>40,000 turkey hens; premises quarantined 3/9; depopulation complete 3/11; disposal by burial started 3/12, inclement weather hampering completion</td>
</tr>
<tr>
<td>9-Mar</td>
<td>MO</td>
<td>Moniteau</td>
<td>H5N2</td>
<td>Turkey Flock</td>
<td>18-house; premises quarantined; depopulated 3/10; composting begun 3/13</td>
</tr>
<tr>
<td>9-Mar</td>
<td>MO</td>
<td>Jasper</td>
<td>H5N2</td>
<td>Turkey Flock</td>
<td>30,100 toms; depopulation complete 3/10; composting begun 3/13</td>
</tr>
<tr>
<td>4-Mar</td>
<td>MN</td>
<td>Pope</td>
<td>H5N2</td>
<td>Turkey Flock</td>
<td>Quarantined 3/6; Depopulation complete 3/7; buffer zone testing complete/negative; flock plan signed</td>
</tr>
<tr>
<td>12-Feb</td>
<td>CA</td>
<td>Kings</td>
<td>H5N8</td>
<td>Commercial chicken/duck</td>
<td>Depopulation complete 2/18; composting begun 2/19; surveillance complete</td>
</tr>
<tr>
<td>1/23</td>
<td>CA</td>
<td>Stanislaus</td>
<td>H5N8</td>
<td>Commercial Turkey</td>
<td>Depopulation complete; composting in process</td>
</tr>
</tbody>
</table>
Regulatory Action

• In all cases the sites were quarantined and depopulated
• Intensive outreach in the impacted areas to all bird owners
• Indemnity was paid to bird owners
Biosecurity is key!

The lower the opportunity of contact with wild birds, the less risk of getting the disease!
Stakeholder Notifications

- Upon confirmation of presumptive positive, USDA notifies State vets and poultry industry via email and conference call, if necessary.
- Upon confirmation of HPAI, USDA notifies all stakeholders through an online announcement.
- OIE is notified of new detections as part of the original H5N8 and H5N2 reports.
- Trading Partners Notified/Phone
HPAI and Trade
U.S. Poultry and Poultry Products Exports
$6.5 Billion in 2014

Broiler Meat: 63%
Turkey Meat: 12%
Other Poultry: 12%
Egg and Egg Products: 10%
Live Poultry: 3%

Source: U.S. Census
Share of U.S. Broiler Production by State

- Georgia, 15%
- Arkansas, 12%
- North Carolina, 12%
- Alabama, 11%
- Other, 50%

Source: National Agricultural Statistical Service, 2013
U.S. Broiler Meat Production and Exports

2015 Forecast:
- Production: 4 percent
- Exports: 3 percent

Exports account for 19 percent of production

Source: WASDE, March 10
Countries with Regionalized Restrictions were Responsible for Two-Thirds of U.S. Exports

2014 ($6.5 Billion)

- Regionalized Restrictions (County and State): 66%
- National Restrictions: 11%
- No Restrictions: 23%

U.S. shipped to 156 countries

Source: U.S. Census
Updates on HPAI

• Sign up for APHIS stakeholder registry
• Confirmations of HPAI are sent to registered stakeholders

https://public.govdelivery.com/accounts/USDAAAPHIS/subscriber/new
Questions?