High Path Avian Influenza

December 10, 2015

Atlantic Flyway
Mississippi Flyway
Central Flyway
Pacific Flyway
Figure 1. All HPAI Detections As Of June 5, 2015 PM (as reported on www.aphis.usda.gov)
*one or more detections may have occurred in county
Most Severe Animal Disease Outbreak in US History

- 223 Domestic Poultry Flocks
- Hardest Hit Industries
  - Turkeys
  - Laying Hens/Pullets
- Iowa, Minnesota
  - Also Nebraska, Wisconsin, South Dakota, Arkansas, Missouri, North Dakota
- 49.6 million birds impacted
Figure 3a (Pacific Flyway). All HPAI Detections with Details, as of 8/31/2015
(as reported on www.aphis.usda.gov)

1. Whatcom County (WA)
   - H5N1 Wild Bird (3)
   - H5N2 Wild Bird (5)
   - H5N8 Captive Wild Bird (1)
   - H5N8 Wild Bird (2)

2. Okanogan County (WA)
   - H5N2 Backyard (2)

3. Skagit County (WA)
   - H5N2 Wild Bird (1)

4. Flathead County (MT)
   - H5N2 Captive Wild Bird (1)

5. Clallam County (WA)
   - H5N2 Backyard (1)

6. Jefferson County (WA)
   - H5N2 Wild Bird (1)

7. Kootenai County (ID)
   - H5N8 Captive Wild Bird (1)

8. Grays Harbor County (WA)
   - H5N8 Wild Bird (1)

9. Benton County (WA)
   - H5N2 Backyard (2)
   - H5N2 Wild Bird (1)

10. Walla Walla County (WA)
    - H5N2 Wild Bird (1)

11. Columbia County (OR)
    - H5N2 Wild Bird (3)
    - H5N8 Wild Bird (1)

12. Clark County (WA)
    - H5N2 Wild Bird (1)
    - H5N8 Wild Bird (1)

13. Morrow County (OR)
    - H5N2 Wild Bird (6)

14. Lane County (OR)
    - H5N2 Wild Bird (4)

15. Deschutes County (OR)
    - H5N2 Backyard (1)

16. Canyon County (ID)
    - H5N2 Backyard (1)
    - H5N2 Captive Wild Bird (1)
    - H5N2 Wild Bird (2)
    - H5N8 Wild Bird (1)

17. Ada County (ID)
    - H5N2 Wild Bird (1)

18. Douglas County (OR)
    - H5N8 Backyard (1)

19. Bingham County (ID)
    - H5N8 Wild Bird (2)

20. Gooding County (ID)
    - H5N8 Wild Bird (1)

21. Klamath County (OR)
    - H5N8 Wild Bird (2)

22. Siskiyou County (CA)
    - EA H5 Wild Bird (10)
    - H5N8 Wild Bird (2)

23. Davis County (UT)
    - EA H5 Wild Bird (1)
    - H5N8 Wild Bird (1)

24. Butte County (CA)
    - H5N8 Wild Bird (2)

25. Colusa County (CA)
    - EA H5 Wild Bird (1)
    - H5N8 Wild Bird (3)

26. Sutter County (CA)
    - EA H5 Wild Bird (4)

27. Yolo County (CA)
    - H5N8 Wild Bird (1)

28. Solano County (CA)
    - H5N8 Wild Bird (1)

29. Lincoln County (NV)
    - H5N8 Wild Bird (1)

30. Stanislaus County (CA)
    - H5N8 Commercial (1)

31. Kings County (CA)
    - H5N8 Commercial (1)
Figure 3b (Mississippi and Central Flyways). All HPAI Detections with Details, as of 8/31/2015 (as reported on www.aphis.usda.gov)

- State of Iowa
  - see individual map figure
- State of Minnesota
  - see individual map figure
- State of South Dakota
  - see individual map figure
- 1. Judith Basin County (MT)
  - H5N2 Backyard (1)
- 2. LaMoure County (ND)
  - H5N2 Commercial (1)
- 3. Dickey County (ND)
  - H5N2 Commercial (1)
- 4. Barron County (WI)
  - H5N2 Commercial (5)
- 5. Chippewa County (WI)
  - H5N2 Commercial (1)
- 6. Oconto County (WI)
  - H5N2 Wild Bird (1)
- 7. Juneau County (WI)
  - H5N2 Backyard (1)
- 8. Jefferson County (WI)
  - H5N2 Commercial (3)
- 9. Macomb County (MI)
  - EA H5 Wild Bird (7)
  - H5N2 Wild Bird (4)
- 10. Dixon County (NE)
  - DC Commercial (1)
  - H5N2 Backyard (1)
- 11. Laramie County (WY)
  - H5N2 Commercial (4)
- 12. Whitley County (IN)
  - H5N8 Backyard (1)
- 13. Nodaway County (MO)
  - EA H5 Wild Bird (1)
- 14. Lewis County (MO)
  - H5N2 Backyard (1)
- 15. Leavenworth County (KS)
  - H5N2 Backyard (1)
- 16. St. Charles County (MO)
  - H5N2 Commercial (1)
- 17. St. Louis County (MO)
  - H5N2 Captive Wild Bird (1)
- 18. Moniteau County (MO)
  - H5N2 Commercial (1)
- 19. Lyon County (KS)
  - H5N2 Wild Bird (1)
- 20. Jasper County (MO)
  - H5N2 Commercial (1)
- 21. McCracken County (KY)
  - H5N2 Wild Bird (2)
- 22. Boone County (AR)
  - H5N2 Commercial (1)
- 23. Socorro County (NM)
  - EA H5 Wild Bird (1)
Economic Impacts Elsewhere

- Ten percent of nation’s egg-laying hens killed.
- Iowa (#1 in U.S. egg production):
  - 33 million-plus birds, worth $84 million, killed
    - Lost 24 million, or more than 40 percent, of its egg-laying hens
    - Requested presidential disaster declaration
    - Loss estimates exceed $1 billion
    - Expect 1,500 lost jobs
- Minnesota:
  - $310 million - direct poultry industry loss
  - $1.8 billion – loss by allied industries
Figure 3d (Inset of Iowa). All HPAI Detections with Details, as of 8/31/2015 (as reported on www.aphis.usda.gov)

1. Lyon County (IA)
   - H5N2 Commercial (1)

2. Osceola County (IA)
   - H5N2 Backyard (1)
   - H5N2 Commercial (3)

3. Kossewth County (IA)
   - H5N2 Commercial (1)

4. Sioux County (IA)
   - H5 ICA Backyard (1)
   - H5 ICA Wild (1)
   - H5N2 Backyard (3)
   - H5N2 Commercial (14)

5. O'Brien County (IA)
   - H5N2 Backyard (1)
   - H5N2 Commercial (2)

6. Clay County (IA)
   - H5N2 Commercial (2)

7. Palo Alto County (IA)
   - H5N2 Commercial (1)

8. Plymouth County (IA)
   - H5N2 Commercial (1)

9. Cherokee County (IA)
   - H5N2 Commercial (5)

10. Buena Vista County (IA)
    - H5 ICA Commercial (1)
    - H5N2 Commercial (14)

11. Pocahontas County (IA)
    - H5N2 Commercial (3)

12. Wright County (IA)
    - H5N2 Commercial (6)

13. Webster County (IA)
    - H5N2 Commercial (1)

14. Sac County (IA)
    - H5 ICA Commercial (1)
    - H5N2 Commercial (7)

15. Calhoun County (IA)
    - H5N2 Commercial (2)

16. Hamilton County (IA)
    - H5N2 Commercial (4)

17. Adair County (IA)
    - H5N2 Commercial (1)

18. Madison County (IA)
    - H5N2 Commercial (1)
Figure 3c (Inset of Minnesota). All HPAI Detections with Details, as of 8/31/2015 (as reported on www.aphis.usda.gov)

1. Roseau County (MN)
   - H5N2 Commercial (1)

2. Clay County (MN)
   - H5N2 Commercial (1)

3. Wadena County (MN)
   - H5N2 Commercial (1)

4. Otter Tail County (MN)
   - DC Commercial (1)
   - H5N2 Commercial (3)

5. Pope County (MN)
   - DC Commercial (1)
   - H5N2 Commercial (1)

6. Stearns County (MN)
   - H5N2 Commercial (14)

7. Swift County (MN)
   - H5N2 Commercial (1)
   - H5N2 Commercial (6)

8. Kandiyohi County (MN)
   - DC Commercial (3)
   - H5N2 Commercial (37)

9. Meeker County (MN)
   - H5N2 Commercial (10)

10. Chippewa County (MN)
    - H5N2 Commercial (1)

11. Ramsey County (MN)
    - H5N2 Commercial (1)
    - H5N2 Wild Bird (1)

12. Lac Qui Parle County (MN)
    - H5N2 Commercial (1)

13. Renville County (MN)
    - H5N2 Commercial (8)

14. Yellow Medicine County (MN)
    - H5N2 Wild Bird (1)

15. Lyon County (MN)
    - H5N2 Commercial (1)

16. Redwood County (MN)
    - DC Commercial (1)
    - H5N2 Commercial (3)

17. Le Sueur County (MN)
    - H5N2 Commercial (1)

18. Nicollet County (MN)
    - H5N2 Commercial (1)

19. Brown County (MN)
    - H5N2 Commercial (1)
    - H5N2 Commercial (4)

20. Blue Earth County (MN)
    - H5N2 Commercial (1)

21. Pipestone County (MN)
    - H5N2 Backyard (1)
    - H5N2 Commercial (1)

22. Steele County (MN)
    - H5N2 Commercial (1)

23. Cottonwood County (MN)
    - H5N2 Commercial (2)

24. Watonwan County (MN)
    - H5N2 Commercial (1)

25. Nobles County (MN)
    - H5N2 Commercial (1)
Cost of Disease Eradication

- $700M from Commodity Credit Corporation
  - $500 million to control spread
  - $190 million in direct indemnity payments

- Industry Costs
  - $1.6 million in turkey and laying hen industry losses
  - $3.3 billion loss to broader economy
  - International trade bans (including partial and regional)
• A lull in newly infected flocks in the Upper Midwest since late June – warm weather conditions
• HPAI is expected to return with cooler weather this winter.
  • Possibly to major poultry production regions in the Southeast and East that were previously untouched.
Potential Costs and Losses

Costs Include

- Loss of birds – farmer/integrator indemnity
- Depopulation (estimates from $6-$26 per bird)
- Disposal of dead birds and contaminated materials (litter, feed, manure, eggs, bedding)
- Cleaning and disinfection of premises
- Down time of production facilities
- Losses to allied industries (poultry service companies, feed providers, the poultry and egg processing industries, etc.)
Indemnity

• For birds that must be euthanized or those alive at time of disease confirmation.
• Fair market value of inventory based on calculator that takes into consideration age and intended use of birds.
• Indemnity is not paid for:
  - Birds that die prior to HPAI confirmation.
  - Lost income from idled facilities.

• Indemnity is not restorative.
• Most HPAI strains are not transmissible to humans.
  - Exception Asian H5N1 with limited infectivity for humans. Causes severe disease in limited number of human cases.
• According to the Centers for Disease Control no human infections have been associated with the ongoing U.S. HPAI outbreak.
• Personal protective equipment recommendations for all responders.
HPAI Vaccination

- A possible strategy as an emergency measure for disease containment and elimination.
- Considered a last resort under extreme conditions in severe outbreaks.
  - Protect susceptible population.
  - Reduce severity of disease.
- Inactivated vaccine is under development
  - Field isolate genetically modified by USDA, ARS
- Concerns:
  - International trade
  - Re-establishing the nation’s disease-free status.
  - Testing – differentiating vaccinated poultry from naturally infected poultry.
• HPAI is a foreign animal disease dealt with by stamping out procedures per federal requirements.
• Federal financial assistance to producers
  • Indemnity for birds alive at time HPAI diagnosis is laboratory-confirmed.
  • Testing, Depopulation, Disposal, Cleaning and Disinfection assistance.
    • Small flocks – compliance agreement with producer
    • Larger firms – cooperative agreement with producer
• Based on flock plan agreement signed by federal officials, state officials and producer – once HPAI is confirmed.
**Control & Surveillance Zones**

**Infected Zone (IZ)** - at least three kilometer (1.86 mi.) perimeter to extend from infected premises. Initially encompasses infected (IP), suspect (SP), contact (CP), at risk (ARP), and monitored premises (MP). Within infected zone - IP, SP, and CP – subject to quarantine ARP and MP subject to movement controls.

**Buffer Zone (BZ)** – at least seven kilometer (4.35 mi.) perimeter beyond infected zone to surround infected zone. Within buffer zone – any CPs are subject to quarantine, ARPs and MPs are subject to movement controls.

**Control Area (CA)** = Infected Zone + Buffer Zone. Shape is subject to change depending on outbreak circumstances.
Virus Inactivation on Infected Premises

• Takes a minimum of about 30 days in decomposing carcasses.
• Disposal options:
  - Composting – preferably in-house
  - Burial
  - Incineration
  - Landfill
South Central PA Geology

Kerry Leib & Brian Moore – DEP Emergency Response
• Minimum of 21 days after:
  - Cleaning and Disinfection
  - Negative confirmatory environmental testing
  - Generally restocking criteria are met two to six months after disease outbreak, depending on conditions.
  - Phased restocking of laying operations takes longer (Anywhere from 18 or more months)

• Restocking must be approved by USDA,APHIS
  - Farms that restock without APHIS approval will not be indemnified if they become re-infected.
Subcommittees

- Depopulation – Dr. Greg Martin, PSU
- Disposal – Dr. Paul Patterson, PSU
- Premise C&D – Dr. Sherrill Davison, UPenn
- GIS – Susan Casavant, UPenn
- Logistics – Derek Ruhl, PDA
- Vaccine – Dr. Eva Pendleton, PSU
- Communications – B. Hunter-Davenport, PDA, & Rachel Cloninger, PennAg Industries
- Epidemiology – Dr. David Zellner, PDA
- Finance – Mike Smith, PDA
- Health – Dr. Enzo Campagnolo, DOH
- PADLS – Dr. Deepanker Tewari, PDA
- Labor – Greg Hostetter, PDA
- Biosecurity, Dr. Nan Hanshaw, PDA
Sept. 12, 2015
Franklin County Meat Turkey Flock
- 7000 birds – 18 weeks old
- September 11 – Six mortalities ‘normal’
- September 12 – 100 mortalities
- Ongoing mortalities through the day

Emergency notification to PDA.
Emergency testing at PVL.
Initial steps in notification/activation.
PCR test results negative for HPAI at 7 PM, 9-12-15
Further diagnostics in PADLS to determine cause
Samples arrive at the PA Veterinary Lab for PCR testing.

A PDA veterinarian is dispatched to the premise to begin a Foreign Animal Disease (FAD) investigation.
• Ornithobacterium Rhinotracheale (ORT)
  – Bacterial
• Mycoplasma gallisepticum
• Pasteurella multocida (Fowl Cholera)
  – Bacterial
• Laryngotracheitis (LT)