

Avian Influenza Viruses Found in Pacific NW Birds: Focus on Idaho, Public Health Concerns, and Interventions

During December 2014 – March 2015, numerous avian influenza (AI) virus subtypes were detected in domestic and wild birds throughout the Pacific Northwest (See online issue for Figure)^{1,2}. These viruses were likely introduced into the region by waterfowl migrating along the Pacific flyway. The viruses detected were newly reported in the United States and considered to have the potential to infect humans. Three outbreaks of AI in Idaho birds and the public health interventions are described here. On January 9, 2015 an investigation into the death of three captive hunting Peregrine falcons in Canyon County was initiated by the Idaho Department of Fish and Game (IDFG). Highly pathogenic avian influenza (HPAI)* H5N2 was detected in samples collected from all three birds. The birds died within days of consuming wild-caught migratory waterfowl; the suspected source of infection. On January 15, 2015, the death of domestic chickens in a backyard flock in Canyon County was investigated by the Idaho State Department of Agriculture (ISDA) and the U.S. Department of Agriculture (USDA). HPAI H5N2 was also detected in this second outbreak and wild waterfowl exposures were again suspected, but not confirmed, as the source of infection. On January 20, 2015 the death of two privately-owned Gyrfalcons in Kootenai County were under investigation by IDFG. HPAI H5N8 was detected in samples from these birds, both of which had consumed wild ducks collected in Oregon. This represented the third investigation into an AI mortality event in privately owned birds in Idaho within a two week period. In all three domestic mortality events in 2015 humans were exposed to secretions and excretions from ill birds. Because of zoonotic transmission concerns public health interventions were instituted. The last AI outbreak investigated in Idaho occurred in 2008 in captive birds on a game bird farm which were infected with HPAI H5N8.

Public Health Response

Although the H5N2 and H5N8 viruses

recently detected in Idaho birds are not known to have caused disease in humans, a small number of seroconversions to H5N2 in asymptomatic bird handlers in Taiwan have been described³. Until more is known about the public health risks associated with these AI subtypes and strains public health officials advise precautions similar to recommendations for exposure to AI viruses known to cause severe disease in humans⁴. These precautions include antiviral prophylaxis using treatment dosing (one dose twice daily) of Tamiflu® (oseltamivir phosphate) for seven days and active daily influenza like illness (ILI) monitoring by local public health epidemiologists of all exposed persons for ten consecutive days after last known exposure to infected birds. While under monitoring by Idaho public health officials, no persons exposed to the ill Idaho birds developed signs or symptoms of ILI. All people with exposure to ill birds associated with the two Canyon County investigations completed treatment dosing and the ten day monitoring period without incident. The public health interventions were conducted by Southwest District Health epidemiologists. Despite multiple attempts by Panhandle Health District epidemiologists, contact was not made with the persons associated with the ill Gyrfalcon IDFG investigation; therefore, treatment dosing and monitoring activities were not conducted in the third investigation. It is believed that no illnesses occurred in association with the three Idaho bird mortality events. Should ILI or conjunctivitis have occurred, vigorous testing would have ensued to determine if they were infected with a novel/AI subtype.

Only three hemagglutinin (HA) subtypes (H1, H2, and H3) and two neuraminidase subtypes (N1 and N2) circulate widely in humans. The three AI HA subtypes of utmost concern to human health are H5, H7, and H9. The Idaho Bureau of Laboratories routinely tests clinical samples for influenza A, influenza A(H1), and influenza A(H3). Specimens that test positive for influenza A, but negative for H1 and H3 are tested for influenza A subtypes H5 and H7 by



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real-time polymerase chain reaction (RT-PCR). All H5, H7 and unsubtypable influenza A viruses are forwarded to the influenza laboratory at the Centers for Disease Control and Prevention (CDC) for testing and confirmation of any novel subtype and strain. Variations in symptom severity in humans are attributed to a combination of host factors, such as age and immune status, and the avian influenza virus subtype involved. Although the terms highly pathogenic and low pathogenic are often seen with AI subtypes, and only refer to the clinical outcome

in birds, there is some correlation with human disease outcome as well. Viruses of low pathogenicity in poultry, with the exception of H7N9 viruses, have been associated with generally mild, non-fatal illness in people. Symptoms described range from conjunctivitis to ILI to pneumonia requiring hospitalization. Subtypes of HPAI infecting humans have been associated with a wide range of illness outcomes, including severe respiratory disease and multi-organ disease, sometimes accompanied by nausea, vomiting, abdominal pain, diarrhea, and central nervous system disorders. Although seasonal influenza infections are not reportable in Idaho, novel influenza A virus infections are.

Zoonotic Spread Of Avian Influenza

Transmission of AI viruses from birds to people is possible, but considered uncommon. Human infection with two important influenza A AI subtypes, Asian HPAI H5N1 (circulating mostly in Asia and North Africa since initial detection in 2003) and LPAI* H7N9 (circulating in China since 2013), occurs directly by contact with infected birds or indirectly through contact with surfaces contaminated with bird secretions or excretions^{5,6}. Both subtypes have demonstrated high case-fatality rates in people (60% for the Asian HPAI H5N1 subtype and 30% for the LPAI H7N9 subtype). Close contact with an ill infected person has also been

a documented source of infection with the Asian HPAI H5N1 virus. To date neither subtype has developed the ability to efficiently spread from person-to-person with sustained transmission. If an AI virus were to recombine with a seasonal influenza virus that readily infects and spreads between humans, the virus arising from this reassortment event could acquire the ability to maintain sustained person-to-person transmission. Therefore, although the risk to the general public is very low at present a seemingly isolated zoonotic event, particularly during the time that seasonal influenza subtypes are co-circulating, is of great public health concern and could lead to the next pandemic.

To learn more about management of AI exposures, CDC has posted guidance for testing (www.cdc.gov/flu/avianflu/severe-potential.htm) and antiviral prophylaxis (www.cdc.gov/flu/avianflu/guidance-exposed-persons.htm) of persons exposed to birds possibly infected with novel influenza viruses. This guidance should be considered for exposures to all AI subtypes in the absence of specific subtype guidance. To learn more about seasonal and avian influenza in Idaho visit: <http://flu.idaho.gov>

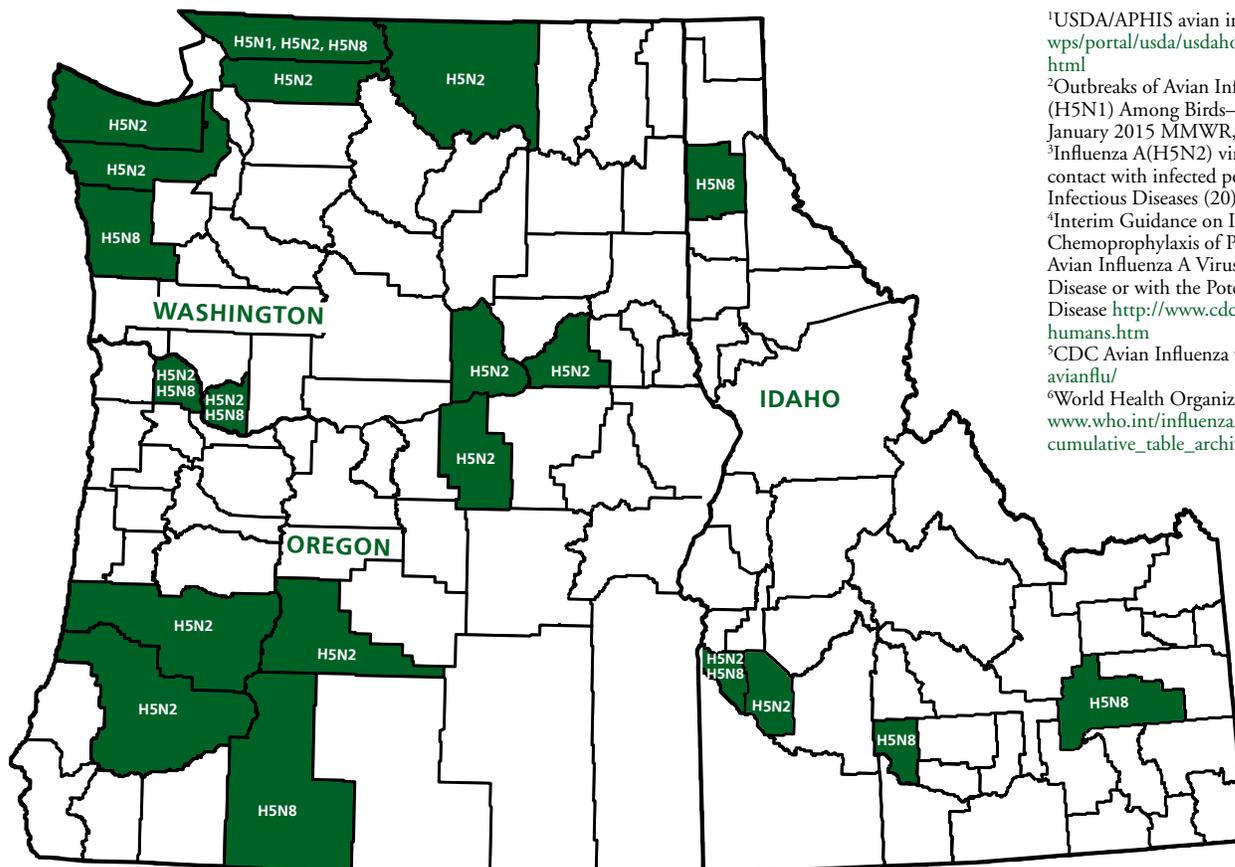
Wildbird Surveillance

All AI viruses circulate worldwide among wild waterfowl, with the exception of H17N10, which has only been found in bats. They tend

to circulate in birds during the winter months, coinciding with seasonal influenza virus circulation in humans. AI viruses can be carried for long distances by infected symptomatic and asymptomatic migratory birds¹. In the Pacific Northwest, some bird species that traverse the Pacific Flyway come along with birds from the East Asian-Australasian Flyway during the northern apex of their migratory pattern; potentially bringing new Asian AI subtypes southward through Idaho upon their return. Results of virus surveillance efforts in migratory waterfowl provide information on seasonal introduction of AI subtypes along migratory flyways. IDFG and USDA-Wildlife Services conducted enhanced surveillance activities for AI among migratory waterfowl throughout South and Southwestern Idaho during the 2014-2015 fall and winter months. Birds were sampled for AI during investigations into waterfowl mortality events and by convenience sampling at hunter check stations. Influenza A(H5N8) was detected in migratory waterfowl sampled in Bingham, Canyon, and Gooding counties, and A(H5N2) was detected in Ada County (See online issue for Figure). Since December, 2014, AI has also been detected in domestic and wild birds along the Central and Mississippi Flyways¹.

*HPAI: Highly pathogenic AI, LPAI: Low pathogenicity AI. Designation of pathogenicity in domestic poultry.

Figure. Avian influenza findings in domestic and wild birds, by subtype and county—Idaho, Oregon, and Washington 2014–2015*



References

- ¹USDA/APHIS avian influenza site http://www.usda.gov/wps/portal/usda/usdahome?contentid=avian_influenza.html
- ²Outbreaks of Avian Influenza A(H5N2), (H5N8), and (H5N1) Among Birds—United States, December 2014–January 2015 MMWR, Feb 6, 2015/64(04);111
- ³Influenza A(H5N2) virus antibodies in humans after contact with infected poultry, Taiwan, 2012. Emerging Infectious Diseases (20)5 May, 2014
- ⁴Interim Guidance on Influenza Antiviral Chemoprophylaxis of Persons Exposed to Birds with Avian Influenza A Viruses Associated with Severe Human Disease or with the Potential to Cause Severe Human Disease <http://www.cdc.gov/flu/avianflu/avian-in-humans.htm>
- ⁵CDC Avian Influenza website: <http://www.cdc.gov/flu/avianflu/>
- ⁶World Health Organization avian influenza data http://www.who.int/influenza/human_animal_interface/H5N1_cumulative_table_archives/en/

*As of 4/10/2015 Domestic/captive raptor/wild bird surveillance data. www.aphis.usda.gov/animal_health.