With the help of the lectures and this additional reading material, you will be able to:

1) Explain what Avian Influenza is, how lethal it can be, how it is acquired by birds, what the symptoms are in birds, and how it can get to the Pacific region.

2) Understand how Avian Influenza can be transmitted to humans and the impact if transmission becomes easy.

3) How you can contribute to the safety of your nation.

Overview

Introduction

What is avian influenza?

The term “avian influenza” is used to describe influenza A subtypes that primarily affect chickens, turkeys, guinea fowls, migratory waterfowl, and other avian species. In the same way that humans are susceptible to the seasonal influenza, also called the “flu,” other species have a similar afflictions: Avian Influenza (also called “Bird flu”) primarily affects domestic and wild birds. Swine influenza/flu infects pigs and Horse influenza/flu infects horses. In normal circumstances, only a portion of the animals in a region will contract the influenza and in a very small percentage, the infection is fatal.

At any given time, there are multiple strains of the influenza circulating the globe. For instance, Avian Influenza has multiple strains in global circulation. All the strains of Avian Influenza have the ability to infect domestic and wild birds, but the resulting infections are quite different. The resulting infections are classified into two categories:

- Highly Pathogenic Avian Influenza (HPAI), and
- Low Pathogenic Avian Influenza (LPAI).

“Highly Pathogenic” refers to its lethality in chickens (not other birds). Highly Pathogenic Avian Influenza requires minimal exposure to infect a host, and mortality rates in infected flocks of chickens often approach 100%. Alternatively, Low Pathogenic Avian Influenza often results in little or no symptoms, and rarely leads to death. The strain of Avian Influenza currently drawing international attention, H5N1, is Highly Pathogenic Avian Influenza (HPAI). HPAI H5N1 is not as lethal in ducks as in chickens, and ducks carrying and shedding the virus can appear healthy (unlike chickens). This strain is also unusual in that it can apparently spread through migratory birds as well as the traffic in poultry and poultry parts.

Facts about the HPAI H5N1

Cold and heat kills H5N1 (i.e. inactivates the virus)
(OIC website www.oie.int):

- Over 30 days at 0ºC (32.0ºF) (over one month at freezing temperature)
- 6 days at 37ºC (98.6ºF) (one week at human body temperature)
- 30 minutes 60ºC (140.0ºF) (half hour at a temperature that causes first and second degree burns in humans in ten seconds)

Inactivation of the virus also occurs under the following conditions
(OIC website www.oie.int):

- Acidic pH conditions
- Presence of oxidizing agents such as sodium dodecyl sulfate, lipid solvents, and B-propiolactone
- Exposure to disinfectants: chlorine bleach, iodine compounds

How will HPAI H5N1 get to the Pacific Region?

HPAI H5N1 was initially found in East Asia, and is slowly spreading across the globe along migratory bird flyways, and poultry trade/smuggling routes. Migratory birds, such as the Pacific Golden plover, may potentially carry the virus from the bird's wintering grounds to their breeding grounds, infecting domestic birds through direct contact, or indirect contact via shared food and water sources. Recent evidence suggests that while migratory birds are the natural reservoir for the HPAI H5N1 virus, the virus may be spreading through legal and illegal poultry trade across national borders. As of June 2006, the US-Affiliated Pacific Islands (USAPI), Australia, North and South America and many other countries, were free of HPAI H5N1. Globally, all countries, states, and islands governments are preparing for the agricultural, economic, and health impacts of HPAI H5N1. For the most updated information on the global distribution of the HPAI H5N1 virus, you can visit the World Organization for Animal Health (OIE) website at www.oie.int.

Recognizing signs of Avian Influenza infection in chicken or other birds:

- Sudden death without clinical signs
- Lack of energy and appetite
- Ruffled feathers
- Decreased or no egg production
- Soft–shelled or misshapen eggs
- Swelling of the head, eyelids, comb, wattles, and hocks
- Bluish or purple discoloration of the wattles, combs, and legs caused by small hemorrhages
- Nasal discharge, particularly look for signs of blood in nose discharge
- Difficulty in breathing
- Coughing, sneezing
- Lack of coordination (including inability to walk and stand)
- Diarrhea

Bird–to–bird transmission

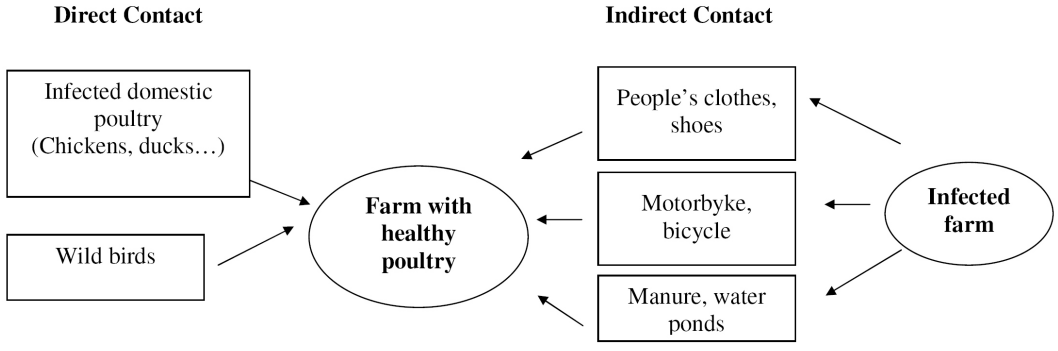
Avian Influenza is spread by direct contact between healthy and infected birds and by indirect contact with contaminated equipment, materials in food and water. Infected birds excrete virus through their saliva, nasal secretions, feces, and blood. Other animals may become infected with the virus through direct contact with these bodily fluids or through contact with surfaces contaminated with them. According to the US Department of Agriculture, “contact with infected fecal material is the most common means of bird-to-bird transmission.” In enclosed poultry houses, there is an additional risk of infection from airborne aerosols (gaseous suspension of fine solid or liquid particles). Here is a summary of ways that virus can be transmitted:

- Contact with feces
  - Carried on the boots of visitors
  - Used for compost
- Contact with contaminated equipment, materials, cages, and clothing
- Contact with secretions from mouth, nose, or eyes
- Contact with blood
- Environmental transmission
  - Shared food or water resources

Bird-to-human transmission

The risk of chicken-to-human transmission of HPAI H5N1 grows greater the longer and more intensive the contact is with the infected poultry. The areas of the human body that are particularly vulnerable to infection include the nose, mouth, eyes, and fresh cuts and open sores. Respiratory safety is a primary concern because recent scientific findings suggest that the HPAI H5N1 virus can enter the body through cells deep in the lungs (i.e. you can breath the virus into your lungs). Recent human cases of HPAI H5N1 show the diversity of circumstances and opportunities for infection. People have contracted the virus through infected poultry manure used as fertilizer or feed. Others have contracted the virus after plucking dead swans of their feathers. In other countries, as a response to mass culling of poultry, people have hidden birds in their house, and have become infected with the HPAI H5N1 virus due to living in close quarters with infected birds. The Center for Infectious Disease Research & Policy at the Academic Health Center – University of Minnesota identified the following types of exposures that resulted in HPAI H5N1 infection:

- Plucking and preparing diseased birds
- Handling fighting cocks
- Playing with poultry (particularly asymptomatic ducks)
- Consumption of duck blood and possibly under-cooked poultry
- Contact with blood
  - Eating raw infected meat (if properly cooked, infected meat is perfectly safe to eat - but it is not advised)
- The USDA notes that “AI can also be found on the outer surfaces of egg shells.”



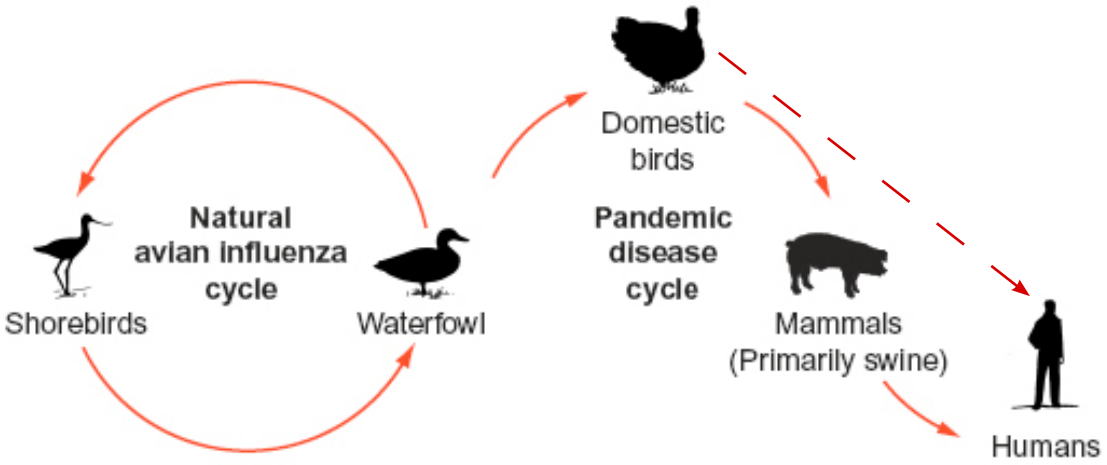
Global cycle of avian influenza viruses in animals. Figure from USGS’s *Field Manual of Wildlife*.

What is pandemic influenza?

According to the website www.pandemicflu.gov (maintained by the US Department of Health and Human Services), “A pandemic is a global disease outbreak. An influenza pandemic occurs when a new influenza A virus emerges for which there is little or no immunity in the human population, begins to cause serious illness and then spreads easily person-to-person worldwide. The federal government, states, communities and industry are taking steps to prepare for and respond to an influenza pandemic. A pandemic is likely to be a prolonged and widespread outbreak that could require temporary changes in many areas of society, such as schools, work, transportation and other public services.”

What is Avian Influenza’s connection with pandemic influenza?

Influenza A which circulates in wild birds can change, through mutation or genetic recombination, to forms which are transmissible among people. In most cases this genetic change occurs in pigs or other farm animals, but in some cases avian influenza can acquire this ability without an intermediary step. Pandemics of influenza have occurred repeatedly in the past. If H5N1 changes to become readily transmissible among humans, it could become a dangerous pandemic strain because people will have little or no immunity to the virus. At this time, HPAI H5N1 remains a disease of birds that has not changed genetically to become a pandemic strain.



Global cycle of avian influenza viruses in animals. Figure from USGS’s *Field Manual of Wildlife Diseases*, “Avian Influenza” chapter.

Potential role of Paravets and Extension professionals

- Working with agricultural producers and government agencies, Paravets and Extension professionals can assist in providing close surveillance of a possible Avian Influenza outbreak, and, if indicated, help implement early intervention strategies to slow down the spread of the disease.
- Educating the public that interacts with live poultry regarding the signs of HPAI, the characteristics of H5N1, and how to minimize exposure of poultry workers and household members to potential contamination (basically an outreach role).
- Teaching good hand-washing and other sanitation techniques to those who handle animals.
- Urging the public to report dead domestic, peri-domestic/feral, and wild birds to the appropriate person.
- Assisting in retrieval and submittal of appropriate specimens to diagnostic laboratories.

Notes . . .