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## Questions and Answers: Avian Influenza *March 2007*

### The Biology of Avian Influenza

#### Q. What is avian influenza?

A. Avian influenza (AI)--the bird flu--is a virus that infects wild birds (such as ducks, gulls, and shorebirds) and domestic poultry (such as chickens, turkeys, ducks, and geese). There is flu for birds just as there is for humans and, as with people, some forms of the flu are worse than others.

AI viruses are classified by a combination of two groups of proteins: the hemagglutinin or H proteins, of which there are 16 (H1-H16), and neuraminidase or N proteins, of which there are 9 (N1-N9). Based upon these two groups of proteins, there are 144 different characterizations of the virus.

AI strains also are divided into two groups based upon the ability of the virus to produce disease in poultry: low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI).

LPAI, or "low path" avian influenza, naturally occurs in wild birds and can spread to domestic birds. In most cases it causes no signs of infection or only minor symptoms in birds. These strains of the virus pose little threat to human health. LPAI H5 and H7 strains have the potential to mutate into HPAI and are therefore closely monitored.

HPAI, or "high path" avian influenza, is often fatal in chickens and turkeys. HPAI spreads more rapidly than LPAI and has a higher death rate in birds. HPAI H5N1 is the type rapidly spreading in some parts of the world.

#### Q. How does the avian influenza virus spread in birds?

A. Avian influenza is primarily spread by direct contact between healthy birds and infected birds, and through indirect contact with contaminated equipment and materials. The virus is excreted through the feces of infected birds and through secretions from the nose, mouth and eyes.

Contact with infected fecal material is the most common of bird-to-bird transmission. Wild ducks often introduce low pathogenic avian influenza into domestic flocks raised on range or in open flight pens through fecal contamination. Within a poultry house, transfer of the highly pathogenic avian influenza virus between birds also can occur via airborne secretions. The spread of avian influenza between poultry premises almost always follows the movement of contaminated people and equipment. Avian influenza also can be found on the outer surfaces of egg shells. Transfer of eggs is a potential means of transmission. Airborne transmission of virus from farm to farm is highly unlikely under usual circumstances.

#### Q. What are the signs of illness of birds infected with avian influenza?

A. Low pathogenic avian influenza signs are typically mild. Infected birds typically show

signs of decreased food consumption, respiratory signs (coughing and sneezing) and decreased egg production. Birds that are infected with highly pathogenic avian influenza are more severely ill and could exhibit one or more of the following clinical signs: sudden death; lack of energy and appetite; decreased egg production; soft-shelled or misshapen eggs; swelling; purple discoloration; nasal discharge; coughing, sneezing; lack of coordination and diarrhea.

**Q. Is it possible for a low pathogenic avian influenza strain to become highly pathogenic?**

A. Some low pathogenic subtypes have the capacity to mutate into more virulent strains. While low pathogenic avian influenza is considered lower risk, low pathogenic strains of the virus – the H5 and H7 strains – can mutate into highly pathogenic forms.

**History of Avian Influenza in the United States**

**Q. Does highly pathogenic H5N1 avian influenza currently exist in the United States? Has it ever occurred in this country?**

A. Incidents of low pathogenic avian influenza are commonly detected in domestic poultry flocks. Low pathogenic avian influenza does not pose a serious threat to human health.

There is no evidence that any highly pathogenic avian influenza currently exists in the United States. Historically, there have been three highly pathogenic avian influenza outbreaks in poultry in this country--in 1924, 1983 and 2004. No significant human illness resulted from these outbreaks.

The 1924 H7 HPAI outbreak was detected in and contained to East Coast live bird markets.

The 1983-84 H5N2 HPAI bird outbreaks resulted in the destruction of approximately 17 million chickens, turkeys, and guinea fowl in the northeastern United States to contain and eradicate the disease.

In 2004, USDA confirmed an H5N2 HPAI outbreak in chickens in the southern United States. The disease was quickly eradicated thanks to close coordination and cooperation between USDA, state, local, and industry leaders. Because of the quick response, the disease was limited to one flock.

**Avian Influenza and USDA's Role in Protecting the United States**

**Q. What is USDA doing to prevent the introduction of HPAI into the United States?**

A: USDA recognizes that highly pathogenic avian influenza poses a significant threat to animal health and has the potential to threaten human health. Accordingly, USDA has safeguards in place to protect against the introduction of highly pathogenic avian influenza into the United States. USDA maintains trade restrictions on the importation of poultry and poultry products from countries and/or regions where there have been confirmed outbreaks of highly pathogenic H5N1 avian influenza in commercial or traditionally-raised poultry.

Surveillance: USDA works with Federal and State partners and industry to monitor U.S. bird populations. Surveillance is conducted in four key areas: live bird markets, commercial flocks, backyard flocks, and migratory bird populations. Extensive testing occurs in live bird markets and commercial flocks. Additionally, birds that show signs of illness are tested.

Through a backyard flock biosecurity program, USDA encourages backyard and small poultry producers to strengthen biosecurity practices in order to prevent the introduction of AI into their flocks. Biosecurity refers to practical management practices that help to prevent diseases.

USDA recognizes that prevention is only one part of a comprehensive strategy and therefore continues to work closely with its Federal, State, and Tribal partners and industry stakeholders to have effective and coordinated emergency response plans at the ready should

an outbreak of highly pathogenic avian influenza occur in the United States.

**Q. Is USDA doing any work globally?**

A. USDA works closely with international organizations like the World Organization for Animal Health (OIE), the United Nations' Food and Agriculture Organization (FAO), and World Health Organization (WHO) to assist highly pathogenic H5N1 avian influenza-affected countries and other neighboring Asian-Pacific countries with disease prevention, management, and eradication activities. By helping these countries prepare for, manage, or eradicate highly pathogenic H5N1 avian influenza outbreaks, USDA can help stop the spread of this virus at its source - overseas.

Some efforts include:

- Training sessions for veterinarians and poultry disease experts from H5N1-affected and at-risk countries to teach testing protocols.
- Professional expertise and funding to help launch the FAO-OIE Crisis Management Center in Rome, to respond rapidly and effectively to avian influenza outbreaks in poultry worldwide.
- Assistance to highly pathogenic H5N1-affected countries, including laboratory equipment, reagents, and sample shipping containers to bolster AI testing and diagnostic programs.
- In collaboration with FAO and OIE, USDA has deployed expert scientists, veterinarians, and animal health emergency managers to highly pathogenic H5N1-affected countries to test and diagnose avian influenza; advise on surveillance and vaccination programs to protect poultry; and advise on emergency contingency plans.

**Q. If there was an outbreak of avian influenza in the United States, what would USDA do?**

A. USDA works closely with its Federal, State, and tribal partners, as well as industry stakeholders, to coordinate emergency response to animal disease outbreaks, including AI.

USDA provides expertise, funding, and support personnel to States when low pathogenic avian influenza is detected. Close attention is paid to low pathogenic avian influenza H5 and H7 strains, because of their potential to mutate into highly pathogenic avian influenza. When highly pathogenic avian influenza is detected, USDA and State personnel are primary responders because of the rapid spread and high death rate among poultry.

In the event of a highly pathogenic avian influenza outbreak in the United States, USDA would work with States and industry to respond quickly and decisively following these five basic steps:

- Quarantine – restrict movement of poultry and poultry-moving equipment into and out of the control area;
- Eradicate – humanely euthanize;
- Monitor region – broad area of testing;
- Disinfect – kills virus; and
- Test – confirm that the poultry farm is AI virus-free.

USDA also maintains a bank of AI vaccine that could be used to protect healthy birds outside a control area, if necessary.

USDA and State veterinarians are specially trained to diagnose foreign animal diseases, such as avian influenza and regularly conduct field investigations of suspicious disease conditions. This monitoring is assisted by university personnel, State animal health officials, USDA-accredited veterinarians, and members of the industry who report suspicious cases. USDA and State animal health officials work cooperatively with the poultry industry to conduct surveillance at breeding flocks, slaughter plants, live-bird markets, livestock auctions, and poultry dealers.

**Avian Influenza Testing and Diagnostics**

**Q. What kind of test is used to diagnose avian influenza in birds?**

A: Samples are usually taken by swabbing the mucus that coats the throat of live birds, which does not harm the birds. With wild birds, a fecal sample can be taken instead. These samples go into sealed tubes and are taken to USDA-approved laboratories. The initial test is a polymerase chain reaction (PCR) test. A PCR test is a rapid method of identifying the virus, typically producing results within 3 hours. If a sample from an area where avian influenza has not been previously detected tests positive on a rapid test, a virus isolation confirmatory test is performed. This test involves growing the sample in embryonated chicken eggs, which then provides the material to allow detailed identification of the strain of virus and whether it is highly pathogenic or low pathogenic. The virus isolation test can take 7-10 days to produce results. All H5 and H7 isolations are confirmed at the National Veterinary Services Laboratory at Ames, Iowa.

**Protecting Birds from Avian Influenza****Q. I have a back yard flock. How can I protect them from avian influenza?**

A. USDA recommends that owners of backyard flocks follow these six tips to prevent poultry disease:

- keep your distance (restrict access to your property and your birds);
- keep it clean (clean and disinfect your clothes, shoes, equipment, and hands);
- don't haul disease home (if you have been near other birds or bird owners, clean and disinfect poultry cages and equipment before going home);
- don't risk disease from your neighbor (do not borrow lawn and garden equipment, tools, or poultry supplies from other bird owners);
- know the warning signs (sudden increase in bird deaths, sneezing, coughing, nasal discharge, watery or green diarrhea, lack of energy, poor appetite, drop in egg production, swelling around the eyes, neck, and head, and purple discoloration of wattles, combs, and legs); and
- report sick birds (call your local or State veterinarian, or USDA toll-free at 1-866-536-7593).

**Q. What can poultry producers do to prevent an AI outbreak on their farms?**

A. Poultry producers should strengthen biosecurity practices to prevent the introduction of AI into their flocks. The following are some sound biosecurity practices:

- Keep an "all-in, all-out" philosophy of flock management. Avoid skimming flocks—birds left behind are exposed to work crews and equipment that could carry poultry disease viruses. Process each lot of birds separately, and clean and disinfect poultry houses between flocks.
- Protect poultry flocks from coming into contact with wild or migratory birds. Keep poultry away from any source of water that could have been contaminated by wild birds.
- Permit only essential workers and vehicles to enter the farm.
- Provide clean clothing and disinfection facilities for employees.
- Thoroughly clean and disinfect equipment and vehicles (including tires and undercarriage) entering and leaving the farm.
- Do not loan to, or borrow equipment or vehicles from, other farms.
- Change footwear and clothing before working with your own flock after visiting another farm or
- live-bird market or avoid visiting another bird farm if possible.
- Do not bring birds from slaughter channels, especially those from live-bird markets, back to the farm.

If avian influenza is detected, farms must be thoroughly cleaned and disinfected. Avian influenza viruses are inactivated by heat and drying and also these viruses are very sensitive to most disinfectants and detergents. The area to be disinfected must be clear of organic material, which greatly increases the resistance of avian influenza virus' resistance to disinfection.

**Q. What should producers do if their birds appear to have signs of avian influenza?**

A. If birds exhibit clinical signs of highly pathogenic avian influenza or might have been exposed to birds with the disease, producers or bird owners should immediately notify Federal or State animal health officials. Information can be found at [www.usda.gov/birdflu](http://www.usda.gov/birdflu).

### **Food Safety and Avian Influenza**

#### **Q. Does proper food handling prevent avian influenza?**

A. Avian influenza is not transmissible by eating properly prepared poultry. If highly pathogenic avian influenza were detected in the United States, the chance of infected poultry or eggs entering the food chain would be extremely low because of the rapid onset of symptoms in poultry as well as the safeguards in place, which include testing of flocks, and Federal inspection programs.

USDA works to educate the public about safe food handling practices in response to numerous questions from the public about the human risk associated with avian influenza.

#### **Q. What does proper food handling mean?**

A. Proper handling and cooking of poultry provides protection against all avian influenza viruses, as it does against many viruses and bacteria, including Salmonella and E.coli. Safe food handling and preparation is important at all times. USDA continually reminds consumers to practice safe food handling and preparation every day:

Cooking poultry, eggs, and other poultry products to the proper temperature and preventing cross-contamination between raw and cooked food is the key to safety. You should:

- Wash hands with warm water and soap for at least 20 seconds before and after handling raw poultry and eggs;
- Prevent cross-contamination by keeping raw poultry and eggs away from other foods;
- After cutting raw meat, wash cutting board, knife, and countertops with hot, soapy water;
- Sanitize cutting boards by using a solution of 1 tablespoon chlorine bleach in 1 gallon of water; and
- Use a food thermometer to ensure poultry has reached the safe internal temperature of at least

165 °F to kill foodborne germs that might be present, including the avian influenza viruses.

### **Avian Influenza and Human Health**

#### **Q. How can people become infected with avian influenza?**

A. Although the highly pathogenic H5N1 avian influenza virus does not usually infect people, more than 200 human cases have been reported since 2004. Most people who have become sick or died from highly pathogenic H5N1 have had extensive, direct contact with infected poultry. Broad concerns about public health relate to the potential for the virus to mutate, or change into a form that could easily spread from person to person, a characteristic that could result in a human influenza pandemic. There is no evidence that this is occurring. Strains of avian influenza that have been detected in U.S. poultry, including low pathogenic and highly pathogenic; have caused no known human illnesses.

### **Avian Influenza and World Trade**

#### **Q. Could live poultry, poultry or poultry products come from a country where there is highly pathogenic H5N1 avian influenza?**

A. Poultry products imported into the U.S. must meet all safety standards that are applied to foods produced in the United States.

No poultry or poultry products from countries and/or regions with confirmed cases of highly pathogenic H5N1 avian influenza can be imported into the United States. USDA regulations require that import permits accompany properly sanitized poultry products, such as

raw feathers.

**Q. Is avian influenza a reportable disease under international trade guidelines?**

A. Highly pathogenic avian influenza is considered a reportable disease by the World Organization for Animal Health (OIE). OIE has developed animal health standards that classify all H5 and H7 viruses as reportable diseases.

**Q. Does USDA maintain import restrictions?**

A. USDA quarantines and tests live birds imported into the United States to ensure that they do not have any foreign animal diseases such as the highly pathogenic H5N1 avian influenza virus.

All imported live birds (except from Canada) must spend 30 days at a USDA quarantine facility where they are tested for the avian influenza virus before entering the country. Returning U.S.-origin pet birds (except from Canada) also are tested and quarantined at a USDA facility.

USDA maintains trade restrictions on the importation of poultry and poultry products originating from countries and/or regions where the highly pathogenic H5N1 avian influenza strain has been detected in commercial or traditionally raised poultry (not wild birds). USDA regulations require that import permits accompany properly sanitized poultry products, such as raw feathers.

Additionally, USDA has increased its monitoring for illegally smuggled poultry and poultry products through an anti-smuggling program in coordination with the U.S. Department of Homeland Security - Customs and Border Protection.

**Q. How do I get more information about avian influenza?**

USDA efforts to protect against and respond to bird flu: [www.usda.gov/birdflu](http://www.usda.gov/birdflu)

Report Sick Farm Birds: If your farm birds are sick or dying, call USDA's Veterinary Services toll free at 1-866-536-7593, or your State Veterinarian or local extension agent.

Report Dead Wild Birds: Dead wild birds can be reported to State or Federal wildlife agencies. Information on how to make contact with Wildlife officials in your State is available at [www.usda.gov/birdflu](http://www.usda.gov/birdflu)

Safe Food Preparation: USDA Meat and Poultry Hotline - 1-888-MPHotline (1-888-674-6854), TTY: 1-800-256-7072 (available in English and Spanish). Online answers are provided at [www.fsis.usda.gov](http://www.fsis.usda.gov) by clicking on "Ask Karen."

Current Listing of Countries/Areas Affected with HPAI H5N1: [www.usda.gov/birdflu](http://www.usda.gov/birdflu)

U.S. Government efforts to protect human health: [www.pandemicflu.gov](http://www.pandemicflu.gov)

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