

# Avian Influenza (AI)

## What is Avian Influenza?

Avian influenza (AI) is an infectious disease of birds caused by type A strains of the influenza virus. Since AI causes disease in various types of birds, it has been given the common name "bird flu." AI viruses can infect chickens, turkeys, pheasants, quail, ducks, geese and guinea fowl as well as a wide variety of other birds, including migratory waterfowl. Each year, there is a flu season for birds just as there is for humans and, as with people, some forms of the flu are worse than others.

AI viruses follow the classification scheme outlined above, having an HA subtype 1-15 and an NA subtype of 1-9. In addition, AI strains are divided into two groups based on the pathogenicity of the virus--the ability of the virus to produce disease.

- **Low Pathogenicity Avian Influenza (LPAI):** Most AI strains are classified as low pathogenicity and cause few clinical signs in infected birds. LPAI generally does not pose a significant health threat to humans. However, LPAI is monitored because two strains of LPAI, the H5 and H7 strains, can mutate into highly pathogenic forms.
- **High Pathogenicity Avian Influenza (HPAI):** This is a more pathogenic type of avian influenza that is frequently fatal to birds and easily transmissible between susceptible species. The strain that is currently of concern in Southeast Asia and Europe is the H5N1 HPAI virus.

## How Avian Influenza Spreads

AI is primarily spread by direct contact between healthy and infected birds through respiratory secretions and feces. Wild birds often infect domesticated birds by shedding the virus in their droppings, saliva and nasal secretions. The disease also can be spread through indirect contact if healthy birds are exposed to contaminated water, feed, soil, equipment or materials.

AI virus can be spread from birds to people as a result of extensive direct contact with infected birds. Open-air markets, where eggs and birds are often sold in crowded and unsanitary conditions, are hotbeds of infection and spread the disease into the wider community. Cock fighting has also been implicated in the spread of bird flu — fighting roosters are often trucked long distances and smuggled across borders. At any point along the way, humans may pick up the virus through close contact with sick birds or contaminated surfaces. An ailing bird can shed the virus in its feathers as well as in droppings, and some people have contracted bird flu simply by touching an infected chicken or fighting rooster.

Since 2003, more than 100 human H5N1 cases have been diagnosed in Thailand, Vietnam, Cambodia, Indonesia and China. Of those cases, more than half have died as a result of the virus. Concerns about public health relate to the potential for the virus to mutate into a form that could easily spread from person to person. In the worst case scenario, this could give rise to a pandemic (see "An Influenza Pandemic?" below).

## Avian Influenza Symptoms in Humans

The reported symptoms of avian influenza in humans have ranged from typical influenza-like symptoms (e.g. fever, cough, sore throat, and muscle aches) to eye infections (conjunctivitis), severe respiratory distress secondary to viral pneumonia (which causes the air sacs in your lungs to fill with fluid) and other severe, life-threatening complications. Previously healthy adults and children, and some with chronic medical conditions, were affected.

Of special concern is the discovery, by scientists studying the 1997 outbreak in Hong Kong, that those dying from H5N1 suffered from a "cytokine storm". Cytokines are a class of proteins that function as immune system activators. These protein messengers are normally released by White Blood Cells upon encountering an infection. A "cytokine storm" occurs when excess cytokines are released and the immune system is over stimulated. This results in the immune system damaging or destroying the tissue(s) that it was trying to protect.

An influenza virus that causes a cytokine storm is likely to have be more destructive in those who have strong immune systems. In other words, those who are normally young and healthy would be at greater risk of serious complications or even death. This was the case with the 1918 pandemic that killed a disproportionate number of young people. If the H5N1 virus creates a pandemic, it could follow a similar path.

## Prevention of Avian Influenza

In the event of a pandemic, certain public health measures may be important to help contain or limit the spread of infection as effectively as possible. The following actions could include:

- Treating sick and exposed people with antiviral medications
- Isolating sick people in hospitals, homes, or other facilities
- Identifying and quarantining exposed people
- Closing schools and workplaces as needed
- Canceling public events
- Restricting travel

In addition, individuals should protect themselves by:

- Getting seasonal flu shots
- Washing hands frequently with soap and water
- Staying away from people who are sick
- Staying home if sick

Avian influenza is not transmitted through cooked food. To date, no evidence indicates that anyone has become infected following the consumption of properly cooked poultry or poultry products, even when these foods were contaminated with the H5N1 virus. Eating chicken and other poultry should pose no health hazard if the following precautions are taken:

- Use proper hygiene in the handling and preparation of food
  - Wash hands with warm water and soap for at least 20 seconds before and after handling food
  - Prevent cross-contamination by keeping raw meat, poultry, fish, and their juices away from other foods
  - After cutting raw meats, wash cutting board, knife, and counter tops with hot, soapy water
  - Sanitize cutting boards by using a solution of 1 teaspoon chlorine bleach in 1 quart of water
- Ensure that all poultry and eggs are thoroughly cooked. Poultry should have no “pink” parts and eggs should not be “runny”.
- In areas experiencing outbreaks in poultry, raw eggs should not be used in foods that will not be further heat-treated as, for example by cooking or baking.

### **Vaccination against Avian Influenza**

Vaccines are produced each year for seasonal influenza but will not protect against pandemic influenza. Although a vaccine against the H5N1 virus is under development in several countries, no vaccine is ready for commercial production and no vaccines are expected to be widely available until several months after the start of a pandemic.

Some clinical trials are now under way to test whether experimental vaccines will be fully protective and to determine whether different formulations can economize on the amount of antigen required, thus boosting production capacity. Because the vaccine needs to closely match the pandemic virus, large-scale commercial production will not start until the new virus has emerged and a pandemic has been declared. Current global production capacity falls far short of the demand expected during a pandemic.

### **Treatment of Avian Influenza**

So far, research suggests that two antiviral medicines, oseltamavir (Tamiflu<sup>®</sup>) and zanamavir (Relenza<sup>®</sup>), may be useful treatments for H5N1 avian influenza. However, H5N1 viruses are generally resistant to two other available antiviral medications, amantadine and rimantadine, so they cannot be used to treat avian flu.

Tamiflu<sup>®</sup> is currently the primary treatment option. It is a neuraminidase inhibitor that, if taken within 48 hours of becoming ill, stops the virus from escaping its host cell. This reduces the number of new cells infected and possibly reduces the number of other people infected. It's not clear how effective Tamiflu<sup>®</sup> will ultimately prove against H5N1 HPAI since resistance to it seems to be developing quickly.

***-Updated December 30, 2005***