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Avian Flu: Frequently Asked Questions

What is avian flu?

Avian flu is a disease caused by the influenza A virus, which must live inside animal cells to replicate. While birds are the disease hosts, several species of mammals, including humans, may be infected. It was first identified in Italy in the early 1900's.

The strain of avian flu that is causing so much concern throughout the world is known as H5N1. It is a highly contagious and deadly virus in birds that emerged in Hong Kong in 1997, killing or resulting in the slaughter of 1.5 million chickens, ducks and geese. Some health authorities have speculated that the rapid slaughter of potentially infected birds may have averted a pandemic.

What is the difference between avian flu and the virus that occurs among humans year after year?

The disease that affects millions of humans around the world each year is caused by conventional influenza virus, popularly known as common flu. It is far less deadly than the avian flu virus, though it typically causes more than 30,000 deaths annually in the United States.

Why does the H5N1 flu virus pose a threat to humanity?

It is the natural order of viruses to mutate, and the H5N1 virus is no exception. The H5N1 virus is of special concern to health authorities around the world because, in rare cases, it has jumped the species barrier to infect a handful of humans. Virtually all of this exposure resulted from the kind of intimate association with birds common among veterinarians, poultry workers and farm families.

Even though avian flu is almost entirely confined to birds, every human exposure to the disease is believed to increase the likelihood that the virus could mutate into a form that could be spread from human to human.

While only a small number of people have been infected, the virus nonetheless is considered "highly pathogenic and aggressive." H5N1 attacks more than just the respiratory system; it also kills through pneumonia and secondary bacterial infections. Conventional flu isn't so lethal.

How does mutation occur in flu viruses? Why does it seem to occur so easily?

Viruses are known to mutate in two ways: through genetic drifting and shifting.

Viruses have a built-in genetic tendency to drift --- in other words, to replicate unfaithfully, resulting in a steady accumulation of mutations. In the course of this drifting, there is the potential for one of these viruses to develop into a form that could be spread from person to person.

Another method involves shifting, which could occur when a human virus and a bird virus invade the same cell and begin swapping genes, possibly developing into a hybridized form that could threaten humans.

Scientists now believe it is possible the dreaded H5N1 virus could be transformed into a deadly human strain by a simpler method --- recombination, a process that, until now, scientists dismissed as only a minor contribution to genetic variation.

In this case, the viruses simply recycle old mutations by exchanging pieces of genes from among their own gene segments or from the same genes of another strain or subtype infecting the same cell. This is not only a more efficient process but one that appears to be followed by all viruses --- not only influenza but HIV, SARS and West Nile virus.

What was the 1918 flu pandemic, and why is it mentioned so often when the threat of a future pandemic is discussed?

Scientists are concerned the H5N1 virus could mutate, possibly acquiring traits from an ordinary flu virus an infected person already is carrying. Rapid human-to-human transmission of a mutated virus could snowball into a worldwide pandemic resulting in the deaths of tens of millions of people.

For this reason, many health authorities believe a future pandemic outbreak could closely parallel what happened in 1918, when a form of avian flu mutated into a type that could be transmitted from human to human. It was an unusually virulent strain of avian influenza that killed between 50 million and 100 million people around the world from 1918 to 1919.

Will a common flu shot protect me against avian flu?

No. The human influenza (common flu) vaccine is not effective against avian flu.

Nevertheless, some experts recommend getting a common flu vaccine anyway on the assumption that someone suffering from common flu may be more susceptible to becoming infected with avian flu. Likewise, some health authorities believe that widespread vaccination of high-risk groups against common flu may be an effective safeguard in the lead up to an avian flu pandemic.

What is a pandemic?

A pandemic is an epidemic that spreads over the entire planet, or, at least, an entire region.

When will we know a pandemic is happening?

Most likely, we will know when we are alerted by one of the surveillance networks already in place at the local, state, national and international level to monitor for evidence of a pandemic outbreak.

How worried should we be that such a pandemic could occur?

The threat of the H5N1 strain developing into a form that could threaten humanity is conceivable and should not be discounted.

Even so, while the H5N1 virus bears some intriguing similarities to the 1918 avian flu strain, there is no guarantee it will ever develop into a form that threatens humans on a wide scale.

For now, one thing is certain: The virus already has been around for years and has had many opportunities to mutate into a human transmissible strain but hasn't. Some scientists consider this as evidence that the virus has reached its evolutionary dead end and will not mutate into a human transmissible form.

Medical science also is far better equipped to deal with a pandemic than in 1918. Antibiotics are now widely available to treat bacterial infections that likely will accompany such a virus. There also have been marked improvements in surveillance and sanitation within the last century.

Could a pandemic be caused by other viruses in addition to avian flu?

Yes. The H5N1 strain of avian flu is only one of several viruses that conceivably could mutate into a form that threatens humans on a worldwide scale. Indeed, humans can --- and have --- acquired flu viruses from other species besides poultry.

In 1976, for example, then-President Gerald Ford, along with the nation's health authorities, urged Americans to be vaccinated to stave off a possible pandemic outbreak of swine flu. A series of public relations breakdowns eventually led to termination of the vaccination program, though not before 24 percent of the U.S. population was vaccinated.

The next pandemic, when and if it occurs, could be caused by a virus that originates in poultry or mammals and mutates into a human transmissible form, or it could be caused by a virus that is confined entirely to humans.

However, scientists believe the latter scenario is the most likely because the genetic makeup of animal-borne viruses must undergo significant changes before it can affect humans. Indeed, as mutations go, the likelihood of a poultry virus mutating into a human-transmissible form is comparatively small because of the genetic hurdles it must overcome along the way.

What role do migratory birds play in the spread of avian flu?

Waterfowl, such as ducks, geese, gulls and terns, are particularly susceptible to the disease. Among birds, the condition typically is manifested in intestinal infections. The virus spreads, sometimes to poultry flocks, when feces from infected birds come in contact with unaffected birds.

Why do health authorities act so quickly to destroy poultry flocks when avian flu outbreaks occur?

Destroying these flocks serves as kind of firewall, not only containing the spread of the virus but reducing the risks of human exposure to the disease.

Should I avoid eating poultry products?

No. U.S. health authorities stress that no case of avian flu in humans has ever occurred from eating a cooked bird. In fact, experts believe the disease is spread from direct human contact with live birds, from exposure to infected saliva or feces.

Why is the United States less susceptible to a mass outbreak of avian flu than developing nations, such as Cambodia and Vietnam?

It has been a longstanding practice in the United States to raise chickens in houses and to follow rigorous hygienic standards designed to minimize human exposure to diseases and bacterial outbreaks that sometimes occur among chickens. These strict standards associated with U.S. poultry production became even more stringent following a Jan. 5, 2006 announcement by the National Chicken Council that it would immediately begin testing virtually all U.S. flocks for avian flu.

If U.S.-grown poultry products pose little, if any, risk to Americans, why are health officials still warning us about the risks of avian flu?

The most likely source of a mass outbreak of avian flu in the United States would be from an infected international traveler passing through a crowded airport terminal.

Health authorities have speculated that Los Angeles International Airport is the most likely place within the United States for such an introduction to occur --- the port of entry for 22 percent of air travelers from Asia, where human cases of avian flu are most prevalent. However, this remains only conjecture.

What else is the U.S. poultry industry doing to minimize the risk of avian flu outbreaks?

As further safeguards against avian flu, poultry producers throughout the United States are adopting other biosecurity practices, including monitoring and sanitizing water sources and equipment; restricting poultry house access to essential workers and vehicles; and avoiding mixing poultry with other live bird species.

As additional safeguards, poultry facilities typically provide clean clothing and disinfection facilities for employees.

Poultry facilities also are discouraged from using borrowed equipment, which may have been present at other poultry growing facilities, and from visiting other poultry facilities without changing clothes and footwear.

Poultry workers also are urged to avoid live markets or slaughter facilities.

Why does the risk of avian flu appear to be so much greater in developing countries?

Backyard chicken flocks and live markets are common practices in many developing countries, particularly Southeast Asia, which accounts for why the small outbreaks of human cases of avian flu have occurred in these countries.

Because these practices are so deeply rooted in the culture and economies of these countries, outbreaks of H5N1 among flocks and humans will remain a real threat for many years to come. Many of these countries lack the capital and infrastructure to make the transition into the highly commercialized and concentrated system commonplace in the United States --- one in which growers and health authorities cooperate to detect and treat disease outbreaks quickly and effectively.

Aside from the poultry production practices common throughout the region, why is Southeast Asia considered especially vulnerable to an outbreak of a human-transmissible for of avian flu?

The World Health Organization has announced that one of the first steps in the event of a mass outbreak of avian flu among people will be dispatching medical SWAT teams into affected villages to impose quarantines and to administer massive doses of Tamiflu, an antiviral medicine considered at least partially effective in mitigating the effects of this particular virus.

However, this may prove especially challenging in remote, highly underdeveloped Southeast Asian countries such as Cambodia and Vietnam.

This is because the window of opportunity for containing and treating a flu outbreak before it spreads from one village to another is likely to be extremely narrow. To put it another way, it is one thing to fly Tamiflu into Phnom Penh, the Cambodian capital, in response to a mass outbreak, quite another to transport it from there to affected villages fast enough and in sufficient amounts.

What is the U.S. government doing to protect us should such an outbreak occur?

The *National Strategy for Pandemic Influenza*, outlined by President Bush Nov. 1, 2005, is based on three strategies: early detection, containment and treatment.

A major focus of this effort will be the National Biosurveillance Initiative, “to detect, quantify and respond to outbreaks in humans and animals and deliver information quickly to state and local and national and international public health officials.”

Meanwhile, the U.S. Centers for Disease Control and Prevention is working to expand a system called BioSense, launched after the Sept. 11 terrorist attacks to help detect possible acts of bioterrorism as well as naturally occurring disease outbreaks.

As a long-term goal, the government is providing drug makers with incentives to develop a new generation of highly effective avian flu vaccines that could be provided to every U.S. citizen following an outbreak. It is also developing a national stockpile of antiviral drugs to treat and control the spread of the disease.

What are drug manufacturers doing to prevent a pandemic?

One factor that has hamstrung production of an effective avian flu vaccine involves the way flu vaccines are made. The current method is based on an unusually labor-intensive process in which the flu vaccines are grown in millions of fertilized chicken eggs --- a process that usually takes about six months.

However, two new techniques could make this turnaround process a lot faster.

One approach is known as reverse genetics, which involves taking apart the genes that comprise two viruses --- one deadly, the other comparatively harmless --- and reassembling them into a new, weakened virus that, when administered through a vaccine, provides immunity from the deadly virus. When the vaccine is administered to an animal or person, it tricks the body into thinking it has been infected, thereby triggering an immune response.

From the standpoint of mass production, another approach that shows great promise is the so-called DNA vaccine. Producing such a vaccine would involve inserting the genetic instructions for the H5 protein in the H5N1 avian flu virus into a small ring of DNA extracted from *E.coli*, a common intestinal bacterium. A vaccine containing this tiny bit of DNA could then be injected into a cell, triggering the same immune response associated with a conventional vaccine.

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