Avian Influenza

Fact Sheet

Avian Influenza or Bird Flu is an infectious disease caused by avian (bird) influenza viruses. This disease has been identified over a century ago in Italy. These influenza viruses occur naturally among birds. Wild birds worldwide carry the virus in their intestines, but usually do not get sick from them. However all birds are susceptible to the disease although some species are thought to be more vulnerable. It is highly contagious among some birds and causes fatal disease among domesticated birds such as chicken, ducks and turkey.

Avian influenza Infection causes a wide spectrum of symptoms in symptomatic birds ranging from mild illness to a highly contagious and rapidly fatal disease resulting in severe epidemics among bird flocks.

Outbreaks of Avian Influenza A have been reported from Cambodia, China, Hong Kong, Indonesia, Japan, Laos, South Korea, Thailand and Vietnam over the years. Avian influenza viruses do not usually infect humans. The disease among humans was first reported in 1997 from Hong Kong.

Infectious Agent

Influenza viruses are of three types i.e. A, B, C. While all affect humans, viruses of A sub type is known to cause disease in lower animals and birds. There are many different subtypes of influenza type A virus. These subtypes differ due to the surface proteins found on them. All subtypes of type A virus can be found in birds. All outbreaks of highly pathogenic avian influenza have been caused by influenza A viruses of sub types H5 and H7. The present outbreak prevailing in Asia is caused by the H5N1 virus.

Transmission

Within a country, the disease is easily spread from place to place. Infected birds shed large amounts of virus in bird droppings (faeces), saliva and nasal secretions contaminating dust and soil. Airborne virus can spread the disease from bird to bird, causing infection when the virus is inhaled. Contaminated equipment, vehicles, feed cages or clothing – especially shoes – can carry the virus from farm to farm. The virus can also be carried on the feet and bodies of animals, such as rodents, which act as mechanical vectors for spreading the disease. Limited evidence suggests that flies can also act as ‘mechanical vectors’.

Droppings from infected wild birds can introduce the virus into both commercial and

domestic poultry flocks. This risk is greater where domestic poultry roams freely, share a water supply with wild birds or use a water supply that might be contaminated by droppings from infected wild-bird carriers. 'Wet' markets where live birds are sold under crowded and unsanitary conditions can be another source of spread.

From one country to another, avian influenza can spread through trade in birds or through migratory birds. Migratory birds that may not be sick although infected can carry the virus to long distances. Epidemics of avian influenza may occur when domesticated birds come in contact with wild birds carrying the virus.

At present, there is no concrete evidence to confirm sustained human-to-human transmission of avian influenza. The influenza virus type A and its various subtypes can, in the presence of another influenza virus, merge with it through mixing and ressortment. This can result in a new virus with different characteristics than the parent viruses, to which the population has no immunity. These new viruses can lead to human-to-human transmission of a severe disease resulting in a pandemic situation that is a cause for extreme concern.

All reported human cases have been linked to direct exposure to dead or infected birds or contaminated surfaces. A few exceptional cases have been associated with food preparation. No cases have been reported following consumption of properly cooked meat or eggs or among cullers and poultry workers. Only a single case of human-to-human transmission has been reported from Thailand to date.

Symptoms of Avian Influenza

Most avian influenza viruses cause no symptoms or only mild ones among birds. However the range of symptoms in birds varies greatly depending on the strain of the virus and the type of bird. Infection with highly pathogenic influenza viruses such as H5 and H7 strains cause widespread disease and death among some species of birds.

In humans symptoms of avian influenza range from typical flu symptoms (e.g. fever, sore throat and muscle aches) to eye infections, pneumonia, acute respiratory distress and other severe life threatening complications.

- Influenza viruses are of 3 types (A, B, C) and all subtypes of type A virus is known to cause avian influenza in birds.
- Infected birds shed large amounts of virus in their droppings, saliva and nasal secretions contaminating dust and soil. The infection spreads via airborne virus and through contaminated articles/surfaces.
- Human to human transmission is possible and only a single case with human-to-human transmission has been reported to date.

- The present outbreak of avian influenza is caused by highly pathogenic H5N1 virus.
- Among humans, symptom of avian influenza may range from typical flu like symptoms to eye infections, pneumonia and severe life threatening complications.

Confirmation of Diagnosis

Virus isolation, Reverse Transcriptase Polymerase Chain Reaction (RT PCR) and immunofluorescence can directly demonstrate the presence of virus or virus material from clinical specimens from infected persons. A four-fold rise in specific antibody also confirms the diagnosis. It is essential that all clinical specimens are handled under appropriate biosafety precautions and infrastructure. BSL 2 facilities are required to handle influenza viruses and BSL 3 for H5N1.

Treatment of Avian Influenza

Anti viral agents, M2 inhibitors (amantadine and rimantadine) and neuraminidase inhibitors (oseltamivir and zanimivir) have been licensed for prevention and treatment of human influenza and were thought to be effective regardless of the causative strain. However, it has been recently indicated that these viruses are now resistant to M2 inhibitors. Oseltamivir is available in capsule and liquid forms. (Each capsule of 75mg costs US$ 2). The treatment course requires 5-7 days of therapy with 1 capsule twice daily.

Vaccines against Avian Influenza

At present, there is no specific vaccine available to prevent avian influenza in humans. Currently available influenza vaccines offer no protection against H5N1 strain of the virus. However recombinant H5N1 prototype vaccine strains are now being developed and several avian influenza vaccine trials are under way around the globe.

Presently available influenza vaccines may be used to prevent an avian influenza pandemic in a precisely targeted way. These, when administered to high risk groups such as poultry cullers, will protect them against other common circulating human influenza viruses and thus will reduce the chance of these high risk groups becoming infected with avian and human influenza viruses at the same time. Since such dual infections give avian and human viruses an opportunity to exchange genes resulting in new virus subtypes with pandemic potential, immunization of high risk persons with available influenza vaccines that protect from presently circulating virus strains, may be important in preventing influenza pandemics.

- Virus isolation, RT PCR and immunofluorescence can confirm the diagnosis of avian influenza.
- Anti viral agents namely M2 inhibitors and neuraminidase inhibitors can be used in the treatment and prophylaxis of avian influenza.
- Although a number of potential vaccine trials are under way in several countries, no specific vaccine is presently available to prevent avian influenza in humans.

Current Situation

The present outbreak of avian influenza is caused by the highly pathogenic H5N1 virus strain and was first detected among poultry in the Republic of Korea in December 2003. The virus has been gradually expanding its host range (including domestic, wild and migratory birds and animals such as pigs, cats and tigers) and also geographical boundaries spreading to many other countries.

Birds in 12 countries have been affected so far. These countries are Republic of Korea, Japan, Cambodia, China, Indonesia, Laos, Malaysia, Russia, Kazakhastan, Mongolia, Thailand and Vietnam. Out of these countries H5N1 virus has been continuously detected from Vietnam, Thailand, Cambodia, China, Indonesia and Laos.

By the end of August 2005, 112 laboratory confirmed human cases have been reported from Cambodia, Indonesia, Thailand and Vietnam. This includes 57 deaths.

The present outbreak has resulted in a major economic blow to the poultry industry globally. 150 million chickens have died or have been destroyed so far.

Why Are We Concerned?

There are several countries in our neighbouring region from where large epidemics of avian influenza are being reported. These countries have reported the infection over a relatively short period of time.

Avian Influenza viruses are not easily transmitted to humans, but if a human is infected by both the avian and human influenza viruses at the same time, these viruses can exchange genes and this process of gene mixing or reassortment can result in a virulent, highly pathogenic influenza virus strain to which humans may not have natural immunity and may cause disease in large numbers of cases with high mortality. Also, as human-to-human transmission (although not yet established) is possible, a large epidemic (pandemic) involving billions of people may occur.

Economically, a large epidemic of avian influenza can be devastating for the poultry industry and farmers. Large numbers of exposed birds have to be killed rapidly to prevent the spread of the disease. This is a severe blow to the industry and has a significant economic impact to a country.

Averting a Pandemic of Influenza

Experts agree that the next influenza pandemic is inevitable and possibly imminent. Therefore the following measures have been planned by global health authorities to minimize the global public health risks.

When large outbreaks of H5N1 avian influenza occur in birds

1. Halting further spread of disease among poultry populations by mass destroying (culling) of poultry flocks. This move reduces opportunities for human exposure to the virus.

2. Vaccination of persons at high risk of exposure to infected poultry using existing vaccines effective against currently circulating human influenza strains. This will minimize the likelihood of co-infection of humans with avian and human influenza virus strains and thus reduce the risk of gene mixing.

3. Protection of workers involved in the culling of poultry flocks against infection by proper clothing and equipment.
   These workers should also be given antiviral drugs as a prophylactic measure.

When case of avian influenza in humans occur

1. Collection of information on the extent of influenza infection in animals and humans and on the circulating influenza viruses is vital to aid assessment of public health risks and to guide the best protective measures.

2. Investigation of every single case is essential.

3. Aggressive management of human cases by treating with antiviral drugs and by isolation.

4. Prophylactic antiviral treatment of all possible contacts or contacts in a defined geographical area.

5. Improvement of epidemiological and laboratory capacity of the country and intensification of surveillance activities will aid the successful containment of the public health risks.

6. Development and implementation of pandemic preparedness plans for the country with full involvement of all relevant sectors.

Preventing a Pandemic

- Culling of the total poultry population
- Provision of proper clothing and equipment to protect those involved in culling
- Vaccination of high risk persons with presently available influenza vaccines
- Chemo prophylaxis for high risk persons and all possible contacts of human cases
- Intensified laboratory and epidemiological surveillance
- Aggressive management of human cases with antivirals.