

# Avian influenza: implications for Australia

## Introduction

Avian influenza (AI) or 'bird flu' is a highly contagious viral infection of birds. Some AI viruses, called 'highly pathogenic avian influenza' (HPAI) viruses, can cause sudden high mortality (up to 100%) in domestic fowl (chickens). AI viruses are classified into subtypes on the basis of haemagglutinin (H) and neuraminidase (N) projections on their surface. There are 16 H and nine N types and, to date, all outbreaks of HPAI have been caused by H5 or H7 viruses.

All commercial or domesticated poultry and many species of wild birds are susceptible to infection with AI viruses. AI viruses occur throughout the world in wild birds, especially in waterbirds – Anatidae (ducks, geese and swans) and Charadriiforms (shorebirds and waders) – with outbreaks of disease in domestic poultry usually occurring as sporadic events.

AI viruses can spread through droppings (faeces), saliva and nasal secretions from

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infected birds. AI viruses can persist and remain infective in water for 4 days or more (depending on temperature) and can be spread by contaminated equipment, footwear and clothing.

## Clinical signs

The clinical signs of infection with AI viruses in birds are quite variable and depend on a range of factors, including the pathogenicity of the particular virus, the species and age of the birds infected and the presence of concurrent diseases. With low pathogenic avian influenza (LPAI), infection may be subclinical or the predominant signs tend to be respiratory

(such as coughing, sneezing and sinusitis), along with egg drop, diarrhoea and, rarely, oedema of the head and face. With HPAI, clinical signs include marked depression, sudden death, respiratory distress, a sudden drop in egg production, loss of appetite, coughing and diarrhoea, and swelling and purple discolouration of the wattles, combs and legs.

## Human health

Some AI viruses, including H5N1 HPAI, can infect people who contact infected birds or their excretions or secretions. People are not readily infected – it appears that exposure to massive amounts of virus may be needed (e.g. via drinking blood of infected ducks, sucking the nostrils or wounds of infected fighting cocks, ingestion of faeces of infected birds). There is no evidence that people get infected with AI through eating cooked chicken meat and eggs.

Clinical signs and symptoms of AI in humans include conjunctivitis, fever, sore throat, respiratory distress, pneumonia and, in some cases, death. Since January 2003, the World Health Organization has confirmed just over 100 fatal human cases associated with the current epidemic of H5N1 HPAI in poultry in Eurasia and Africa. There is currently no evidence of efficient human-to-human transmission with H5N1 AI viruses.

## World situation

Outbreaks of H5N1 HPAI were reported almost simultaneously in eight Asian countries (Republic of Korea, Japan, China, Thailand, Vietnam, Lao PDR, Cambodia and Indonesia) in late 2003 and early 2004. These were followed by outbreaks in Malaysia later in 2004, in poultry and/or wild birds in Eastern Russia, Kazakhstan and Mongolia in the second half of 2005, and in a number of European and African countries in the first quarter of 2006.

H5N1 HPAI viruses were first identified in 1996 associated with deaths of geese in



People in Asia often live in very close contact with poultry (Backyard ducks in Bali, Indonesia – Photo Mike Nunn).

Guangdong province in southern China. All subsequent isolates of H5N1 virus are related to this (or a similar) virus and all have been highly pathogenic. This differs from the situation seen previously in which low pathogenicity viruses from wild birds infected domestic poultry and then converted to highly pathogenicity after multiplying undetected in poultry flocks for some time.

Experimentally, infected ducks can excrete virus, intermittently and in low quantities, for up to 17 days. Although some viruses cause disease in some ducks, others don't; these silently infected healthy ducks pose a significant risk. Domestic ducks have played a key role in the maintenance of H5N1 HPAI viruses in Asia, and if this disease is to be controlled, specific measures have to be taken to control infection in these birds.

An important driver for the increased number and size of outbreaks is the huge increase in poultry numbers and densities in South-East Asia and southern China in recent years. These large populations, often with different poultry species on the same establishment or nearby, combined with inadequate biosecurity in some sectors, helped the disease to spread widely to the point where H5N1 HPAI viruses are now endemic in several countries in Asia and have caused outbreaks in a number of countries in Europe and Africa.

Live bird markets have also been a key factor in the spread of the disease. Many species of poultry and wild birds are traded in live bird markets, which offer opportunities for mixing and spread of AI viruses. In some markets, birds that are not sold are taken home, facilitating the spread of the disease. Other practices such as the movement of fighting cocks and, in some countries, of trucking ducks along river valleys to graze on residual grain and snails in paddies after rice harvests, have also contributed to the spread of the disease.

Many poultry flocks that maintained good biosecurity in Asia have stayed free of the disease even when there have

been outbreaks in birds in less secure commercial premises and smallholder farms or village and backyard flocks. The disease situation in some infected countries has improved greatly as animal health authorities respond to outbreaks. For example, animal health authorities in Thailand have made enormous gains in controlling the spread of infection and containing the disease using a stamping-out approach without vaccination.

In Vietnam and southern China, very good control appears to be being achieved with the help of effective vaccination. Vaccination by itself does not provide complete control and needs to be accompanied by other measures such as movement controls, effective surveillance and good biosecurity. In some other countries, poorly resourced veterinary services are struggling to contain outbreaks and control further spread of the disease.

### Involvement of other species

AI viruses can mutate via passage through other animals such as pigs; this is a potential risk to human health. H5N1 HPAI viruses were isolated from pigs from the Fujian Province of China in 2001 and 2003. Serological evidence of infection with H5 viruses was also found in pigs in Guangdong Province in 2003. Recent research shows that H5N1 viruses from Thailand and Vietnam multiply poorly in pigs and suggests that, to date, they have not become widely established in pigs in Asia.

H5N1 HPAI viruses have caused disease in zoo felids (tigers and leopards), in domestic cats, civets and pine marten. These cases appear to be associated with eating carcasses of poultry or wild birds that have died from HPAI.

### Australia

What is the risk to Australia? The most likely means of entry of H5N1 viruses into Australia are through smuggled birds or poultry products and through migratory wild birds. The risk from smuggling is minimised by strong border quarantine measures and sound farm biosecurity.

The risk that H5N1 viruses might reach Australia via wild birds is recognised as real but low. The risk is not from migrating waterfowl, which do not migrate into or out of Australia. The birds that migrate here are shorebirds and waders and, to date, there have been only limited isolation of H5N1 HPAI viruses from these birds in Siberia. These birds also do not usually inhabit the same area as domestic poultry, so the risk of direct transmission is low. Nevertheless, they can share habitats with wild waterfowl here, providing a potential route of transmission through local endemic and nomadic wild birds. Spread to farms via direct contact with wild birds or through untreated water is a potential hazard that requires constant vigilance, and should already be part of existing farm biosecurity plans.

If an outbreak of H5N1 HPAI were to occur here, Australia's effective emergency animal disease response mechanisms could quickly contain the disease; all five previous outbreaks of HPAI in Australia – the first in 1976, the last in 1997 (due to H7 viruses with several N types: 3, 4 and 7) – were very quickly contained and eradicated.

People who keep or treat birds should be alert for unusual signs of disease and report any suspicious or unusual events immediately to a local vet, State and Territory animal health authorities, or to the national animal disease emergency hotline number (1800 675 888).

### Conclusion

H5N1 HPAI will not be eradicated from poultry in Asia unless the viruses change to milder forms and until there are major changes in the way that poultry are reared. The world will need to learn to live with these viruses for some time to come – and Australia will need to remain constantly vigilant if it is to minimise the disruption that would accompany even a small outbreak of this disease in poultry here.