

Avian influenza - the facts

What is avian influenza?

Avian influenza, or "bird flu", is an infectious disease of animals caused by viruses that normally infect only birds and, less commonly, pigs. While all bird species are thought to be susceptible to infection, domestic poultry flocks are especially vulnerable and this can rapidly cause epidemics in poultry.

Only influenza A viruses infect birds. All known subtypes of influenza A virus can infect birds. Within subtypes of avian influenza viruses there also are different strains. Avian influenza H5 and H7 viruses can be distinguished as "low pathogenic" and "high pathogenic" forms on the basis of genetic features of the virus and the severity of the illness they cause in poultry; influenza H9 virus has been identified only in a "low pathogenic" form. Each of these three avian influenza viruses (H5, H7, and H9) can theoretically be partnered with any one of nine neuraminidase surface proteins; thus, there are potentially nine different forms of each subtype (e.g., H5N1, H5N2, H5N3, H5N9).

Avian flu causes little or no disease in wild waterfowl but sometimes causes large outbreaks associated with high mortality in poultry. In these instances the term "highly pathogenic avian influenza" (HPAI) is used. This form, which was first recognized in Italy in 1878, is extremely contagious in birds and rapidly fatal, with a mortality approaching 100%. Birds can die on the same day that symptoms first appear. Outbreaks in poultry may spread rapidly.

What's been the situation in recent years?

Since mid-December 2003, a growing number of south east Asian countries have [reported outbreaks](#) of HPAI in chickens and ducks. Infections in several species of wild birds and in pigs have also been reported.

H5N1 (HPAI) outbreaks

Of particular concern, in terms of risks for human health, is the detection of the highly pathogenic strain H5N1 as the cause of most of these outbreaks. H5N1 jumped the species barrier, causing severe disease in humans in Hong Kong in 1997 and in SE Asia in 2003. From January 2004 onwards, this strain has affected humans in gradually growing numbers, in VietNam,

Thailand, Cambodia and more recently Indonesia ([WHO avian influenza home page](#)).

Since 2003, 112 human cases of avian influenza have been reported, 57 of them deadly, - to 29th September 2005; [see WHO website](#) for up-to-date information.

Almost all of the human cases had direct contact with poultry although rare cases of H5N1 person-to-person transmission have been documented. These have occurred within close families but not at a community level.

H7N7 (HPAI) outbreaks

An outbreak of highly pathogenic H7N7 avian influenza in birds occurred in the Netherlands in 2003 and caused the death of a vet and mild illness in 88 poultry workers and members of their families.

H7N3 (HPAI) outbreaks

In 2004, an outbreak of highly pathogenic H7N3 avian influenza occurred in British Columbia, Canada causing 2 cases of mild illness in humans.

How are people infected?

People are usually infected through close contact with live infected birds. Birds shed influenza virus in their faeces, so contact with faeces (for example by visiting enclosures or markets where birds have been recently kept) is also a possible transmission route.

How long does it take for people to develop symptoms after infection?

The time from exposure to the source of infection to onset of influenza is likely to be between three and five days, with a maximum time of seven days.

What symptoms can be expected?

Early symptoms in people are likely to be similar to normal influenza such as fever and cough.

What if someone returned from an affected country and developed a flu-like illness?

It would be highly unlikely to be avian flu but more likely human flu because it circulates in many areas of southeast Asia from winter to spring. However, if the person developed a severe respiratory illness requiring treatment and had visited a country on the list of countries affected by outbreaks of HPAI and had had contact with live poultry or pigs, or places that house

them, in the seven days prior to onset of illness, then the GP should seek further advice.

Is there evidence of person-to-person transmission?

There have been a limited number of well-documented cases in which there is evidence to suggest person-to-person transmission but, to date, there is no evidence that the highly pathogenic avian flu virus has adapted to spread easily among humans.

Should people avoid travelling to affected countries?

Latest travel advice is posted on the Department of Health websites. If the number of cases associated with the current outbreaks remain low then advice is unlikely to change from the following; avoid live poultry markets and similar places with large concentrations of birds or other animals and avoid eating undercooked poultry meat.

Does the current flu vaccine offer any protection against avian flu?

No

Is there a vaccine which protects against avian flu?

No. WHO is urgently working together with laboratories in the WHO Global Influenza Surveillance Network to develop a prototype H5N1 virus for use by leading vaccine manufacturers.

Can drugs prevent or treat avian flu?

Yes. M2 inhibitors (amantadine and rimantadine) and neuraminidase inhibitors (oseltamivir and zanamivir) are available. However, initial analysis of viruses isolated from recently fatal cases in Vietnam indicates that the viruses are invariably resistant to the M2 inhibitors although oseltamivir has been demonstrated under laboratory conditions to be effective against current H5N1 strains.

Why is there concern about these outbreaks?

Public health officials are alarmed by the unprecedented outbreaks in poultry for several reasons. First, most – but not all – of the major outbreaks recently reported in Asia have been caused by the highly pathogenic H5N1 strain. There is mounting evidence that this strain has a unique capacity to jump the species barrier and cause severe disease, with high mortality, in humans. A second and even greater concern is the possibility that the present situation could give rise to another influenza global epidemic (a pandemic) in humans. Scientists know that avian and human influenza viruses can exchange genes when a person or a suitable animal host such as pig is *simultaneously* infected with viruses from both species. This process of gene swapping inside the human body can give rise to a completely new subtype of the influenza virus to which few, if any, humans would have natural immunity. Moreover, existing vaccines, which are developed each year to match presently circulating strains and protect humans during seasonal epidemics, would not be effective against a completely new influenza virus.

If the new virus contains sufficient human genes, transmission directly from one person to another (instead of from birds to humans only) could occur. When this happens, the conditions for the start of a new influenza pandemic will have been met. Most alarming would be a situation in which person-to-person transmission resulted in successive generations of severe disease with high mortality.

This was the situation during the great influenza pandemic of 1918-1919, when a completely new influenza virus subtype emerged and spread around the globe, in around 4 to 6 months. Several waves of infection occurred over 2 years, killing an estimated 40-50 million people.

How likely is a new pandemic of influenza?

There are 3 prerequisites for a pandemic; a novel virus subtype for which humans are immunologically naïve must be transmitted to humans; it must replicate and cause disease; and it must be efficiently transmitted among humans. The present H5N1 virus lacks the 3rd step but sustained person-to-person transmission could occur through mutations in H5N1 genome or through 'reassortment' (mixing with a virus of human origin in co-infected host). The risk of such events increases as the avian flu outbreaks continue.

Can a pandemic be averted?

No-one knows for sure. Influenza viruses are highly unstable and their behaviour defies prediction. However, WHO believes that if the right actions are taken quickly, an influenza pandemic might be averted. This is WHO's foremost objective at present.

What is the NHS Greater Glasgow doing to prepare for a flu pandemic?

NHS Greater Glasgow has compiled and is further developing a flu pandemic plan in accordance with national guidelines issued by the Scottish Executive. In addition, there is a Strathclyde Emergency Coordination Group plan which contains information for local authorities, emergency services and utilities as to the implications of a response to an outbreak. All these plans have been validated by a two-day table-top exercise called 'Eastern Bird' held at Strathclyde Police Headquarters on 21st/22nd September 2005. This exercise was attended by representatives from a number of NHS Boards, Health Protection Scotland, Scottish Executive, National Association of Undertakers and the emergency services.

Lessons learned from this exercise will be collated and incorporated into the plans.

If you would like to comment on any aspect of this newsletter please contact Marie Laurie on 201 4933 or at marie.laurie@gghb.scot.nhs.uk