

Update on avian influenza and pandemic threat issues

This article is based on information that was posted on PacNet on 16 February 2007 by Dr Seini Kupu, Pandemic Influenza Preparedness Specialist at SPC, Noumea, in response to communications from a number of Pacific Island countries and territories (PICTs) requesting clarification regarding some avian influenza and pandemic risk issues. In light of the interest shown from PICTs, we thought it worthwhile to reproduce it in Inform'ACTION.

Information was sourced from WHO, APEC-EINet, ProMED excerpts, and several other sources, and provides a basis upon which preparedness activities can be planned and modified.

Topics covered include:

- avian influenza and pandemic risk;
- avian influenza in humans (this section has been updated since the posting);
- mode of transmission:
 - a) the role of migratory birds versus trade in spreading H5N1,
 - b) transmission from birds/poultry to humans;
- clinical features of H5N1 infection in humans; and
- the safety of eating poultry and poultry products.

Avian influenza and pandemic risk

Avian influenza is an infectious disease of birds caused by type A influenza viruses, of which H5N1 is one. Influenza A viruses have 16-H (Haemagglutinin) subtypes and 9-N (Neuraminidase) subtypes of their major surface-glycoprotein antigens. Of the hundreds of strains of avian influenza A viruses, only four subtypes (H5N1, H7N3, H7N7 and H9N2) have been known to cause infections in humans; of these, H5N1 is quite exceptional, as it is causing both severe infections and even deaths in humans (WHO Factsheet, last reviewed in Feb. 2006).

It is very important to note that avian influenza is not — as of now — a human pandemic influenza. It may, however, be correct to refer to the current bird flu event as an avian disease only, and if this is the case, the correct term would be panzootic.

In birds, the virus strains can cause two distinct disease forms: one, a mild influenza-type illness (caused by the low pathogenic avian influenza virus, or LPAI), and the other, a severe and potentially lethal illness (high pathogenic avian influenza, or HPAI).

Avian influenza in humans

According to WHO Avian Influenza Update of 15 June 2007, there are now 12 countries in which human cases of avian influenza A (H5N1) infection have been confirmed. Between 2003 and 15 June 2007, there have been 313 confirmed cases, with 191 deaths. Among the 12 countries, six have not reported any new human avian influenza infections since 2006, and one has reported no new cases since 2005.

According to Dr J. Domenech, Chief of Animal Health Services at FAO's Rome headquarters: 'Bird flu is on the decline around the world... [but]...the risk of a pandemic will be with us for the foreseeable future.' (FAO press release 2nd April 2007). According to the WHO Western Pacific Regional Office if the H5N1 is found to be entrenched, which is now likely to be the case, it will be very difficult to eradicate. However, reducing human exposure to H5N1 is the key to preventing a pandemic event, as reduced exposure results in less opportunity for the virus to infect and reassort in humans. This requires cooperation between the agricultural/veterinary and public health sectors to handle diseased animals effectively, and communication with the public to encourage responsible behaviours such as good food and personal hygiene and good avian flock management.

To date, scientific and epidemiological evidence shows that H5N1 still does not spread easily from birds to humans. Nevertheless, it is our task to ensure that our respective countries and territories are prepared well before the next phase of transmissibility occurs (that is, efficient transmission from birds to human, and efficient and sustained transmission between humans).

Avian influenza in humans runs a more severe course of illness than the usual seasonal influenza.

Mode of transmission

A – The role of migratory birds versus trade on spread of H5N1

While all birds are thought to be susceptible to infection with avian influenza, many wild bird species carry these viruses with no apparent signs of harm, and they are known to carry the H5 and H7 form as low pathogenic avian influenza (LPAI). If H5 and H7 viruses are introduced as LPAI, and given time to circulate among poultry populations, they can mutate into HPAI. There are new findings, however, which suggest that some migratory waterfowl now carry HPAI-H5N1 and introduce these to domestic poultry flocks in areas that lie along their migratory pathways.

The die-off at Qinghai Lake (China) in 2005 of more than 6000 migratory birds infected by the HPAI H5N1 virus was very unusual and unprecedented, but the long-standing relationship between the H5N1 virus and its natural wild bird reservoir may be changing. Scientific studies have compared viruses in countries lying along the migratory routes that were (and are now) experiencing bird flu outbreaks, and have found that the viruses are almost identical to those recovered from dead migratory birds at Qinghai Lake. In the first two cases resulting in death in 2006 (in Turkey), the viruses responsible were found to be identical with the Qinghai strains.

Recent postings (<http://www.promedmail.org> : February 13-2007) have referred to the strong inference, since the beginning of the bird flu outbreaks in 2003, that wild migratory birds were the primary culprit in spreading avian flu to other domestic birds, including poultry.

However, as observed by S. Jutzi (Director of Agriculture Department, FAO), '...we underestimated the role of trade... ' in the spread of avian influenza, and '...the virus is behaving rather differently than last year [2006]; it's rather enigmatic.' [<http://www.promedmail.org>: February 13-2007]. There were suspicions that infected poultry meat might have entered the United Kingdom from Hungary, through partially processed meat that was routinely shipped from a Hungarian farm for final processing in England.

To date, available evidence (APEC-INet Influenza Alert, 24 February 2007) does not demonstrate conclusively that infected poultry meat entered the UK from Hungary. However, PacNet wishes to alert readers of the possibility that the virus can spread through commercial means if strict infection control is not observed and biosecurity is breached.

Therefore, advisories on these issues should emphasise the following:

- Strict personal hygiene and good occupational infection control measures should facilitate safety and protection of workers, and serve to limit transmission of the virus.
- Proper cooking can kill avian influenza virus, while it survives well in raw or improperly cooked meat and eggs.

B – From birds/poultry to humans

Evidence to date has revealed that H5N1 can be transmitted through close contact with infected birds, whether alive or dead. This can be through:

- slaughtering;
- butchering;
- defeathering;
- preparation of food for consumption;

- handling of and exposure to faeces of infected birds, especially those that are free-ranging and treated as pets around the home (especially by children/young adults).

Note:

- The H5N1 virus is now firmly entrenched in many parts of Asia. The risk of additional new infections among humans persists; these would give the virus more opportunities to improve transmissibility among humans, and would subsequently increase the likelihood of mutation into a pandemic strain.
- Avian influenza is readily transmissible between farms (through the movement of live birds and poultry, people [especially when shoes or clothing are contaminated], contaminated vehicles, equipments, feed and eggs).

Clinical features of H5N1 infection in humans

This section is based on limited epidemiological information available to date from countries where H5N1 human infections have been documented by WHO; however, much more is yet to be learned. (Drawn from http://www.who.int/mediacentre/factsheets/avian_influenza/en/print.html).

a) Incubation period

For H5N1 human infection, the incubation period ranges from 2–8 days, and possibly as long as 17 days. WHO recommends 7 days for field investigation purposes and monitoring of index patients' contacts. This contrasts with the incubation period for normal seasonal influenza of around 2–3 days.

b) Initial symptoms: High fever (>38° C), and other influenza-like symptoms (e.g. cough, sore throat, and/or myalgia).

- A variety of early symptoms have been observed, including diarrhoea, vomiting, abdominal pain, chest pain, and bleeding from the nose and gums.
- Watery (not bloody) diarrhoea was observed more frequently with H5N1 infections in humans in comparison to normal influenza.
- Many patients were observed to develop lower respiratory symptoms early in the illness (difficulty in breathing developing around 5 days after the onset of symptoms), and almost all develop pneumonia (usually viral without microbiological evidence of bacterial supra-infection, meaning treatment with antibiotics is not relevant).
- Clinical deterioration can be rapid with H5N1 infection. Acute respiratory distress can develop around 6 days from onset of first symptoms (range of 4–13 days); in more severe cases (as seen in Turkey), respiratory failure occurs 3–5 days after onset of first symptom(s).

c) Another common finding is multi-organ dysfunction, reflected by laboratory abnormal findings (e.g. leucopenia, lymphocytopenia, elevated aminotransferases, and occasionally disseminated intravascular coagulation [DIC]).**Is it safe to eat poultry/poultry products?**

It is safe to eat poultry and poultry products, but the following facts and specific precautions need to be taken into consideration.

- Poultry and poultry products should be well cooked before consumption. No 'pinkish' poultry meat should be present (if seen it implies the meat is not being well cooked), and no 'runny' egg-yolks.
- Normal temperatures used for cooking (70° C/183° F) should be applied to all parts of the food, as that temperature will kill the virus.
- Although H5N1 has not been reported in any PICTs to date, caution must be maintained, especially with respect to preparation measures for imported raw and/or partially processed meat (including birds, poultry and pigs), especially from countries identified as being

affected. These measures include personal hygiene (washing hands thoroughly, including cleaning and disinfecting items and/or surfaces used in the process), and ensuring poultry meat and products are properly cooked before consumption.

- It is advisable to take the precaution of considering halting importation of raw poultry meat and/or products from identified affected countries and areas..
- Avoid the risk of cross contamination — especially during food preparation — between potentially infected poultry meat and/or products, juices from these products, and other food items (especially those that are intended to be eaten/consumed raw). The person preparing these food items should also wash their hands properly with running water and soap.

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