



Department of Health  
Hong Kong, China

# Public Health & Epidemiology Bulletin

## SPECIAL EDITION

### AVIAN INFLUENZA A (H5N1)

#### *Current Global Situation of Avian Influenza A (H5N1) Outbreaks*

Between 13 January and 5 February 2004, the World Health Organization (WHO) received laboratory confirmation of 20 human cases of influenza A (H5N1) infection, 15 in Viet Nam and five in Thailand. Sixteen cases died.<sup>1</sup> Since December 2003, outbreaks of avian influenza A (H5N1) affecting chicken farms in the Republic of Korea were confirmed and reported to the World Organization for Animal Health (OIE).<sup>2</sup> This was followed by reports of avian flu outbreaks in other countries. As of 5 February, countries that had reported H5N1 avian influenza outbreaks included Cambodia, China, Indonesia, Japan, Laos, Republic of Korea, Thailand and Viet Nam. In China, confirmed or suspected outbreaks of highly pathogenic H5N1 avian influenza have been reported on poultry farms in 12 of China's 31 provinces, autonomous regions and municipalities. Taiwan had reported an H5N2 outbreak in a poultry farm. No cases of human H5N1 infection have been reported in China to date.

The WHO had investigated a cluster of respiratory illness in members of a family in Viet Nam.<sup>3</sup> The cluster involved a 31-year-old man, his two sisters, aged 23 and 30 years, and his 28-year-old wife. Both the man and his two sisters died. The wife had fully recovered. Laboratory tests confirmed H5N1 infection in the sisters. Neither the man nor his wife was tested.

The family members gathered in late December 2003 to prepare for the man's wedding on 3 January. The man and one sister were reported to have handled ducks while preparing a meal on 4 January. However, the investigation failed to reveal any direct contact with poultry for the man's other sister and his wife.<sup>3</sup>

In the absence of evidence of direct exposure to poultry in these two cases, WHO epidemiologists are considering various alternative explanations. Both sisters were known to have provided health care for their brother, prior to his hospitalization, and would thus have had opportunities for close exposure. Direct human-to-human transmission following this close exposure is thus one possible explanation. However, contacts with an infected bird and with some other environmental source of the virus are other possible routes of infection that have not been ruled out. Outbreaks of H5N1 in poultry are widespread in Viet Nam. Large amounts of the virus are excreted in bird droppings and can survive for some time in the environment.<sup>3</sup>

Gene sequencing of the influenza A(H5N1) viruses showed that all genes are of avian origin, indicating that reassortment with human influenza gene has not taken place. There are likely different variations of H5N1 virus circulating at this time. Genetic sequencing of virus samples from Republic of Korea and Viet Nam showed that the viruses in these two countries are slightly different.

#### *Public Health Measures in Hong Kong*

On 30 January, 2004, by the Order of the Director of Health, Influenza A (H5) was added to the list of infectious diseases in the First Schedule to Cap. 141, Quarantine and Prevention of Disease Ordinance, making this condition a statutorily notifiable disease.<sup>4</sup> The reporting criteria are as follows:

---

*Criteria for Reporting:*

- (a) A person with acute respiratory illness, characterized by fever (temperature >38°C) **and** cough and/or sore throat, **AND EITHER**
- had contact with a case of Influenza A (H5) during the infectious period, **OR**
  - had recent (less than one week) visit to a poultry farm in an area known to have outbreaks of highly pathogenic avian influenza (HPAI), **OR**
  - worked in a laboratory that is processing samples from persons or animals that are suspected from HPAI infection

**OR**

- (b) A person with severe pneumonia caused by Influenza A (e.g. Directigen test positive for Influenza A) **AND** had contact with live birds/poultry within one week before onset of illness

The global situation of avian influenza is available from website of the Department of Health (DH) ([www.info.gov.hk/dh/diseases/influenza/globalupdate.htm](http://www.info.gov.hk/dh/diseases/influenza/globalupdate.htm)). The notification form can be downloaded from [www.info.gov.hk/dh/diseases/notify.htm](http://www.info.gov.hk/dh/diseases/notify.htm).

Doctors should report such cases to the following Regional Offices of the DH during office hours or DH Medical Control Officer (MCO) on pager 7116 3300 call 9179 after office hours.

Regional Office	Fax No.	Telephone No.
Hong Kong	2572 7582	2961 8729
Kowloon	2375 8451	2199 9149
New Territories East	2699 7691	2158 5107
New Territories West	2439 9622	2615 8571

Laboratory confirmation of influenza A (H5N1) infection requires the following criteria be met:

A person with

- positive viral culture for Influenza A (H5), **OR**
- positive Polymerase Chain Reaction for Influenza A (H5), **OR**
- a $\geq$ 4-fold rise in H5 specific antibody titre

The clinical specimen of choice is nasopharyngeal aspirate. The vast majority of patients with influenza-like symptoms do not require laboratory work up for influenza A (H5N1) unless there are other suggestive features (e.g. poultry contact in an area known to have avian influenza outbreaks).

The DH is closely monitoring the influenza situation through sentinel surveillance, laboratory surveillance and investigation of influenza-like-illness outbreaks. Sentinel surveillance is supported by some 50 private doctors and 60 general outpatient clinics in the public sector. The DH's Public Health Laboratory is a WHO National Influenza Centre conducting virologic surveillance that detects unusual increase in influenza activity and prevalent strains of influenza virus. A special website for avian influenza is accessible at <http://www.info.gov.hk/info/flu/eng/index.htm>.

In accordance with the recommendations of the Advisory Committee on Immunization made on 30 January 2004, Hong Kong live poultry workers can receive free vaccination for personal protection against influenza at one of the 16 designated general out-patient clinics of the Hospital Authority. The programme started on 2 February 2004.

Publicity and education for the public to protect them against avian influenza have been stepped up. A dedicated website was created at <http://www.info.gov.hk/info/flu>. Over 1.3 million copies of a leaflet entitled "What You Should Know about Avian Flu" have been produced for wide dissemination throughout Hong Kong. Multi-lingual versions in Tagalog, Thai and Indonesian are being made. Health advice and circulars have been issued to heads of all schools, child care centres and other institutions. Announcements in public interests are being made on all radio and TV channels in Hong Kong on regular intervals. Special announcements are being broadcast at Hong Kong's land and sea control points, and on vessels and trains to and from the Mainland. Travellers are advised that when visiting territories reporting outbreaks of avian flu, they should avoid going to poultry markets and farms, and avoid touching live birds, poultry or their droppings, as well as wash hands frequently.

---

## ***Background Information***

Influenza viruses can be classified into three types: A, B and C. Type A includes three subtypes (H1N1, H2N2 and H3N2) that have been associated with widespread epidemics and pandemics. Influenza A subtypes are classified by the antigenic properties of the surface glycoproteins, the haemagglutinin (H) and neuraminidase (N). Antigenic shift occurs only with influenza A viruses and is thought to arise from recombination of human and avian or swine influenza antigens (genetic reassortment). The emergence of new subtypes through antigenic shift may give rise to pandemic influenza. Besides humans, species such as birds and pigs are major reservoirs of influenza viruses. Avian influenza strains rarely infect humans; however, human infections with H5, H7 and H9 have been documented.

Avian influenza virus can survive, at cool temperatures, in contaminated manure for at least three months. In water, the virus can survive for up to four days at 22°C and more than 30 days at 0°C. The virus is killed by heat (56°C for three hours or 60°C for 30 minutes) and common disinfectants, such as formalin and iodine compounds.

### ***The 1997 Influenza A(H5N1) Outbreak in Humans***

In 1997, influenza A (H5N1) was first discovered to result in human infections in Hong Kong.<sup>5-8</sup> There were a total of 18 confirmed cases affecting eight males and ten females. Their age ranged from one to 60 and nine cases were aged 12 and below. Six cases died. The case-fatality rate was 18% in children aged 16 years and below and 57% in persons above that age. The first case had disease onset in May 1997 and the remaining 17 cases during November and December 1997. The timing coincided with avian influenza outbreaks among local chicken farms and markets.

The initial clinical presentation of influenza A (H5N1) infection was similar to that of other influenza viruses, typically with high fever, malaise, myalgia, sore throat and cough. Gastrointestinal symptoms such as vomiting, diarrhoea or abdominal pain were not uncommonly observed. In some patients, the infection ran a rapidly downhill course complicated by viral pneumonia, respiratory distress syndrome and multi-organ failure. Severely ill patients often showed deranged liver function and sometimes impaired renal function. Some patients had prolonged clotting times. Myocarditis or encephalitis was not a recognized feature of the disease.

Aspirin should be avoided in children as they may develop Reye's syndrome. Antipyretics such as paracetamol or indomethacin may be useful. Adequate fluid replacement and rest are important. Broad spectrum antibiotics should be given to cover typical and atypical agents causing acute community acquired pneumonia. Supplemental oxygen by nasal cannula should be given to those with oxygen desaturation. *Genetic sequencing of influenza A (H5N1) virus samples from recent human cases in Viet Nam showed antiviral resistance to amantadine and rimantadine, two of the antiviral drugs commonly used for influenza. Thus, neuraminidase inhibitors (e.g. oseltamivir) are the drugs of choice in the treatment of influenza A(H5N1) infection.*

A case control study of patients hospitalized for influenza A (H5N1) showed that exposure to live poultry (by visiting either a retail poultry stall or a market selling live poultry) in the week before illness began was significantly associated with H5N1 disease.<sup>9</sup> Eating or preparing poultry products was not associated with disease. A retrospective cohort study found that health care workers (HCW) exposed to H5N1 patients had a significantly higher prevalence of H5 antibodies compared with non-exposed HCW (eight of 217 exposed (3.7%) vs. two of 309 non-exposed HCW (0.6%)).<sup>10</sup> Another cohort study showed that approximately 10% of local poultry workers and 3% of government workers involved in culling poultry had H5 antibody.<sup>11</sup> More intensive poultry exposure, such as butchering and exposure to ill poultry, was associated with having H5 antibody. These studies suggested that the predominant mode of transmission of H5N1 is from infected birds to humans, though limited and inefficient human-to-human transmission could also occur.<sup>9-12</sup>

### ***Human Cases of H5N1 in 2003***

In February 2003, two cases of influenza A (H5N1) were confirmed.<sup>13</sup> Both cases were members of the same family (father and son) who returned to Hong Kong on 9 February 2003 after travelling to Fujian in the Mainland in January 2003. The 33-year-old father developed respiratory symptoms on 7 February while in Fujian. He was admitted to hospital in Hong Kong on 11 February with pneumonia but died on 17 February. His 9-year-old

---

son also became unwell on 9 February and was admitted to hospital in Hong Kong on 12 February with pneumonia. He recovered subsequently.

### ***Avian Influenza Outbreaks in Poultry in Hong Kong since 1997***

An outbreak of H5N1 avian influenza killing thousand of chickens in local farms occurred in late 1997. The spread of the disease was halted after 1.3 million chickens were culled.

During May 2001, eight poultry markets had birds dying in large numbers which were positive for HPAI. Surveillance of viruses in faecal samples suggested that the chickens died from H5N1 infection. Some 440 000 birds in retail markets and 800 000 birds in the farms were culled.

During January through March 2002, outbreaks of H5 avian influenza occurred in some 20 local farms in areas around Kam Tin, Hung Shiu Kiu and Pak Sha. Approximately 900 000 chickens were destroyed on infected and quarantined farms during the outbreak period.

During the period December 2002 through March 2003, dead birds infected with H5 avian influenza were identified, including from waterfowls in Penfold Park and Kowloon Park, grey herons and a black headed gull. H5 avian influenza infection was found in farms in Tak Kwu Ling and Tai Kong Po. Over 80 000 chickens were destroyed to halt the spread of infection.

### ***Other Useful Links and Resources***

Further information on avian influenza can be accessed at the WHO websites at

- WHO avian flu fact sheet: [http://www.who.int/csr/don/2004\\_01\\_15/en/](http://www.who.int/csr/don/2004_01_15/en/)
- WHO guidelines for the use of seasonal influenza vaccine in humans at risk of H5N1 infection: [http://www.who.int/csr/disease/avian\\_influenza/guidelines/seasonal\\_vaccine/en/](http://www.who.int/csr/disease/avian_influenza/guidelines/seasonal_vaccine/en/)
- WHO interim infection control guidelines for healthcare facilities for avian flu: [http://www.wpro.who.int/avian/docs/IC\\_Guidelines\\_for\\_HPIA.pdf](http://www.wpro.who.int/avian/docs/IC_Guidelines_for_HPIA.pdf)
- WHO FAQ on avian flu: [http://www.who.int/csr/disease/avian\\_influenza/avian\\_faqs/en/](http://www.who.int/csr/disease/avian_influenza/avian_faqs/en/)

---

### ***References***

1. WHO. Confirmed human cases of avian influenza A (H5N1). [http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2004\\_02\\_05/en/](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2004_02_05/en/) accessed on 5.2.2004.
2. OIE. Update on avian influenza in animals in Asia. [http://www.oie.int/downld/AVIAN%20INFLUENZA/A\\_AI-Asia.htm](http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm) accessed on 4.2.2004.
3. WHO. Avian Influenza A(H5N1):Update 15. [http://www.who.int/csr/don/2004\\_02\\_02/en/](http://www.who.int/csr/don/2004_02_02/en/) accessed on 4.2.2004.
4. DH. Letter to Doctor. <http://www.info.gov.hk/dh/useful/ltod/ltod20040129.htm> . accessed on 4.2.2004.
5. Snacken R, Kendal AP, Haaheim LR, Wood JM. The Next Influenza Pandemic: Lessons from Hong Kong, 1997. *EID* Vol5 N2. 1999.
6. News in Brief: Influenza A (H5N1). *Public Health and Epidemiology Bulletin*. Vol. 6 No. 4 (Nov 97).
7. Choi S, Tsang T. An Update of Influenza A (H5N1) in Hong Kong. *Public Health and Epidemiology Bulletin*. Vol. 7 No. 1 (Feb 98).
8. Lee SY, Mak KH, Saw TA. The Avian Flu (H5N1): One Year On. *Public Health and Epidemiology Bulletin*. Vol. 8 No. 1 (Feb 99).
9. Mounts AW, Kwong H, Izurieta HS, Ho Y, Au T, Lee M, Buxton Bridges C, Williams SW, Mak KH, Katz JM, Thompson WW, Cox NJ, Fukuda K. Case-control study of risk factors for avian influenza A (H5N1) disease, Hong Kong, 1997. *J Infect Dis*. Aug 1999; 180(2):505-8.
10. Buxton Bridges C, Katz JM, Seto WH, Chan PK, Tsang D, Ho W, Mak KH, Lim W, Tam JS, Clarke M, Williams SG, Mounts AW, Bresee JS, Conn LA, Rowe T, Hu-Primmer J, Abernathy RA, Lu X, Cox NJ, Fukuda K. Risk of influenza A (H5N1) infection among health care workers exposed to patients with influenza A (H5N1), Hong Kong. *J Infect Dis*. Jan 2000; 181(1): 344-8.
11. Bridges CB, Lim W, Hu-Primmer J, Sims L, Fukuda K, Mak KH, Rowe T, Thompson WW, Conn L, Lu X, Cox NJ, Katz JM. Risk of influenza A (H5N1) infection among poultry workers, Hong Kong, 1997-1998. *J Infect Dis*. Apr 2002; 185(8):1005-10.
12. Katz JM, Lim W, Bridges CB, Rowe T, Hu-Primmer J, Lu X, Abernathy RA, Clarke M, Conn L, Kwong H, Lee M, Au G, Ho YY, Mak KH, Cox NJ, Fukuda K. Antibody response in individuals infected with avian influenza A (H5N1) viruses and detection of anti-H5 antibody among household and social contacts. *J Infect Dis*. Dec 1999; 180(6):1763-70.
13. News in Brief: Two Cases of Influenza A (H5N1) Infection in 2003. *Public Health and Epidemiology Bulletin*. Vol. 12 No. 2 (Apr 03).