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### Avian Flu: Influenza A (H5N1) Virus – The Hong Kong Experience and Beyond

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#### Abstract

##### General level of health in Hong Kong

The general level of health in Hong Kong compares very favourably with that of developed countries. The infant mortality rate is at 4 per 1000 live births, and the maternal mortality rate is at 4 per 100,000 total births, which is one of the lowest in the world. Life expectancy is very high, 81.5 for female, and 76 for male; second only to Japan in the Asia-Pacific area. The major causes of death are due to chronic and degenerative diseases, with cancer, heart diseases, cerebro-vascular diseases being the top three leading causes of death followed by pneumonia, accidents and poisoning.

##### Infectious Diseases in Hong Kong

Infectious diseases are no longer the major causes of mortality and morbidity in Hong Kong. Because of the effectiveness of the expanded programme of immunization, the vaccine - preventable diseases of childhood such as diphtheria, poliomyelitis, whooping cough, and measles have either been eradicated or well brought under control. Each year there are about 8,000 to 10,000 cases of infectious diseases reported to the Department of Health. In 1996, the total number of cases reported was 8660. The main bulk of the reports was tuberculosis with 6501 cases (75.1%); followed by rubella with 605 cases (7.0%), viral hepatitis 478 cases (5.5%), food poisoning with 314 outbreaks affecting 1829 people (3.6%) and bacillary dysentery 300 cases (3.5%). Apart from the specified 26 infectious diseases, which are required to be reported to the Health Authority by law, there are other infectious diseases, which, although not statutorily required for notifications, are placed under surveillance. These include influenza, HIV/AIDS, dengue haemorrhagic fever and Salmonellosis. (12)

##### The Influenza A (H5N1) - Hong Kong Experience

The first epidemic caused by influenza A/HK/68 (H3N2) virus occurred in midsummer of 1968. Two further outbreaks of influenza A (H3N2) occurred in 1970 and 1971. In 1977 and 1978, Hong Kong experienced two moderate outbreaks of influenza A (H1N1) virus. Influenza B virus is usually detected in sporadic cases but small outbreaks have been observed in 1975, 1977 and 1979.

Influenza virus is present in Hong Kong all year round. The viruses isolated include Influenza A (H3N2, H1N1) and Influenza B. Seasonal outbreaks tend to occur in March and

July each year. A majority of the population had evidence of previous infection. Outbreaks tend to be less explosive and pronounced than those in the West. (15)

## **Epidemiology**

Influenza A (H5N1) virus was previously known to infect birds only. The first human case of Influenza A (H5N1) was reported in Hong Kong in mid May 1997. As of 23 January 1998, there were 18 confirmed human cases. The onset date of the last confirmed case was on 28 December 1997. After the first case report in May 1997, there was a gap of almost six months before the second case was reported in early November.

The 18 confirmed cases comprised 8 males and 10 females, age ranging from 1 year to 60. Nine cases were children under the age of 10. The cases came from different parts of the territory: 3 cases in Hong Kong Island, 6 cases in Kowloon, 3 in East New Territories and 6 in West New Territories. (3,10)

Following laboratory confirmation of the first case, the Hong Kong Department of Health invited the Centre for Disease Control and Prevention (CDC) and the World Health Organization to assist in investigating the case. The findings reported in this paper are the joint efforts of the investigating teams both locally and from overseas.

## **Symptoms and signs**

A (H5N1) are very similar to other influenza viruses, typically with fever, malaise, myalgia, sore throat and cough. Conjunctivitis is seen in some patients. Persistent high fever (>38 degrees), is another useful sign. X-ray of the chest is useful in detecting early viral pneumonia. The virus may cause a rapid downhill course in some cases, ending with viral pneumonia, respiratory distress syndrome and multi-organ failure. Among the 18 confirmed cases, 6 have died. Two individuals, originally in critical condition, recovered and were subsequently discharged from the hospital. (1)

## **Mode of transmission**

Investigation of the first case indicated that the main mode of transmission of influenza A (H5N1) was from bird to man. There was history of possible exposure to poultry in 7 out of the 18 confirmed cases. In one case, the school kept chickens and ducklings, but there was no history of the patient coming into direct contact with these birds. Three patients had a history of buying poultry from markets before disease onset. In another two cases, there were chicken stalls in the close vicinity of their living place and playing area. H5N1 viruses were also isolated from the chicken stalls. As for the remaining case, the patient frequently went to work in the market where there were chicken stalls although the recollection of petting chickens could not be ascertained.

A total of nine (less than 2 percent) of the 502 people potentially in contact with either the child, the virus in the laboratory or poultry were antibody positive for influenza A (H5N1). None of the 419 specimens from the comparison group tested was antibody positive to A (H5N1). The results suggested that the main mode of H5N1 transmission was from bird-to-

human. People were more likely to test positive for antibody to the H5N1 virus if they were poultry workers or exposed to the virus in the laboratory. (2,5,6)

The absence of antibody among family members of the ill child and the overall low number of antibody positive people in contact with the child suggested that person to person transmission, if occurring, is relatively inefficient at this time.

### **Diagnosis and treatment**

Private laboratories in Hong Kong provide a rapid screening test for the direct detection of Influenza A antigen. Confirmation and sub-typing will have to be carried out by the Virus Laboratory of the Department of Health.

Initial clinical presentation is not different from ordinary influenza cases. However, complications like viral pneumonia, respiratory distress syndrome and renal failure set in rapidly in three cases. One should not wait for the laboratory diagnosis of H5N1, infection before treatment is started. Treatment for HSN, infection is essentially the same as for other influenza viruses. Appropriate treatment, including the use of amantadine, should be guided by the clinical assessment and should be started immediately once influenza with complications is clinically diagnosed. (1)

### **Prevention and Control**

There are special 'risk factors' in Hong Kong which favour the transmission of the H5N1 influenza virus:

1. The sanitation of the wholesale markets for poultry and the chicken stalls in the retailed outlets are in a deplorable condition.
2. Chicken stalls and markets are in close proximity to the living and playing areas of a great majority of the housing estates.
3. There is absence of a central slaughtering facility for chickens, and the practice of slaughtering chickens at the retailed outlets is highly unsatisfactory.
4. Until recently there was no system to monitor the importation of chickens into Hong Kong from the China mainland to ensure public health safety.
5. The standard of hygiene of local chicken farms left a lot to be desired.

The mass destruction of about 1.5M chickens in Hong Kong, the thorough cleansing of the markets and chicken stalls, the temporary suspension of chicken imports from the China mainland as well as other control actions were only immediate control measures. In the long term, a new import control system, stringent control on local chicken farms, raising the standard of hygiene of all markets, continuing health education and eventually the establishment of a central slaughtering facility for the hygienic handling of all chickens will need to be introduced. (7)

## **The Influenza A (H5N1) - Experience beyond Hong Kong**

The occurrence of the Influenza A (H5N1) cases at the time of the epidemic in Hong Kong has caused great concern among the health authorities in the neighbouring countries and territories. Because of the unfounded fear, there was a reduction of tourists coming to Hong Kong. In the Philippines and Thailand, there was suggestion of screening travelers arriving from Hong Kong. To dispel this unnecessary fear information sheets for tourists were disseminated through Hong Kong Government Overseas Offices and the Hong Kong Tourist Association. The message in the information sheet was to point out the true facts of the "avian flu", and that screening of travelers coming in or going out of Hong Kong was not necessary and not practical.

The WHO investigation team headed by Dr. Daniel Lavenchy together with health officials from the Department of Health of the HKSAR Government visited the chicken farms in Guangdong Province, China. They held discussions with their counterparts in the Guangdong Public Health Bureau on how to tighten control of poultry exported from the China mainland to Hong Kong, and the new arrangements which only allow chickens to be exported from farms where disease status is monitored by officials. A system was later established to ensure the health status of chickens entering Hong Kong. These include certification, quarantine and border checks for - influenza A (H5N1) virus at the point of entry.

### **What lessons Hong Kong has learned from the 'Avian Flu' outbreak?**

The prevention and control of infectious diseases should not be seen on an individual-specific basis. The emergence of many outbreaks of infectious diseases in recent years including the present outbreak of Avian Flu (H5N1) represents the 'tip of an ice-berg' phenomenon. The deep-rooted problems are the common causes of poor environmental hygiene and sanitation, food contamination and pollution of water sources. Unless these problems are dealt with effectively as a whole, Hong Kong will continue to be affected with these diseases. (11)

To begin with, there is an urgent need to improve the local surveillance system, upgrade the laboratory services and strengthen the international co-operation on the global surveillance of infectious diseases.

Secondly, action should be taken to improve the present environmental hygiene and sanitation in Hong Kong.

Thirdly, doctors and other health care professionals have an important role to play in disease surveillance, prevention and control of infectious diseases. Their support should be actively sought.

Fourthly, public information and education will go a long way in dispelling public misconceptions and allay the anxiety and fear about infectious diseases. The mass media can greatly assist by disseminating information to the grass root levels. Because of their extensive coverage and powerful influence, their support and involvement as partners in health is essential in the fight against infectious diseases.

Lastly, research is crucial to the better understanding of the determinants of health. The study on the epidemiology of infectious diseases and the development of effective intervention programmes, including the production of vaccines, should continue to be promoted. (16)

## **Conclusion**

At this stage, one can only conclude that the outbreak of influenza A (H5N1) in Hong Kong which started in 1997 has been contained. It is of crucial importance to continue to maintain close vigilance in the surveillance of the H5N1 virus in both humans and animals. Extensive epidemiological studies should also be conducted. In order to protect the community from avian flu, the poultry imported to Hong Kong should be free of the virus through the institution of various control and preventive measures at the chicken farms, border and markets.

Health education on the prevention of influenza, including washing hands after handling poultry, should be emphasized and continued. Meanwhile, laboratory investigations like genetic sequencing should continue, eventually elucidating the genetic structure of various isolates. The issue of vaccine development and production should be closely monitored, taking into account various factors such as the possibility of human-to-human transmission, virus mutation and genetic reassortment. The epidemic potential of this virus cannot be underestimated and concerted efforts among local and international authorities are needed to combat this emerging new infection. (4,13)