

## Avian influenza

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### Abstrak

*Avian influenza atau Flu Burung adalah penyakit menular pada binatang yang kemudian menulari manusia pula. Penularan para manusia menimbulkan masalah kesehatan penting sejak tahun 2004, apalagi dengan adanya ancaman pandemi. Sampai 1 Maret 2006 pasien penyakit ini pada sudah dilaporkan di 7 negara, yaitu Cambodia, Indonesia, Thailand, Viet Nam, China, Irak dan Turki. Jumlah total kasus adalah 174 orang, 94 diantaranya meninggal dunia (54.02%). Sampai 1 Maret 2006 Indonesia mempunyai 27 pasien, 20 meninggal (74.07%). Pasien AI Indonesia sebagian besar adalah pria (62.5%) dan semuanya datang dengan keluhan demam. Pandemi influenza terjadi bila muncul virus sub tipe baru yang sebelumnya tidak menyerang manusia. Karena itu, avian H5N1 punya potensi untuk menimbulkan pandemik karena mungkin menulari antar manusia. Dampak pandemik dapat berupa tingginya angka kesakitan serta pekerja absen dari tugasnya, yang semuanya akan memberi dampak sosio ekonomi yang besar. Tentang kematian, pengalaman masa lalu ternyata bervariasi, tergantung dari 4 faktor, yaitu jumlah orang yang terinfeksi, virulensi virus, keadaan kesehatan pasien dan efektifitas upaya pencegahan yang ada. Prediksi akurat tentang angka kematian sulit dibuat. (Med J Indones 2006; 15:125-8)*

### Abstract

*Avian influenza, or “bird flu”, is a contagious disease of animals which crossed the species barrier to infect humans and gave a quite impact on public health in the world since 2004, especially due to the threat of pandemic situation. Until 1<sup>st</sup> March 2006, laboratory-confirmed human cases have been reported in seven countries: Cambodia, Indonesia, Thailand, Viet Nam, China, Iraq and Turkey with a total of 174 cases and 94 dead (54.02%). Indonesia has 27 cases, 20 were dead (74.07%). AI cases in Indonesia are more in male (62.5%) and all have a symptom of fever. An influenza pandemic is a rare but recurrent event. An influenza pandemic happens when a new subtype emerges that has not previously circulated in humans. For this reason, avian H5N1 is a strain with pandemic potential, since it might ultimately adapt into a strain that is contagious among humans. Impact of the pandemic could include high rates of illness and worker absenteeism are expected, and these will contribute to social and economic disruption. Historically, the number of deaths during a pandemic has varied greatly. Death rates are largely determined by four factors: the number of people who become infected, the virulence of the virus, the underlying characteristics and vulnerability of affected populations, and the effectiveness of preventive measures. Accurate predictions of mortality cannot be made before the pandemic virus emerges and begins to spread. (Med J Indones 2006; 15:125-8)*

**Keywords:** Avian Influenza, Pandemic

Avian influenza, or “bird flu”, is a contagious disease of animals caused by viruses that normally infect only birds and, less commonly other animals. Actually avian influenza viruses are highly species-specific, but have, on rare occasions, crossed the species barrier to infect humans and gave a quite impact on public health in the world since 2004, especially due to the threat of pandemic situation.<sup>1</sup>

Avian influenza caused by type A / H5 N1 strains of the influenza virus. The disease occurs worldwide.

While all birds are thought to be susceptible to infection with avian influenza viruses, many wild bird species carry these viruses with no apparent signs of harm. Other bird species, including domestic poultry, develop disease when infected with avian influenza viruses.<sup>2</sup> But the diseases is not only affect birds. Authorities in Germany have also announced detection of H5N1 avian influenza in a domestic cat in March 2006. Several published studies have demonstrated H5N1 infection in large cats kept in captivity. In December 2003, two tigers and two leopards, fed on fresh chicken carcasses, died unexpectedly at a zoo in Thailand. In February 2004, the virus was detected in a clouded leopard that died at a zoo near Bangkok. A white tiger died from infection with the virus at the same zoo in March 2004.<sup>3</sup>

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In poultry, the viruses cause two distinctly different forms of disease – one common and mild, the other rare and highly lethal. In the mild form, signs of illness may be expressed only as ruffled feathers, reduced egg production, or mild effects on the respiratory system. Outbreaks can be so mild they escape detection unless regular testing for viruses is in place. In contrast, the second and far less common highly pathogenic form is difficult to miss. First identified in Italy in 1878, highly pathogenic avian influenza is characterized by sudden onset of severe disease, rapid contagion, and a mortality rate that can approach 100% within 48 hours. In this form of the disease, the virus not only affects the respiratory tract, as in the mild form, but also invades multiple organs and tissues. The resulting massive internal haemorrhaging has earned it the lay name of “chicken Ebola”.<sup>1</sup>

The widespread persistence of H5N1 in poultry populations poses two main risks for human health. The first is the risk of direct infection when the virus passes from poultry to humans, resulting in very severe disease. Of the few avian influenza viruses that have crossed the species barrier to infect humans, H5N1 has caused the largest number of cases of severe disease and death in humans. Unlike normal seasonal influenza, where infection causes only mild respiratory symptoms in most people, the disease caused by H5N1 follows an unusually aggressive clinical course, with rapid deterioration and high fatality. Primary viral pneumonia and multi-organ failure are common. In the present outbreak, more than half of those infected with the virus have died. Most cases have occurred in previously healthy children and young adults. A second risk, of even greater concern, is that the virus – if given enough opportunities – will change into a form that is highly infectious for humans and spreads easily from person to person. Such a change could mark the start of a global outbreak (a pandemic).<sup>2</sup>

### Epidemiological and Indonesia Data

Direct contact with infected poultry, or surfaces and objects contaminated by their faeces, is presently considered the main route of human infection. To date, most human cases have occurred in rural or periurban areas where many households keep small poultry flocks, which often roam freely, sometimes entering homes or sharing outdoor areas where children play. As infected birds shed large quantities

of virus in their faeces, opportunities for exposure to infected droppings or to environments contaminated by the virus are abundant under such conditions. Moreover, because many households in Asia depend on poultry for income and food, many families sell or slaughter and consume birds when signs of illness appear in a flock, and this practice has proved difficult to change. Exposure is considered most likely during slaughter, defeathering, butchering, and preparation of poultry for cooking. Investigations of all the most recently confirmed human cases in 2005 and early 2006, in China, Indonesia, and Turkey, have identified direct contact with infected birds as the most likely source of exposure. To date, not all human cases have arisen from exposure to dead or visibly ill domestic birds. Exposure to an environment that may have been contaminated by faeces from infected birds is a second source of human infection. Research in 2005 has shown that domestic ducks can excrete large quantities of highly pathogenic virus without showing signs of illness.<sup>1,2</sup>

But, of course there are a lot of question still unanswered regarding transmissibility of avian influenza. WHO mention that For unknown reasons, most cases have occurred in rural and periurban households where small flocks of poultry are kept. Again for unknown reasons, very few cases have been detected in presumed high-risk groups, such as commercial poultry workers, workers at live poultry markets, cullers, veterinarians, and health staff caring for patients without adequate PPE.<sup>2</sup>

In the current outbreak, until 1<sup>st</sup> March 2006, laboratory-confirmed human cases have been reported in seven countries: Cambodia, Indonesia, Thailand, Viet Nam, China, Iraq and Turkey (Table 1).

Table 1. Laboratory confirmed Avian Influenza cases in the world – 1 March 2006 (cited from 5)

Country	1 March 2006		
	Patient	Death	%
Vietnam	93	42	45.16%
Indonesia	27	20	74.07%
Thailand	22	14	63.63%
Turkey	12	4	33.33%
China	14	8	57.14%
Cambodia	4	4	100%
Irak	2	2	100%
Total	174	94	54.02%

Based on previous cases, the symptoms of avian influenza include :

- Fever (temperature >38°C)
- Headache
- Myalgia
- Diarrhea
- Abdominal pain
- Vomiting
- Cough
- Sputum
- Sore throat
- Rhinorrhea
- Shortness of breath

Data from the first 24 Indonesian avian influenza cases (until early February 2006) as reported by Director General of CDC Ministry of Health Indonesia showed that the symptoms in Indonesian avian influenza (AI) patients include :

- Fever (100%)
- Cough (95.8%)
- Dyspnoe (91.7%)
- Sore Throat (20.8%)

These 24 Indonesian avian influenza (AI) cases were 15 male (62.5%) and 9 (37.5%) female. Of the 15 male, 8 (53.33%) were died and among 9 female 8 (88.89%) were died. All of the died patient have fever and dyspnoe (100%) , 93.75% cough and 25% sore throat.

### **Pandemic Risk**

An influenza pandemic is a rare but recurrent event. Three pandemics occurred in the previous century: "Spanish influenza" in 1918, "Asian influenza" in 1957, and "Hong Kong influenza" in 1968. The "Spanish" influenza pandemic of 1918–1919 remains an ominous warning to public health. Many questions about its origins, its unusual epidemiologic features, and the basis of its pathogenicity remain unanswered. An estimated one third of the world's population (or ≈500 million persons) were infected and had clinically apparent illnesses. Total deaths were estimated at ≈50 million and were arguably as high as 100 million killed an estimated 40–50 million people worldwide. That pandemic, which was exceptional, is considered one of the deadliest disease events in human history, the mother of all pandemics. Subsequent pandemics were much milder, with an estimated 2 million deaths in 1957 and 1 million deaths in 1968.<sup>6,7</sup>

An influenza pandemic happens when a new subtype emerges that has not previously circulated in humans. For this reason, avian H5N1 is a strain with pandemic potential, since it might ultimately adapt into a strain that is contagious among humans. Once this adaptation occurs, it will no longer be a bird virus--it will be a human influenza virus. Influenza pandemics are caused by new influenza viruses that have adapted to humans. A pandemic occurs when a new influenza virus emerges and starts spreading as easily as normal influenza – by coughing and sneezing. Because the virus is new, the human immune system will have no pre-existing immunity. This makes it likely that people who contract pandemic influenza will experience more serious disease than that caused by normal influenza.<sup>6</sup>

A pandemic can start when three conditions have been met: a new influenza virus subtype emerges; it infects humans, causing serious illness; and it spreads easily and sustainably among humans. The H5N1 virus amply meets the first two conditions: it is a new virus for humans (H5N1 viruses have never circulated widely among people), and it has infected almost 200 humans, killing over half of them. No one will have immunity should an H5N1-like pandemic virus emerge. All prerequisites for the start of a pandemic have therefore been met save one: the establishment of efficient and sustained human-to-human transmission of the virus. The risk that the H5N1 virus will acquire this ability will persist as long as opportunities for human infections occur. These opportunities, in turn, will persist as long as the virus continues to circulate in birds, and this situation could endure for some years to come.<sup>6,7</sup>

The virus can improve its transmissibility among humans via two principal mechanisms. The first is a "reassortment" event, in which genetic material is exchanged between human and avian viruses during co-infection of a human or pig. Reassortment could result in a fully transmissible pandemic virus, announced by a sudden surge of cases with explosive spread. The second mechanism is a more gradual process of adaptive mutation, whereby the capability of the virus to bind to human cells increases during subsequent infections of humans. Adaptive mutation, expressed initially as small clusters of human cases with some evidence of human-to-human transmission, would probably give the world some time to take defensive action.<sup>1,6,7</sup>

With the H5N1 virus now firmly entrenched in large parts of the world, the risk that more human cases will occur will persist. Each additional human case gives the virus an opportunity to improve its transmissibility in humans, and thus develop into a pandemic strain. The recent spread of the virus to poultry and wild birds in new areas further broadens opportunities for human cases to occur. While neither the timing nor the severity of the next pandemic can be predicted, the probability that a pandemic will occur has increased.

### Impact

The risk of pandemic influenza is serious. Previous influenza pandemic viruses have been shown to derive genes from influenza viruses circulating in birds prior to the pandemic (conclusive shown in 1957 and 1968, while the source of the 1918 pandemic has not been conclusively defined). The last pandemic occurred more than 30 years ago.<sup>4</sup>

Therefore, these recent outbreaks of avian influenza raises concern that this avian influenza virus may soon engender the next influenza pandemic. High rates of illness and worker absenteeism are expected, and these will contribute to social and economic disruption. Past pandemics have spread globally in two and sometimes three waves. Not all parts of the world or of a single country are expected to be severely affected at the same time. Social and economic disruptions could be temporary, but may be amplified in today's closely interrelated and interdependent systems of trade and commerce. Social disruption may be greatest when rates of absenteeism impair essential services, such as power, transportation, and communications.<sup>2,4,6</sup>

Historically, the number of deaths during a pandemic has varied greatly. Death rates are largely determined by four factors: the number of people who become infected, the virulence of the virus, the underlying characteristics and vulnerability of affected populations,

and the effectiveness of preventive measures. Accurate predictions of mortality cannot be made before the pandemic virus emerges and begins to spread. All estimates of the number of deaths are purely speculative. WHO has used a relatively conservative estimate – from 2 million to 7.4 million deaths – because it provides a useful and plausible planning target. This estimate is based on the comparatively mild 1957 pandemic. Estimates based on a more virulent virus, closer to the one seen in 1918, have been made and are much higher. However, the 1918 pandemic was considered exceptional.<sup>4,6,7</sup>

Avian influenza is a very important public health problem. Every health personnel as well as general community and even politician should have good knowledge and information regarding this diseases and it's spread.

### REFERENCES

1. Tjandra Yoga Aditama. Flu Burung pada Manusia. Jakarta : UI Press, 2005 , page 2-11.
2. Avian influenza (" bird flu") - Fact sheet. (Accessed March 4, 2006)  
[http://www.who.int/mediacentre/factsheets/avian\\_influenza/en/index.html](http://www.who.int/mediacentre/factsheets/avian_influenza/en/index.html)
3. H5N1 avian influenza in domestic cats. (Accessed March 4, 2006)  
[http://www.who.int/csr/don/2006\\_02\\_28a/en/index.html](http://www.who.int/csr/don/2006_02_28a/en/index.html)
4. Communicable Disease Surveillance and Response Global Influenza Programme WHO. Responding to the avian influenza pandemic threat. Recommended strategic actions. Geneve : WHO 2005, page 10-19
5. Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO - 1 March 2006. (Accessed March 4, 2006)  
[http://www.who.int/csr/disease/avian\\_influenza/country/cases\\_table\\_2006\\_03\\_01/en/index.html](http://www.who.int/csr/disease/avian_influenza/country/cases_table_2006_03_01/en/index.html)
6. Ten things you need to know about pandemic influenza. (Accessed March 4, 2006)  
<http://www.who.int/csr/disease/influenza/pandemic10things/en/index.html>
7. Taubenberger JK and Morens DM. 1918 Influenza: the Mother of All Pandemics. *Emerg Inf Dis* 2006;12(1): 246-9