



# *Worth Noting*

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The 'Bird-Flu' threat ominously enters the front page of the news and then just as quickly disappears. Most of us would know that it is a virus that can be spread over long distances by migrating birds, is potentially deadly to humans, and has variously been described as the biggest threat facing world populations today. Despite the enormity of the threat to human life, most of us would not know any more about this potential 'pandemic' than this.

In this edition of *Worth Noting*, we thought it would be important to look at the current state of bird flu in the world, what it all means, and how close we are to a doomsday scenario.\*

## **Brief history of pandemics**

To remind us that human beings have no special concord with nature and no automatic grant of immunity to dangerous viruses despite the advances of science and medicine, pandemics have been rare but reoccurring events throughout the past century. In fact, they occur about once every three decades.

In the twentieth century, the first and by far the worse was the 'Spanish Flu' in 1918 which is estimated to have killed between 40-50 million people immediately after the horrors of World War One. To put this in context, about 15 million people were killed in battle during WWI and a further 5 million from war related causes.

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\* Many of the facts from this *Worth Noting* are drawn from research done by Michael Richardson, *ISEAS Briefing Paper on the Threat of an Influenza Pandemic*, November 2005.

The second major pandemic was the 'Asian flu' virus in 1957 which killed about 2 million people and the 'Hong Kong Flu' in 1968 which caused about 1 million deaths. The recent SARS (Severe Acute Respiratory Syndrome) threat first appeared in 2002 led to 774 deaths. The normal seasonal flu each year is responsible for about 500,000 deaths worldwide.

### **What is 'Bird Flu'?**

We often see the terminology H5N1 used to characterize the current bird flu threat. What is the H5N1 strain of 'bird flu'?

Influenza viruses are grouped into three types: **A**, **B** and **C**. **C** type viruses are common but usually cause no serious illness. **B** type viruses cause occasional outbreaks of respiratory illness, particularly amongst the young and old. Both **B** and **C** type viruses are human viruses. Notably, **C** type viruses are stable, but **A** & **B** types are prone to mutate in form. **A** types are the most prone to mutation and can infect humans, pigs, horses, sea mammals and birds.

**A** type viruses are generally seen to be the greatest threat to human beings. H5N1 is an **A** type virus described by scientists as '*capricious*' and '*promiscuous*'. This means that they lack a 'proof reading mechanism' when replicating themselves and small 'errors' can occur that are left uncorrected. Consequently, these viruses undergo constant changes in their genetic make-up making them adaptable to their host and more likely to sidestep the host's immune system defences.

The H5N1 strain is naturally found in wild birds. The virus in infected wild birds is relatively easily spread through their droppings which contaminate dust, soil and water. As has occurred, the virus can then spread to poultry.

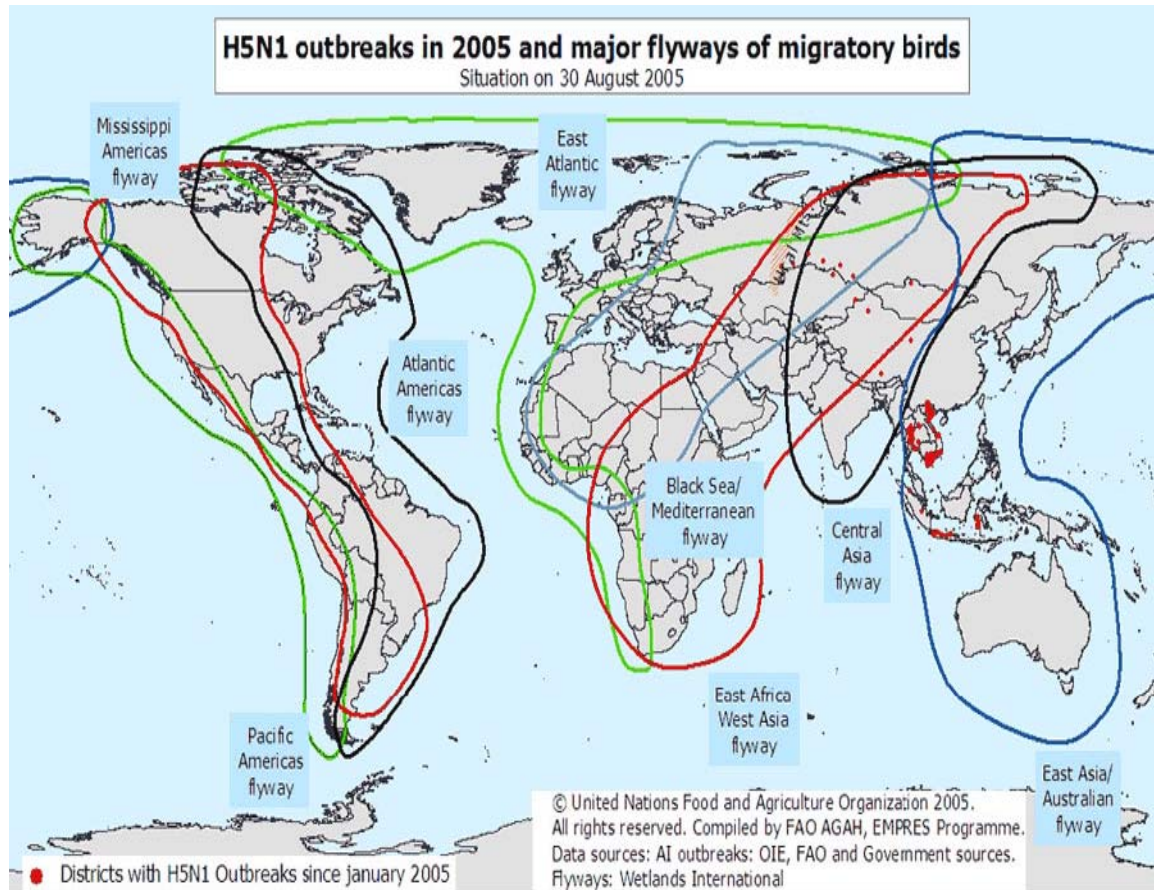
### **Migration of infected birds**

Given that H5N1 is such a virulent strain, the potential for a pandemic increases for three initial reasons.

First, the virus does not generally kill infected wild birds although it can be deadly for chickens and turkeys. Second, the strain is now found in migratory birds that travel long distances making the spread of the virus global. Third, when these migrating birds mix with domestic poultry, the wild birds can infect poultry and the virus can mutate into high-pathogenic strains.

These millions of migratory birds travel along eight broad overlapping corridors called flyways. The flyways stretch across all major continents. Until mid 2005, reported outbreaks of H5N1 were restricted to Southeast and East Asia. Since

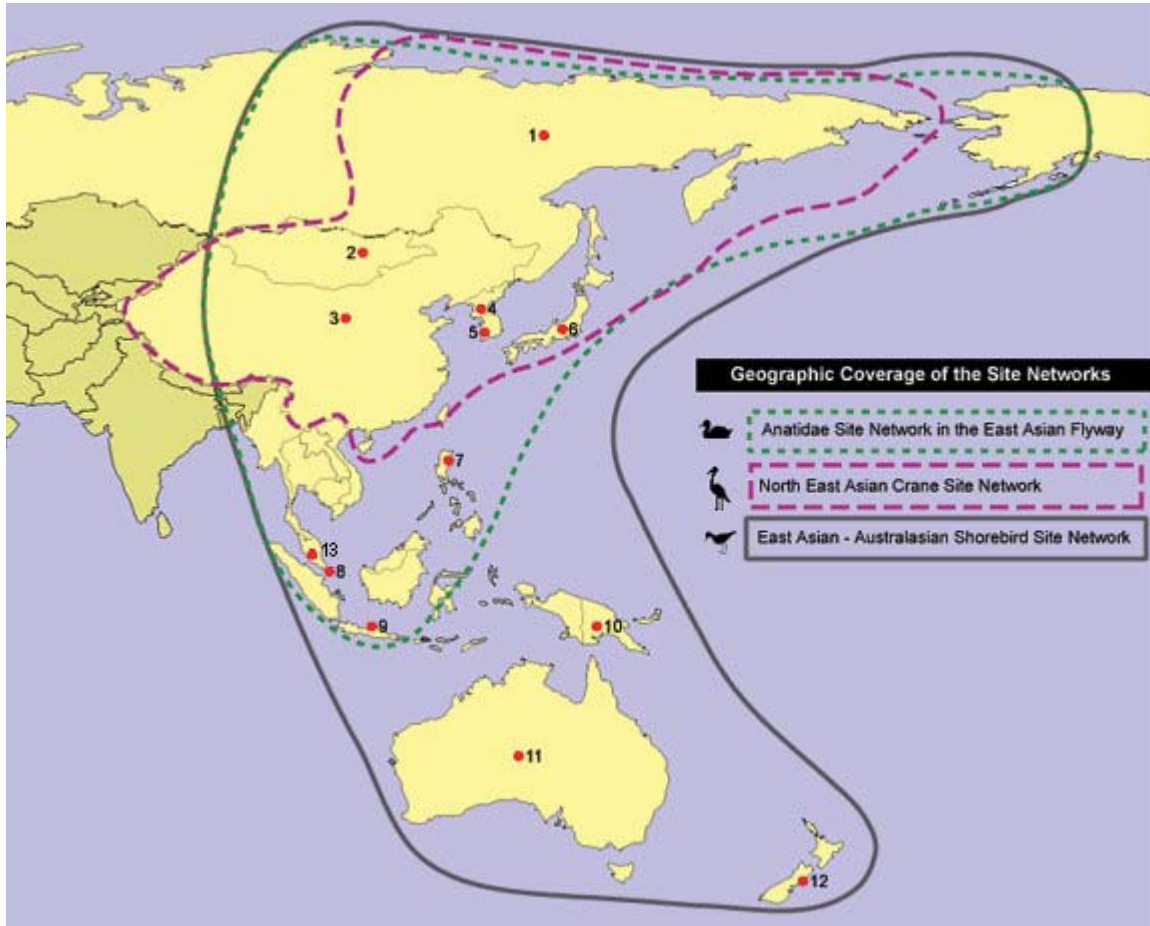
then, there has been confirmation that infected wild birds and poultry have been detected in the east of Russia, Kazakhstan, Turkey, Romania, Western Russia, Croatia, Greece and Kuwait.



Source: UN Food & Agricultural Organisation

As far as Australia is concerned, our geographical isolation offers some protection. Several million migratory birds fly into and out of Australia and New Zealand each year along the so-called East Asian-Australasian flyway. Some of these come from as far away as Siberia. However, the main carriers of the H5N1 strain – ducks, geese and swans – do not go further south than Indonesia. Hence, the risk of direct infection by contact with birds (at the moment) is limited. This is not to say that some of the birds that do reach our shores will not eventually bring the strain with them.

## East Asian – Australasian Migratory Flyway



Source: Wetlands International

### **From bird to poultry to human**

Humans can be infected with the virus through direct contact with infected poultry. This strain made the first known jump from poultry to humans in Hong Kong in 1997. Since then, there have been about 125 cases of confirmed bird to human infection and likely that there have been concealed or unidentified cases of it in China. Of these, about 50% end up dying from the symptoms. The latest confirmed infection and death has been in Turkey meaning that the threat is clearly moving from Asia toward Europe.

Meanwhile, over 150 million birds in over a dozen countries mainly in Asia have been slaughtered to reduce the likelihood of avian flu spread resulting in a loss of about \$US15 billion for the industry.

Moreover, unlike most forms of flu, most cases of infection have involved previously healthy children and young adults. In all cases, individuals have been in close contact with infected live poultry or become infected by consuming recently killed infected birds that are inadequately cooked.

The virus is destroyed by heat at about 70 degrees Celsius and with modern western standards of poultry slaughter and preparation consumers are at little risk of being infected. However, in communities where people live side by side with poultry and slaughtering and preparation is unsupervised (such as in many villages in Asia and Africa), the chance of infection is much higher. Moreover, in less developed societies, universal education and identification of instances of bird flu is a massive challenge whilst in countries like China, the lack of transparency adds a further challenge.

### **The nightmare scenario: Human to human transference**

As deadly as catching the virus from an infected bird is, a pandemic is not likely if infection can only occur from contact with birds. This is relatively easy to protect populations against although the risks of widespread infections amongst communities that live with freely roaming poultry are significant.

The real nightmare scenario is if the H5N1 virus infecting a human from a bird mutates into one that can be passed on from human to human. There would be virtually no defence against the spread of this strain amongst communities in both developed and undeveloped countries.

There is a terrible historical precedent for this. Research now strongly indicates that the 1918 flu that killed 40-50 million worldwide was caused by an avian-like flu virus that adapted to infect human-to-human.

When we fast forward to the present day, since the H5N1 virus is new to people alive today, we have no pre-existing immunity to it. Moreover, if a deadly virus was capable of spreading across the world in 6-9 months in 1918 when overseas travel was exclusively by ship, imagine the speed with which a modern strain could spread given the massive advances in international travel and mobility. In other words, if the H5N1 strain mutates and acquires a person-to-person infection capacity, global spread will be inevitable. The estimation is that it would take less than 3 months for any such virus to spread throughout the world.

Furthermore, not only do we have no pre-existing immunity to this viral strain but the two available anti-viral drugs (Tamiflu and Relenza) cannot prevent or cure any H5N1 pathogen. Moreover, even if we do eventually develop a vaccine or cure for the H5N1 strain of flu, the difficulty of getting these drugs to less

developed countries without efficient health distribution and treatment systems is enormous.

If human-to-human transference becomes a reality, tens of millions worldwide will be infected. Currently, H5N1 from birds kills about 50% of humans infected but it is unknown how virulent the human-to-human mutated strain will be. It is even possible that in that stage of mutation the strain will fail to be a lethal one. The point is that we are currently unsure how the virus will change. We know only that the H5N1 virus *is* changing rapidly.

### **Economic impact of a pandemic**

While the impact on human life of a virulent strain would be a catastrophe in itself, the secondary economic impact would also be significant.

It is obviously difficult to know the economic impact without knowing how virulent the mutated strain would be. As a point of comparison, the SARS epidemic in Asia caused losses of about 2% of East Asia's GDP in the second quarter of 2003. This was an epidemic that caused the deaths of 774 people, far short of the millions that H5N1 might cause.

The Asian Development Bank (ADB) has done modeling based on a mild pandemic in which 20% of people become ill and 0.5% of these people die. This would result in about 3 million deaths. On this basis, consumer and investor confidence is short lived and demand is only seriously affected for 6 months. This would lead to a cut in GDP across Asia of about 2.5%.

If demand is affected for 12 months, a loss of 6.5% of Asian GDP would result. This would lead to a fall of 14% in the worldwide trade of goods and services which would be worth US\$2500 billion.

### **Conclusion**

Reactions to the 'bird flu' threat ranges from panic to consternation to indifference. This is because we do not know when, how and where the virus will mutate. The fact that the 1918 pandemic was also a result of an avian-flu has raised the stakes and it is clear that governments are taking this threat seriously.

Although Tamiflu is not a vaccine or cure for H5N1, it can ease the symptoms if taken within the first 48 hours of infection. (We will not be able to produce an effective vaccine until we know the precise nature of the mutated strain.) The basic strategy at the moment is to stockpile Tamiflu in multiple locations worldwide. The idea is to rush Tamiflu to any area in the world where a cluster of

human-to-human transference has occurred and isolate that community until a safe vaccine can be mass produced and distributed.

The problem currently is that the 50 or so countries that have placed orders or are manufacturing stockpiles of Tamiflu are the industrialized or developed countries. The developing countries who have not placed orders such as China and others in Asia are precisely the countries with populations at most risk of infection since this is the global hub of the H5N1 strain.

The World Health Organisation (WHO) which is the body leading the coordination effort necessarily deals with a delicate balance. The idea is to increase awareness of H5N1 such that countries are prepared, instances of bird-to-human transference or human-to-human transference will be quickly identified and isolated, and individuals are aware of their responsibilities. However, WHO is also careful about the need to avoid triggering mass panic and misinformation about the virus making an efficient coordination strategy impossible.