Avian Flu: Ready or Not?

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Due to an unprecedented warning of a possible influenza pandemic, collaborative international and domestic actions could prevent or mitigate the spread of avian flu among humans. However, the window of opportunity for the international community and national governments to prepare is indeterminate since no scientist can predict with certainty when or if avian influenza, specifically H5N1, may change into a highly pathogenic person-to-person transmissible form capable of causing a pandemic. If such transformation does occur, national interests, health systems and the global economy will be affected. The opportunity to intervene to forestall or even eradicate viral transmission in its early stages depends on the ability of national governments, the World Health Organization and collaborating laboratories to identify viral changes at the source. Timely disease intelligence, national and local level preparedness, and effective response will be critical if a potential pandemic is to be prevented.*

***What is disease intelligence?**

- Local knowledge and surveillance in the form of blood serum surveys,
- hospital/clinic outbreaks,
- insight into community level disease activity in animals and humans, and
- any other information obtained that assists in understanding disease patterns and activity

Steps necessary to preventing, preparing for and/or mitigating the consequences of a pandemic include:

1) *Openness and sharing of local and international information on disease surveillance;*
2) *Immediate notification by countries to the WHO of any suspect cases, whether human or animal, and full cooperation with WHO recommended actions at all levels;*

3) *Improved coordination among the World Health Organization (WHO), the Food and Agriculture Organization (FAO), and the World Organization for Animal Health (OIE);*
4) *Committing the resources and technical assistance to support global actions on avian flu, including by WHO, FAO and the OIE;*
5) *Investing in vaccine technology and manufacturing by ensuring development and supply of vaccine as early as possible and in sufficient quantities for effective intervention should science and international collaboration fall short of stopping the pandemic; and,*
6) *Development of national and coordinated international pandemic preparedness plans.*

So what do we know about bird flu?

H5N1 could cause a human pandemic if it mutates into a highly contagious person-to-person form. This is of growing concern not only as a scientific question but also for its potential to disrupt the global economy and strain health care systems worldwide. Between December 26, 2003, and June 28, 2005, the World Health Organization (WHO) officially confirmed 108 human cases and 54 human deaths from H5N1. In the most recent wave of cases beginning on December 16, 2004, Cambodia's Kampot Province recorded four cases and four deaths; Thailand has not had any new cases since October 8, 2004, because of its vigorous control methods, but increasing case numbers in Vietnam (60 human cases and 18 deaths since December 2004) have stimulated current international concern and action on avian flu pre-pandemic planning.

The prerequisites for the start of a pandemic are: emergence of a novel virus subtype for which the general population has little or no immunity; replication of the new virus in humans causing serious illness; and transmission of the virus efficiently from person-to-person with sustained transmission causing community-wide outbreaks. The current unprecedented window of warning for the global community comes from the knowledge that the first two prerequisites have been satisfied.

A recent WHO report stated that the human cases in northern Vietnam may have been caused by a strain of H5N1 virus that is mutating into a more highly transmissible strain compared with strains found in southern Vietnam and Cambodia. This virus is infecting people in all age ranges in northern Vietnam, while the age range in the south has thus far been limited to people between two and 40 years of age. It also seems that more people are surviving infections with H5N1 in northern Vietnam. This may be due to more cases coming to the attention of medical personnel, but it appears more likely to be related to the virus changing and causing a broader range of effects in humans from no symptoms at all, to mild cases of the flu, to death.

Viruses are constantly adapting and changing. In the 1918 flu pandemic a milder spring flu season preceded a devastating fall rebound. Even then, fatality rates of less than 5 percent amounted to tens of millions of deaths worldwide.

A less lethal virus is potentially more dangerous

When a virus does not kill its host, the host is more likely to carry the infection to other susceptible individuals. For example, a recent study estimates that 70-80 percent of Mekong Delta ducks carry the H5N1 disease and spread it, but do not get sick and die. If an increasing number of cases with less severe disease symptoms occur, the H5N1 virus has more opportunity to recombine with other circulating human influenza strains to create a strain that is efficiently transmitted from person-to-person and has enough potential lethality to cause the next pandemic.

More scientific evidence that the virus is changing

Viruses isolated during 2004-05 indicate that those from northern Vietnam and Thailand have begun to evolve into a grouping distinct from viruses isolated from southern Vietnam and Cambodia. These findings highlight the concern that H5N1 could be transformed into a virus capable of efficient person-to-person transmission. More analysis is necessary to verify that genetic change, known as "antigenic drift," is actually occurring, and more surveillance is needed to determine whether human-to-human transmission with a range of symptom severity may already be occurring.

Pigs in Indonesia with bird flu?

Earlier this year, pigs located near a chicken farm in Tangerang, West Java, that last year was struck by avian flu, tested positive for H5N1 but showed no sign of illness. Pigs can host both bird and human flu viruses and can serve as a "genetic mixer" that can lead to the emergence of a flu strain that can easily infect and be transmissible by humans. The Indonesian Government has increased its surveillance in response to this finding, but authorities say resources are limited. US Navy medical experts in Jakarta are trying to obtain samples for confirmatory testing. The extent to which H5N1 is generally prevalent among pigs will remain unknown until surveillance and laboratory testing are initiated.

Human case of bird flu in Indonesia? Not quite

Following outbreaks of H5N1 among poultry in Sulawesi in February-March 2005, the Indonesian Health Ministry under the auspices of the WHO conducted a blood serum survey of 80 individuals likely to have come into contact with the sick poultry. None had symptoms of illness. Ministry investigators used a test that did not assay specifically for H5N1 and initial concerns of positive results proved unfounded. Three labs, including the CDC, retested the samples. Only one test was very weakly positive for H5N1--below reporting levels for a positive result. A follow-up survey was conducted five weeks later, and the individual with the original weakly positive test turned out to have a negative result. The results, therefore, are not conclusive evidence of a human H5N1 case in Indonesia. The borderline test result underscores the need for additional blood serum surveys and enhanced surveillance of poultry workers, farmers, and others in contact with infected poultry in Indonesia or in contact with people ill from H5N1 in other countries affected by H5N1 poultry outbreaks and human cases.

Surveillance and capacity building

On-the-ground surveillance and local knowledge – disease intelligence -- can be difficult to obtain for a variety of reasons: lack of local capacity or technical expertise, inadequate resources to pay for such testing or even political reasons. Yet disease intelligence is critical for collaborative and innovative interventions to be successful. Developed nations could assist in this dilemma through not only offers of technical assistance directly or via the WHO, but by funding development, non-governmental organizations, or universities to assist in the technical and capacity building that are vital for any intervention to be successful. Working closely with in-country partners to develop local and regional capacities to identify, track, monitor, and report diseases provides the operational trust and collaboration necessary to quell an emerging epidemic.

Pre-pandemic planning

If a pandemic flu occurs, the mitigation of its effects will depend on the effectiveness of international cooperation, preparedness, and disease intelligence. Advance planning is critical to facilitate international and national responses. Early detection, followed by aggressive containment measures--including use of antiviral drugs--are strategies to stamp out or hold the disease at bay and gain time to increase preparedness. Such an approach is aimed at forestalling international spread and gaining time for the development and manufacture of an effective vaccine. It rests on assumptions that the first chains of human-to-human transmission might not reach the efficiency needed to initiate and sustain pandemic spread, and that the cases will be located in rural, relatively isolated communities. It also assumes the antiviral drug Tamiflu® is effective and can be distributed with sufficient supply in a timely fashion.

What is the prognosis?

If human case clusters of an efficiently transmissible avian flu emerge in densely populated urban settings, it will be impossible to contain the spread of the disease. It is therefore essential that investment in vaccine development and manufacturing capacity be given high priority in order to meet a worldwide demand for an effective vaccine – it will take approximately six months to develop a vaccine from the identification of a pandemic strain of virus.

International Concerns

Emerging and reemerging diseases, such as pandemic influenza, will likely severely strain health care systems around the world and affect many countries beyond the devastating direct health effects and costs. Today's greater volume of international travel will facilitate rapid global spread of the virus. The fallout from widespread global disease will affect all sectors of the global economy, particularly international trade and travel. A flu pandemic could cause widespread border closures and absenteeism that might disrupt supply chains and place already fragile states at greater risk of instability. Militaries and peacekeeping forces, vulnerable populations and even the most wealthy of populations will not be immune from its effects.

Coordinating international actions

International cooperation to develop, define, and coordinate response procedures, along with leadership at the highest levels of the international community are essential for pandemic preparation. Pre-pandemic planning should emphasize government responses, as well as preparations from the WHO, FAO, and other international organizations, and NGO's and the private sector. Greater cooperation and coordination among the organizations responsible for human and animal health (WHO, FAO, OIE) and commitment of sufficient resources will do much to facilitate appropriate actions. The

development of a communication strategy, stockpiling of medications and supplies, and plans for vaccine distribution as it becomes available will allow for swift decision-making and action and may do much to alleviate panic and instill confidence should pandemic flu emerge.

Ultimately, the effectiveness of pre-pandemic planning and the international response will require early identification of viral changes and emerging human cases, open, collaborative international action, and investments in local disease intelligence and vaccine capacity- building.

Map Attachments:

a) Avian Influenza (H5N1), dated June 28, 2005
b) Avian Influenza (H5N1): Focus on Human Cases, dated June 28, 2005

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