

Last Chance To Stop Avian Flu Pandemic?

by Colin Lowry

Events in Asia over the past few months have put the world on a short fuse toward the explosion of a global influenza pandemic. Avian influenza has broken out in several new places, and has again infected another species (pig), which could act as a carrier and mixing vessel for the recombination of a hybrid virus that can easily infect people.

Indonesia reported its first human cases and fatalities from avian influenza type H5N1 on July 21, with the death of a father and two of his young daughters. The man died ten days after the onset of symptoms, despite treatment in the hospital. Making the cases more mysterious, is the fact that the man lived in a city and had no known exposure risk to wild or domestic birds, which, so far, have been the primary vectors for spreading the disease to people.

The health authorities in Indonesia are coordinating with the World Health Organization (WHO) to track down all of the people who may have been exposed to the virus from the victims, or who had recent contact with them, to try to find the source of the infection. These new cases bring the global total to 111 confirmed infections in people, resulting in 57 deaths from avian influenza type H5N1 since 2003.

In April in Indonesia, researchers reported that they had been testing for the presence of H5N1 influenza in domestic pigs, and found that in one area on the island of Java there were many pigs that showed no symptoms but were infected with the virus. This finding is extremely serious, as pigs could now be vectors of the avian influenza virus, and because they showed no symptoms of the disease, it makes detection even more difficult. In Asia, large-scale testing for the virus in domestic pigs is economically impossible under current conditions.

The fact that the pigs could now harbor the avian virus also makes them a dangerous new mixing vessel for the creation of a new form of the virus, if the pigs are also infected with a human influenza virus. Pigs routinely are susceptible to human influenza viruses, and can carry them asymptotically as well. Influenza type A viruses can recombine and swap genes, creating a new and potentially more dangerous virus. A recombination event in the pig, with a human and avian influenza virus, could produce a virus that could easily spread from person to person—which is exactly what the experts fear will be the start of the next deadly pandemic.

Can a New Pandemic Be Prevented?

The recent avian flu outbreak in Qinghai province in China showed that wild birds are an important vector in the spread of the disease, and that the disease is far from contained in Asia. So far, more than 140 million domestic chickens have been slaughtered in an attempt to contain the spread of the disease.

In early July, the WHO, the UN Food and Agriculture Organization (FAO), and the World Organization for Animal Health (OIE) held an international meeting of health officials and scientists in Malaysia to review the strategy to combat the avian influenza epidemic in Asia.

The WHO meeting concluded with the adoption of a prevention plan with four main objectives. First, farming practices must be changed to segregate the species, so that chickens, ducks, and pigs are not kept together, allowing a flu virus to move from species to species, and recombine into a new form. Second, a large education program must be set up for small farmers and their families about risky livestock practices, and how to limit exposure of people to animal viruses. Third, the testing and reporting of suspected flu outbreaks must be improved, with incentives for farmers to report outbreaks in their flocks, so that the necessary control measures can be applied. Fourth, a better poultry influenza vaccine needs to be developed; large-scale vaccination of poultry in countries with endemic avian flu may be the only way to stop the epidemic from spreading.

The implementation of this plan would cost about \$250 million, which would have to come mostly from the developed countries outside of Asia. The plan also calls for the buildup of public health infrastructure, including laboratories, clinics, disease surveillance, and the purchase of anti-viral medicines.

The question of the effectiveness of an H5N1 vaccine based on the seed strains the WHO was using last year is still not resolved, as no one can say what the composition of a new variant virus would be, but so far, studies from Vietnam show the virus has changed very little over the last year. The vaccines are still being developed, and if the H5N1 virus were to break out this year in Asia, spreading from person to person, the vaccines would not be ready for use. The only other treatment would be anti-viral drugs, but the older class of drugs such as amantadine and rimantadine have shown little effectiveness against H5N1 in human patients.

The newer drugs, Tamiflu and Relenza, are more effective, but are much more expensive, and are in short supply worldwide. Tamiflu is manufactured only by Roche Pharmaceuticals, and only in one plant in Switzerland. Orders for it from 14 countries for 40 million doses are still being fulfilled, and at current capacity the manufacturing process will take about one year to produce that amount—which will be insufficient in the event of a global pandemic, where potentially a billion doses would be needed.

A new study done by a research team at St. Jude Chil-

dren's Hospital in the United States has shown that the previous assumptions about how much Tamiflu is required, and how long a patient should be treated, may not work against the new variety of avian H5N1 in circulation now. Previous work using the original H5N1 virus, which was isolated from Hong Kong in 1997, showed that a five-day course of Tamiflu given to mice experimentally infected with the virus resulted in about an 80% survival rate. When this experiment was done using the H5N1 virus isolated from Vietnam in 2004, this same treatment was able to save only 50% of the infected mice.

Continuing the study with varying doses and time courses, it was found that to get 80% survival in the mice infected with the 2004 H5N1 virus required an eight-day treatment with Tamiflu. If this study is an indication of what the new variant virus might look like from a treatment perspective, it means that even more Tamiflu will be required, and that current stockpiles of the drug will be exhausted more quickly in the event of a pandemic.

Window of Opportunity Closing

The evidence is increasingly clear that the world will face a new flu pandemic, possibly very soon, and so far, we are unprepared to deal with it. The WHO plan will not be implemented unless the money and resources are put behind it very soon. The window of opportunity for the world to prevent this catastrophe from happening may close very soon. Past flu epidemics have shown us that flu usually resurges in Asia in the Summer, and then sweeps through the rest of the world, hitting the United States in the early Winter.

In the United States, the government has still not done much to solve the vaccine production problem, and the lack of a stockpile of adequate anti-viral medications. These questions have been taken up by U.S. Senators on several occasions, but the Bush Administration has not abandoned its suicidal free-market ideology applied to health-care infrastructure. At a minimum, the government should be issuing guaranteed contracts for the production and development of new flu vaccines, and should be buying and stockpiling crucial anti-viral medications that may provide the only way to curtail the spread of the avian influenza and save lives, should the pandemic erupt this Winter.

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