

Hong Kong Avian Influenza Update

The following article was written largely from an article prepared by Dr. Charles W. Beard with the U.S. Poultry & Egg Association

Human influenza situation in Hong Kong

The death of a child in Hong Kong in May 1997 from an avian influenza virus (H5N1) was the beginning of what has become a series of highly publicized announcements and events. Since that first death, there have been 16 confirmed cases and five suspected cases of this H5N1 avian influenza infection in people with at least four deaths.

At the same time, chickens in Hong Kong were experiencing high death losses to a highly pathogenic avian influenza (H5N1).

Concern of public health experts

Public health experts are concerned that this H5 influenza virus may be the cause of the next worldwide epidemic (pandemic) of human influenza. The two previous introductions of new "H" serotypes into humans occurred in that part of the world. The "Asian

flu" was caused by an H2 virus and began in 1957. In 1968, an H3 virus began the "Hong Kong flu" epidemic and variations of that H3 virus have been the major cause of human influenza since that time. When a different "H" subtype emerges as the cause of human influenza, severe disease and death losses can occur because no one has residual immunity to the new "H" (H5 in this case) from vaccination or past infections. Additionally, the high death rate of H5N1 has forced concern over the potential impact of a pandemic caused by this virus.

Reports have indicated that at least some of the infected humans had been in contact with sick poultry afflicted with avian influenza. Both the human and chicken H5N1 viruses have been shown to cause severe illness and near 100% mortality in experimentally exposed chickens (work done at the USDA Southeast Poultry Research Laboratory in Athens, Georgia).

Potential impact on poultry

If the Hong Kong H5N1 initiates a worldwide pandemic in humans, there is the real possibility that infected and virus-shedding poultry caretakers will infect their poultry flocks. At least one human isolate has experimentally been shown to be highly lethal for chickens. Based on the experiences in Hong Kong with chickens and laboratory results, the virus would likely have a more devastating effect on commercial poultry flocks. Biosecurity measures would be of very little benefit because infected caretakers would be a probably mechanism of H5N1 virus introduction into the flocks. Biosecurity could, however, reduce the secondary spread from the flocks initially infected.

Protection of genetic stock and breeders with vaccine

If the worse case scenario happens and a human pandemic results, the poultry of the world (turkeys, layers and broilers) will be in grave danger. This includes the genetic stock and breeders. If the poultry industry were to lose the majority of its genetic pool it would have a lasting effect with probable negative effects on the world's food supply.

For the reasons cited above, since biosecurity cannot be totally relied upon to protect these valuable flocks, the only recourse will be vaccines. If the flocks have been immunized against fowlpox, the fowlpox vector vaccines will likely be of no value. That leaves inactivated vaccine prepared either

from virus-laden embryonating egg fluids or from the recombinant baculovirus-insect cell culture system.

It will take many months to produce and administer the vaccine needed to protect the genetic stocks (foundation stock, great-grandparents, grandparents). After this group is protected, the multiplier parent flocks for the three types of poultry should be next, followed by table egg layers, turkeys, and lastly broilers. The fowlpox vectored vaccine can be utilized for birds not previously immunized for fowlpox once the vaccine is demonstrated in the laboratory to result in adequate protection against the Hong Kong H5N1. page 4 of 6

Drug treatment of poultry flocks for avian influenza

Experiments conducted at the Southeast Poultry Lab (Beard, et al.) clearly demonstrated that the highly pathogenic H5N2 virus used to experimentally infect chickens quickly became resistant to the anti-influenza drug amantadine. For that reason, it does not appear to have any potential for use in commercial poultry. That experiment is being repeated with the H5N1 virus at the Southeast Poultry Research Laboratory to confirm the earlier finding.

Embryonating eggs for human vaccine production

If the decision is made to provide H5 vaccine for the world's human population, it will utilize a very large number of fertile eggs at the 9th or 10th day of incubation. The use of embryonating eggs to produce the vaccine is the most likely method in that the newer methods such as the baculovirus-insect cell culture probably can't meet the huge demand for vaccine.

The only source of fertile eggs beyond the supplies currently utilized for vaccine production will be eggs from broiler and layer parent flocks. I don't believe that specific pathogen free (SPF) eggs are required to produce vaccine for humans as they currently are for poultry vaccines.

The dramatic increase in demand for fertile eggs for vaccine production adds to the significance of protecting breeder flocks with vaccines.

Consumer concerns about poultry products

Reports indicate that poultry consumption has declined significantly in Hong Kong. Consumers more page 5 of 6 are apparently afraid of becoming ill with influenza from consuming chickens. Since the live bird market is a major means of poultry distribution in Hong Kong, it may be that some consumers also want to avoid contact with live poultry.

There is no indication that the highly pathogenic Hong Kong H5N1 exists in the United States. Because of the severe disease and virtual 100% mortality it causes, it is very doubtful that it could exist in poultry flocks without be-

ing readily detected by ordinary observation.

The Hong Kong authorities reportedly stated that the 1.2 million poultry in Hong Kong were destroyed because they believed they were the source of the human influenza cases.

Because of the severe signs of disease and dramatic mortality in infected poultry, it is difficult to imagine that a flock infected with H5N1 would be caught and transported for processing in the U. S. The ante and post mortem inspection of birds at the plant makes the entry of an infected flock into the food chain very unlikely. As a final safeguard, ordinary cooking readily kills influenza virus. In the first analysis, it appears highly unlikely that the consumption of chicken will have anything to do with the infection of humans in the U. S.

Destruction of chickens in Hong Kong

There was public outcry over the killing of poultry in Hong Kong. Without depopulating a live bird market, it is impossible to clean and disinfect it. Authorities wanted to remove the live bird market as a probable source of H5N1 influenza for humans. The first step in any such program is to destroy and dispose of the birds that may be infected with or exposed to the virus. Had such steps not been taken, it is likely that the birds would have eventually died of the disease.

Hopefully, they will be able to remove all virus from the live bird markets and assure that only H5N1-negative flocks contribute birds when the market reopens. Reports indicate that the Chinese are screening their flocks so that they may assure their negative H5N1 status.

Avian Influenza in Pennsylvania

The 1997 virus that initiated the General Quarantine of poultry in Lancaster County Pennsylvania was the H7N2 serotype. While the quarantine was lifted in November of 1997 recent isolates of low pathogenic H7N2 in chickens and waterfowl (December 1997) will warrant further monitoring.

Summary comments

The initial response to these recent events is to suspect there is overreaction. However, the horrendous consequences of an H5 pandemic in people with a virus that has behaved like the H5N1 in Hong Kong justifies overreaction rather than underreaction. Many of the concerns and suggestions contained in this document have been communicated to Dr. Aronoldi, administrator of veterinary services, APHIS, USDA. She has scheduled a meeting for the week of January 5, 1998, to begin discussions.

Hopefully, the H5N1 issue will pass and no significant problems will develop. If the worst-case-scenario becomes a reality, thoughtful preparation and decisive action will be our only hope.

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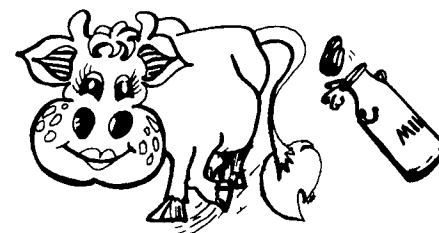
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