Questions remain as Hong Kong's avian flu crisis continues

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The outbreak of avian flu in Hong Kong continues to ring alarm bells and dominate headlines worldwide. The H5N1 influenza A virus has been confirmed in 16 people and is suspected in another four cases. Four people have died, and three remain in a critical condition.

Because these are the world's first reported human cases of a flu strain previously known to infect only birds, fears have been raised that the virus might spark a flu pandemic. There are too many unanswered questions, however, for anyone to be sure. For example, researchers have yet to determine the original source of the virus, the mode of transmission from birds to humans, whether human to human transmission is possible, what the incidence is in Hong Kong, whether fowl or animals apart from chickens are affected, whether anyone in mainland China has been infected with the disease, and the rate at which the virus is mutating.

The outbreak began in early May, when a 3 year old boy died from respiratory failure secondary to viral pneumonia. When scientists at Hong Kong's Department of Health could not identify the strain they sent specimens to centres in Britain, the United States, and the Netherlands. By August all had identified the strain as H5N1, a typically avian virus. The second case was not confirmed until November. According to Professor Kennedy Shortridge, a microbiologist at the University of Hong Kong, the H5N1 strain was first isolated by the Department of Agriculture and Fisheries in Hong Kong after an outbreak in 6800 chickens on three farms between late March and early May last year. "The overall mortality rate exceeded 70%, and on two farms the

mortality rate came close to 100%," he said.

In an attempt to halt the spread of the disease, the Hong Kong government has banned imports of live poultry from China, destroyed over a million chickens, and stepped up surveillance activities. The Department of Health has said that if no new cases are reported in the first two weeks of January then these measures will be considered effective because chickens are regarded as the most important source of the infection and the incubation time is estimated to be about seven days.

A team from the Centers for Disease Control and Prevention (CDCP) in Atlanta is in Hong Kong working with the Hong Kong authorities on cohort and case-control studies involving over 4000 people. According to Barbara Reynolds, spokeswoman for the CDCP, analysis of such a quantity of data would usually take months to complete. However, she said preliminary results expected by the end of January should go some way to answering the questions everyone is asking: is human to human transmission of the virus possible, and what behaviours put people at risk of becoming infected?

Researchers at the University of Hong Kong are working with the World Health Organisation to identify the reservoir of the H5N1 virus in poultry and animals by testing domestic and wild birds, as well as dogs, cats, rats, and any other animals that have close contact with humans, for the presence of the H5N1 virus.

Professor Shortridge said that rigorous follow up is essential, and few animals can be ruled out at this stage: "The virus has cropped up under different circumstances, and so little is known about it. If the virus

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is shed through faeces, as has been suggested, then in theory there could be a lot of virus in the environment. Humans can be infected—perhaps other animals can be infected as well. At the moment we don't know."

Until now it had been thought that new strains of human flu (variations of H1, H2, or H3) emerge after the virus's genes have been reassorted in pig cells with genes from strains of human or avian flu, or both. Pigs are considered a mixing vessel because they have avian, human, and swine flu receptors. But the H5N1 virus, a purely avian strain, has leapt directly from bird to humans.

According to Ms Reynolds, this is significant because it is a new disease in humans, who have no resistance to the virus. "If it becomes efficient in transmitting from human to human then the entire world is vulnerable, and there is the potential for a pandemic." However, she added: "There is no way to predict whether or not this will happen. The virus could go away, it could mutate and become more potent, or it could mutate and become more benign."

Much of the information

about the disease to date has come from a survey released in late December of 502 contacts of the first person known to have contracted H5N1, according to Dr Paul Saw, deputy director of health. Antibodies to the H5N1 virus were found in nine of the contacts, none of whom had serious symptoms. One of the positive samples was from a doctor who treated the boy at Queen Mary Hospital, raising the possibility that the virus could be transmitted from one human to another through direct contact as well as from bird to human, said Dr Saw. "But none of the boy's family tested positive for antibodies to H5N1, so if there is human to human transmission it is very inefficient," he said.

"A typical flu outbreak lasts for six weeks, peaks at three weeks, and affects hundreds or thousands of people," said Dr Lo Wing Lok, a spokesperson for the Hong Kong Medical Association. "Since there has only been 16 confirmed cases [of avian flu] in seven months, clearly the mode of transmission is different, most likely the result of chance contact between man and bird or bird faeces or direct human to human transmission." □