

Is Hong Kong ground zero for the next avian influenza pandemic?

The October 2005 issue of the influential *National Geographic* magazine¹ featured a comprehensive article that included a two-page graphical portrayal of the past 100 years of avian influenza pandemics and outbreaks. Most of this article is available online, but the two-page spread is only available in the hardcopy publication. While the article praised Hong Kong's excellent efforts to control avian influenza, it linked the 1968 Hong Kong flu pandemic with subsequent localised and contained 1997 and 2003 H5N1 outbreaks in humans. It was therefore small wonder that in the magazine's prediction of a forthcoming avian influenza pandemic, Hong Kong was designated as the ground zero (spawning ground) city.

If the *National Geographic* prediction comes true, the HKSAR Government's (HKG's) current stock of 3.5 million doses of oseltamivir (Tamiflu; Roche Laboratories Inc, New Jersey, US) is a far-from-adequate 'fire blanket' to contain the initial spread of the outbreak. There will not be time to keep the virus at bay whilst waiting a minimum of 3 to 6 months for a vaccine to be produced. This is frightening, irrespective of concerns as to whether oseltamivir would actually be effective in the event of a novel virus attack.

The author does not believe that Hong Kong is going to be the ground zero for the next avian influenza pandemic. If our political leaders can muster the courage to take just one more proactive step and immediately ban the importation of live poultry into the region, Hong Kong will definitely not become ground zero.

The reasons are plain. The historical basis for the conclusion that Hong Kong will be the next avian influenza pandemic ground zero is no longer applicable. The HKG has made tremendous strides in poultry management, founded on sound scientific principles. The result is a local environment free of highly pathogenic avian influenza (HPAI) since the 2003 outbreak,² even while the years 2004 to 2005 have seen several outbreaks of HPAI elsewhere in Asia. How did the HKG achieve the present enviable status, and what steps have been taken? The following list is not exhaustive, nor in order of importance.

In 1997, in a world-class achievement of medical science, Hong Kong detected a species crossing of the H5N1 virus from birds to man. At the same time, Hong Kong demonstrated to the world that the complete culling of the local poultry population arrested the spread of the local outbreak among humans. Since then, established poultry-market control measures have come to include:

- The strict separation of the chicken market from that for ducks, in view of the latter being the natural reservoir

for H5N1;

- The requirement that no chicken leave any market alive so as to limit the spread of H5N1 back to the farms through the return of unsold live poultry;
- The rule of regular rest days in poultry markets, which are to be emptied of birds and cleansed in an attempt to break the life cycle of avian flu virus; and
- A ban on the unprotected handling of poultry.

Control measures for local chicken farms include³:

- The universal immunisation of chickens, whether farmed commercially or in the backyard;
- The insertion of un-immunised sentinel chickens among immunised populations in local farms to monitor presence of avian flu among immunised poultry;
- The daily monitoring of local farms, including specimen collections of poultry secretions, droppings, and serology;
- The requirement that chickens be tested and serologically confirmed to be safe before being allowed into markets;
- The institution of biosafety measures on farms;
- The strict shielding of poultry from wild birds in places of rearing as well as in transit to market;
- The mandatory wearing of protective gear when handling poultry; and
- The strict shielding of (three very small, remaining) licensed duck farms from wild birds.

Furthermore, migratory birds at Mai Po Marshes, wild life parks, and pet shops are being routinely monitored.³ Over 1000 specimens of bird droppings have been tested from Mai Po, and all have been found negative for HPAI. Appropriate warnings are issued at the entrances to all parks, and the feeding of birds by the public is prohibited by law (although it is currently prosecuted as littering). From local pet shops, 200 specimens of excreta are routinely taken every month; all have so far tested negative. The importation of live pet birds is also under scrutiny—all 253 specimens so far collected have been found negative. General monitoring of reported dead birds has also found no positive HPAI specimens.

The importation of live poultry has also been carefully scrutinised.³ All live poultry must be sourced from certified farms that have carried out HPAI surveillance by testing secretions, droppings, and serology. The same rules apply to chilled chicken product prior to slaughtering.

Irrespective of how comprehensive the above measures may be, there is no certain way to eliminate the threat of HPAI from our city other than separating live poultry from human contact. This means the immediate abolition of

live poultry markets and the commencement of central slaughtering as soon as possible. Regular market rest days form an effective transmission break within the market poultry population, but whether the markets' cleansings during these rest days can be relied upon is doubtful since the virus can survive and remain infectious in the environment for several weeks.⁴

It is the nature of influenza A, an RNA virus, to continue to mutate on its own, thereby producing progeny without error checking of the copies made. Influenza A will also continue to reassort with other avian and non-avian influenza viruses to produce novel viruses with new characteristics.⁵ The World Health Organization (WHO) has said repeatedly that an avian influenza pandemic is not a matter of whether but when.

With our record of keeping HPAI out of Hong Kong, it is now Hong Kong's responsibility to show the world that such science-based knowledge and practice has so far blocked HPAI from our homegrown and imported poultry. Our success should be considered in the context that Hong Kong is not an island, but linked by land to China, the source of most of its live poultry. Therefore, due credit must be given both to Hong Kong's veterinarians and the HKG which has acted on their advice. If other nations adopt our practices, which may be practical in their individual situations, this may allow more time for the world to better prepare for, and thereby mitigate the inevitable impact of the forthcoming pandemic.

If Hong Kong is not going to be ground zero for the next avian flu pandemic, who is the likely candidate? Current available figures do not speak for themselves. Mike Ryan of WHO is reported to have said, "In the great lottery of pandemic emergencies, more tickets have been bought in Asia".⁶ So which country has bought the most tickets?

Since December 2003, eight Asian countries (Cambodia,

China, Indonesia, Japan, Laos, South Korea, Thailand, and Vietnam) have reported HPAI outbreaks in poultry.² China has the biggest poultry population of around 13 billion and has admitted to significant HPAI problems in poultry, but it has reported very few HPAI human fatalities.² This may be reminiscent of the Sung Dynasty official who told the imperial court that there was indeed a locust pestilence in the country but that it did not devastate the food supply. An alternative explanation may be related to Chinese farming practices. With three quarters of its chicken farms holding less than 100 birds each, most of China's farms are therefore free of the severe overcrowding that characterises chicken farm factories, which provide less space per bird than a single sheet of A4 paper. China's overall more favourable chicken-farming environment should perhaps be taken into account.

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