

Influenza A Virus Surveillance in Live-Bird Markets: First Report of Influenza A Virus Subtype H4N6, H4N9, and H10N3 in Thailand

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Important Findings

A one-year influenza A virus (IAV) survey was conducted in 10 live bird markets (LBMs) in H5N1 high-risk areas in Thailand from January to December 2009 (Figure 1). The study findings further support that LBMs are a potential source of IAV transmission and genetic reassortment.

Significance of Findings

Based on the results of this study, surveys of IAV in LBMs can help identify potential sources of influenza transmissions and genetic reassortment. Preventive measures to reduce the risks of IAV introduction should be considered, such as certifying poultry farms, eliminating the practice of mingling ducks and chickens, and avoiding the mixing of poultry from different farms. Several subtypes of IAV isolated in the LBMs can reflect diversity of viruses circulating in Thailand. Genetic diversity observed in LBMs serves as good evidence of settings suitable for dissemination and genetic reassortment of IAV. Continuous surveys of IAV in LBMs should be carried out in order to monitor influenza virus transmission and evolution in Thailand.

Additional Information

IAV is categorized into 16 HA and 9 NA subtypes. Some influenza A subtypes are very important and can cause severe, fatal diseases, such as avian influenza subtype H5N1 in humans, cats, dogs, tigers, and several avian species. The Office International des Epizooties (OIE) has included avian influenza (AI) among the OIE-listed infectious agents that are characterized by causing severe disease, are fast spreading, and present serious threats to economies and public health worldwide.

LBMs are known as a potential source of avian influenza and have been the origin of IAV outbreaks around the world. A LBM is usually a place for live poultry to be sold and slaughtered for fresh meat. Various species of birds of different ages from different sources are usually housed together in small wire stack cages. These conditions are suitable for IAV transmission both intra- and interspecies. Direct contact and/or indirect contact (aerosol or fecal contact) can occur in LBMs and can cause influenza infection not only in animals but also in humans.

Surveys of IAV in many countries have documented that multiple influenza subtypes are found in LBMs: both highly pathogenic avian influenza (HPAI) and low pathogenic avian influenza (LPAI). Multiple subtypes circulating in such environments increase the chance of genetic reassortment of the viruses and thus might lead to the emergence of a new pandemic virus. For example, “Asian influenza H2N2” in 1957 and “Hong Kong influenza H3N2” in 1968 resulted from genetic reassortment between avian and human

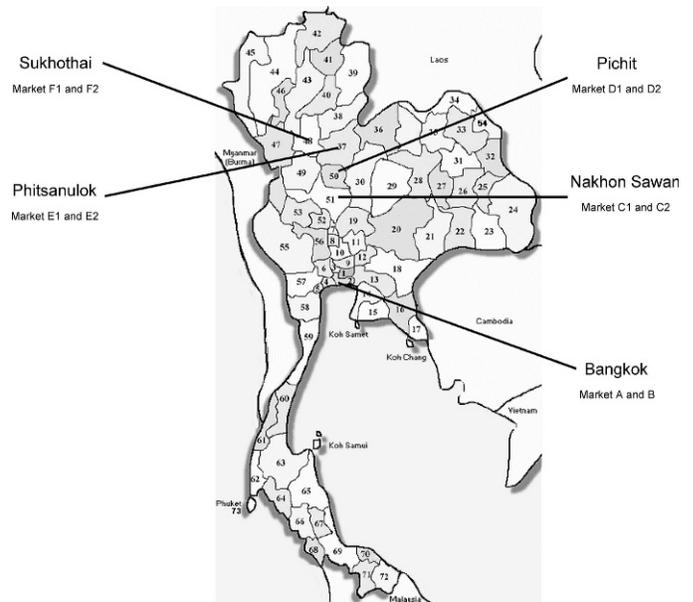


Fig. 1. Map of Thailand; provinces of the locations of LBMs are depicted.
Fig. 1. Mapa de Tailandia; se representan las provincias de los sitios con mercados de aves vivas.

strains and became pandemic viruses that spread throughout the world.

In Thailand, three types of LBMs can be discerned: conventional LBMs, LBMs in local food markets, and LBMs in pet bird markets.

- Conventional LBMs are usually found in rural areas as well as urban settings. However, since HPAI H5N1 outbreaks occurred in 2004, some LBMs have been reduced to small-scale LBMs and are mostly located outside the city centers. Many conventional small-scale LBMs in rural areas are mobile LBMs. Transportation of the birds by these mobile LBMs poses a threat of IAV dissemination.
- The second type comprises LBMs in local food markets. This type of LBM includes several LBM vendors in a food market. Some vendors may have a slaughter area in their own space to process the meat for customers.
- The third type is LBMs in pet bird markets. This type of LBM usually houses many poultry species in the market, fair, or festival along with other pets. Birds sold in this type of LBM are pet birds such as songbirds, wild birds, chicken, and ducks. Fighting cocks are sometimes included in this type of LBM.

In Thailand, HPAI H5N1 presented a major threat to public health and the poultry industry. A survey of HPAI H5N1 in LBMs and