Massive die-offs of poultry were first recognized in Thailand in late 2003, and the Department of Livestock Development announced the H5N1 outbreak in poultry on 23 January 2004. Two independent institutes, the National Institute of Health (Ministry of Public Health) and the Faculty of Medicine Siriraj Hospital, also reported the occurrence of two human cases on the same day.

Currently, Thailand has already encountered three rounds of H5N1 outbreaks. The first round ended on 24 May 2004, the second round lasted between 3 July 2004 to 12 April 2005, and the third round began in July 2005. The last case of the third round was reported on 2 November 2005. By February 2006, three months had elapsed since the last case of highly pathogenic H5N1 avian influenza in poultry. It is recognized that the epidemics were more frequent in central and lower north regions of the country, where land is wet and the weather is moist. Due to lack of previous experience, the first round of the epidemic affected wide geographical areas before the disease was kept under control. Vaccination in poultry is prohibited in Thailand, partly because of an uncertainty in the efficiency of the vaccine, and partly because of the rejection of vaccinated poultry products from the trade partner countries. Instead, the epidemics were controlled through pre-emptive depopulation with disinfection and biosecurity measures, including modern methods of farm management and movement restriction of poultry flocks and poultry products.

The occurrence of avian influenza (AI) produced devastating socio-economic impacts on Thailand’s poultry industry, which has expanded remarkably within the last two decades. Advanced technology in livestock production, such as the introduction of breeders and the evaporative cooling system for industrial production, has changed the industry from producing backyard chicken for domestic consumption to becoming one of the world’s top chicken exporters.

The first batch of chickens exported from Thailand was in 1973, when 142 tons of frozen chickens were sold to Japan. The first exportation of cooked chicken meat was in 1991. Up to 90% of chicken products in Thailand were exported. In 2002, more than 400000 metric tons of chicken meat (raw and cooked) were exported, thus making Thailand the fourth largest world chicken meat exporter, next to the United States, Brazil, and the European Union (EU). China and Thailand were the largest exporters in
Asia. The leading three markets for frozen chicken exported from Thailand in 2002 were Japan, which accounted for 68.92% of the total exported amount, followed by Germany and the Republic of Korea with 6.79% and 5.09%, respectively. In 2004, after the official report of the avian influenza outbreak, frozen chicken exportation from Thailand to these markets was banned. This resulted in a 93% decrease in the exported amount as compared to that in 2003. Thailand lost its market share of poultry exportation to Brazil. Struggling to survive, the decreased exportation of raw chicken was compensated by the increased exportation of cooked chicken meat. Nevertheless, the total exported amount in 2004 was approximately half of that in 2003. The situation improved in 2005, probably from an increased importation of cooked meat by the UK and an expansion to new markets in African and Middle-East countries. The change from the production of raw chicken meat to cooked products had an important impact on the Thai poultry industry, as only the big companies could afford the high cost of the production process.

Improvements in farm management have raised the quality and standard of Thai chicken and duck meat for exportation. On the other hand, the higher cost of modern farm management and biosecurity measures is not affordable for small producers; therefore, farms for domestic consumption may be of lower biosecurity. Small farm holders in repeated outbreak areas have found it particularly difficult to recover from the epidemics. Upon pre-emptive depopulation for the control measure, farmers received 75% compensation of the market price. The depopulation zone was eventually reduced from a 5-kilometer radius to a 1-kilometer radius; and lately, it has been confined to the infected farms or flocks and the nearby area. The justification for this move is based on the success of the disease control measures with prompt intervention such that the majority of AI cases at present occur in small holders for local consumption or backyard chickens. The third epidemic was of the smallest magnitude compared to the previous ones. Among 7409 sub districts in 76 provinces of Thailand, the first epidemic spread over 146 sub districts in 42 provinces; the second epidemic affected 784 sub districts in 51 provinces; and the last one affected only 56 sub districts in 11 provinces (10 provinces in the central and 1 is in the northeast of the country). For the third outbreak, 73% of the infected poultry were backyard chickens, followed by ducks (8.7%), quails (6.9%), fighting cocks (5.2%), native broilers (5.2%), and layers (1.8%). A total of 6.6 million birds were culled in the first epidemic, while 3091365 were culled in the second one. Data on the number of animals culled in the third epidemic is not available at the moment, but is expected to be less than those in the previous ones.

The AI outbreak has changed the husbandry lifestyle of Thai villagers that has persisted for several decades or centuries i.e. raising backyard chickens, free range ducks, and lastly, fighting cocks. For self-sustaining economics, almost every house in rural areas keeps backyard chickens as a source of protein at low cost. The chickens
roam around for food, insects and worms, and are sometimes fed with the leftovers of cooked rice from the family. The villagers pay less for eggs and chicken meat. After each avian influenza outbreak, the chickens either died from the disease or were culled under the control measure. Villagers are advised to house their chickens in a simple closed system. To prevent the disease, villagers have to pay more for their backyard flocks.

Free-range duck raising is common in some Asian countries including China, Vietnam, and Thailand. Flocks of free-range ducks are fed by rice grains falling in the rice fields after the harvesting season. Thailand is also one of the world’s leading exporters for rice. In fertile areas with good water supply, farmers can grow rice two or three times a year. Owners of duck flocks and rice farmers gain a mutual benefit such that the flock owners can save the cost of duck food and, on the farmer’s side, falling rice grains do not make much money. Ducks eat not only rice grains, but also insects, insect larva, and snails, which are enemies of the rice fields; in addition, duck manure is a good fertilizer for rice fields. In olden times, flocks of ducks moved from one rice field to the other rice fields by walking, but now the flocks are moved from place to place by trucks. Some flocks may travel for months at a distance of a few hundred kilometers from their original place; and by the time they travel back, some flocks may have grown enough to be sold to the markets. Based on the knowledge that some H5N1-infected ducks are asymptomatic and may shed a lot of viruses from their respiratory secretions and stools, it is necessary to restrict the movement of duck flocks. According to the control measures implemented under the National Strategic Plan for Avian Influenza Control, which was approved by the cabinet on 25 January 2005, the raising of free-range duck is allowed in only 25 provinces. The owners of the flocks must register to obtain identification books for the flocks. Movement of the flocks is allowed within two or three provinces, as long as they have a movement permit and a record of being free of AI by laboratory investigation. From January 2006 onwards, every duck flock has to be kept in house. Raising free-range ducks is likely going to become extinct in Thailand, even though it has been accepted as a clever way of low-cost production for several decades. At present, the price of chicken and duck eggs in the local Thai markets has increased by 50%-70% and by about 30%-50% for fresh meat.

Cock fighting is popular among a selected group of people in several Asian countries, including Thailand and Vietnam. It has been a local Thai game for centuries. Fighting cocks are a special breed, and they have also been affected by the AI outbreak. Special regulations were set for fighting cocks. Each fighting cock must be registered and must obtain a document of identification known as a “fighting cock passport.” Virus isolation from cloacal swab must be performed monthly, and the laboratory result must be recorded in its passport.

Human cases occurred during all three AI epidemics causing great public health concern. Twelve human cases with 8 deaths occurred during the first epidemic, 5 cases with 4 deaths during the second one, and 5 cases with 2 deaths during the third one. In total, there have been 22 cases with 14 deaths, i.e. a fatality rate of 64%. About half of the cases were children under 14 years old, and the male to female ratio was 1.3: 1. Most of the patients lived in the central region of the country and a few in the lower north region which were the densest areas for poultry populations. Of the
22 patients, 11 had a history of contact with ill or dead chickens, 10 had no direct contact but lived in the infected areas, and one may have contracted the disease from providing closed bedside care for her daughter, which is suggestive of probable human-to-human transmission.

As one of the three hot spots for influenza pandemics (the other two being China and Vietnam), several projects on various aspects of AI are actively conducted in different institutes of Thailand under the government budget through some funding agencies. Among these projects, the important ones are case surveillances in domestic poultry and wildlife birds, surveillance for genetic evolution of viruses in migratory birds, surveillance for human cases in patients with severe pneumonia and asymptomatic infection in populations at risk, and genetic and phenotypic characterizations of the viruses isolated from humans at various outbreaks. In collaboration with the Department of Disease Controls, Ministry of Public Health, the scientists from Mahidol University rapidly reported the full genome sequence of a H5N1 virus isolated from a dead human case during the third epidemic to the national authorities and the international sectors through GenBank. Our current research activity demonstrates that a hybrid virus (reassortant) has not occurred, as observed in more than 100 H5N1 viruses isolated from different species of domestic and wildlife birds and also from humans. An Oseltamivir-resistant virus has not been found, as characterized by genetic analysis and in vitro testing.

The AI epidemic is considered to be a national agenda which the Royal Thai Government has given very high priority for prevention and control in both humans and poultry. The National Avian Influenza Response Committee is chaired by the Deputy Prime Minister and is composed of representatives from 11 ministers of concern. AI operating centers at the provincial level have been established and are chaired by the provincial governor.

At the moment, AI spreads out of Asia to Europe and Africa. Therefore, international collaboration for sharing information and experiences is necessary to face the situation and for pandemic preparedness.

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