

# CHAPTER 1

## INTRODUCTION

### 1.1 Principle, Rationale and Hypothesis

Avian influenza is a viral disease of domestic gallinaceous birds (poultry), and the highly pathogenic avian influenza H5N1 is included as an Office International des Epizooties (OIE) List A disease(5). The disease have devastating effects on poultry industry, particularly when it affects intensive poultry rearing systems and its presence in a given territory results in restrictions on animal movement, marketing and trade of poultry and poultry products.

Early in 2004, the highly pathogenic avian influenza virus (H5N1) has emerged in many countries in Asia including Vietnam, Cambodia, China, Indonesia, Japan, Laos, Republic of Korea, and Thailand. With the identification of highly pathogenic H5N1 outbreak in Thailand in January 2004(18), the government initiated a program for the control, eradication and establishment of a national campaign against avian influenza followed OIE guidelines resulted in a massive slaughter of over 26 millions poultry(18). The disease has had disastrous affects on the poultry industry through its impact on domestic consumption of poultry products and international trade resulted in a major economic loss of over 60 billions baht. In Thailand, as now, there have been reported of reemerge of avian influenza in some provinces indicated that the government still face a serious problem(7).

Moreover, there have been a number of reports demonstrated that avian influenza virus has been transmitted from poultry to human(1). In 1997, highly pathogenic H5N1 influenza virus had circulated among poultry on farms and in retail

markets in Hong Kong. The H5N1 viruses were transmitted to human, causing 18 documented cases of respiratory disease, including six deaths(8). As of March 5, 2008, there have been 371 human cases of avian influenza A (H5N1), resulting in 235 deaths(3). Therefore avian influenza viruses should be considered as a risk to public health. Moreover, human and swine are being considered as a potential mixing vessel for the evolution of avian-human reassortant virus. A reassortant virus with novel avian surface glycoprotein(s) and a constellation of human internal genes that can transmit among human efficiently would promote the spread of the virus among susceptible human lacking immunity to the novel HA leading to human pandemic.

The effectiveness of highly pathogenic avian influenza (HPAI) control strategy is based on the prompt identification of infected and at-risk farm/area. The immediate applications are restriction and eradication (i.e. stamping out) measure on affected farms, and the enforcement of restriction policy to movement and restocking of live birds and its products, and vehicles in the area at risk. The overall goal is to detect, control and eradicates the agent as quickly as possible to return the country to free status. The key to success in disease control strategies are the comprehensive, integrated surveillance and diagnostic program that it depend on epidemiological information. As now, the epidemiological data of avian influenza in Thailand, for example, the disease situation, the origin of H5N1 outbreak, the mechanism(s) for its rapid dissemination are not yet understood. Therefore it is very necessary to study of avian influenza epidemiology.

**Objectives of this study were:**

1. To describe the epidemiology and determine the risk factors responsible for infection and spreading of avian influenza in northern Thailand.
2. To create Geographic Information System (GIS) database for management of avian influenza in northern Thailand.

**The advantage of study**

1. Design an optimum disease prevention and control strategies.
2. The Geographic information system (GIS) for use to manage avian influenza outbreak.
3. Information which can be used to design the surveillance system for the control of avian influenza outbreak in northern Thailand