



# SRRT:

Clipping the Wings  
of Emerging Diseases  
in Thailand

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**Authors:**

1. Achara Suksamran, PhD, RN
2. Anchaleeporn Amatayakul, PhD, RN
3. Boontuan Wattanakul, PhD, RN
4. Jintana Artsanthia, DrPH, NP
5. Kamolrat Turner, PhD, RN
6. Kenrad Nelson, MD
7. Laiad Jamjan, EdD, RN
8. Orarat Wangpradit, PhD, MS, BSc (Pharm)
9. Panarut Wisawatapnimit, PhD, RN
10. Peranan Jerayingmongkol, PhD, RN
11. Pornruedee Nitirat, PhD, RN
12. Sirikul Karuncharernpanit, PhD, RN
13. Soawapak Hinjoy, DrPH, MPH, DVM
14. Sapon Iamsirithaworn, PhD, MPH, MD
15. Sukjai Charoensuk, PhD, RN
16. Sunanta Thongpat, PhD, RN
17. Suparpit von Bormann, PhD, RN
18. Supaporn Wannasuntad, PhD, RN
19. Thongsouy Sitanon, PhD, RN
20. Viliporn Runkawatt, PhD, RN
21. Yupaporn Tirapaiwong, PhD, RN

**Reviewers:** Pongpisut Jongudomsuk, MD  
Paul Turner, PhD  
Sorachai Jamniandamrongkarn, BSc (Pharm)

**Editor:** Kamolrat Turner, PhD, RN

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# THAILAND'S CAPACITY TO MANAGE INFECTIOUS DISEASES

Soawapak Hinjoy<sup>1</sup>,  
Kenrad E. Nelson<sup>2</sup> and Sapon Iamsirithaworn<sup>1</sup>

## Introduction

Thailand covers an area of about 514,000 square kilometers. It is the third largest country among the Southeast Asian nations, after Indonesia and Myanmar. The borders around Thailand are about 8,031 kilometers long, of which 5,326 kilometers are inland and the other 2,705 kilometers are coastlines. Most of the plain areas are in the Central Region of the country. Highland areas are mostly in the Northeast. It is primarily mountainous in the North and the Southeast. The population of Thailand was 65.4 million in 2010. Most of the Thai people are Buddhists (93.6%), followed by Muslims (5.4%), Christians (0.9%) and others. The population growth has continuously dropped from 3.2% prior to 1970 to 0.41% in 2009. Such a large decrease in the population growth has significantly affected the number and age structure of population.

<sup>1</sup> Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health, Nonthaburi 11000, Thailand

<sup>2</sup> Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore 21205, USA

The United Nation Development Program (UNDP) has developed a Human Development Index (HDI), a quality of life measurement, based on social factors (education, life expectancy at birth and economic factors - Gross Domestic Product (GDP) per capita). After the economic crisis, the quality of life of Thai people worsened between 1998 and 2010; Thailand's HDI dropped from high to moderate level and the ranking fell from 59th in 1995 to 92nd among 174 countries in 2010 and 4th among the 10 ASEAN member states, after Singapore, Brunei and Malaysia.

During 1964-2010, Thai life expectancy at birth increased from 55.9 years to 70.6 years for males and 62.0 years to 77.5 years for females. The maternal mortality ratio (MMR) in Thailand has declined from 374.3 per 100,000 live births in 1962 to 10.7 per 100,000 live births in 2009. The infant mortality rate (IMR, per 1,000 live births) declined from 84.3 in 1964 to 40.7 in 1984 and to 11.3 in 2005-2006. The child mortality rate (among children aged under 5 years per 1,000 live births) has decreased slightly from 12.8 in 1990 to 9.5 in 2009. Health statistics from Thailand Ministry of Public Health indicated that the number one cause of death in Thai population between 2007 and 2011 was all types of cancers. The top three most common cancer sites were liver, lung and colon in Thai males and breast, cervix and liver in Thai females.

Vaccine-preventable Diseases have declined since the Ministry of Public Health launched the Expanded Program on Immunization (EPI): in target population groups, the immunization coverage has improved remarkably and the morbidity rates of vaccine-preventable diseases have declined. In addition, hepatitis B infection has had an increasing incidence in recent years, probably resulting from a more extensive surveillance effort (1).

The Constitution of 1997, states that "The state shall thoroughly provide and promote standard and efficient public health services".

Every government has given high priority to the development of public health and quality of life, emphasizing health service provision for all population groups (2). The Thai health care system has undergone several reforms. The Ministry of Public Health (MoPH) is the principal agency responsible for promoting, supporting, controlling, and coordinating all health service activities. In addition, there are several other agencies playing significant roles in medical and health development programs such as the Ministry of Education, the Ministry of Interior, the Ministry of Defense, the Bangkok Metropolitan Administration, state enterprises, and private-sector enterprises. They operate health facilities including hospitals that provide primary, secondary and tertiary medical services (3).

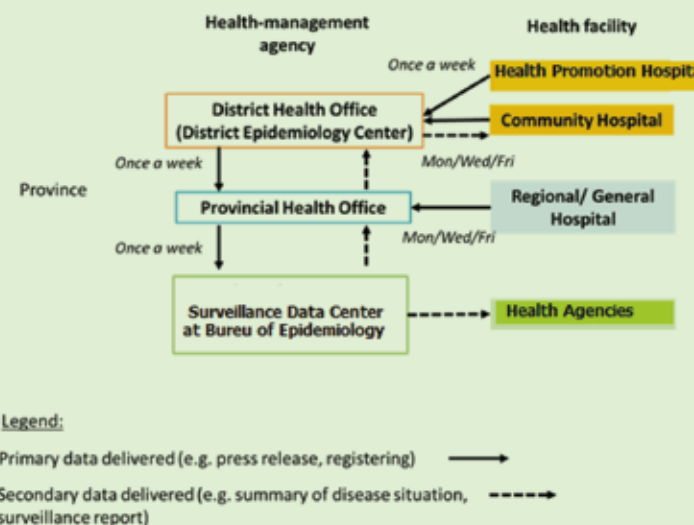
### Structure and performance of infectious disease surveillance and response, Thailand

Since 1970, Thai MoPH disease surveillance system has continuously evolved, beginning with the notification of diseases of public health importance in the early stage, i.e. malaria and yaws, implemented as vertical programs with their own personnel for case detection, collecting data on patients from the provinces for use in monitoring the trends in morbidity, mortality and spread of disease, and implementing control measures. Later, there were other disease prevention and control efforts for the entire country such as the cholera epidemic control, the smallpox eradication project, and the childhood immunization program against poliomyelitis, diphtheria, pertussis and tetanus. Thus, there was a need to set up a national unit for disease surveillance and investigation, using the integrated disease notification principle. According to the reorganization of the MoPH in 1972, Division of Epidemiology was established under the Office of the Permanent Secretary for Public Health. The Division had its own epidemiology officials assigned to collect data on illnesses, deaths and other

epidemiological information on diseases of public health importance and then prepare a patient and disease notification card for use at the provincial level for reporting to the central administration.

After the public sector reform in 2003, the Division of Epidemiology was upgraded as the Bureau of Epidemiology (BOE) and transferred to the Department of Disease Control. BOE strengthens the public health system by coordinating public health surveillance; providing support in scientific communications, statistics, and epidemiology; and training in surveillance, epidemiology, and prevention effectiveness.

**Figure 1** Flowchart of Agencies in the National Surveillance System



Subsequently, since disease surveillance/epidemiology was integrated into the provincial health program, the Epidemiology Unit has become part of the Planning and Evaluation Section of the Provincial Public Health Office (PPHO); each province has one or two staff members. For regional, general and community hospitals, each assigns one of its workers to serve as disease reporting workers. Each year training courses have been organized to train new workers to take on this assignment (5). The hierarchy system for surveillance report starts from the health promotion hospitals (formerly health center) at the sub-district level. Then, the routine reports are sent to the district level (i.e. the district health office), provincial level (i.e. provincial health office), and central level (the BOE), respectively (Figure 1). When each level analyzes their own data to detect abnormal events, the epidemiologist together with a disease control workers of the Disease Control Section will conduct an epidemiological investigation in the field and take or recommend appropriate action for controlling the outbreak. If the disease cannot be controlled at the local or regional level, the national MoPH personnel will be invited to assist.

Thailand National Notifiable Diseases Surveillance System is a multifaceted public health disease surveillance system. It is a passive surveillance system that includes priority diseases under national surveillance. Currently, there are 59 notifiable infectious diseases under the National Disease Surveillance System. The list of nationally notifiable diseases is revised periodically. A disease might be added to the list as a new pathogen emerges, or a disease might be deleted based on up-to-date public health evidence of its importance.

Data reported to the National Notifiable Diseases Surveillance System are used to monitor disease trends, early detect disease outbreak, assess the effectiveness of control and prevention measures, identify populations or geographic areas at high risk,

allocate resources appropriately, formulate prevention strategies, develop public health policies and publish summarized data findings from 77 provinces reporting jurisdictions weekly in the Weekly Epidemiological Surveillance Report (WESR) and annually in the Annual Epidemiological Surveillance Report (AESR). After each reporting year, surveillance staff in provincial health offices finalize reports of notified cases for that year with local or county health departments and reconcile the data with reports previously sent to BOE throughout the year. They are approved by the appropriate epidemiologists from BOE before being published in the ASER.

In the past, when there was a major epidemic, a war room or ad hoc operations center was established to handle such an incident. Cholera epidemics have occurred quite frequently in the past. In order to control these Cholera outbreaks, a team of epidemiology workers, disease control workers and sanitation workers as a Special Response Team had quickly visited the site of the outbreak to identify cases, sources and risk factors for exposure and implemented control measures to improve sanitation to control the epidemic. Once the mission had been accomplished, the team would be dissolved.

When the SARS outbreak occurred, the Department of Disease Control proposed a control and prevention plan that was approved by the MoPH, each province set up at least two operations teams consisting of a physician, an epidemiologist, a lab technician and a disease control officer, who was tasked with identifying SARS contacts. The teams were on duty 24 hours a day; as soon as they were notified of a suspect, they were able visit the site immediately to begin an investigation in the field. When the more extensive outbreak was over, a health emergency response team was organized and a permanent team has been set up at each level to respond to future widespread outbreaks of a disease, if they occur. During the avian influenza outbreak, the MoPH renamed the team

as the Surveillance and Rapid Response Team or SRRT and set a target for each district to have at least one team and at least one provincial SRRT in every province, including Bangkok, which has a team located at every public health center. At the regional level, there is a Regional SRRT and at the national level, the Central SRRT (5).

Emerging zoonoses have increased in importance in human and animal health during the last 10 years. Each of these diseases has emerged unexpectedly and has caused significant health problems for the population. Because of these circumstances, intensive surveillance that closely monitors and rapidly analyzes emerging and re-emerging infections is urgently required. Priority has been given to the establishment and capacity building of joint SRRTs between medical scientists and veterinarians. Links between event-based surveillance and zoonoses and animal health events have improved by building closer links and improving communication between the two sectors. Therefore, the Department of Livestock Development (DLD) is an important partner in the surveillance and response system with the MoPH to contain zoonotic diseases in Thailand.

### Summary of Notifiable Diseases – Thailand, 2011

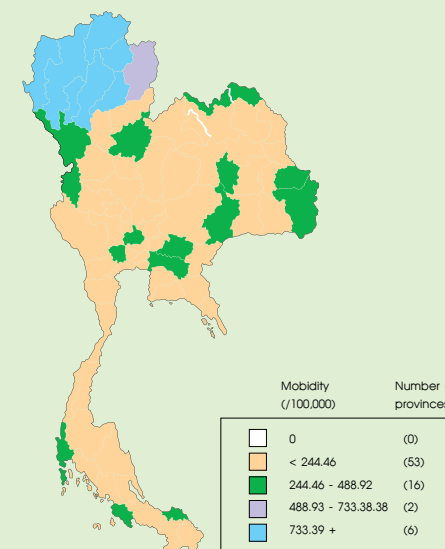
In 2011, Thailand experienced the most severe floods in the country history. About one third of the country areas had been flooded from 1 to 4 months starting from August to December 2011. The deadly floods had impacted millions of population and resulted in a thousand of deaths. The surveillance system maintained by the BOE was a useful source of information for monitoring diseases situation and detection of infectious disease epidemics during the major floods.

Below are summary highlights for selected notifiable diseases in 2011. Highlights are intended to assist in the interpretation of major occurrences that affect disease incidence or surveillance trends (e.g., outbreaks, or policy changes) (6).

#### Acute hemorrhagic conjunctivitis

Acute hemorrhagic conjunctivitis was commonly reported in all geographic regions of Thailand. Greater incidence of the disease was observed in the far northern provinces in 2011. Of 63 eye swabs tested, 40.6% were positive for Coxsackie virus A-24.

**Figure 1. Reported Cases of Acute Hemorrhagic Conjunctivitis per 100,000 Population by Province, Thailand 2011**



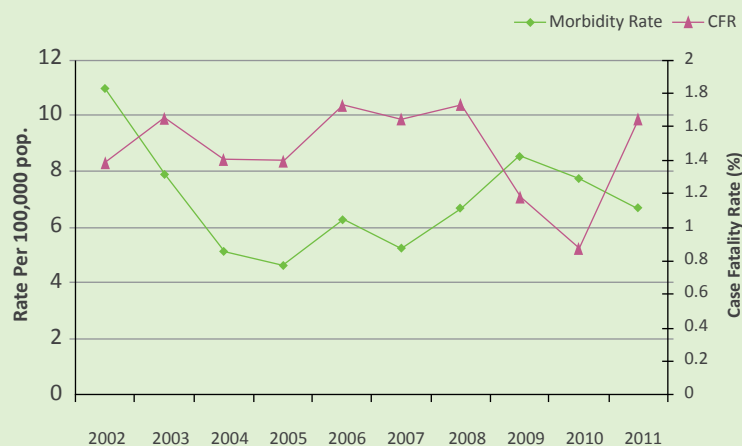
#### Melioidosis

During 2011, the number of cases of melioidosis reported increased 34% over those reported in 2010 (4.56 cases per 1000,000 population 2010 vs. 6.13 per 100,000 population in 2011). Remarkably increasing cases were reported from North-east region, which is an endemic area for melioidosis.

### Leptospirosis

In 2011, the number of reported cases of leptospirosis decreased by 15% from 2010 (4,994 cases in 2010 and 4,261 cases in 2011). The highest incidence was in the Northeastern region of Thailand and the majority of cases (80%) were males. In the Central region, the most important affected area of flooding in 2011, the number of reported leptospirosis cases did not increase in 2011. These, rather unexpected, results might be explained, in part, by warning the inhabitants against the possible health consequences of the flood.

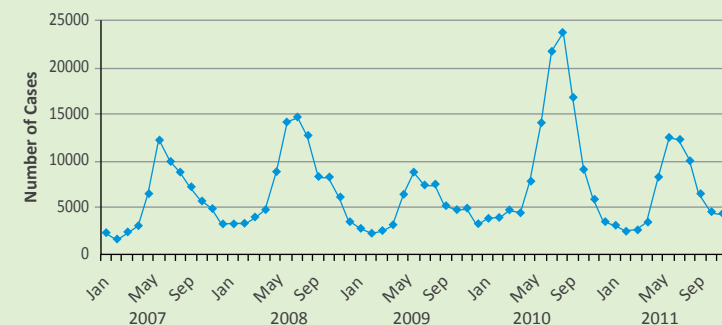
**Figure 2. Reported Cases of Leptospirosis per 100,000 Population and Case Fatality Rate by Year, Thailand 2002-2011**



### Dengue fever (DF), Dengue hemorrhagic fever (DHF) and Dengue shock syndrome (DSS)

Dengue is a major endemic disease in Thailand and usually peak in rainy season (June-August). In 2011, the number of reported cases of DF/DHF/DSS was decreased in all regions of Thailand as compared with 2010, whereas the volume of rainfall was relatively high in 2011.

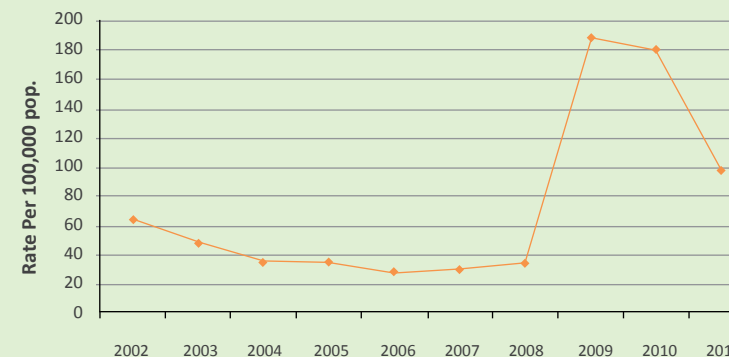
**Figure 3. Reported Cases of DF/DHF/DSS by Month, Thailand, 2007-2011**



### Influenza

The incidence of reported human influenza cases declined in 2011 from the highest incidence in 10 years in 2009 and 2010 (Figure 4). During the flooding period, the surveillance system for emergency system was instituted. The system could detect sporadic outbreaks of influenza and influenza-like-illness. From the laboratory-confirmed influenza cases reported, 70.3% were positive for influenza A H3N2, followed by influenza A H1N1 2009 (14.9%) and influenza B (14.9%).

**Figure 4. Reported Cases of Influenza per 100,000 Population by Year, Thailand, 2002-2011**



### **Eradication of polio and elimination of measles**

The global effort to eradicate polio has become the largest public health initiative in history and is spearheaded by the WHO. Highly sensitive surveillance for acute flaccid paralysis (AFP) has been conducted in Thailand for 20 years. In 2011, the annualized rate of non-polio AFP in children under 15 years of age in the Thailand was 1.97 per 100,000, just failing to reach the target rate of 2 per 100,000. No cases of wild polio virus infection were detected in Thailand after 1997.

Thailand started a national measles elimination program in 2011. The passive surveillance for measles was strengthened to monitor the burden of measles cases and deaths. However, the system was able to detect increasing numbers of measles in the country during the last quarter of 2011.

### **Hand foot mouth disease**

Epidemic hand foot mouth disease associated with Enterovirus 71 and coxsackie virus emerged in the North and Central regions, and six deaths were reported nationwide. A case definition has been adapted by BOE to include herpangina disease with a goal to increase the level of case detection.

### **Streptococcus equi subspecies zooepidemicus**

In 2011, the first outbreak of infection of *Streptococcus equi* subspecies *zooepidemicus* occurred in Northern Thailand. There were a total of twelve confirmed cases and four deaths reported related to consuming inadequately cooked beef, pigs' blood or cattle blood.

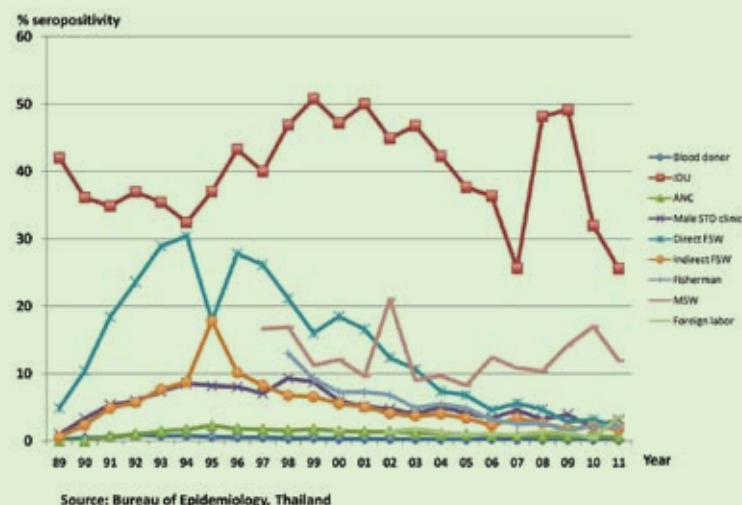
### **HIV and AIDS**

Thailand has experienced an extensive epidemic of HIV/AIDS since the sexual transmission of HIV was first detected in 1989. HIV infections spread throughout Thailand in the early 1990's.

Epidemiologic investigations by the MoPH established that the main risk exposures leading to HIV infection were heterosexual sex although transmission of HIV was also occurring among injection drug users and men having sex with men (MSM). Therefore, the MoPH instituted a national control program to prevent the transmission of HIV. This program included extensive public education about the risk factors for acquiring HIV, along with promotion of condom use-especially during sex with commercial sex workers. In addition, free treatment was provided for sexually transmitted diseases and HIV infections at Government clinics. This program became known as the "100% Condom Program" because of its emphasis on safe sex. However, an important component of the prevention effort was the establishment of a Sentinel Surveillance System among risk groups and the general population to monitor HIV prevalence in selected subpopulation groups representing several high and low risk populations. These populations included direct brothel-based commercial sex workers (CSWs), indirect CSWs, STD patients, Injection drug users, pregnant women and blood donors. A national committee was established which included not only the MoPH but representatives of the other Governmental Ministries. The HIV Control Committee was chaired by the Prime Minister to involve all sectors of the Government in the HIV/AIDS control effort. This program was quite successful in reducing the HIV infection rates in heterosexual non-drug injecting populations in Thailand. It has often been cited as an ideal Public Health response to a rapidly emerging generalized epidemic (7, 8). Currently the HIV infection prevalence and incidence has been dramatically reduced among heterosexuals; however HIV infection rates remain very high among injection drug users and are high and possibly increasing among urban MSM populations (Figure 5).



Figure 5. HIV Sentinel Surveillance among Risk Groups, Thailand, 1989-2011



Successful prevention and treatment efforts throughout the past two decades have reduced the number of annual new HIV infections. Thailand recently began an acceleration plan for reducing HIV incidence among its most vulnerable populations. Equipped with support from the Global Fund and technical assistance from various UN agencies, Thailand remains determined to meet its targets outlined in its new National AIDS Strategy for 2012 to 2016. There remain several challenges to Thailand’s vision of zero infections, zero AIDS-related deaths, and zero stigma and discrimination (9).

## Emerging infectious disease (EID) challenges in Thailand

Newly emerging infections are those that have not previously been recognized in humans. Several diverse factors including microbial genetic mutation and viral genetic recombination or re-assortment, changes in populations of reservoir hosts or inter-mediate insect vectors, non-therapeutic use of antibiotics in animals to promote growth with emergence of antibiotic resistant human pathogens, human behavioral changes, and environmental factors can contribute to the emergence of novel infectious diseases in man (10). They will continue to emerge and re-emerge, leading to unpredictable epidemics and difficult challenges to public health around the world including Thailand.

Since 2003, a devastating epidemic of highly pathogenic avian influenza (HPAI) A H5N1 has predominately affected poultry flocks in Thailand, Indonesia, and Viet Nam. It resulted in severe consequences on the economies of affected countries and on poor farmers’ livelihoods. Several human cases were detected in the areas of preceding poultries outbreaks. During 2004-2006, a total of 25 human cases of laboratory-confirmed H5N1 were reported in Thailand. Among those, 17 (68%) were fatal. In response to the HPAI epidemics, millions of poultries were culled to stop transmission from poultries to humans.

The major lesson learned from HPAI response is the central importance of efficient surveillance, effective intersectoral collaboration, a well-designed national strategy and sustained political will. Experience from the HPAI response underscores the importance of investing in effective disease surveillance at the human, animal and ecosystem levels, enabling Thailand to better respond to a range of existing and emerging infectious diseases.

In late 2010, Thailand MoPH launched Event-based Surveillance System to complement the National Notifiable Disease Surveillance System. With the newly established surveillance system, clusters of human disease suspected an outbreak, abnormal animal deaths and rapid environmental change such as water pollution will be reported by village health volunteers to local health authorities. The system aims to improve timeliness of outbreaks detection and response to infectious diseases including EIDs.

In Thailand, collaborations between the human health and animal health sectors and across various line ministries have been improving following HPAI crises. However, there is wide variability in the institutional capacity to participate in EID control without substantial long-term investment aimed at strengthening existing institutions, basic education, communication campaigns to promote behavior changes and supporting networks of institutions to improve cross-sectoral collaboration.

The investments in the public health system will be critical to improving the health and well-being of both humans and animals and strengthening the economy of Thailand. Using the 2nd National Strategic Plan for Prevention and Control of Avian Influenza and Preparedness for Influenza Pandemic, many institutions in Thailand began to develop effective emergency response mechanisms as well as long-term capacity to control HPAI and other zoonotic EIDs. The transition away from short-term responses towards more sustainable capacity and systems strengthening reflected the improved EID preparedness and responses to infectious diseases at the animal-human-ecosystems interface (11).

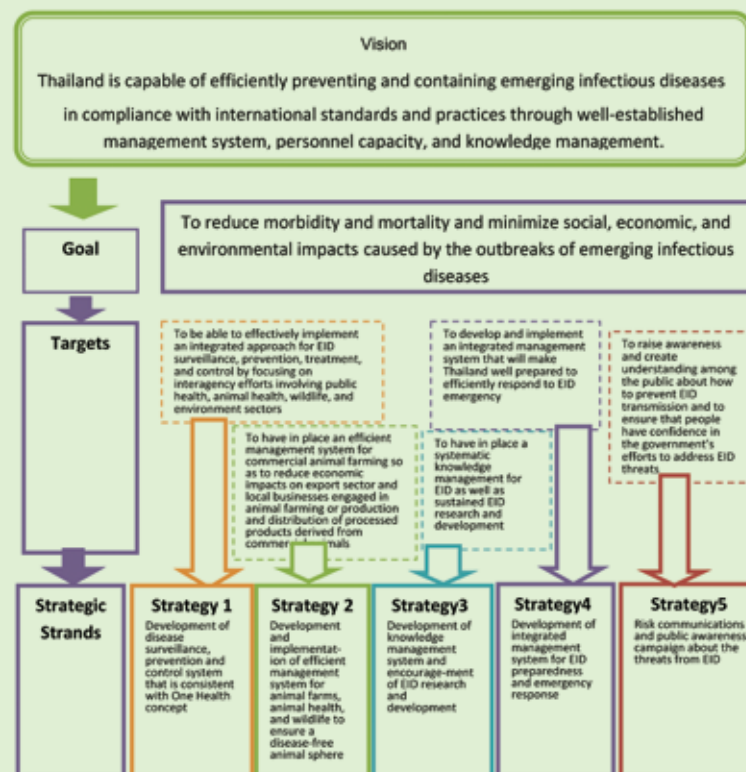
## The prospects of Thailand in addressing global threat of emerging and re-emerging infectious diseases

The recent EIDs such as HPAIH5N1, SARS, Ebola, West Nile, Hantavirus, Hepatitis E, and many others show animal health and human health to be integrally interconnected and linked worlds. About 70% to 80% of EIDs in humans had originated from animals. Economic growth, changing in habitation and farming systems, deforestation, increased travel and trade as well as climate change are important factors contributed to the spread of infectious diseases. Improved infectious disease prevention and management can be made through close collaboration across sectors including human, animal, environment and disciplines including natural and social science.

Thailand, as other countries is preparing for emerging and re-emerging infectious diseases. The strategy to better understand and address this contemporary health issue has been based primarily on an extensive review of the situations and trends in EID over the past 20 years, in conjunction with an analysis of both internal and external factors, lessons learned from the previous implementation of the 2nd National Strategic Plan for Prevention and Control of Avian Influenza and Preparedness for Influenza Pandemic, recommendations made by the National Economic and Social Advisory Council (NESAC), and the resolution of the meeting of the 2nd Thailand National Health Assembly (NHA), as well as taking into account the conceptual framework of the 11th National Economic and Social Development Plan, International Health Regulations (IHR) 2005, Asia Pacific Strategy for Emerging Diseases (APSED), ASEAN Cooperation Framework, Thailand's preparations for the upcoming regional integration into ASEAN Economic Community (AEC).

With perspectives from above, the National Strategic Plan for Emerging Infectious Diseases Preparedness and Response 2013-2016 was developed and implemented to reduce morbidity and mortality rates and minimize potential social, economic, and environmental impacts caused by EID outbreaks. The national strategic plan was obtained endorsements from its own constituent organizations, other professional organizations, academic institutions, opinion leaders and authorities in government agencies. The five key strategic strands include: 1) Development of disease surveillance, prevention and control system that is consistent with “One Health” concept, 2) development and implementation of efficient management system for commercial animal farms, animal health, and wildlife, 3) development of knowledge management system and encouragement of research and development 4) development of integrated management system for EID preparedness and emergency response and 5) risk communications and public awareness campaign relating to the risks from EIDs.

Figure 6. Vision, Goal, Targets, and Strategies in the National Strategic Plan for Emerging Infectious Diseases Preparedness and Response 2013-2016



All five strategic strands are systematically interrelated to one another (Figure 6) covering the development of disease surveillance, prevention and control system in humans, animals, wildlife, and environments in an efficient, consistent manner so as to ensure a timely response to the outbreaks, thus providing adequate protection for high-risk and general populations alike. In the meantime, preparations are also being made to effectively respond to EID outbreaks, which in turn will strengthen Thailand's

public health system capabilities and self-reliance and help minimize potential social and economic impacts arising from the outbreaks.

In addition, the development of integrated management system will also help mobilize resources, strengthen capabilities, and share knowledge and expertise from across a range of sectors in order to ensure concerted efforts in addressing the threats from EID. Furthermore, as there is currently an increased risk of EID outbreaks which can spread across the globe, strong and continued collaboration from the international community is indispensable in order to adequately address these challenges (12).

## Conclusions

The available evidence from several sources leads to the following conclusions on the future threat of infectious diseases in Thailand that many existing diseases will remain important, but new diseases will emerge in the future. Thailand has improved its capacity to prepare for and respond to infectious disease threats of national importance. Strengthening surveillance and preparedness capacity through cross-sectoral collaboration between human health, animal health and wildlife health sectors to detect and respond to outbreaks in a timely, effective manner is a key priority. Thai MoPH's rapid and effective response to a number of outbreaks and other emergencies over the years, in collaboration with provinces and other stakeholders demonstrates the country's capacity and commitment to responding to potential threats to the health of public. Thai MoPH is working with domestic partners and international organizations to synergize EID prevention and control efforts. The 'One Health' approach will be a foundation to harmonize preparedness and responses to EIDs by involving agencies with different disciplines and lead to preventing diseases from crossing the divide between humans, their livestock and wildlife.

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**DISEASE  
SURVEILLANCE SYSTEM  
IN TOURISM SPOT:  
A CHONBURI CASE**

# Chonburi Case



# DISEASE SURVEILLANCE SYSTEM IN TOURISM SPOT: A CHONBURI CASE

Achara Suksamran<sup>1</sup>  
Yupaporn Trirapaiwong<sup>2</sup>

## Chonburi at a Glance

Chon Buri is a province of Thailand and means “the City of Water”. Industrial estate, seaports rapidly grow up in the province, located in the East of the Gulf of Thailand, just 80 kilometers far away from Bangkok. Chonburi is also famous for Pattaya beach, making tourism another important contribution to provincial economy as up to four million tourists visited the province and Pattaya each year.



Beautiful sunset over Pattaya beach



The Four Regions Floating Market Pattaya

<sup>1</sup> Boromarajonani College of Nursing, Chonburi  
<sup>2</sup> Boromarajonani College of Nursing, Bangkok

## The Impact of Flu Pandemic on Tourism Industry: A Chonburi Case

In April 2009, the World Health Organization declared influenza pandemic following the emergence of the H1N1 influenza.

The outbreak hit Thai tourism industry hard including Chonburi. People avoided going out in public areas due to scare of contracting the virus.

In response to the pandemic, strategies for preliminary preparedness including knowledge enhancement, intensive surveillance, careful investigation, effective medical services, and good public relations were implemented.



Tabletop exercise

## Chon Buri Provincial actions includes:

- *Tabletop exercise*: participants from all related governmental organizations, agencies, or authorities meet to seek ways to raise public awareness on outbreak prevention.
- *Operation center*: an emergency unit was set up in a bid to respond to health crisis, identify strategies, and prepare manuals and guidelines.
- *Provincial health regulation*: the so-called “Four 4s” measure was set up. Health staff and involving parties are required to put the measure into practice as follow:
  - Operate strict disease surveillance preparedness for four months.
  - Implement four regulations including raising public awareness, giving co-operation, working to reduce H1N1 cases and mortality rate.





- Reach out to four groups of population mainly students, labor, households, and people regarded as at risk of contracting the virus such as pregnant women, children and the elderly.
- Promote prevention practice such as wearing face mask, washing hands, and avoiding crowded place etc.

### Influenza Pandemic Alert in Pattaya City

As soon as two Taiwanese tourists were reported positive for H1N1 influenza, the city immediately responded to the pandemic in order to control the virus widespread by screening cases having flu-like symptoms in the area nearby the original spot where the flu case was confirmed, investigating the outbreak cause, and conducting surveillance and prevention measure at communities, public places, and hospitals.

### Dealing With Flu Pandemic and Public Fear

The announcements by the Department of Medical Sciences in Bangkok and the Ministry of Public Health about the H1N1 (Swine Flu) being detected and 17 confirmed cases being found in Pattaya alone and 4 in Chonburi had set alarm bells ringing all over the region.



*Pattaya Mayor and Chonburi Provincial Chief of Public Health Office made a statement together*

In efforts to stop widespread panic, Pattaya Mayor Ittipol Khunplome made a statement at City about the latest developments in dealing with the spread of the disease.

In preparing for a possible epidemic in the city, a number of mobile medical centers were set up all over the area which made available to suspected victims of the infection.

Surveillance and rapid response teams (SRRT) were divided into three groups.

The first group of SRRT was from the Bureau of Epidemiology and health staff in Chonburi's Sattahip district. They conducted investigation and identified H1N1 cases and their possible close contacts. Of the total 50 hotel staff, 12 had influenza-like illness. However lab test showed negative result of H1N1 influenza.

The second group of SRRT included staff from the Office of Prevention and Control in Chonburi and Sattahip district. They were responsible for investigating the entertainment spot where the two Taiwanese tourists who were found positive for H1N1 influenza showed up. Sixty-eight workers were considered exposed to the virus. Laboratory result indicated that 17 of them were positive for the H1N1 influenza.

The third group of SRRT included the personnel from the provincial Public Health Office, and health staff from the province's Banglamung and Sriracha districts.



*Surveillance and Rapid Response Team*



*Tamiflu & Medical supplies*





*Big Cleaning Day*

In addition, more than 80 health volunteers in Pattaya City also closely monitored health of immediate family members of the flu cases. The ‘Big Cleaning Day’, a campaign aimed at encouraging residents and business operators in the tourism area to clean up their places for H1N1 influenza control. Thermo scan machines were also set up in Pattaya Walking Street for public to check if they were flu suspects.

The city also carried out public relations via local and national media providing updated information about H1N1 situation and disease prevention both Thai and English language to increase public confidence, decrease public fear.

In fact, there were five major areas that needed to manage systematically and strictly.

1. Educational Institutes

- Screening students with flu-like illness.
- Closing school for disease control purpose.
- Promoting disease prevention by washing hands.

2. Work Places

- Screening workers with flu-like illness.
- Closing workplace to control disease widespread.

3. Health services

- Surveillance sent tissue samples of flu-like cases for lab test.
- Setting up screening points and providing health education to patients.

4. Public Relations

- Wearing masks and washing hands.
- Providing information to public to avoid panic.

5. Training on standard operation procedure among SRRT at a district level for local response.



*Hand wash introduced by Mayor of Pattaya City*



*Put on facemask*

### Lessons learned

Dr.Wichai Thanasophon, deputy medical chief of Chonburi Provincial Public Health Office, said one of the most challenges in H1N1 flu control in Pattaya City was the government’s decision to inform the public about confirmed H1N1 cases due to afraid of over the flu impact on tourism industry.

“Cover up of information could worsen the pandemic influenza situation,” Dr.Wichai said.

A resident of Pattaya City, who requested anonymity also expressed that, “The government and the school should not withhold information about the infections. As long as we were properly informed we would not be panic”.

Moreover, it is crucial that collaboration between the central government and local administrative organization, agencies, private businesses had to be put in place to deal with the outbreak. Although some travellers cancelled their flights and hotel bookings after the outbreak was announced at the beginning, the situation was manageable in time.







Good cooperation among health professionals at the front line and SRRT also help control pandemic influenza.

Most importantly, strong surveillance and rapid response system must be well prepared. Dr.Wichai said 'PROMPT' was the motto that health and involving parties always kept in mind when dealing with situation. 'PROMPT' stands for People, Resources, Organization, Management, and Time.

People should be well prepared and take part in emergency response instead of leaving behind without updated information and staying panic.

All resources for supporting operation plan at both public hospitals and private hospitals should be put in place to deal with many flu-like illness cases coming to the hospitals in case of pandemic.

Third, each organization must review its structure as part of disease surveillance and pandemic preparedness. Time for taking prompt action is also essential.

"It is important for everyone to learn a lesson from H1N1 flu outbreak that in every crisis situation, there is a good opportunity," he said.

### Acknowledgement

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We also would like to thank Chon Buri Public Health Office, especially Dr.Smit Prasunnakarn, Chon Buri Provincial Chief of Medical Officer; Dr.Wichai Thanasophon, Deputy Chief of Chonburi

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Also, special thanks to all staffs and coordinators at Pattaya City, especially Mr. Itthipol Khunplome, Mayor of Pattaya City, for warm welcome and great support. Thanks to Mrs. Kanrapha Mukdasanit and Mrs.Na-Unya Chanthragard for their kindly supports and good coordination.





**COLLABORATION FOR DISEASE  
SURVEILLANCE IN POULTRY  
INDUSTRY: A CASE STUDY OF  
CHACHOENSAO PROVINCE**

**Cha**

**choengsao**

**Case**



# COLLABORATION FOR DISEASE SURVEILLANCE IN POULTRY INDUSTRY: A CASE STUDY OF CHACHOENGSAO PROVINCE

Sukjai Charoensuk <sup>1</sup>  
Sirikul Karuncharernpanit <sup>1</sup>

## Chachoengsao at a glance

Only an hour away from the Capital City of Bangkok, the central province of Chachoengsao is regarded as the largest farming area in eastern Thailand. The province is wonderful for agriculture due to its rich and fertile soil accumulated from sediments of Bang Pa Kong River. Its location near Bangkok makes it convenient in logistics and transportation as well as creating various job opportunities in industrial and agricultural sectors, particularly in planting sweet mangoes and poultry farming.



Bang Pa Kong River



Sweet mangoes

<sup>1</sup> Boromarajonani College of Nursing, Chakriraj

## The First Outbreak of Avian Flu in Thailand

Prior to the avian flu outbreak in 2003-2004, Chachoengsao is full of open-farm poultry. Free-range ducks were also seen everywhere. However, all open farms were forced to change to the closed system after the outbreak.



The first wave of avian flu outbreaks occurred in Thailand during 2003-2004. In late 2003, the outbreak rampaged poultry farms throughout Thailand, but the government attributed the mass fowl deaths across the country to cholera. It did not take long for the lethal strain of influenza to transmit from animal to human. The situation then became chaotic as the Public Health Ministry confirmed the first human death from avian flu in January 2004.



A lack of transparency and information also led to public fear. Thai people avoided eating chicken due to fear of avian flu. "Chicken phobia" seemed to be an explanation for that chaos. The outbreak hit chicken farmers across the country including those in Chachoengsao. They lost money from poultry investment. All poultry on farms had to be culled if about 10 percents of sick chicken were reported in any farm resulting in dramatically decreased of poultry.



- (1) Closed farming of duckling
- (2) ducks in a river
- (3) Free-ranged ducks in a farm
- (4) Culling of poultry





### Chaos in Poultry Industry

Chicken consumption dropped drastically due to chicken phobia and the outbreak which occurred before Chinese New Year, which is considered the peak season for poultry consumption. Chinese families usually buy cooked poultry to pay homage to their past ancestors.

*Mr. Viroj Prayoonwiwat, the head of livestock provincial office, recalled that "when I started working here at the time of outbreak, the number of poultry was obviously dropped from 12 million to be two million."*

Domestic orders were cancelled. Moreover, Europe and Japan, the main importers, also banned poultry products from Thailand because of the lack of confidence in product safety. The severe outbreak caused Thailand to lose its ranking as the world 5th largest poultry exporter of during that time, which resulted in a 1.5 percent decrease of the Gross Domestic Product.

### Comprehensive Response



*Meeting among the working group*

During the first outbreak, Chachoengsao showed its strength in rapid response to avian flu in various ways. The provincial governor prioritized policy on avian flu control. Meetings among livestock officials, health professionals, disaster prevention and mitigation officials and stakeholders were set up on a

weekly basis to deal with the situation. Deputy Governor, Bundit Teweetiwaruk, chaired the meetings and worked with other departments to assess severity of the outbreak and to control the flu widespread. Meanwhile, livestock and health officials worked closely with community residents to carry out avian flu surveillance, investigation and prevention at the front line.

### Bird Flu Case in Chachoengsao

Rungrat Hongthongkam, an epidemiologist at the province, was surprised to get a call from Ban Pho district hospital late at night asking about possibility of the first avian flu case in human. An employee from poultry farm in the province was sent to the hospital due to high fever and respiratory problem. The employee was also reported to have frequent contact to dead poultry.



*Mrs. Rungrat and SRRT*

*Ban Pho hospital*

As an epidemiologist, Rungrat was positive that the case had avian-flu like symptoms. She immediately contacted Ban Pho district health office chief, Preecha Hengsomboon and other Surveillance Rapid Response Team (SRRT) officers, to prepare for a meeting and investigation the first thing in the morning.

### Surveillance and Investigation SRRT Style

After investigating the house of the avian flu-like case, the SRRT went to the poultry company where the probable bird flu case was working and found that many employees also fell ill due to avian-flu like symptoms.





Working at the suspected case house



Investigating at the Ducking company

The company executive cooperated with the SRRTs coming to the site for conducting surveillance system and collecting samples from employees for lab testing. Fortunately, lab test showed negative result for bird flu.

Interestingly, operation by the SRRTs was completed within two hours. Thanks to the company's full cooperation to health and livestock authorities.

### Dealing with Rumor

Cancellation of poultry order after avian-flu like symptoms among employees hit poultry business hard. Rumor about transmission of avian flu from poultry to human also spread like wildfire. The company executive rushed to ask for help from the province. Then the Provincial health office checked the quality of poultry and its production process before giving certification that it was free of avian flu. A campaign aimed at boosting public confidence in poultry products was launched. Chachoengsao governor and other prominent figures in the province also ate cooked chicken and ducks in the public to show that the poultry in the province was safe from bird flu.

### Practical Information Support for Staff

The provincial health office supported knowledge and information, sharing in both formal and informal ways. The official Chachoengsao health official website [www.cco.moph.go.th](http://www.cco.moph.go.th) was developed to provide knowledge about avian flu outbreaks and surveillance system. At the same time, workshop sessions about the avian flu and outbreak control were also organized in the province, so health professionals can participate into the program and improve SRRT skills for putting into practice. Social networks, like Facebook, were also useful channels for health professionals to share information to one another.



The Health provincial officer posted information on website



Livestock officials prevent avian flu transmission

### Teamwork in battling against Avian Flu

Livestock officials, health professionals, disaster prevention and mitigation officials, private sectors and community residents could effectively work together in a bid to control bird flu outbreak. Thanks to well-established working system in the province, each sector clearly understood its roles in bird flu control. Willingness and supportive working environment are significant for team work.



“Good teamwork and joyful working environment enable us to work effectively as a team to curb bird flu outbreak, despite many challenges and difficulties facing us,” said Viroj Prayoonwiwat serving as a secretariat of the working group during the outbreak.

Small and large-scale poultry farmers also agreed to report to authorities if any bird flu-like symptom in animals and human was found.

### Trust and Cooperation

Public and private participation into bird flu control came from good communications by front-line health professionals and livestock officials. Such skill is essential for developing trust among private sectors and foreign poultry importers. Trust is also crucial to convince community people companies to adopt surveillance system into practice. A good sample was that health officials directly approached a poultry farm to openly discuss about the situation and promised that all information would be confidential, Mrs. Rungrat said.

Good communication skills also brought a win-win solution to the avian flu issue. After the avian-flu affected poultry company reported its problem about cancellation of orders from exporters, health officials rapidly responded to the issue by giving a certified letter to support safety process of the farm. Poultry exporters were aware of surveillance system as a good strategy to show that the farm was concerned about the avian flu outbreak and willing to be a part of a solution.

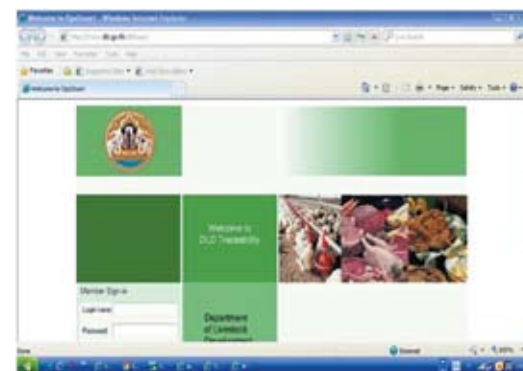
Accurate and reliable data for all working levels were collected and reported to the chief of provincial health office and the ministry of public health on daily basis. Such contribution of information led to

effective disease surveillance. Involving parties can evaluate severity of the outbreak and respond to the situation quickly based alert information received.

### Right Approach for Massive Bird Flu Control

Carrying out bird flu control during the outbreak was not an easy task. Most large-scale farms did not want to report livestock officials about bird flu-like cases. Livestock officials had to set up a station in front of their farms to monitor the situation and finally encouraged the farm operators to follow the measure.

Chachoengsao responded well to avian flu outbreak among poultry in terms of early detection, isolation, treatment, and communication. Local residents agreed with the policy on chicken culling and accepted compensation from government authorities. As a result, the province could successfully control avian flu transmission from animal to human.



Website of livestock movement



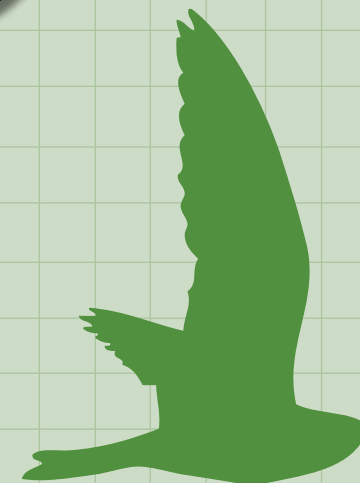
Surveillance system was strengthened because involving parties carried out their work continuously. Livestock officials used online system to record and check poultry movement. Disaster prevention and mitigation officials prepared a plan and rehearsals for avian flu control. Additionally, health professionals and health volunteers were trained on how to work effectively with SRRTs. Updated information on website, [www.diseasecontrolgroup.com](http://www.diseasecontrolgroup.com), of disease control department is also available. These plans could be applied for any outbreak control in the long run.

### Challenge in Battling a New Wave of Avian Flu

Although most facilities and system were put in place to control bird flu during the first wave of the outbreak, a few officers in the Chachoengsao surveillance team and the outbreak reporting system have been changed. As Chachoengsao recently faced a new wave of avian flu in poultry, surveillance system needed to be strengthened and developed to meet changing factor to effectively response to avian flu.

### Acknowledgement

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**SURVEILLANCE RAPID  
RESPONSE TEAM (SRRT):  
A PROACTIVE MODEL OF HEALTH  
PREVENTION EXCELLENCE**

**Nakhon Pathom  
Case**



# SURVEILLANCE RAPID RESPONSE TEAM (SRRT): A PROACTIVE MODEL OF HEALTH PREVENTION EXCELLENCE

Pornruedee Nitirat <sup>1</sup>  
Thongsouy Sitanon <sup>1</sup>

Prior to monsoon season in May is a usual period of the year for health staff to start preventing dengue hemorrhagic fever (DHF) outbreak. All households are alerted to wipe out mosquito breeding spots and drop abate sand in static water. These activities are repeatedly carried out year after year. Outbreak controls seem to be endless work that requires unlimited efforts and multidisciplinary collaboration to address the outbreak.



Provincial Chief Medical Officer and SRRTs

<sup>1</sup> Phrapokklao Nursing College, Chanthaburi



*Phra Pathom Chedi: the world's highest pagoda*



*Nakhon Pathom River: impressive river landscape*



*Famous products from fruit farms: sweet pomelo, fragrant coconuts, and crunchy guavas*

## Nakhon Pathom Province at a Glance:

Located only 56 kilometers away from Bangkok, Nakhon Pathom is regarded as gateway to the West of Thailand. The province's name means the first or the oldest city of Thailand. The remarkable symbol of the province is the world's highest pagoda called Phra Pathom Chedi. The province is also famous for beautiful river landscape, interesting tourist spots, fruit orchards, drawing numerous tourists each year.

Rich in natural resources, Nakhon Pathom is a land of rice fields, fruit farms, and livestock farms. However, to date, the growth of industry is evident. The number of industrial factories and alienate labors has markedly risen persistently. High density of population in the city leads to food, waterborne and vector-borne diseases. Dengue once was the leading cause of death in the province, prompting all sectors to seek way to solve the health issue.

## The Establishment of SRRT Network

Thai SRRT services have been developed following the International Health Regulation since 2005 with the collaboration between the Ministry of Public Health as well as provincial and local administrative organizations. The main goal is to provide expertise in handling outbreaks and diasters.





*“Controlling dengue outbreaks is tough. But promoting public awareness and behavioral changes on health prevention is even tougher,” said Thaval Poblap, chief of Nakhon Pathom provincial public health office.*

Raising public awareness on disease prevention and putting behavioral changes among community members into practice are challenging for the investigation team. A collaborative effort to address a dengue outbreak in the province started with a Memorandum of Understanding signing between the provincial health office and provincial administration organization to support on manpower, budget, and instruments to battle against dengue outbreak.



*Provincial meeting of SRRTs*

Provincial health office will be responsible for technical expertise and staff while provincial administrative body will support budget and instruments. Trust and integrated support from the two parties are the keys to succeed in dengue in Nakhon Pathom. Mrs. Pornsomboonsiry, Head of disease control, Nakhon Pathom Province also has the same point of view.

*“I don’t want anyone to fall ill due to the outbreaks. We may lose our family members if we are unable to save their life. That is why we set up Surveillance Rapid*

*Report Team or SRRT here to work on dengue control,” said Amornrat Pornsomboonsiry, Head of Provincial Disease Control Department, Nakhon Pathom province.*

Similar to provinces nationwide, the SRRT is developed. The SRRT principle is to be equipped with clear and continuous working process, positive attitude and excellent epidemiological skills. Training programs, and real-life situation practices are also available to maintain good epidemiological investigation and networking to improve standard and quality of health care. A good SRRT model undertaken by Nakhon Pathom province has been recognized and praised nationwide.

The success of Nakhon Pathom SRRT network does not happen overnight. There had been dengue cases since 1998. Dengue morbidity in the province was as high as 170.46 cases per 100 000 population. This morbidity is higher than that in the provincial strategic plan and is ranked in one of the top 10 in Thailand. This information implies that DHF is increasingly serious. In 2007, the province faced the highest dengue outbreak which was ranked number 3 of the country. A significant increase in dengue outbreak prompted health officials to seek ways to reduce human deaths. Since then, the SRRT and the networks were strongly developed as part of an effort to curb dengue outbreak.

### The Establishment of Provincial SRRT Network

The Nakhon Pathom provincial disease control team is one of the strongest networks to carry out disease control activities especially the surveillance system. The SRRT Network comprises of the teams at provincial, district and local levels. Professional and nonprofessional stakeholders are recruited to each team in regard to specific tasks of each level. Typically, each team is formed based on the collaboration among health providers, community leaders,





private partners, health volunteers, and animal health staffs. Nevertheless, nonprofessional stakeholders decrease as the level of SRRT increases.

*“The main important point of our SRRT success is our leader, a Provincial Chief Medical Officer. He works with us as a part of our team. When he takes part in, everyone is happy to work together,” said Darunee Phosri, Head of Provincial Epidemiology Department, Nakhon Pathom province. The SRRT network covers provincial level as seen in Figure 1.*

**Figure 1: SRRT Levels**



The SRRT networks deal with dengue outbreaks and other infectious diseases including food poisoning. The SRRT works at different levels Collaboration among health investigation staff, leaders, private partners, health volunteers, and animal health teams is the key to success in effectively implementing surveillance in Nakhon Pathom. Strong leadership and teamwork are also crucial factors enabling the SRRT to work proactively and effectively.

## Dealing with Dengue Outbreaks

To deal with the outbreaks, Nakhon Pathom SRRT follows five practical steps considered as part of the success in SRRT networks.

Setting a data collection is the first and important step in dealing with receiving and sending reports as well as health emergencies. Next step is monitoring SRRT working in district level to send reports and conduct data verification. Data analysis, interpretation and synthesis is the following step prior to data sharing with health care providers and other stakeholders. The final step is to report information back to community. Information will be immediately updated online for everyone in the networks.

**Figure 2: L-SRRT and D-SRRT workflow in Nakhon Pathom province**





The L-team is a front-line team for disease surveillance and control in community. This team includes three main parties which are the representatives of local governor, health providers in primary care hospital, and trained village health volunteers (VHVs). Also, other potential alliances in community such as temples, schools, and private sectors have been asked for cooperation, though not in SRRT. Work function of SRRT network is presented here through a story of DHF surveillance and control in one village.

After being trained to understand DHF outbreak and control, each village health volunteer (VHV) is assigned to observe around 15 households. Right after a suspected DHF case is reported, a home visit for the first check is conducted. Meanwhile, VHVs also ask a health provider in a primary care hospital for case confirmation. In case that a DHF case is confirmed, assistance from the district health officer and local governor regarding staff, mosquito fogging machines, and abate sand are requested.

The SRRT actively works to control DHF within 24 hours by spraying to kill adult mosquitoes in 100-meter radius around the patient's house and eliminating mosquito breeding spots (i.e., remove breeding containers and put abate sand or fish in static water). If the second case reoccurs in the same area, the first house would be assumed as a source. In this case, it is considered an outbreak and a D-SRRT takes action. All aforementioned activities for DHF control are more aggressively repeated. Moreover, a P-SRRT might

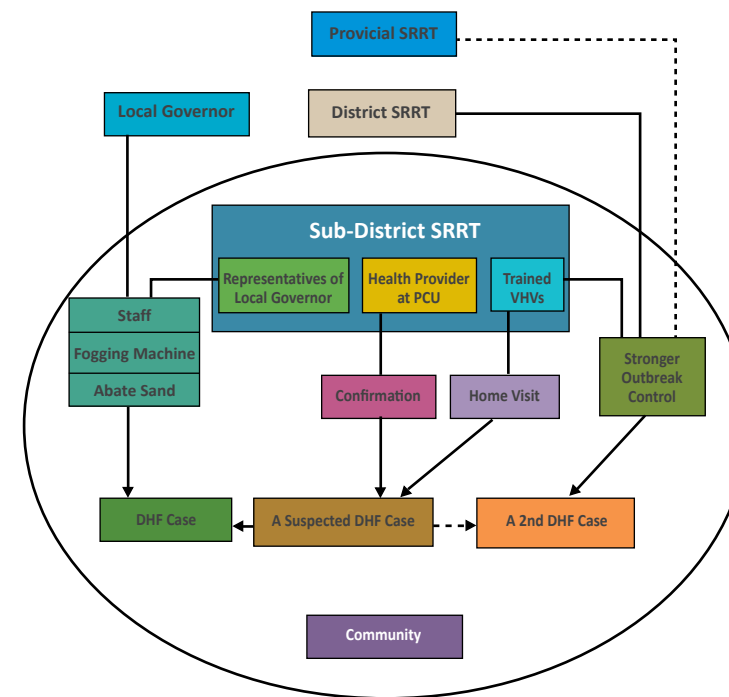
involve if necessary. A work process of DHF control management by L-SRRT and D-SRRT is showed in Figure 2 and the process of SRRTs is showed in Figure 3:



Temple contribution

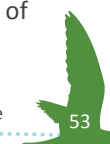
The temple also gets involved with the surveillance system. The monks give local residents including students and teachers information about dengue prevention. Private sector is also willing to support fund and equipment to enhance surveillance work.

Figure 3: DHF surveillance and control



### The Pride of the SRRT Network of Nakhon Pathom Province

Mrs. Phosri, a Head of Provincial Epidemiology Department, is proud to share with us about the success of the SRRT network. She believes the strong efforts of the SRRT network to ensure health of





SRRT National Award 2009

people in responsibility from infectious diseases and outbreaks can touch people's heart. For this reason, SRRTs never stand alone in community and that is the answer why the SRRT network in this province is doing well. Also, when building a new SRRT, existing teams are sincerely willing to assist new comers to develop an effective SRRT. Everyone commits to the same common goal, effective outbreak control. Many national awards during the last 3 years well represent the strength of the SRRT network.

*"In the past, community people didn't help us because they were not aware of outbreak control. After epidemics affected their family, they concerned about our team. They actively participate in every task till become part of our SRRT! They are very helpful for suspected case report," said Mrs. Phosri, Head of Provincial Epidemiology Department.*

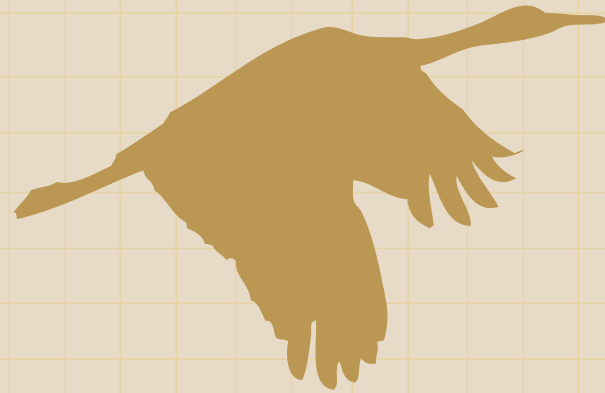
### Take-home Messages:

- **An excellent SRRT could be a victim** of its own success: Despite being highlighted as an effective innovation for outbreak control, SRRT can be seen as a result of disease prevention failure. In fact, SRRT is a downstream solution to the issue of ineffective public awareness on health prevention and promotion and behavior change campaigns. Therefore, the success of SRRT could blindside these key to good health care system.
- **Lesson learned to success:** Once, Nakhon Pathom faced the country's highest dengue incidents. However involving parties learned from the past failure to work together to better curb dengue outbreak. The province's SRRT model has won praise and recognition nationwide.

### Acknowledgement

Special thanks for Dr. Thaval Poblap, the Provincial Chief Medical Officer, all informants, and staff of SRRT network, Nakhon Pathom Province for sincerely providing useful information. Thanks a lot also to the Director of Banglane Hospital and all SRRT members for sharing knowledge and experiences about Local and District SRRTs as well as all SRRT networks.





**MIGRANT HEALTH VOLUNTEERS:  
THE KEY TO SUCCESS SAVING THE  
'SEAFOOD KITCHEN OF THE  
WORLD' FROM SEVERE DIARRHEA**

**Samut**

**sakhon**

**Case**



# MIGRANT HEALTH VOLUNTEERS: THE KEY TO SUCCESS SAVING THE ‘SEAFOOD KITCHEN OF THE WORLD’ FROM SEVERE DIARRHEA

Suparpit von Bormann <sup>1</sup>  
Sunanta Thongpat <sup>2</sup>

## Samut Sakhon: Seafood Kitchen of the World

Samut Sakhon province is in the central part of Thailand, 30 kilometres South-west of Bangkok. It is located on the tidal reaches of the Tha Chin River which flows into the Gulf of Thailand some 45 kilometres west of the Chao Phraya estuary. The province was first



Sea view from Samut Sakhon



The city of sea and rivers

<sup>1</sup> Boromarajonani College of Nursing, Chang Wat Nonthaburi

<sup>2</sup> Boromarajonani College of Nursing, Nopparat Vajira Boromarajonani College of Nursing, Nopparat Vajira

known as ‘Tha Chin’ after the river. It was then formally given its indigenous name, Mahachai and finally King Rama IV decreed Samut Sakhon to be the official name which means “the city of sea and rivers”.

Samut Sakhon is comprised of three districts: Muang Samut Sakhon, Ban Phaeo, and Krathum Baen. Its size is only 872 square kilometres, or approximately 4% that of Nakhon Ratchasima, the largest province of Thailand. However the province has the country’s 4th highest population density at 570 persons per square kilometre.



The seafood kitchen of the world

Its location in the Chao Phraya delta is ideal, enabling seafood products from areas around Samut Sakhon to be shipped through sea ports in the province. That is why Samut Sakhon is regarded as Thailand’s centre of the seafood industry or “the seafood kitchen of the world”.

## Migrant Labour – Pros and Cons

The seafood processing industry, which is very profitable, has a tremendous impact on the provincial and national economy. Activities such as shelling prawns and filleting fish are labour intensive and most skilled Thai workers refuse to do the repetitive work required by the industry. Because of this, job opportunities are available for unskilled workers from neighbouring countries. It is estimated that 400,000 migrants, mainly from Cambodia, Laos and Myanmar, are working in the seafood processing industry and this number is expected to increase by 3.6% each year.



*Migrant workers processing sea food*



*Migrant workers shelling prawns and filleting fish*

The rapid increase in the number of migrants is affecting the province in several ways, such as socio-economics, health care, environment, and community security. Furthermore, a lack of appropriate migrant labour management has been linked to human trafficking, drug problems and crime. These issues put Samut Sakhon under national and international scrutiny and this affects the seafood industry. Thus, several administrative and commercial bodies in the province have been seeking ways to resolve these issues.

### Managing Severe Diarrhea among Migrants: the Challenge to the Seafood Kitchen of the World

Diarrhea is a common health problem which needs to be immediately treated and the disease is one of the major health issues among illegal migrant workers in Samut Sakhon.

Migrant workers registering with Thailand's Ministry of Labor can access medical health benefits since they pay for health insurance through the Social Security System. Of the estimated 400,000 migrant workers in Samut Sakhon, only about 83,000 have legal status. This factor affects the national public health system since health officials find it difficult to track illegal migrant workers who may be carriers of such disease as severe diarrhea which can become epidemic. Also, all migrant communities are prone to

disease due to poor hygiene practices and facilities in their accommodation.

Managing epidemic diseases among a migrant group, particularly illegal migrants with a lack of trust in the Thai authorities, the language barrier and their traditional beliefs and culture, is a challenge which makes it difficult for health professionals to reach out to these communities and investigate when there is an outbreak reported. This can delay their access to health care thus giving outbreaks time to spread.



*Typical migrant worker dormitory*

### Strategies to Counter Severe Diarrhea

Despite the limitations, provincial authorities in Samut Sakhon try to support migrant workers, regardless of their legal status. This is achieved within a framework of basic human and social rights through three strategic concepts: 1) National Security, an issue regarding national internal security such as illegal migration; 2) Social Security, which enhances community involvement into community development; and 3) Human Security, which respects human rights and dignity. The success of this plan is founded on cooperation and integration among all relevant bodies in the area. Samut Sakhon Provincial Health Office is one of the key players in dealing with health problems.



*Provincial authorities work to support migrant workers*



*Strategies to Counter Severe Diarrhea*



*An SRRT meeting*



A public health emergency management plan has been developed to prevent disease outbreaks and mortality. Any outbreak of severe diarrhea is regarded as a public health emergency and Samut Sakhon has a high risk of outbreaks because of the rapid increase in immigration.

In 2010, there were 61 cases of severe diarrhea and two deaths. In 2011, there were only five cases of severe diarrhea reported. Of these five, three were immigrants from Myanmar. However, investigation by the Health Investigating Team found 10 more cases in Muang Samut Sakhon district, seven of which were migrants from Myanmar.

A Surveillance and Rapid Response Team (SRRT) was set up in response to the epidemic. Rectal swabs were taken from severe diarrhea cases since rapid investigation enhances patient access to health facilities leading to more rapid disease control. A team of epidemiologists worked in cooperation with laboratories, hospitals, disease control and other prevention departments to investigate for other diseases in patients with acute severe diarrhea by using rapid testing. Reporting results was achieved within 24 hours.



*Investigation at an open market into a severe diarrhea outbreak*



*Investigation at a seafood market into a severe diarrhea outbreak*

As a method of disease control, chlorine was used to sterilize toilets and water tank locations where there were communities of migrant workers. A map was created to identify the boundaries for disease control. A program of health education on severe diarrhea prevention delivered a message to encourage improved hygiene behaviour by the community and was broadcast at open markets and dormitories. People also received useful information such as how to buy and cook healthy food and effective hand cleansing before eating. The education program continued for 10 days with results being reported daily for data analysis, and to learn about the epidemic development. These strategies led to rapid control of the outbreak.

The disease control strategy included the collection of samples of fresh meat, vegetables, drinking water, and ice from market food stalls in outbreak areas and these were sent for laboratory testing. This procedure continued for a period of one month and was accompanied by the distribution of health information leaflets in Thai and Burmese.

### Migrant Health Volunteers – Key to Success

The success of Samut Sakhon Provincial Office in controlling severe diarrhea is due mainly to effective primary health care and



*Trained migrant health volunteers*



*Migrant health volunteers providing health education to help prevent severe diarrhea*







cooperation from all stakeholders in the province. It is the first and only governmental organization in Thailand to have set up a department of health development for migrant workers.

Training migrants to become health volunteers is a very effective strategy in enabling authorities to gain the trust of migrant workers. At the time of writing, there are about 1,400 volunteers drawn from the immigrant communities taking care of a population of 250,000 immigrant workers in the province. All these volunteers can speak both Thai and Burmese. They work collaboratively with Thai health volunteers who can also speak Burmese. These volunteers use bicycles borrowed from health promotion hospitals

Most volunteers are proud of what they are doing. As one of the volunteers explained:

*“In my country, health care is far behind what we have here in Thailand. I want to help my people because I can speak Thai. People from Myanmar like to call me ‘Mor’ (means doctor). As a trained health volunteer, I am confident that I can provide good health services and make merit helping people from my Motherland. I myself have benefited. I have better health behaviour such as washing my hands before meal. Severe diarrhea is not such trouble if we know how to prevent it”.*



Burmese speaking Thai health professionals collaborate with migrant health volunteers



Nurses and a migrant health volunteer (green t-shirt)



Health volunteers teach migrant workers the importance of clean hands



Migrant health volunteers show pride in working for migrant workers

to do their work on primary health care among migrant workers. This also includes matters such as advising on the use of condoms and contraceptive pills.

There are 26 migrant health officers working as translators at each health promotion hospital and a migrant representative at almost every dormitory. The Public Health Ministry’s “Clean Food Good Taste” project, encouraging people to consume only freshly cooked food as part of health prevention and disease control, was also extended to the migrant population.

## Acknowledgements

The authors would like to give special thanks for the invaluable information, time and support provided by Dr. Chairat Wechpanich, Medical Chief of Samut Sakhon Provincial Health Office, Ms. Warunee Seangboon, and the staff of Samut Sakhon Provincial Health Office. We are also thankful to Mr. John (Munro Miller) Cable for his advice in English language.





**MULTI-SECTORAL  
COLLABORATION  
AT DISTRICT LEVEL:  
THE RATCHABURI MODEL**

**Ratchaburi**  
**Case**



# MULTI-SECTORAL COLLABORATION AT DISTRICT LEVEL: THE RATCHABURI MODEL

Laiad Jamjun <sup>1</sup>  
Boontuan Wattanakul <sup>2</sup>

## Ratchaburi at a Glance

Located along the Thai-Burma border, a central province of Ratchaburi, meaning of the City of King, is full of cultural heritage, beautiful landscapes and historical sites. Floating market and dragon-painted earthenware jars are symbols of the province. The jar manufacturing dated back in 1933 when the two Chinese ancestors found that red clay in the province was of high quality. Dragon is also the symbol of power in Chinese culture.



Earthenware jars and floating market, the symbol of Ratchaburi.

<sup>1</sup> Saint Louis College  
<sup>2</sup> Boromarajonani College of Nursing, Chonburi

## Challenges of Re-Emerging Shigellosis

Food-borne and mosquito borne diseases such as severe diarrhea, dengue, and malaria are endemic in a tropical country like Thailand, particularly during the monsoon season starting from May-October.

In the Ratchaburi, these communicable diseases are common. Although the province is equipped with surveillance system, shigellosis, which is acute bacterial infection affecting intestinal tract, was found re-emerged and rapidly spread in the province's southernmost district of Pak Tor in 2011.

Human cases of diarrhea also increased dramatically from 310 per 100,000 people to 430 per 100,000 people, especially among the elderly and children aged below 4 years.

## Surveillance System on Alert

A middle aged woman whose name is Lek was diagnosed the first shigellosis case in Pak Tor district when the outbreak re-emerged in 2011 after having been reported for decades.



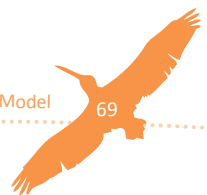
Lek, the first diarrheal case of Pak Tor

"I felt such a terrible burn in my chest and sweated badly," she said, reminiscing that she bought Thai dissert from a street vendor before having severe diarrhea and fainting immediately.



Lek and her mother

Her co-worker sent her to Pak Tor hospital. However, Lek's condition deteriorated and became hypovolemic shock. She was transferred to provincial hospital for treatment. Several severe





*(left) Suriya Kuharat, MD., a previous deputy Medical Chief of the Ratchaburi Provincial Health Office. Currently, he serves as the Medical Chief of Ra-Nong Provincial Health Office.*

*(right) Taweesak Kiatsakundeja, Director of Pak Tor Hospital*

diarrhea cases were also found in the district shortly after and it was sporadic epidemic pattern. The provincial SRRT put health care team in the district on alert for shigellosis outbreak.

Unlike the usual shigellosis wide spreading among children, people aged 40-50 years and the elderly are among those suffering from the outbreak, said Suriya Kuharat, chief of Ratchaburi provincial SRRT.

Suriya, also an epidemiologist, said most shigellosis cases would experience severe diarrhea, high fever, and cramp in stomach for a few days after contracting the disease.

Taweesak Kiatsakundeja, the director of Pak Tor district hospital, also found shigellosis cases had poor response to antibiotics. Drug resistance is challenging for medical professional to seek regimen for treatment the infectious disease. As a director the district SRRT, Taweesak also sent a team to rapidly investigate diarrhea outbreak in the community.

To stamp out shigellosis outbreak, the SRRT in the Ratchaburi had to quickly put surveillance system into practice by investigating diarrhea cases from the source e.g. water supply, food, vegetable, and food vendors. For Pak Tor cases, the team needed to talk to a

street vendor selling dessert to Lek. However, the team could not pinpoint the original source of shigella outbreak due to delayed diagnosis and investigation process. As a chief of the provincial SRRT, Suriya assigned the SRRT of all levels in the province to conduct mass surveillance system regarded as the most effective strategy which is recommended by the World Health Organization.



*Pranee Ob-Cheoy, Chief of District Health Office of Pak Tor*

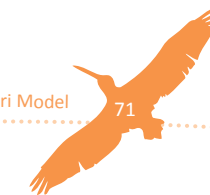
### The SRRT Partnership

At the beginning of mass surveillance campaign, the SRRT needed to scan all areas in responsibility in a bid to stop shigellosis widespread in communities. Food vendors at wet market in Pak Tor district were asked to withhold the business for at least a week for cleaning purpose.

As shigellosis widespread in the district, Pranee Ob-Cheoy, Chief of Pak Tor district health office, realized health staff could not deal with this task alone and that collaboration from multiple sectors was important to fight against the health issue.

Community and municipal leaders supported materials and staffs to help health professionals and volunteers communicated and raised awareness on good eating habit and sanitation among local residents at their houses, and health workers had to deliver the chlorine solution into sources of water supply at their house, she said.

Beyond community support, Suriya believed that effective knowledge management was the key to shigellosis eradication. He visited villages in Pak Tor district and worked closely with SRRT



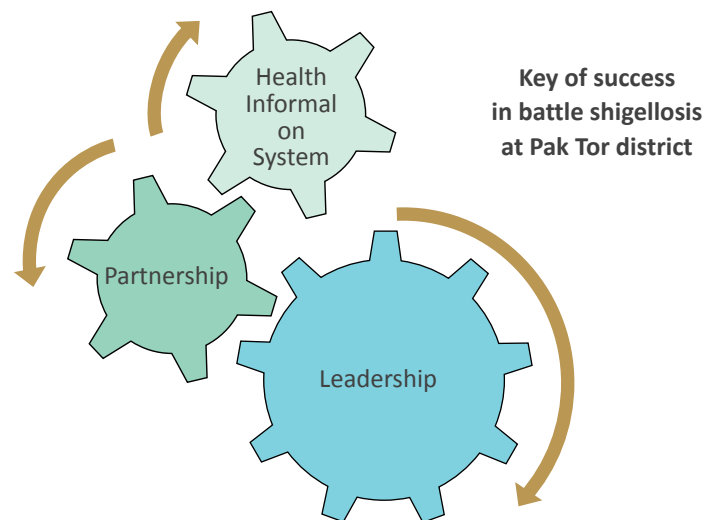


members to gather the epidemiological information as he worked harder during weekend. Suriya also used research and evidence based practice for controlling the shigellosis outbreak.

With strong political will and community support, shigellosis outbreak was controlled within a month after the SRRT campaign started. Additionally, effective communications among the SRRT partnership contributed to success in shigellosis surveillance and control.

### Lesson Learned

Collaboration among involving parties in putting surveillance system into practice leads to success in shigellosis control in Pak Tor district and that it could be adapted for use with other infectious disease control. Good inter-personal relationship and communication will enable health workers to work effectively with involving sectors that the partnership arises.

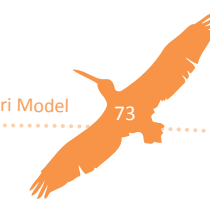


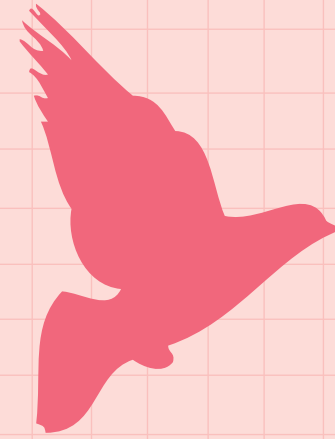
*The SRRT Partnership*

Strong leadership is also crucial in battling against shigellosis. Although the provincial SRRT obviously plays an important role in surveillance system, leadership should be applied at all levels of the SRRT. Health information management is important process leading to success in the disease control and surveillance system.

### Acknowledgement

We cannot complete this work without support from Ratchaburi provincial health office, particularly doctor Suriya Kuharat, Mr. Akkawuth Supa-Aksorn, and Mrs. Lisa Roi-Krong. Thanks to doctor Taweesak Kiatsakundeja, a director of Pak Tor district hospital, for helpful information. We sincerely thank Mrs. Pranee Ob-Cheoy, district health office chief, for her support on PMAC field trip. Special thanks for drivers who drove us everywhere on field trip preparation.





**STRONG SRRT  
AT A SUB-DISTRICT  
LEVEL**

**Lopburi  
Case**



## STRONG SRRT AT A SUB-DISTRICT LEVEL

Kamolrat Turner <sup>1</sup>  
Viliporn Runkawatt <sup>1</sup>



Strength in disease surveillance and control is the pride of the Lopburi health care team. Thoughtful planning and a high degree of participation by all sectors, regardless of the government authority, community residents and the private sector have led to outstanding Surveillance and Rapid Response Team or SRRT across the province. Delung sub-district is an example of outstanding disease surveillance capacity, prevention and control.

### Lopburi at a Glance

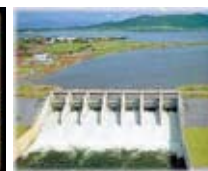
Lopburi, the city of temples and monkeys, is located about 150 km north-east of Bangkok. The city has a long history, dating back to

<sup>1</sup> Boromarajonani College of Nursing, Nakhonratchasima

the Dvaravati period, more than 1,000 years ago. It was known as Lavo and existed during the Khmer empire. Delung sub-district is situated in the west of the province's Pattananikom district. It was the area where people migrated to from surrounding villages to avoid the outbreak of cholera and small pox, around 200 years ago. Pasak Jolasid Dam, stretching across Lopburi and nearby Saraburi provinces, is also a major tourist attraction.



Pasak Jolasid Dam



Shuttle bus  
at Pasak Jolasid Dam

### Crisis Driven Strong SRRT

During 2004-2005, epidemic diseases such as avian flu, dengue, H1N1 influenza, hand-foot-mouth disease, and measles spread from one village to another in Lopburi. Instead of seeking proper medical care, people in rural districts took care of themselves by buying medication from drug stores. However, this was not an appropriate way to control the diseases. Many people in Lopburi died and suffered from the emerging diseases.

To overcome the health crisis, the provincial SRRT started learning and building capacity regarding emerging disease surveillance, prevention, and control. A comprehensive plan for the province and participation of all sectors, including community members, is established. A Self-reliant disease control system is also put in practice at all districts in the province.



Delung community





The province's Pattananikom district, in particular, is successful in controlling emerging diseases, through an expansion of the SRRT Network at the sub-district level. Thanks to cooperation and collaboration at all levels, including government agencies, local government, village health volunteers, teachers, and community leaders, the involved parties integrate quality information systems for practice and developing a sustainable disease surveillance network.



*Involvement of all parties*

### His Majesty the King's Self-Sufficiency Philosophy as a Model of Strategic Disease Surveillance

Lopburi provincial public health team developed an action plan for the health development strategy called 'Strategic Linkage Model or SLM' based on His Majesty the King's self-sufficiency economy, applicable to the local way of living among Thai people. The philosophy guides all Thai people to live their lives with diligence, intelligence, self-awareness, and attentiveness.

"We integrate the King's self-sufficiency economy and public service-minded concept into a strategic model aimed at combating infectious diseases," said Nopporn Pongpleumpitchai <sup>2</sup>, the senior medical physician of Lopburi Provincial Public Health Office.

<sup>2</sup> He is currently appointed as the Medical Chief of Prachinburi Provincial Health Office

People should be a part of a battle against epidemic diseases from screening, early detection, rapid control, effective cure and patient transfer. For example, a village health volunteer can perform early detection of dengue fever, she said.

### School Students and Disease Control

At Promrangsee Elementary School, a group of students is collecting empty water bottles for keeping at a recycled bank, while others were actively gardening. They are using flower pots made of automobile tires for planting. The school came up with this recycled bank idea to build a healthy environment and to eliminate the breeding habitat of mosquito larvae. They use flash lights to look for mosquito larvae in cement tanks and pots. They will flip those tanks and pots upside-down to get rid of breeding sources for mosquitoes.

"Since students spend most of their time at school, it is practical to train and guide them so that they can also be a part of dengue control and help protect the environment surrounding their villages," said Kamthorn Watanakul, school director.

These activities had been undertaken since 2005 in a bid to control dengue hemorrhagic fever plaguing the province, including Delung sub-district. Mr. Watanakul therefore came up with the project so students could bring dengue-control knowledge learned at school to inform their parents and relatives.



- (1) Contribution of all sectors
- (2) Involvement of school students
- (3) Covering water container
- (4) Looking for mosquito larvae







Similar dengue-control activities are also undertaken not only at Promrangsee School but also at all villages in Delung sub-district. It is usual to see students and villagers going together to eradicate breeding grounds for mosquito larvae. Sometimes they use nets to cover water containers so mosquitoes cannot lay eggs. This eliminated a major source of mosquitoes.

### A Recycling Bank is More Meaningful than Reducing Rubbish

The recycling bank was developed in 2009 and was awarded the best new idea at provincial level in 2010. The administration structure comprised of a manager as well as marketing and sales units. The project is solely run by student volunteers with teacher supervision.

A center called 'Demonstration Center for Quality of Life of the Community' was also developed at the school to provide lessons about waste management to the students and community people. Some of these lessons were integrated into a basic program at vocational schools in the province. Both students and local residents learn how to make a planting pot from automobile tires. An art teacher gives students advice on how to decorate and make the product more attractive.



*Looking for mosquito larvae*

In fact, these tire pots help prevent the community from dengue fever by reducing unused automobile tires regarded as ideal breeding grounds of mosquito larvae. People preserve lemongrass by planting it in the pots

instead of leaving stagnant water in automobile tires. Villagers have also made extra income from selling tire pots for flower planting. Most importantly, the project creates a close relationship between school and community.

Having a recycling bank at Promrangsee Elementary School not only gives the community a better environment from reduced rubbish, but also raises public awareness on building a healthy environment for the community. Students learn about good dengue control habits by bringing empty water bottles from home for recycling. In addition, this activity brings not only hygienic surroundings but also a small financial profit to the school. Money earned from selling recycled waste will be deposited at the bank on behalf of the student assembly. Further than that, it helps create public awareness of a healthy environment at the community level. Students themselves also learned how to manage a small business following His Majesty the King's self-sufficiency philosophy.



*Tire pots for plants*

### Instant Alert for Instant Response

Local public health volunteers usually survey the health condition of local people including the elderly, young children and chronic patients, as part of the preparation for household registration. For dengue control, health volunteers trained in basic testing will visit families as part of their responsibility. If the health volunteer or village SRRT is informed about a dengue case, they will perform a basic disease investigation and report to health staff at a health promotion hospital for further diagnosis. In the meanwhile, the SRRT and health volunteers will perform basic disease investigation





Vep Alert System

and control activities, such as searching for new cases for early treatment and prevention, and eliminating the breeding sites of mosquitoes.

An efficient alert system has been created for the instant warning of dengue cases. At Pattananikom hospital, if a client is diagnosed with or suspected of having dengue fever, the Social Medicine Department will be alerted. The officer there will then further interview and validate the information before putting it into the Vep-alert, the program set up for an instant alarm which will simultaneously alert a health promotion hospital, municipality office, sub-district, and local administrative organization about the outbreak.

At a health promotion hospital, after receiving the signal for an alert case, the officer will check diagnostic information and resident area of the positive case before calling health volunteers

to collaboratively perform disease investigation and control activities, including chemical spraying.

If the officer of the health promotion hospital does not receive the alert within 30 minutes, the signal will prompt the District Public Health Office to start carrying out emergency dengue control activities. If there is still no response, an SMS will be automatically sent to health officials at the District Public Health Office and the director of the health promotion hospital.

The Veb-alert system also operates on weekends. Telephone, Skype, and SMS are the means of communication among staff of health promotion hospitals and Pattananikom hospital. Messages about treatment, health care and home visits are also shared and responded to on the website of Pattananikom Contracting Unit of Primary Care (CUP). Disease control activities including eradicating larvae, manipulating the environment, and regular thermal spraying will be performed.


### Further development for sustainable SRRT at sub-district level

All involving parties can apply the information and technology system to help fast track and strengthen their work on disease surveillance and control. The Internet and website can be useful tools for SRRT teams and others to monitor and evaluate the outbreak situation in real time. They can also alert health promotion hospitals at local communities about outbreak warnings through the



Strong SRRT





Internet. Also, SMS will be sent to involved parties at all levels. Most importantly, the information and technology system helps connect databases from different communities for disease control and prevention. Development of youth's right attitudes toward disease prevention and control along with encouraging a sharing and learning culture among the community, the local government administrative organization, and other local organizations for appropriate and continuing care based on an effective health information system are crucial for a sustainable surveillance system.

### Acknowledgment

Special thanks to Dr. Sirichai Limsakul, Medical Chief of Lopburi Provincial Health Office; Dr. Nopporn Pongpleumpitichai, Medical Chief of Prachinburi Provincial Health Office; Mr. Kamthorn Watanakul Promrangsee School; Mr. Apichat Pohomsiri, Director of Delung Health Promotion Hospital; Mr. Somchai Toomdeelang; Mr.Khamphan Kongkhamin, Mr.Opart Boonyanat, Mrs. Nuanprang Pratoomsri; and all stakeholders for their information contribution to this article.



**VILLAGE HEALTH VOLUNTEERS AND  
SELF-RELIANCE OF COMMUNITY IN  
DISEASE PREVENTION & CONTROL:  
BAN PA SUB-DISTRICT SCENARIO**

**Saraburi**  
**Case**



# VILLAGE HEALTH VOLUNTEERS AND SELF-RELIANCE OF COMMUNITY IN DISEASE PREVENTION & CONTROL: BAN PA SUB-DISTRICT SCENARIO

Supaporn Wannasuntad <sup>1</sup>  
Anchaleeporn Amatayakul <sup>2</sup>

At Moo 5 Village of Saraburi’s Ban Pa sub-district, health volunteers led by Thongkhoon Sibpunta work dedicatedly to prevent and control diseases, especially Dengue Hemorrhagic Fever (DHF), a tropical infectious disease spread by *Aedes aegypti* or striped-mosquito. Every Friday, during the rainy season between May and September, health volunteers will drop by at each house located in their assigned areas to encourage and help people destroy mosquito- breeding site to prevent the outbreak. In addition, surveillance and rapid response team of the village (village SRRT) is



*Aedes aegypti* or striped-mosquito, a carrier of Dengue Hemorrhagic Fever

<sup>1</sup> Boromarajonani College of Nursing, Bangkok  
<sup>2</sup> Boromarajonani College of Nursing, Nopparat Vajira



*Dr. Prasitchai Mangjit, Expert in Preventive Medicine and the Director of Kaeng Khoi hospital, is a key person in provincial SRRT and district SRRT*



*Mr. Thongkhoon Sibpunta, a chief of village health volunteers of Ban Pa sub-district and the winner of distinguished village health volunteer award in the area of disease prevention and control for several*

arranged as a taskforce for early detection, report, and control. Mr. Thongkhoon’s house is an operating center set up to receive updates on disease surveillance, equipment necessary for dengue control such as chemical spray and abate sand granules. Besides, he designed an innovation called “Khua Noi Khoi Look Nam”, which is a little bottle for capturing mosquito larvae. Dengue control and prevention model undertaken by Ban Pa sub-district is an award winning model. The village itself is also awarded distinguished dengue hemorrhagic fever prevention and control in 2010 and 2011 by Kaeng Khoi district.

## Ban Pa Sub-district at a Glance

Ban Pa sub-district is located in Saraburi’s Kaeng Khoi district, 120 kilometers in the Northeast. The sub-district has about 3,700 households and 10,000 residents. Most of the area is located by big factories, such as a power plant, cement manufacture, and weaving factory and more than half of the residents work in the factory. The incidence of DHF of Kaeng Khoi district was confirmed at 135.89:100,000 populations in 2010, which was over the criteria of





Geography of Kaeng Khoi District, Saraburi Province



A huge pile of used automobile tyres, one of the bleeding sites of striped mosquitoes in Ban Pa sub-district a couple years ago

Ban Pa Sub-district Health Promotion Hospital, a primary care center of Ban Pa Sub-district and an operating center of Sub- district SRRT

50:100,000 populations because of high reproduction of mosquito larvae inside huge pile of used automobile tires that a power plant burns them as fuel to produce electric.

The sub-district SRRT working on dengue prevention and control includes health staff from the Ban Pa Health Promotion Hospital regarded as a primary care unit, Kaengkhroi District Hospital, Kaengkhroi District Health Office, and Saraburi Provincial Health Office, to work collaboratively with health volunteers. Its aim is to early detect, report, and control dengue outbreak. Several activities



A training session related to disease prevention and control is arranged by Kaeng Khoi district SRRT for the village health volunteers

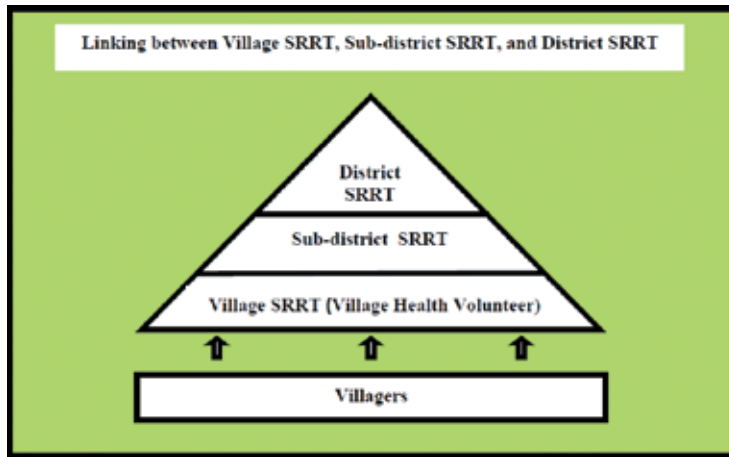


A walking campaign for dengue prevention and control is set by district SRRT



A public health officer, one of district SRRT, did disease investigate to the child with Dengue-like symptoms at Kaengkhroi hospital





such as walking campaigns and health education related to DHF prevention are also carried out. Ban Pa Health Promotion Hospital is a center for reporting dengue-like symptoms and other communicable diseases for further investigation and control. Its aim is to maintain dengue case at 50:100,000 populations following the Disease Control Department criteria.

Previously lacking support from health volunteers and delayed report on dengue cases in human led to failure to control disease outbreaks including dengue in the community, said Sermsak Khompiranon, a member of the sub-district SRRT. He realized the



Mr. Arnon Parkmalee & Mr. Sermsak Khompiranon, public health officers at Ban Pa Health Promotion Hospital and a consultant of village SRRT, updated knowledge and practice related to Dengue prevention & control to the group of village health volunteers

team needed to work closely with health volunteers in a bid to effectively control the outbreak. There are a total of 117 health volunteers working across 11 villages in Ban Pa sub-district. Mr. Sermsak discussed with Mr. Thongkhon about the health problems and how to enhance the quality of communicable disease prevention and control. Finally, health volunteers agreed to work in collaboration with SRRT at the sub-district.

### Village Health Volunteers and Self-reliance Community in Dengue Prevention & Control

An area of the Moo 5 village is surrounded by big factories such as power plant, cement manufacture, textile and ceramic factories, etc. Approximately three quarter of the villagers work in the factories. The village is at high risk for dengue because there are a large number of migrant workers living in crowded areas. Urban and crowded areas are ideal for dengue outbreak.

Mr. Thongkhon accidentally lost his right leg while working at a cement factory over 30 years ago. However, the 55-year-old man has been working



- (1) A meeting among chief executive of the Ban Pa Sub-district Administrative Organization, the Moo 5 village headman, Public health officer from Ban Pa Sub-district Health Promotion Hospital, and village health volunteers of Ban Pa sub-district to plan about disease prevention & control
- (2) An operating center of village SRRT, set up to receive updates on disease surveillance, equipment necessary for dengue control such as telephone and fax machine, chemical spray, and abate sand granules.
- (3) A machine for chemical spray to kill mosquito
- (4) A pack of abate sand granules for putting in water tank to kill mosquito larvae





Mr. Thongkhon Sibpunta was awarded for distinguished village health volunteer in an area of disease prevention and control in 2010 from Ministry of Public Health



Village health volunteers and a public health staff, members of the village SRRT, performed disease investigate and health education at a house of the child with dengue-like symptoms admitted in the hospital



- 1
- 2
- 3
- 4

- (1) Village health volunteers, members of the village SRRT, checked a mosquito' eggs and larvae in water tank inside a toilet at a house with a child having dengue hemorrhagic fever
- (2) Village health volunteers checked mosquito' eggs and larvae in water tank in a house with a child having dengue hemorrhagic fever
- (3) Village health volunteers put abate sand granules to kill mosquito larvae
- (4) A village health volunteer spraying chemical to kill mosquito at risk areas

as a health volunteer for over 20 years because he was impressed with health services during his treatment at the hospital. His dedication and volunteering mind earned himself the Distinguished Village Health Volunteer Award in Prevention and Control Disease in 2010- 2011.

Unlike other SRRT comprising health officers from sub-district, district, and provincial levels, Ban Pa SRRT includes health volunteers in the network. Mr. Thongkhon also proposed to use his house as an operating center for receiving information related to disease surveillance. Health volunteers are trained on the measure of disease prevention and control in the village and how to detect dengue-like symptoms. Once a case is reported, health volunteers will investigate the case within 24 hours, provide local residents health education, and disease control by destroying mosquito breeding sites such as used tires, putting abate sand granules in stagnant water, and spraying chemicals to kill striped mosquitoes. All health volunteers meet every the second week of the month to update on his/her work. Mr. Thongkhon, leading health volunteers, then summarizes and reports it to the sub-district SRRT.



- (1) A binder keeps documents related to activity related to disease prevention and control of each village health volunteer, each one will summarize and report it to the chief of village health volunteer every second week of the month, then the chief will summarize and further report it to the sub-district SRRT
- (2) Mr. Thongkhon Sibpunta demonstrated how to make "Khuad Noi Khoi Look Nam" to the village health volunteers of Ban Pa sub-district

The village SRRT has enough budgets to run all activities to prevent and control dengue from local administrative bodies and private sector, such as cement- manufacturing plant.

Since Mr. Thongkhon tries to reduce the use of chemicals in preventing reproduction of mosquito





- (1) Village health volunteers showed how to make “Khuad Noi Khoi Look Nam”: first step- cutting a water bottle into two parts
- (2) Second step- putting a part with bottle mouth into the bottom part
- (3) “Khuad Noi Khoi Look Nam” look like
- (4) Last step- putting “Khuad Noi Khoi Look Nam” into water by making a bottom of the bottle float above water and the other side sink under water

1	2
3	4

in the village, he invented a little bottle for capturing mosquito larvae called “Khuad Noi Khoi Look Nam”. When the bottle is put in water, the bottle mouth will be sunk under the water. Mosquito larvae will then automatically flow into the bottle and be captured inside. When mosquito larvae become mosquitoes several days after, those mosquitoes cannot be able to fly out from the bottle surrounded by water and will die inside the bottle. The idea for this local wisdom came from a device that the folk uses for capturing shrimp he has seen when he was young.



Ban Pa' village health volunteers



Mr. Thongkhon Sibpunta and team of village health volunteers received the first prize award for the village with distinguished dengue hemorrhagic fever prevention & control in 2011

Dengue incidence in Ban Pa sub-district in 2011 decreased to 5 cases in 2011 and reached the goal of 50 per 100,000 populations. The village SRRT also received the Distinguished Dengue Hemorrhagic Fever Prevention and Control Village Award from Khang Khoi district for two years in a row during 2010-2011.







Ban Pa community uses its own effort to prevent and control dengue. Thanks to dedication of local residents and strong collaboration among health volunteers, private sector, local administrative bodies and health staffs at Ban Pa sub-district and Kaeng Khoi district.

### Conclusion

Apart from well-planned measure and policy, and good disease surveillance network, strong collaboration among community, local government, and private sectors can make a difference on disease prevention and control in any community.

### Acknowledgement

My heartfelt acknowledgement goes to all contributors at Kaengkhohi hospital, Kaeng Khoi District Health Office, Ban Pa Sub-district Health Promotion Hospital, Saraburi Provincial Health Office for comprehensive information especially, Dr. Prasitchai Mangjit, Mr. Santi Poolpeng, Mrs. Jumrus Prasiw, Mr. Arnon Parkmalee, and Mr. Sermsak Khompiranon.

I would like to extend my special thanks to Mr. Thongkhon Sibpunta and all Ban Pa village health volunteers for willingness to share information about their contribution to the village Surveillance and Rapid Response Team.

Finally, I also would like to thank Mr. Udom Sudjai, and Mrs. Onepen Teena for helping me access to all contributors.



## INFECTIOUS DISEASE CONTROL IN BANGKOK: A VARIETY OF URBAN COMMUNITY

# Bangkok Case



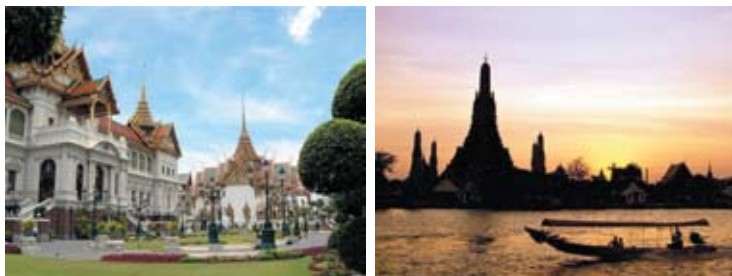
# INFECTIOUS DISEASE CONTROL IN BANGKOK: A VARIETY OF URBAN COMMUNITY

Peranan Jerayingmongkol<sup>1</sup>  
Jintana Artsanthia<sup>2</sup>

## Bangkok at a Glance

Bangkok has been ranked the World's Best City by Travel & Leisure Magazine for three consecutive years. The city offers travelers not only various accommodations and shopping destinations, but also unique Thai culture.

Thailand's capital city is made up of 50 districts covering over 1,500 square kilometers. The city is under supervision of the Bangkok



Bangkok; the City of Paradise

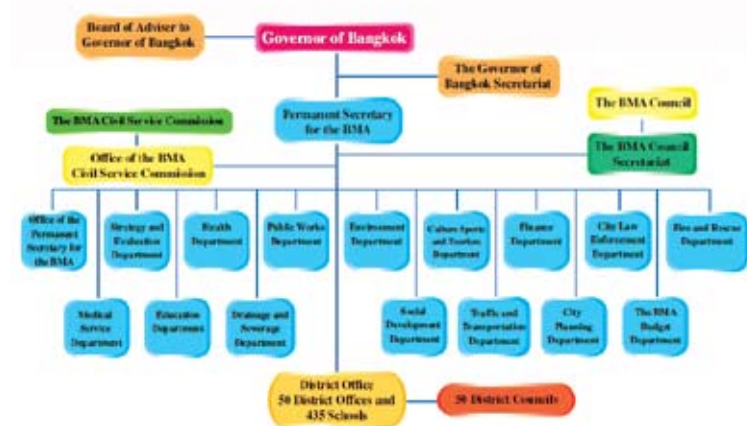
<sup>1</sup> Boromarajonani College of Nursing, Nopparat Vajira

<sup>2</sup> Saint Louis College

Metropolitan Administration (BMA). BMA comprises two pillars- executive office chaired by city governor and the legislative office under the city council administration.

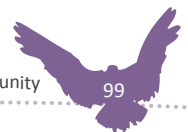
BMA's main task is to formulate and implement policies on city management including transport services, urban planning, environment and waste management, housing, roads and highways, and health and security services.

## ORGANIZATION CHART OF THE BANGKOK METROPOLITAN ADMINISTRATION



## Bangkok: Diversity Management for Infectious Control

In terms of health care, BMA operates nine public hospitals and sixty eight community health centers across 50 districts. However these health facilities are still not sufficient for taking care of an estimated 10 million people including migrant workers. The city also faces the challenge in infectious disease control and management.





Recognizing the importance of disease surveillance, investigation as well as outbreak prevention, the Communicable Disease Control Division under the Department of Health collaborates with 68 health centers including public and private hospitals around Bangkok to work together all the time.

The division works proactively to identify, prevent, and control infectious diseases posing public health threats. The division is responsible for these following three areas:

1. Epidemiology: works on disease surveillance, monitoring and evaluation.



(left) Director,  
Communicable Disease Control  
Division  
(right) Dr Chaninan Sonthichai  
Head of Epidemiology Section

2. Insect and vector control: educates community about urban diseases such as dengue fever and other vector-borne diseases.



(left) Sompit Oatwaree  
head of Insect and Vector  
Control Section  
(right) Chantara Chuntanom  
head of Vaccine Section

3. Immunization & Vaccine: supplies cold chain vaccine and other equipments for all vaccination activities at health care centers in Bangkok.



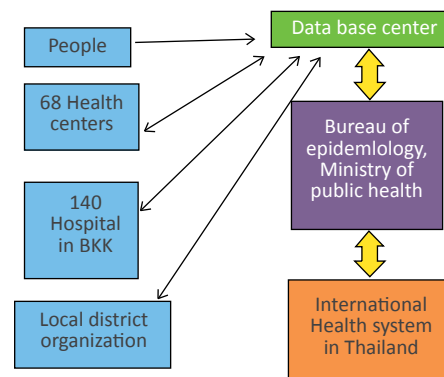
(left) Cold chain vaccine container  
(right) cold chain vaccine box

## Networking and Collaboration

The Section of Epidemiology collaborates with 68 health centres, district offices, community leaders, and health volunteers to work on surveillance as well as prevention of any disease outbreaks.

An outbreak alert comes from community residents, hospitals and health centers in the city. After receiving information, staff at health department rapidly responds to the situation.

Investigation team sends a real-time report from any areas in Bangkok having a disease outbreak. Health care providers at the area will then be directed to respond to the outbreak following by the disease management.



Data center





Bangkok also has a Surveillance Rapid Response Team or SRRT to respond to the outbreak. The team also supports public and private partnership aimed at raising public awareness on infectious disease outbreak.

### Influenza Control in Bangkok

Human cases were reported contracting the virus causing respiratory illness when the Influenza A (H1N1) outbreak was reported in Bangkok in May 2009. Most cases were the young and the elderly. By July 2009, human cases increased rapidly among students. A lot of public schools in the city had to be closed for a week as part of the government's outbreak control.

Similar measure was also applied to schools in other provinces having H1N1 influenza outbreak. Public were encouraged to wear masks and use hand sanitizer to prevent themselves from



*Children wear mask as part of influenza prevention*

contracting the virus. Leaflets, posters and billboards to promote self-protection from H1N1 were also distributed to communities across the country.

Meanwhile vaccines were also given to vulnerable groups- health care workers at the frontline, pregnant women, the elderly aged over 65 years, people suffering from obesity, those having chronic diseases, and people with disabilities.

During the H1N1 outbreak, the SRRTs are also working with laboratory technicians to develop diagnostic kit for rapid virus testing.

Prevention and early detection were important to curb the H1N1 outbreak and that involving parties including health authorities including the SRRT as well as public and private sectors need to work together in a battle against H1N1 outbreak.

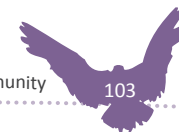
### Health Challenge Facing Urban Area

Bangkok is among the world's fastest-growing cities. High-rises and new construction projects are seen everywhere. Labors, both locals and migrants also travel from upcountry to urban areas for work. Their families also come along with them. Poor quality of living at construction sites could pose health threats including the influenza outbreak among vulnerable population including children.



*Children live in construction area*

Raising public awareness on disease prevention is also a health challenge for involving parties to put into practice.



## Strength

1. The strength of health networking at different levels from health centers, district offices, private sector, local communities and health volunteers.
2. Real-time report on outbreak situation leads to effective mitigation measure.
3. Dynamic community participation also leads to sustainable outbreak control in the long run.

Sompit Oatwaree, head of BMA Insect and Vector Control Section, said community residents themselves were crucial in helping control disease widespread.

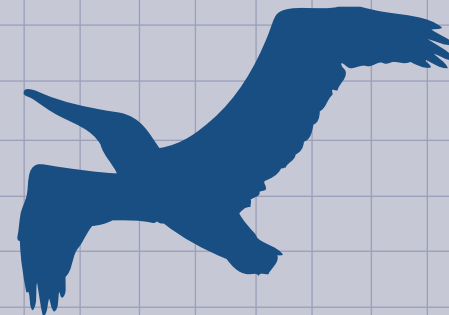
*“Health volunteers, community leaders, local administration members and residents themselves are the key to success in curbing disease widespread,” she said.*

## Conclusion

Clear guidelines on outbreak communication among health care providers and public will result in sustainable public resilience, outbreak control, and less mortality rate. It will also help minimize damage to economy and health at national and international levels.

## Acknowledgements

This manuscript could not have been completed without useful information from all related sites and kindness of interviewees as follows: Dr.Wongwat Liulak, the director of Division of Communicable Disease Control, Dr.Chaninan Sonthichai head of Epidemiology Section, Sompit Oatwaree head of Insect and Vector Control Section, Chantara Chuntanom head of Vaccine Section and all participants.



## ROLE OF MEDICAL SCHOOL IN DISEASE CONTROL: A CASE OF SIRIRAJ HOSPITAL'S FACULTY OF MEDICINE

# Siriraj Case



# ROLE OF MEDICAL SCHOOL IN DISEASE CONTROL: A CASE OF SIRIRAJ HOSPITAL'S FACULTY OF MEDICINE

Panarut Wisawatapnimit <sup>1</sup>  
Orarat Wangpradit <sup>2</sup>

## Siriraj Hospital at a Glance

“Siriraj Hospital” is the top medical school in Thailand. The hospital is also renowned among health care providers and patients alike for its finest antimicrobial resistant management and modern microbiology laboratory to detect infectious disease.



Siriraj Hospital

<sup>1</sup> Boromarajonani College of Nursing, Bangkok  
<sup>2</sup> Sirindhorn College of Public Health, Chonburi

Situated by the Chao Phraya River, the hospital was established in 1888 by His Majesty King Rama V. It was the country’s oldest and biggest medical school.

The hospital mission is not only to provide high-standard health services for patients, but also to produce young medical graduates, conduct research, and lead Thai society to good health. The mission reflects the philosophy of His Royal Highness Prince Mahidol of Songkla, Father of Modern Medicine and Public Health of Thailand as follow: “True success is not in the learning, but in its application to the benefit of mankind.”

The award-winning hospital is also well-known for its great work on improving public health issues particularly infectious disease control.



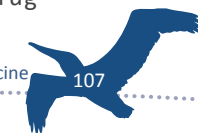
His Royal Highness Prince Mahidol of Songkla's monument at Siriraj Hospital

## Challenge of Antimicrobial Resistant Infection in Thailand

Irrational use of antibiotics becomes a challenge of national health care in Thailand. Over 20 billion baht was spent on antibiotics alone in 2007 according to the Public Health Ministry. The overall consumption is two times more than the U.S.A. and in four times more than the Netherlands.

“Antimicrobial resistant infection is a big problem of national health care. It is difficult to control due to irrational use of antibiotics,” said Dr. Pattarachai Kiratisin, Siriraj Hospital’s head of microbiology department.

Antimicrobial resistant infection has been increasing, mainly due to irrational use of drugs. Microorganisms could develop drug





resistance within only a few months while it takes 10-30 years to develop antibiotics and huge investment into medical research and development. People should be aware of this fact about irrational use of antibiotics to solve the issue.

### Center for Infectious Disease Control in Thailand



*Activity of Mister Hygiene*



*Washing Hands of Health Care providers*

“Do you wash your hand? If not, please give me your hands before visiting patients at the ward,” said a young health care provider to both doctors and nurses with smile. Then, the so-called “Mister Hygiene” presses alcohol gel to their hands and thanks his clients.

Mister and Miss Hygiene is an initiative project launched in 2012 at the hospital. The project focuses on health providers at the frontline and is aimed at encouraging the hand washing habit; widely accepted as effective disease prevention.

The other project is a voice message for reminding health providers to wash their hands particularly when entering and leaving such highly infectious area as intensive care unit.

In fact, the Center for Infection Control at Siriraj Hospital has played a vital role in controlling infection in Thailand since its establishment in 1979.

Thailand faced a challenge of high hospital infection rate at 11% following the World Health Organization report in the early 1980s. The infection rate was even higher than 7-9% global rate.

Dr. Somwang Danchaiwijitr pioneered the hospital infection control in the country. At the beginning, Dr. Somwang, who is an expert on infectious diseases at the hospital, worked with few nurses to reduce hospital infection rate. To date the hospital still maintains good strategies to curb hospital infection following the Joint Commission International Standard (JCIS).

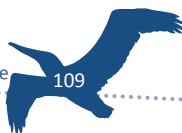
The Infection Control Committee (ICC) is also set up at the hospital to develop policies and action plans for infection control team members to put into practice.

Surveillance on infectious disease outbreak, antimicrobial resistance, and microorganisms are undertaken at all hospital wards on a monthly basis.

One of the key strategies is setting up panels working on infectious disease surveillance, personnel training, and clinical practice guidelines. These panels closely work with the Department of Disease Control, Ministry of Public Health, and Bamrasnaradura Infectious Diseases Institute to organize, evaluate and implement policies on infectious disease control in Thailand.

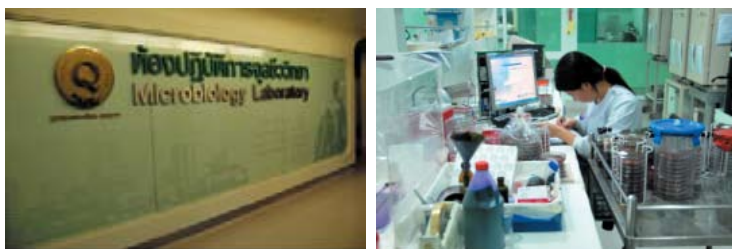
In the role of medical school, the center also provides training on infectious control for national and international health care providers and conducts many studies to develop new knowledge and policy guidelines.

Siriraj Hospital is also successful at hospital infection control. Catheter-associated infection in bloodstream urinary tract, and ventilator-associated infection such as pneumonia decreased from 6.8 to 6.6 following a study among 114 patients during 2010-2011.





Assoc. Prof.  
Dr. Pattarachai  
Kiratisin



Microbiology Laboratory

### Advanced Microbiology Laboratory toward International Excellence: A Vital Mechanism for a Battle against Infectious Disease and Antimicrobial Resistance

Microbiology laboratory at Siriraj Hospital serves as the excellence centre for medical research and development.

Running labs effectively, however, is not an easy task and requires well-designed infrastructure and managing system, said Dr. Pattarachai Kiratisin, Siriraj Hospital's head of microbiology department.

More than 90 health professionals including experts on microbiology and are working at the lab and collaborating with physicians and staff at the center for hospital infection control. Graduate students and health staff at the hospitals also receive training at the laboratory categorized into seven units-central, bacteriology, mycobacteriology and mycology, virology, serology, molecular microbiology, and environmental microbiology.

Approximately 30,000 specimens from Siriraj Hospital and others nationwide are sent for lab tests here every day. Laboratory technicians use instruments from basic microscope to advanced devices to examine DNA of pathogens; consequently, identification of the DNA helps guide anti-infective and anti-resistant medications.

According to Dr. Pattarachai, it is the first lab unit which discovered in 2006 and 2007 that the inflammation of membrane lines inside heart chambers in a patient having heart failure and a kidney patient having hemodialysis are caused by two bacteria species *Inquilinus spp.* and *Dyella japonica*, respectively.



Specimens



Awards of Microbiology Laboratories

The laboratory is also accredited by an International Standard Organization on quality management system particular to medical laboratories (ISO 15189) and received many awards from national and international levels.







## Antimicrobial Resistant Infection: A Challenge of Infectious Disease Control at Siriraj Hospital

As a tertiary care center, Siriraj Hospital looks after many patients in critical conditions. Many also need advanced and specialized treatment. Antimicrobial resistance in patients is among the top medical challenge.

“The main factor of antimicrobial resistance is the critical condition of the patients themselves,” said Dr. Yong Rongrungruang, Siriraj Hospital’s head of infectious control unit, department of internal medicine.

He said critical patients usually have low immunity and that they could contract infectious diseases easily. Doctors, therefore, prescribe high-generation of antibiotics for patients. However, the more antibiotics are given to patients, the more pathogens adapt itself to resist antibiotics, he said.

Collaboration among health care providers is also important for hospital infection surveillance. The microbiology department is also responsible for detecting and identifying microorganisms leading to drug resistance as well as giving alert to other departments including the infection control committee. Doctors and hospital staff at the frontline will then put the action plan on infection control into practice to avoid widespread disease outbreaks.

However, infectious diseases caused by bacteria in the *Acinetobacter* species, especially *Acinetobacter baumannii*, is still the most problematic, leading to drug resistance at hospitals nationwide including Siriraj Hospital.

Dr. Yong said bacteria in this group could adapt itself to high and low temperature. If it is found, many types of antibiotics are needed for treatment. It is why hospital infection control is essential.



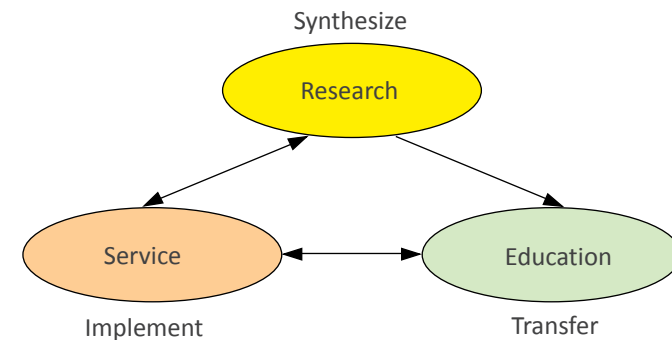
Assistant Prof. Yong Rongrungruang (first person on the left) and infection control team on Siriraj IC Days 2012



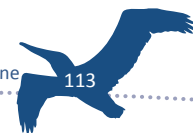
Health Care Personnel training about Infection Control

### Key Success

In function as a medical school, Siriraj Hospital plays crucial roles in managing antimicrobial resistant infection particularly at hospital by focusing on research, education and service as shown in diagram below.



Awareness on hospital infection control among health care providers and patients themselves are important. Activities aimed at promoting hospital infection need to be continuously undertaken and further developed. Utilizing Mister and Miss Hygiene and the annual Siriraj Infection Control Days held in





October are good examples of the hospital infection control projects.

In spite of high-standard laboratories and hospital staff, only Siriraj Hospital alone cannot battle antimicrobial resistance. Collaboration of all involved parties at local, national, and global levels is needed to solve this issue seriously.

### Acknowledgement

Special thanks to Associated Professor Dr. Pattarachai Kiratisin, Manging Unit Chief, Department of Microbiology and Assistant Professor Yong Rongrungruang, Head of Infectious Control Unit, Department of Internal Medicine, Siriraj Hospital for their great contribution on information about infection control.

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Boromarajonani College of Nursing, Nakhonratchasima  
Boromarajonani College of Nursing, Chakriraj  
Boromarajonani College of Nursing, Bangkok  
Boromarajonani College of Nursing, Chonburi  
Boromarajonani College of Nursing, Chang Wat Nonthaburi  
Boromarajonani College of Nursing, Nopparat Vajira  
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Saint Louis College  
Sirindhorn College of Public Health, Chonburi

