
Original Article

Adoption of One Health in Thailand's National strategic plan for emerging infectious diseases

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Abstract This study illustrates how Thailand adopted the One Health concept. Massive socio-economic and health consequences of emerging infectious diseases, especially Avian Influenza in 2004, led to recognition of the importance of and need for One Health. Based on collaboration and consultative meetings between the national actors and international development partners, Thailand adopted One Health to drive more effective containment of Emerging Infectious Diseases. This concept gained support from the non-governmental and civil society organizations through processes of the National Health Assembly. In 2012, a Cabinet resolution endorsed a National Strategic Plan for Emerging Infectious Diseases (2013–2016), in which One Health appeared as a core principle. Collaboration among multi-disciplinary groups of professionals, particularly epidemiologists trained in Field Epidemiology Training Programs (FETP), including FETP, FETP-veterinarian, and FETP-wildlife veterinarians, promoted implementation of One Health.

Journal of Public Health Policy (2017) 38, 121–136.

doi:10.1057/s41271-016-0053-9; published online, 17 November 2016

Keywords: One Health; policy; Thailand; emerging infectious diseases; EID; Public health

Background

Recognition of the effects of environmental factors on human health dates back to the Greek physician Hippocrates (c. 460 BCE–c. 370 BCE). He observed a link between public health and a clean



environment.¹ During the 17th and 18th centuries, understanding of the environment's role in the spread of diseases to humans and animals gradually improved.² The first description of the term 'zoonosis,' in 1858 by Rudolph Virchow, the father of comparative medicine, included the statement: "Between animal and human medicines there are no dividing lines—nor should there be".³ Calvin Schwabe promoted the term 'One Medicine' in 1984, describing it as the science of health and disease in which differences between humans and animals are not considered.⁴ During the last century, recognition of Emerging Infectious Diseases (EIDs) increased around the world; 70 per cent of EIDs in humans originated in animals.⁵ This recognition led to new action by governments and others. In 1995, the World Health Organization (WHO) and its Member States revised the International Health Regulations (IHR1969) to reflect *emergence* of new infectious agents such as the virus causing Ebola hemorrhagic fever and *resurgence* of old epidemics including cholera.⁶

Subsequently, the Wildlife Conservation Society organized a *One World, One Health* meeting in 2004 to discuss the One Health concept.⁷ Global momentum since then has increased coordination between human, animal, and ecosystem health to improve infection control, particularly of EIDs.⁸ The scope of One Health has been interpreted variously. By 2008, the American Veterinary Medical Association, Food and Agriculture Organization of the United Nations (FAO), Office International des Epizooties (OIE), World Health Organization (WHO), the UN System Influenza Coordinator, UNICEF, and the World Bank proposed a definition of One Health as "a collaborative effort of multiple disciplines-working locally, nationally, and globally to attain optimal health for people and animals, and a healthy environment".⁹

In the last decade in Thailand, EID outbreaks, including from the highly pathogenic Avian Influenza, H5N1 in 2004 and Pandemic Influenza H1N1 in 2009, have caused substantial socio-economic harm, and human and animal losses. These outbreaks expedited recognition of links among humans, animals, and the environment. In Thailand the term One Health is 'Sookkapap Nueng Daew'. Thailand's government adopted it in its National Strategic Plan for EID (2013–2016) as a foundation for achieving healthy lives for humans, animals, wildlife, and for maintaining a healthy environment. The Cabinet endorsed this plan in August 2012. It reflected close collaboration among stakeholders in animal and human health sectors.¹⁰



To help others understand how Thailand transcended previous national policies to adopt One Health in its national and regional strategies, we analyzed agenda setting, actors, policy formulation processes, and the context or policy environment from 2003 to 2013.

Methods

We undertook a qualitative study in which we reviewed documents, observed and participated in meetings, and conducted in-depth interviews of key informants. We reviewed forty-eight documents including eleven primary documents (national reports, meeting minutes, and declarations (see discussion of Hanoi and Thai One Declarations below) and thirty-seven secondary documents (journal articles, presentation handouts, proceedings, internet information, and newspapers). We selected all documents using 4 criteria:

- related to EIDs and zoonoses in Thailand,
- applied multi-disciplinary approach to solve health-related problems,
- released between January 2003 and February 2013, and
- related to Thai delegates' participation in EIDs meetings.

One author (AS) conducted the participant observations in twelve meetings and conferences related to One Health (national and international) between January 2013 and February 2014, as a participant, speaker, or rapporteur. We used purposive sampling to identify eleven key informants for in-depth interviews from among government officials whose departments bore direct responsibility for One Health, technical experts, and academics involved in One Health policy (Table 1). We used snowball sampling to identify additional informants until we reached 'information saturation' (where new information was no longer emerging). We conducted all interviews in Thai, recorded and transcribed them.

We summarized all documents and interviews, and subjected all of the material to a thematic analysis. We verified accuracy by comparing documents and interviews and across key informants ('triangulation'). We expurgated information that was not clear. We have applied a policy analysis framework¹¹ to depict what policy issues contributed to One Health agenda setting, which actors engaged in policy

**Table 1:** The profile of key informants

	M	F	Total	Average age, years median, (min–max)	Work experience, in organization, years median (min–max)	Work experience in current position, year, mean (min–max)	Code
Ministry of Public Health	4	0	4	59.5, (44–73)	33, (20–47)	9, (1–13)	PH01-04
Ministry of Agriculture	1	1	2	56, (55–57)	31	2, (1–2)	LH01-02
Ministry of National Resources and Environment	1	2	3	40, 30–59	10, (3–36)	2, (1–3)	WH01-03
International Development Partner	0	1	1	54	7	7	IO01
University	1	0	1	59	11	11	AC01
Total	7	4	11	55, (30–73)	23, (3–47)	5, (1–13)	

formulation, and what elements of global and regional contexts or environments supported Thailand’s adoption of One Health.

The Thai Research Ethics Committee at the Institute for Development of Human Research in Ministry of Public Health (MoPH), Thailand approved this study. For the in-depth interviews, we obtained written informed consent from the key informants before interviews, and kept confidential any characteristics that would identify the individuals.

Results: How Thailand Adopted One Health

The devastating effects of H5N1 and H1N1 in Thailand

In January 2004, an H5N1 outbreak in poultry and transmission to humans seriously affected human lives and caused economic losses. Between 2004 and 2006, Thai public health officials confirmed 25 human cases including 17 deaths by H5N1 in 18 provinces. Authorities arranged to cull more than 60 million birds to contain the outbreaks. The government spent more than 5 billion baht (\$ 200 million USD at



40 Baht per dollar exchange rate in 2004) to compensate farmers. This amount did not reflect the full loss. Several countries banned importation of raw chicken products from Thailand.¹² H5N1 caused an economic loss of US\$ 754 million in 2004, equivalent to 0.4 per cent of Gross Domestic Product (GDP).¹³ Larger H5N1 epidemics with high case fatality rates seriously affected Indonesia and Vietnam from August 2003.¹⁴

The H1N1 pandemic in 2009 prompted a special session of Health Ministers to foster collective effort to prevent and control H1N1 in the region at a meeting of the Association of Southeast Asian Nations (ASEAN) Plus three (ten ASEAN members, China, Japan, and Korea). Participants recalled the Joint Ministerial Statement on Prevention and Control of H5N1 outbreak in 2004. The H1N1 pandemic reflected dynamics of the H1N1 virus spread from human to human and between humans and animals. The Ministerial meeting urged development of a more effective national pandemic preparedness plan, intensification of animal and human surveillance, and support for a more effective response system.¹⁵

Agenda setting: EID recognized as a national agenda

Mass media publicized the high case fatality of H5N1 in 2004 (60 per cent)¹⁶ and factors that hampered outbreak control: lack of an effective human vaccine and lack of sharing surveillance data about humans, poultry, and wild birds. These reports heightened public concern and dissatisfaction. The Prime Minister responded immediately (on 23 January 2004) by issuing an executive order to establish a National Committee, chaired by the Deputy Prime Minister, with six Minister members (from Health, Agriculture, Commerce, Foreign Affairs, Industry, Labor) and a representative from Thailand's National Economic and Social Development Board. After successfully controlling the first wave of outbreak, this Committee reached consensus for urgently establishing more effective Avian Influenza control and prevention mechanisms. The Deputy Prime Minister appointed a group of experts (from Ministry of Public Health, Ministry of Agriculture, Ministry of Natural Resources and Environment, Ministry of Science and Technology, academic institutions, among others) to draft a first National Strategic Plan for Preparedness and Response to Avian Influenza and Influenza Pandemic in Thailand (2005–2007). Its essence

is collaborative action across ministries and sectors, asserting that: “...to solve the Avian Influenza outbreaks, the operation needs to be integrated and systematically approached. The complexity involving many factors cannot be solved independently”.¹⁰ As one key informant noted:

After the announcement of Avian Influenza outbreak in Thailand, there was chaos and panic at the political and public levels. Later, Prime Minister Thaksin ordered the Public Health Minister to stop this outbreak. Consequently, he established the national committee. Later the MoPH proposed drafting the national strategic plan in response to the outbreak and the committee endorsed it.....” [PHoI-See Table 1].

By the conclusion of the first National Strategic Plan in 2007, the National Committee had recognized that an Avian Influenza outbreak could become an epidemic. Thailand endorsed and implemented a second National Strategic Plan for Preparedness and Response to Avian Influenza and Influenza Pandemic (2008–2010). It continued to focus on harmonization and strengthening international collaboration.¹⁷

One Health: from global to national policies

After the Wildlife Conservation Society introduced One Health in 2004, the concept gained momentum through international meetings at policy and technical levels (including in declarations such as the one in Hanoi).^{18–22} Resurgence of EIDs increased awareness of the usefulness of the One Health approach. Additionally, FAO, OIE, and WHO promoted this concept, along with technical guidelines, to member states including Thailand. Another key informant said:

Each part of the health sector has its own link to intergovernmental agencies. In the public health sector, we collaborate with WHO. In animal health sector there are FAO and OIE. The tri-partite joint report (by WHO, FAO and OIE) set the precedent and enabled us to do cross-sectoral work at country level...” [LHoI].

Academic institutions in Thailand convened meetings, as they did in other countries. They promoted One Health, at policy fora²³ and in



technical meetings.²⁴ In 2013, the Prince Mahidol Award Conference hosted the Second International One Health Congress in Bangkok entitled *A World United against Infectious Diseases: Cross-sectoral solutions*.²⁵ This meeting increased awareness of the multi-disciplinary nature and importance of One Health for coping with EIDs.

The birth of Thailand's One Health network: role of diverse actors

Prior to the 2004 H5N1 outbreak, the public health and livestock sectors had been working together for more than two decades to contain zoonotic diseases such as rabies, anthrax, and brucellosis. Research institutes, including the Armed Forces Research Institute for Medical Sciences (AFRIMS), conducted several studies about zoonosis and vector borne diseases [reported to us by key informants PH02, AC01]. The collaborations that produced the work were *ad hoc* and not sustainable. The major deficiency was absence of systematic data sharing between human and animal health sectors. In 2004, collaboration across disciplines improved and helped to contain H5N1 influenza. The emergence of leptospirosis after flooding in Nan Province in 2009 again fostered intersectoral collaboration. These experiences fostered establishment of the Thailand One Health Network and endorsement by the One Health Declaration²⁶ in 2011. 'Technocrats' including government officials, researchers, academics, and experts from international development partners played critical roles. At an EID side event of the annual National Epidemiology Conference all relevant partners committed themselves fully to continue One Health collaboration. This network has evolved naturally based on strong informal relationships among participants committed to direct collaboration to increase effectiveness for responding to EIDs. Having started with a goal to coordinate all relevant authorities within Thailand, the goals expanded to include support for countries in the region (technical support and training for the public health workforce, and for animal and environmental health). About 100 individuals remain active in this network.²⁷

The avian Influenza crisis created a platform to strengthen relationships. The more we worked together, the more trust we built. We, though from different sectors, worked as colleagues on several activities including training. We had a FETP-V course in

field epidemiology for veterinarians which fosters relationships between the two sectors...not only in Thailand but extended to support neighboring countries as EID observed no geographical borders. The One Health is successful because of the existing strong partnerships. [PH03].

One Health capacity building: roles of international development partners

The international development partners promoted multi-sectoral and multi-disciplinary collaboration. Three agencies lead support for One Health capacity building: the Food and Agriculture Organizations of the United Nations (FAO), the United States Agency for International Development (USAID), and US Centers for Disease Control and Prevention (CDC). From 1980, collaboration for strengthening capacity among the MoPH, US-CDC, and the WHO had been ongoing through the Field Epidemiology Training Program (FETP). Later these sponsors extended FETP to FETP-Veterinarian (FETP-V) with support from FAO (from 2005) and FETP-Wildlife veterinarians (from 2013). FAO fostered cross-sectoral collaboration through livestock and wildlife studies by FETP-V trainees. FETP established 1030 Surveillance and Rapid Response Teams (SRRTs)—in all districts—to facilitate early detection and response to outbreaks. Through the Emerging Pandemic Threat (EPT) program,²⁸ USAID in 2012 began to support the Thailand One Health University Network (THOHUN), in conjunction with the South East Asia One Health University Network (SEAOHUN) for pre-service training.²⁹

In 2012, a project entitled *Strengthen One Health Epidemiological Teams at the Provincial and District Level*, proposed by FETP and its allies (FAO, USAID, US-CDC, and THOHUN), became the first applied epidemiology training to recruit trainers and participants from public health, animal health, and wildlife health, and from both international and national agencies. Participants engaged in pilot field projects in 5 provinces to extend learning beyond the classroom. Thus, the network expanded to include local participants, incorporating field operations into national One Health efforts. USAID's RESPOND project provided financial support through Development Alternatives, Inc. (DAI), US-CDC, FAO, and Thai governmental agencies.³⁰



Public Policy Process: national health assembly in 2009 and 2013

In Thailand, the annual National Health Assembly (NHA) facilitated participatory public health policy formulation. Its creation amounted to a social innovation intended to promote evidence-based policy based on multi-sectoral participation and wide public involvement. Under the National Health Act 2007, the constituencies of NHA (government, academia, and the public), took part in the policy processes: agenda setting, policy formulation, policy implementation, and monitoring outcomes. The NHA adopted resolutions and proposed that the cabinet endorse most of them to assure that the new policies would be binding on government agencies, thus requiring implementation and monitoring of progress.³¹

In 2009, the H1N1 pandemic that originated in swine triggered the ASEAN + 3 Health Ministers Special Meeting on Influenza A (H1N1) in May. At the December meeting of the same year, the NHA included H1N1 on its agenda. The NHA adopted an EID resolution requesting the National Health Commission to establish a national committee to draft a strategic plan for more effective EID management. Its members included public agencies, private sector entities, academia, local government organizations, and civil society.³²

Although relevant organizations (including the Ministries of Public Health, Agriculture, Natural Resources and Environment) are committed to the implementation of the One Health concept, many beyond the technocrats mentioned above were not familiar with this term, particularly those in private and non-government organizations. In 2013, the NHA proposed that the local government apply One Health at the community level. This resolution, entitled *Multi-sectoral Collaboration for One Health of Humans, Animals and Environment* requested public sector organizations, other partner organizations, and networks to support implementation of the National Strategic Plan for EID (2013–2016) for translating One Health into tangible outcomes in communities.³³

Policy formulation process

Thailand established the Bureau of Emerging Infectious Diseases (BoEID), MoPH, in 2008—a transformation from the Bureau of Influenza founded in 2005 in response to H5N1 epidemics. As technical secretariat of the National Committee for Preparedness and Response to Avian Influenza (2005–2007), they were responsible to implement

and monitor Avian Influenza outcomes. With conclusion of the second National Strategic Plan for Avian Influenza (2008–2010), BoEID convened a meeting to draft a new strategic plan. Corresponding to the second National Health Assembly in 2009, this body expanded the scope of the strategic plan to include all EIDs. The BoEID convened more than 60 consultation sessions with relevant agencies in Bangkok and other provinces to ensure broad support to facilitate ‘ownership’ and effective implementation.

The committee consisted of 100 individuals from government and non-governmental organizations, academic institutions, and civil society (10). The public hearing involved more than 1,000 people. It illustrated a participatory process throughout policy development while committee members built relationships among themselves. Key informants commented:

At that time, we needed to expand the third national strategic plan to cover EID (not only Influenza). During the drafting process, the One Health concept emerged and gained recognition among working group members. I can say that the drafting group brought the One Health concept to the meeting and we fully agree to insert it into the strategic plan...” [PH03]. and

This strategic plan did not come from the policy maker in a top down manner. We (at the technical level) had many experiences in working together. Because we want policy makers to see how important of EID problem, we all strongly agree to push it into the national policy. When it became a policy, we could achieve more, both immediate and long-term outcomes. [WH02].

After a consultation and drafting process of two years (2011 and 2012) the cabinet endorsed the national strategic plan for EID (2013–2016) on 28 August 2012. The Deputy Prime Minister who has strong convening power chaired a newly established National EID Committee. The second Avian Influenza plan operated during the two years between the second Avian Influenza plan (2008–2010) and the EID strategic plan (2013–2016).



EID: One Health recognized as essential for EID control and prevention

The National Strategic Plan for EID (2013–2016) improves EID control and prevention in humans and promotes health and wellbeing in humans and animals.³⁴ Its drafters synchronized its five strategies, 25 sub-strategies, and 140 action points with the first and the second National Strategic Plans for Preparedness and Response to Avian Influenza and Influenza Pandemic, the second National Health Assembly resolution on EID, and with the “core capacities” required by the International Health Regulation (2005).

The One Health concept is integrated in four out of five strategies including:

- Development and implementation of effective management systems for commercial animal farms, animal health, and wildlife to ensure a disease-free animal sphere,
- Development of knowledge management system and supporting research and development,
- Development of integrated management system for EID preparedness and emergency response, and
- Risk communications and public awareness campaign relating to the risks from EID.

From the findings on agenda setting, policy formulation, and the context or policy environment, Figure 1 summarizes key chronological events of policy adoption of One Health in Thailand.

Discussion: Key Themes

Four key themes emerged from our analysis.

First, the 2004 H5N1 and the 2009 Influenza A (H1N1) triggered political decisions to adopt EID into the national agenda. Decision makers recognized One Health to be a more effective way of responding to the devastating health and socio-economic impacts of EIDs and integrated One Health into the EID strategic plan. The ASEAN Plus Three political concerns about the 2009 Influenza A (H1N1) fostered political commitments in Thailand (15). Multi-

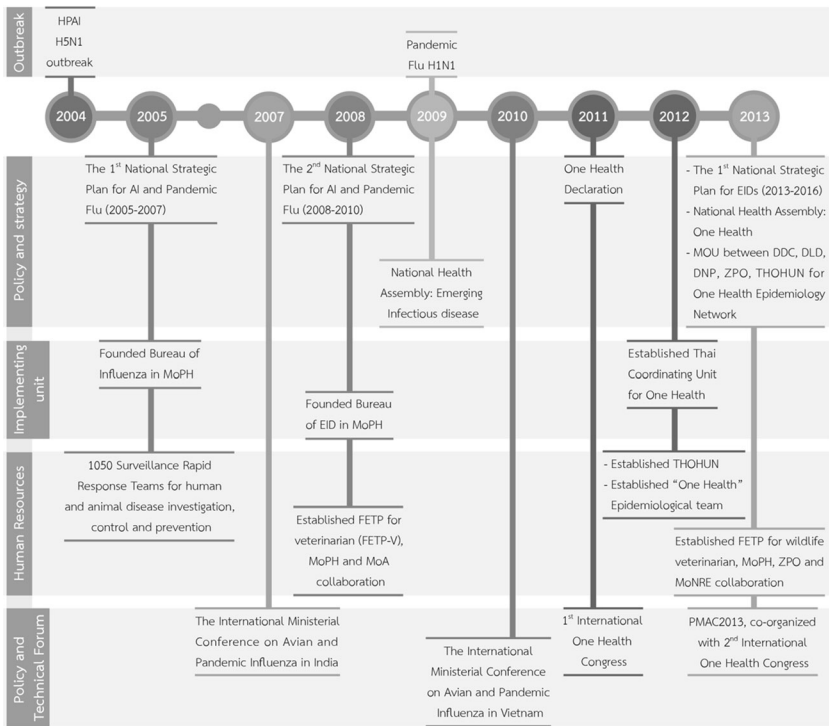


Figure 1: Key chronological events of policy adoption of One Health in Thailand.

disciplinary and multi-sectoral collaboration did appear to be notably more effective for EID control and prevention

Second, domestic technocrats and international development partners played critical roles. The latter helped support capacity building of field epidemiologists in Thailand and extended support to countries in the region. Domestic partners (in human, livestock, and environmental health) had collaborated for decades on zoonosis control. Their experiences confirmed need for and ease of reaching cross-sectoral consensus on One Health. Creation of the national EID strategy provided opportunities for meeting and sharing information for effective control. These national actors played two roles: policy formulation (proposing One Health to guide the National EID Strategy), and implementation (through surveillance and response to EIDs). Without these technocrat actors and epidemiologists working across key sectors, the strategic plan results might have been poor. Our



observations in meetings confirm the enthusiasm and collegial relationships among partners across disciplines and ministries. Official and informal data sharing among government agencies (for public, livestock, and wildlife health) have become common practices.

Third, international activities played vital roles. Several global One Health movements gradually entered national policy discussions. Increasingly perceived as effective, One Health came into play with two global health crises, the 2004 Avian influenza H₅N₁ epidemics and the 2009 H₁N₁ pandemic. Thus Thailand adopted One Health into the National Strategic plan for EID (2013–2016).

Finally, the National Health Assembly, a participatory public policy process heightened awareness of EIDs and widened recognition of One Health to many in government and non-governmental organizations beyond the human, animal, and environment health constituencies.

Participants developed the National Strategic Plan for EID (2013–2016) based on trust among multi-sectoral technocrats. Those from MoPH played significant roles in policy formulation. The BoEID, originally having served as a secretariat of the National Strategic Plan on Avian Influenza, has expanded its mandate to all EIDs; One Health is fully integrated. Undeniably, evidence shows that the trusting relationship among multi-disciplinary collaborators is the critical success factor for EID implementations on ground.

Conclusion

Although the One Health term is relatively new, the concept, even if implicit, has guided responses to various zoonoses for decades. One Health emerged at the right time in responses to H₅N₁ and H₁N₁. ‘Windows of opportunity’ permitted success in adopting One Health as a fundamental principle in Thailand’s National Strategic Plan for EID (2013–2016). This plan helped foster national capacity and broadened collaboration through the routine meetings of key stakeholders to discuss disease dynamics, share knowledge, conduct research, and train staff jointly. The enduring goal has been to ensure human and animal health security through preparedness, detection, and response to EIDs.

Acknowledgements

The Strengthening Thai Capacity for Health Promotion (STRETCH) program, International Health Policy Program, funded by Thai Health Foundation supported this work. We thank our mentors, Dr Suwit Wibulpolprasert, Dr Supamitr Chunsuttiwat, Dr Panthep Rattanakorn, Dr Sudarat Damrongwatanapokin and Dr Alden Henderson who provided expertise that greatly assisted the research. We also thank Dr Thaksaphon Thamarangsri, Khun Jarinporn Kongsrijan, and Khun Mayura Maneejam for assistance with program management. Our thanks go also to key informants who made time in their busy working days to talk to us.

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