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THE REGIONALIZATION OF AVIAN INFLUENZA IN EAST ASIA

Responding to the Next Pandemic(?)

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Abstract

In 2003, a highly pathogenic version of an avian influenza virus—H5N1—began to emerge in a number of countries in Southeast Asia. The subsequent spread of this virus to nearly all parts of the world has raised concerns about a possible pandemic. This article explores how the virus spread and the policy implications for regional states.

Keywords: H5N1, East Asia, China, public health, infectious diseases

> The interaction between human and animal health is not a new phenomenon. However, the scope, scale, and world-wide impact of zoonoses we are facing today have no historical precedent. Central to the profound changes . . . are both the birth of a new era of emerging and re-emerging diseases and the significant potential impact of these diseases on public health.
> —Bernard Vallat, "Emerging and Re-emerging Zoonoses"

Introduction

The threat from infectious diseases is nothing new.[1] Throughout the ages, populations have struggled to overcome the debilitating

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1. Bernard Vallat, "Emerging and Re-emerging Zoonoses," *World Organization for Animal Health*, editorial, November 2004, <http://www.oie.int/eng/Edito/en_edito_nov04.htm>, accessed December 2004. Zoonoses are communicable diseases occurring between humans and animals.

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effects of disease outbreaks, few of which have been subject to sovereign limitations. During the past century, infectious disease outbreaks continued to ravage societies across the world. Between 1918 and 1919, the outbreak of Spanish Flu is estimated to have infected one-fifth of the world's population, killing up to 40 million people. In the decades that followed, the Asian Flu outbreak (1958–59) is estimated to have killed in excess of one million people worldwide, while the Hong Kong Flu outbreak (1968–69) brought approximately 750,000 deaths worldwide. These major outbreaks were followed by other—comparatively minor—influenza outbreaks such as Swine Flu (1976) and Russian Flu (1977). In all of these cases, the epidemics were largely left to run their course. Now, on the possible brink of another pandemic, little has changed.

As the East Asian region moves to deepen ties among neighboring states, there has been a concomitant rise in intra-regional population flows. At the same time, global processes are leading to more people traveling from the region to other parts of the world. On the one hand, these enhanced ties bring a range of benefits to the participating states, markets, and societies. Deeper regional integration in East Asia could lead to the formation of a stable and prosperous regional community better able to meet the needs of its attendant societies than the present situation allows for. Closer ties could also mean a greater sharing of state capacity. Where one state cannot address a particular issue (such as good economic governance) unilaterally, a regional grouping can collectively work toward a solution. On the other hand, as the region moves closer together threats within a particular state can more readily cross national borders to become a problem for other states. Although this has always been seen where contiguous national borders meant shared natural concerns (in terms of the use of resources or in addressing such issues as air pollution), more human-centric threats (such as drug trafficking, illegal immigration, or small-arms smuggling) have emerged as problems with a regional, or even global, scope.

Another challenge shared by all regional states is the threat posed by newly emergent infectious diseases. Even in pre-modern times, diseases spread through human contact along trading routes and from key cities. This is still the case today, except that as the region integrates further and global processes expand, the time frame for the spread of the disease (and thus for detection and preventive action) has shortened dramatically. The outbreak of Severe Acute Respiratory Syndrome (SARS), for example, showed how quickly regional and global connectivity could be subverted in the spread of infectious diseases beyond national borders.

Highly Pathogenic Avian Influenza (HPAI), of the subtype H5N1, first resulted in human fatalities in Asia in Hong Kong in 1997.[2] The rapid response

2. Note: there are non-highly pathogenic strains of H5N1 in circulation, but the focus of this paper is on HPAI H5N1.

of Hong Kong health officials limited the impact of that outbreak, preventing it from spreading to other locations. In its present form, HPAI H5N1 reemerged possibly as early as 2003 and has now been detected in all regional countries as well as a growing number of other nations. The objective of this paper is to explore the impact that the reemergence of this virus has had on East Asian countries and how those countries have coordinated their response through existing or new regional institutions or mechanisms. This study also seeks to ascertain from where the main policy pressure for action against the virus is emanating—from within the nation-state, from other regional states or institutions, or from international organizations. The paper will first review the integrative processes taking place among East Asian states and the impact this has had on the public health sector at the regional level. Public policy responses to the current outbreak of avian flu in Thailand and Vietnam, as well as from the Association of Southeast Asian Nations (ASEAN), will be explored. These states were chosen because they were also involved in the regional responses to the 2003 SARS outbreak. Drawing on this analysis, the key issues arising from these domestic and regional responses will be reviewed, before drawing conclusions.

East Asian Regionalization and Public Health

In December 2005, the first East Asian Summit, hosted by ASEAN, was held in Kuala Lumpur. This summit, designed to bring all regional countries together as equals, was a step forward in creating an East Asian Community. This region-building process began over three decades ago when the then-five-member ASEAN group opened a bilateral dialogue with South Korea. Over the next two decades, ASEAN expanded to encompass all 10 Southeast Asian states; its bilateral dialogues grew to encompass Japan and China as well as Korea in what became known as the ASEAN+3 process. However, it was only when the 1997 financial crisis spread that the regional governments were truly catalyzed into undertaking collective public policy programs among all 13 states. Although these activities were initially centered on enhancing economic and financial capacity at both the domestic and regional levels, they have since expanded into a wide range of policy areas. It was an expansion that emerged from recognition that the future for Southeast Asian and Northeast Asian states was intrinsically linked by common challenges and issues.

Beyond the core political, economic, and financial areas, ASEAN+3 countries have also been cooperating in a variety of functional areas. To date these have included educational initiatives, environmental concerns, labor issues, and security threats, to name only a fraction. However, unlike these other sectors, public health was not developed at the regional level until 2003. Transnational

cooperation in public health issues occurred via membership of different international organizations such as the World Health Organization (WHO) or through training programs initiated by the more developed regional states for their less developed brethren. This all changed after the SARS outbreak. As with the 1997 financial crisis, SARS demonstrated how quickly a domestic issue could transcend national boundaries and how, at the regional level, time and space were compressed, requiring faster response times and a better understanding of the situation in neighboring countries.

The recognition that public health issues could transcend boundaries and affect the stability and prosperity of other states is not new. Pirages and Runci have commented that

> [v]iruses, bacteria, and various kinds of plants and animals have never respected national borders. They have travelled across frontiers with the winds, waters, explorers, merchants, and mercenaries. Most of the time these crossings have been quite innocent, but occasionally whole societies or ecosystems have been reshaped by them. Now there is growing concern over the impact of increasing globalisation on the potential development and spread of new and resurgent diseases across increasingly porous borders.[3]

This view is supported by Cusimano, who concluded that "while open society, open economy, and open technology forces can help contribute resources to combat the spread of infectious disease, these dynamics also create an infrastructure that allows and encourages diseases to spread."[4]

The two questions that then arise are how—and why—domestic health issues develop into regional health threats. The answer to the first question is complex and relates to the specific disease or virus being investigated. The reasons incorporate different aspects of "globalization, modern medical practices, unsustained urbanization, environmental factors, and the changes in social and behavioral patterns."[5] Of these aspects, the last two—changes to the environment and alterations to social and behavioral patterns—have played key roles in both the SARS and HPAI H5N1 outbreaks. At the same time, man-made alterations to species habitats have disrupted the patterns of interaction between domesticated and wild animal species and humans. Thus, another condition, the changing patterns of animal husbandry, should be included. This could be seen as a sub-factor in several of the above conditions. But as competition over

3. Dennis Pirages and Paul Runci, "Ecological Interdependence and the Spread of Infectious Disease," in *Beyond Sovereignty: Issues for a Global Agenda*, ed. Maryann Cusimano (New York: St. Martins Press, 2000), p. 176.

4. Cusimano, "Editors Preface to Chapter Seven," in ibid., p. 174.

5. Nanyang Technological University, Institute of Defense and Strategic Studies, "Workshop Report: Dynamics and Securitization in Asia," <http://www.idss-nts.org/PDF/NTS%20Workshop%20report.pdf>, accessed March 14, 2006.

land use grows, the greater interaction between animals and humans (often in unhygienic conditions) has been so pivotal to both the SARS and HPAI H5N1 outbreaks that it constitutes a separate condition. In the case of SARS, the proximity of humans to the civet population—especially in urban areas where civets were marketed as food—was a key condition allowing the virus to cross the species barrier. Once civets were identified as the most likely source of the SARS virus, they were withdrawn from local market stalls and menus, diminishing the opportunity for the disease to cross species. At the regional level, the public health challenges inherent in these six aspects is intensified as cross-border trade flows increase and with them the movement (regulated and otherwise) of wildlife and livestock.

The second question is why do domestic health problems sometimes become regional crises? Ultimately, this can be explained as a failure on some level of the disease host state that spills over the border into other nations. States effectively conterminous via borders or other conduits are more susceptible to transmission than more distant states.

Colebatch and Larmour identify three meso-level sectors where such failures can occur: the bureaucracy, the market, or the community.[6] Bureaucratic failure occurs when time constraints and information requirements fail to meet the needs of a particular case. This may be compounded by conflicting requirements between the central authorities and those implementing the policies at street level. Such failures may also arise when different organizational units have conflicting goals. Market failure can occur when an information gap is present or when decisions generate unforeseen consequences. Community failure can transpire when the overlapping needs and identities of individuals pull people in varying directions, placing the society at risk. In the East Asian responses to HPAI H5N1, it will be shown how failures in all three sectors—domestically and in terms of regional responses—have led to the current situation. First, however, it is necessary to understand the characteristics of the virus and the way it has spread.

Avian Flu in East Asia: A Brief Overview

All influenza is avian in origin and in most of its variations it does not present a threat to humans. Some influenza viruses, however, have evolved a greater affinity for humans. Others have done so for horses, dogs, cats, or seals. This is an ever-developing pool of viruses. Normally, avian strains do not readily infect humans and vice versa. Despite this, over the past 100 years different strains of the avian influenza virus have crossed the species barrier causing millions of deaths around the world. The Spanish, Asian, and Hong Kong flus were

6. Hal Colebatch and Peter Larmour, *Market, Bureaucracy, and Community* (London: Pluto Press, 1993), pp. 28–39.

all caused by mutated avian influenza strains—respectively, H1N1, H2N2, and H3N2. Moreover, an intermingling of human and avian genes is suspected to have played a role in the development of the latter two strains.[7]

The strain of the current outbreak, HPAI H5N1, that is affecting a large number of East Asian countries first came to prominence in 1997 in Hong Kong. During that outbreak, 18 people were infected by the virus and six died from it. To prevent the virus from spreading, authorities slaughtered every chicken—approximately 1.4 million—in Hong Kong.

In late 2000, the virus changed genetically, incorporating new genes from other influenza viruses. These genes were believed to be from influenza viruses derived from aquatic birds. As reported by the U.N.'s Food and Agriculture Organization (FAO), "(V)iruses isolated from a goose and a duck in December 2000 have acquired NS, PA, M, and PB2 genes from the aquatic avian influenza gene pool through reassortment. For pandemic preparedness, it is important to monitor whether these reassortant viruses have the capacity for interspecies transmission to terrestrial poultry or mammals."[8]

The virus reemerged in Hong Kong in 2001 but without any human casualties. As before, the entire local stock of chickens older than 75 days as well as related fowls (ducks, geese, pigeons, and quail) were culled. The importation of stock from mainland China was banned, although no evidence of the virus was ever revealed by Chinese authorities.[9] However, at the same time the strain was again found in duck meat that had been imported to South Korea from China,[10] lending credence to the notion that there was an uncontained (and unreported) outbreak in China. The most recent Hong Kong-centered emergence of human infection occurred in February 2003, when a limited outbreak of HPAI H5N1 hit two family members, killing one of them.[11] While it is known that the two Hong Kong residents had travelled to China's Fujian Province immediately prior

7. Nature.com, "Avian Flu Timeline," <http://www.nature.com/nature/focus/avianflu/timeline.html>, accessed June 15, 2005.

8. FAO, "History of H5N1 Virus Circulation in South-East Asia before 2004," <http://www.fao.org>, accessed May 2005. Reassortment occurs when viruses exchange genes during replication; such mutations can allow old viruses to act in new ways.

9. "HK to Resume Imports of Live Chickens from Mainland China," Japan Economic Newswire, June 11, 2001.

10. T. M. Tumpey, D. L. Suarez, L. E. L. Perkins, D. A. Senne, J. G. Lee, Y. J. Lee, I. P. Mo, H. W. Sung, and D. E. Swayne, "Characterization of a Highly Pathogenic H5N1 Avian Influenza A Virus Isolated from Duck Meat," *Journal of Virology* 76:12 (June 2002), pp. 6344–55.

11. Frank Ching, "A Pox on Chicken," *South China Morning Post*, March 1, 2003. Although these figures are technically correct—insofar as only one person died in Hong Kong during this outbreak—they cover up the fact that the daughter died on the mainland of pneumonia (a possible misdiagnosis of HPAI H5N1). See Mary Ann Benitez, "Migratory Birds Linked to Avian Flu Virus: Dead Geese and Ducks Have Been Found in Four Locations across Hong Kong," ibid., February 25, 2003.

to becoming ill, no cases of the virus were reported by authorities in either Fujian or adjacent Guangdong Province.[12] Hence, the source of this outbreak was never confirmed.[13]

Regionally, HPAI H5N1 next emerged in South Korea in mid-December 2003.[14] Unlike during the earlier episodes in Hong Kong, the main carrier of the South Korean virus was ducks, not chickens, although both were heavily culled across a number of provinces as a precautionary measure. Interestingly, the South Korean virus was identified as being genetically different from the other, more lethal strains of HPAI H5N1. This is indicative of a second reservoir of the disease and may also account for why no people died.[15] One month after the South Korean outbreak, the disease was detected on a farm in Ato, Yamaguchi Prefecture, Japan. This was the first outbreak of poultry influenza in Japan since 1925.[16] The Japanese episode was limited compared with outbreaks in other countries and quickly contained.[17] Since these initial outbreaks, both countries have experienced repeat episodes, particularly in wild fowl species.

At the same time as the South Korean and Japanese episodes were occurring, Southeast Asian countries were also experiencing outbreaks of HPAI H5N1. Between November 2003 and January 2004, Cambodia, Laos, Thailand, and Vietnam all reported instances of the virus. Over the next 12 months, it spread to four more Asian countries. In a significant departure from protocols developed during the SARS outbreak, few countries in Southeast Asia immediately alerted either their regional neighbors or the relevant international organizations. It was only when the situation worsened, exceeding the state's capacity to handle it (or was revealed by whistle-blowing officials), that the initial contact countries called for international assistance. Between December 2003 and June 2006, the outbreak of HPAI H5N1 has resulted in 101 deaths in Southeast Asia, compared with 12 deaths in China and 17 deaths elsewhere (see Table 1). Throughout this period, few of these Southeast Asian governments

12. Leu Siew-ying, "We Have No Cases, Say Fujian and Guangzhou," ibid., February 20, 2003.

13. It is, however, worth noting that in late 2005 reports from Chinese health authorities acknowledged that two siblings who died in 2003 after traveling to Fujian Province contracted H5N1 of the same strain that first appeared in Hong Kong in 1997. The stability of this strain may lend further weight to the argument that the HPAI H5N1 strain has probably been responsible for human fatalities in mainland China for a far longer period of time than has been officially acknowledged. See Mary Ann Benitez, "Mainland Bird Flu Close to HK Type," ibid., December 21, 2005.

14. In-between the 2003 Hong Kong and South Korean outbreaks, another strain of avian influenza, H7N7, emerged in the Netherlands, infecting 83 people with flu symptoms and conjunctivitis. One person died.

15. "New Bird Flu Case Confirmed as South Korean Poultry Consumption Falls," *Financial Times Information*, February 6, 2004.

16. "1st Bird Flu Plague since '25," Asahi News Service, January 13, 2004.

17. "Tests Point to Avian Flu in 28,000 Chicken Deaths," ibid., February 24, 2004. Shortly after the first Japanese case was noted, Taiwan also declared an outbreak of avian influenza. However, tests revealed a less pathogenic strain of H5N2.

TABLE 1 *Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO*

	2003		*2004*		*2005*		*2006*		*Total*	
	Cases	*Deaths*	*Cases*	*Deaths*	*Cases*	*Deaths*	*Cases*	*Deaths*	*Cases*	*Deaths*
Azerbaijan	0	0	0	0	0	0	8	5	8	5
Cambodia	0	0	0	0	4	4	2	2	6	6
China	0	0	0	0	8	5	11	7	19	12
Djibouti	0	0	0	0	0	0	1	0	1	0
Egypt	0	0	0	0	0	0	14	6	14	6
Indonesia	0	0	0	0	17	11	34	28	51	39
Iraq	0	0	0	0	0	0	2	2	2	2
Thailand	0	0	17	12	5	2	0	0	22	14
Turkey	0	0	0	0	0	0	12	4	12	4
Vietnam	3	3	29	20	61	19	0	0	93	42
Total	3	3	46	32	95	41	84	54	228	130

SOURCE: WHO, "Epidemic and Pandemic Alert and Response, Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO," <http://www.who.int/csr/disease/avian_influenza/country/cases_table_2006_06_20/en/index.html>, accessed June 29, 2006.
NOTE: Total numbers of cases, including the number of deaths, are from laboratory-confirmed cases only (June 29, 2006).

have been able to entirely eliminate the prevalence of the virus in domesticated and wild fowl populations. The concern is now being expressed by international organizations that these countries could be becoming reservoirs for a more lethal strain of the virus, one that can be passed by human-to-human contact. The frequent reemergence of the virus across Asia suggests that it has been established there for at least a decade. In understanding how this situation has developed, it is appropriate to examine the public policy responses undertaken by different countries in their efforts to contain and eradicate the virus.

Responses to Avian Flu

National Level

Thailand. Despite the lessons learned during the SARS crisis, Thailand initially sought to downplay the possibility of an outbreak of HPAI H5N1, with the deputy agriculture minister describing it as chicken cholera and denying that it could be transmitted to humans. However, even as this official position was being promulgated, local media in central Thailand were getting farmers' statements describing the outbreak as HPAI H5N1.[18] In an overly optimistic

18. "Thailand Insists Its Chickens Free of Bird Flu," Deutsche Presse-Agentur, January 14, 2004.

move to reassure both the local population as well as export partners, then-Prime Minister Thaksin Shinawatra declared in early January 2004 that "I can certify that the country is free of bird flu, the country is safe, the government has paid attention to this issue for a long time, we have checked the suspected places and killed all chickens infected by disease, even though it's not bird flu."[19] This statement was soon contradicted by Senator Nirun Phitakwatchara who announced later that month that the first case of HPAI H5N1 had already been verified. The government subsequently confirmed that Thailand indeed had the virus.[20] From this confused starting point, the country played catch-up. However, the delay meant that the outbreak was allowed to spread much further than should have been the case, with 29 of 76 provinces declared infected soon after Senator Nirun's statement.

Of all the regional countries affected by HPAI H5N1, Thailand has the largest poultry sector for both domestic consumption and international export. "The country's earnings from exports of chickens and chicken products in 2003 totaled more than 60 billion baht ($1.5 billion) while about 20,000 people are involved in the entire industry."[21] Although no concrete figures have been provided, a review of government estimates puts the cost of directly combating the virus in the billions of dollars. Indirect costs—providing compensation for affected industries—will also rise the longer the outbreak continues.[22] The value of the poultry industry has itself hampered the implementation of government policies, with notable resistance coming from the provinces and within the industry. During the current outbreak, corruption has also been reported, with some officials being offered inducements not to cull infected birds.[23]

As shown in Table 1, the Thai government's efforts to stem and eradicate the instances of avian-human infections have met with uneven success. Although the mortality rate declined over 2005 (and there are yet to be any new cases as of June 2006), the situation has still not yet fully stabilized, with a variety of non-domesticated birds, such as sparrows and pigeons, being found to carry the virus.[24] These wild birds often live in and around infected poultry and may share feed and water supplies, thereby possibly extending the time needed to eradicate the disease at infected sites. Nonetheless, the fact that incidences of confirmed avian flu have been trending down suggests that the new policies, designed to limit the virus's spread and curb its opportunities to cross the species

19. "Thailand Free of Bird Flu: PM," Xinhua News Agency, January 15, 2004.

20. "Senator Says Thailand Has Its 1st Bird Flu Case," Japan Economic Newswire, January 22, 2004.

21. "Thailand to Train Officials on Bird Flu Controlling," Xinhua, August 28, 2004.

22. For a summary of the ways in which the Thai government is providing assistance to industry, see "Government Extends Help to Poultry Related Businesses Affected by Bird Flu Outbreak," Global News Wire—Asia Africa Intelligence Wire, October 11, 2004.

23. See, for example, "Government Insists Bird Flu Will Not Mutate," ibid., July 12, 2004.

24. "Thailand: Sparrows, Pigeons Found with Bird Flu Virus," ibid., October 20, 2005.

barrier, are meeting with success. Examples of such policies include widespread culling of avian stocks, bans on the movement of avian stocks, as well as the introduction of closed farms to prevent further transmission of the virus between domesticated and wild avian species. This was particularly necessary with the duck population, where studies have shown that "of the nation's estimated 4,000 duck flocks, around 30% are infected with avian flu although most do not display any symptoms."[25] However, not all of the policies have succeeded. A community-based program to encourage villagers to cull chickens had great potential but offered only the equivalent of US$1 per kilogram of poultry handed in. This led many participants to simply keep the birds to eat or sell, boosting the risk of exposure.[26]

Beyond its domestic policies, Thailand has actively supported sub-regional and bilateral programs to monitor and eradicate avian flu. Through its membership in the Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy group, Thailand has provided funds to help neighboring countries combat avian flu. At the same time, Bangkok has worked with communities and refugee groups along the Thai-Myanmar border to implement health protocols in more remote areas. Although these programs serve to recognize the transnational nature of the threat, particularly in peninsular Southeast Asia, many of them were started only in 2005, well after nations and societies there were exposed to the virus.

Vietnam. At the same time HPAI H5N1 was being confirmed in Thailand, Vietnam also began reporting infections. This was not, however, the first outbreak there. Soon after Vietnamese authorities called for international assistance, they confirmed that an earlier outbreak had been detected in July 2003. However, for political and economic reasons (Vietnam was preparing to stage the 22nd Southeast Asian Games) the authorities elected not to publicize the matter. That outbreak, in northern Vietnam, lasted from July to September.[27] In this case, Vietnam demonstrated a notably different procedure for dealing with infectious diseases than was the case with SARS.

For the current outbreak, the virus was first detected in the southern provinces of Tien Giang and Long An, but it "subsequently spread to other Mekong Delta provinces and Ho Chi Minh City as a result of panic selling [of chickens] by local farmers."[28] Within two weeks of HPAI H5N1 being officially announced,

25. "BT50 Million for Bird Flu Vaccine Research," ibid., February 21, 2005.

26. "Thai Villagers Mobilized to Cull Poultry," Channel News Asia, November 7, 2005.

27. "Chicken Imports Banned, Vietnamese Officials Admit Earlier Knowledge of Bird Flu," Deutsche Presse-Agentur, January 13, 2004.

28. "Vietnam Says It Will Ask for Help to Identify Mystery Poultry Virus," Agence France-Presse, January 8, 2004. I use the term "current outbreak" here; however, given the lack of verifiable data, there remains the possibility that the incidence in mid-2003 continued on to become what is otherwise identified as the 2004 outbreak.

three people were confirmed dead and over one million chickens had either been killed by the virus or culled by authorities.[29] Further tests showed that the virus was present in 20 of Vietnam's 64 provinces.

In the wake of these initial outbreaks, the virus spread throughout Vietnam and caused the highest number of deaths per country (despite the authorities claiming several times to have contained the virus).[30] Of most concern was that the pattern of the disease spread suggested the virus could be clustering, with limited human-to-human transmission. This pattern is suggestive of a pre-pandemic stage of a virus and may thus be of greater concern than the outbreaks in other regional countries.

Methods to control the initial outbreaks met with limited success because of policy shortcomings as well as gaps in technical capacities. For example, the Vietnamese government instituted a compensation policy, offering 5,000 dong ($0.30) per culled bird. This was problematic in two ways.[31] First, the level of compensation was below market prices, so farmers were not provided with an incentive to cooperate with the government; rather, they tried to recoup likely losses by lowering prices. Second, the policy only covered culled birds. No funds were allocated for birds that died as a result of the disease. This further hampered reporting practices. The decision not to immediately alert the population to the disease also meant that those who were in a position to take proactive measures (farmers and local health officials) were not equipped with the necessary information to do so. In addition, when the public was eventually alerted, the virus had already spread through nearly one-third of Vietnam's provinces, exceeding the state's capacity to address the threat.

Since reaching a peak in 2005, the number of cases in Vietnam has fallen sharply, with no new cases as of the end of June 2006. However, this assessment was based only on reported cases of human and avian infections. Not only is it possible for the virus to persist in the local environment outside a living host but other species, such as ducks, may be carriers without showing symptoms. Moreover, given Vietnam's geographic location, reintroduction of the virus from neighboring countries where it is still prevalent cannot be ruled out. Indeed, in early 2006 a number of infected poultry shipments, which had

29. "Vietnam Appeals for UN Help over Bird Flu, Asia on Alert," Channel News Asia, January 13, 2004.

30. On the latter point, see, for example, Hoang Cuong, "Bird Flu under Control, Says Minister," *Saigon Times Daily*, February 26, 2004; Hoang Cuong, "Bird Flu Basically Contained," ibid., March 2, 2004; and "Agriculture: Vietnam Contains Returned Bird Flu," Vietnam News Briefs, October 6, 2004.

31. FAO Workshop on Social and Economic Impacts of Avian Influenza Control, December 2004, <http://www.fao.org/ag/againfo/subjects/documents/AIReport.pdf>, p. 42, accessed May 2005.

been smuggled in from China, were found in Vietnam's northern provinces of Lang Song and Quang Ninh, jeopardizing the country's disease-free status.[32]

Responses to Avian Flu

Regional Level

> The avian influenza at the moment is a crisis of Asian dimensions. . . . Every country is really encouraged to do more than they do at the moment.
> —Dr. Hans Wagner, FAO

As was the case at the national level, the mechanisms by which regional organizations responded to the current outbreak of avian flu derived in part from methods adopted in response to the SARS outbreak in early 2003.[33] Although ASEAN's responses in principle reflect the needs of its members, the organization was largely passive as member states attempted to address the issue without significant regional involvement. Nonetheless, since the current outbreak began a variety of meetings have been held between regional political leaderships, parliamentarians, health officials, and medical specialists from the ASEAN, ASEAN+1, and ASEAN+3 groups.

In the cases of ASEAN and ASEAN+3, regional-level responses to avian flu have been limited, in part reflecting member states' policies. This stemmed in part from resistance by different regional states to declaring a HPAI H5N1 outbreak, which officials feared would hurt domestic and export poultry markets. Nonetheless, the Seventh ASEAN Health Ministers' Meeting held in late April 2004 was immediately followed by the First ASEAN+3 Health Ministers' Meeting. This proximity reflected the growing seriousness of the threat posed by infectious diseases—and also the interconnectedness of Southeast and Northeast Asian populations with respect to public health challenges. Attendees agreed to set up an emerging infectious disease (EID) program and to deepen regional public health cooperation. They also reached accord on the need to develop a standard operating procedure for all regional states in handling communicable diseases. This expanded meeting had been preceded by an ASEAN+1 meeting in Beijing in March to improve communication and cooperation between China and ASEAN on avian influenza issues.[34] Regional health ministers met again in Bangkok in late November to further coordinate

32. "Agriculture Vietnam to Collaborate with China in Poultry Smuggling Control," *Financial Times Information*, April 11, 2006.

33. Comment in epigraph by Dr. Hans Wagner, FAO, as reported in Alexis Hooi, "Warning Goes Out: Fight Bird Flu Together; Health Experts Say Coordinated Approach Needed to Avert Pandemic," *Straits Times*, December 21, 2004.

34. "China, ASEAN Agree to Step Up Cooperation on Curbing Bird Flu Virus," Agence France-Presse, March 2, 2004.

responses to the outbreak and agreed to ensure the "transparent exchange of ideas, mutual assistance, and the development of researchers to investigate the spread of the disease," in conjunction with the WHO.[35]

In response to the growing threat posed by HPAI H5N1—and in light of individual countries' inability to eradicate the virus—in December 2004 ASEAN established a task force to address the threat posed by the outbreak. Responsibility for combating the disease was divided among the five founding members, with each country taking on a specific role. As reported in the *Straits Times*,

> Thailand will coordinate the surveillance and diagnosis of the disease, while Indonesia will deal with policy and vaccinations. Malaysia will be in charge of containment measures—such as quarantine and border control—as well as the establishment of disease-free zones to facilitate the resumption of exports. Malaysia will also deal with emergency response plans. Singapore will coordinate the sharing of information on bird flu around the region, while the Philippines will handle efforts to raise public awareness and communication to help control the threat.[36]

The task force is the best example of a regional approach to the HPAI H5N1 outbreak. However, as with earlier efforts, it is limited by being disaggregated among five of the 10 ASEAN countries. Although this reflects the sites of greatest capacity within the region, it is still limited and cannot be considered a truly regional approach to the problem.

Since the task force was formed, other meetings have been held on the outbreak. In April 2005, ASEAN held a training meeting of epidemiologists from its member states and the +3 states as well as from the WHO and the U.S. Centers for Disease Control (CDC). This meeting was part of the EID program that had been agreed upon at the 2004 ASEAN+3 Health Ministers Meeting. This was followed by a meeting of regional politicians from eight of the ASEAN+3 countries. The purpose of the meeting was not only information sharing but also developing political networks that would allow for greater transparency in policy and research development. Although such networks are of limited efficacy in authoritarian or partially democratic regimes, their existence may indicate a deepening of regional political ties on public health issues in general and HPAI H5N1 in particular.

At the East Asian Summit in December 2005, the pressing nature of the avian flu threat led regional states to agree on establishing an international network for monitoring the virus. Even though this is a step forward in exchanging information and best practices, it is still predicated on all member states supplying accurate and timely information. As the two country studies above suggest, this may not always be the case. The two-year lag in setting up such a

35. "ASEAN+3 Joins Hands to Combat Bird Flu," Thai Press Reports, November 29, 2004.
36. "ASEAN Action Plan to Fight Bird Flu," *Straits Times*, December 22, 2004.

regional network is an indictment of ASEAN+3 and its dialogue partners for failure to take the initiative, coming just as the outbreak may be ending in some countries.

During the first half of 2006, regional countries began exploring more ways to address the threat posed by the HPAI H5N1 outbreak. Indonesia, Thailand, and Vietnam have embarked on a two-year study on finding effective ways to treat the virus. Vietnam and Indonesia are also exploring possible bilateral programs in addressing new outbreaks and ensuring vaccine supplies for affected populations. The Asian Development Bank (ADB) also announced a new project to strengthen regional capacity and cooperation in detecting and controlling existing and future outbreaks. Even though ASEAN and its partners have been slow to respond institutionally to this problem, it is also likely that the issue will remain high on the agenda of most regional meetings for the foreseeable future.

Issues Raised

A key concern is the probability of the current outbreak of HPAI H5N1 developing into a global pandemic. Among the more conservative estimates are between 7.4 million and 50 million dead if the virus mutates into a form spread from human to human.[37] Some analyses suggest that if the current outbreak were to evolve into a pandemic mirroring the Spanish Flu catastrophe, the death toll would be far greater. Globalization, coupled with the lower cost of international travel, means that carriers can disseminate the virus rapidly, exposing all countries to the threat. Even considering technological advances in the detection and treatment of infected persons, WHO and other U.N. officials have suggested that totals could reach 100 million to 150 million dead.[38] Southeast Asia and China are likely to be the places from which such a pandemic would emerge; given the region's generally low public health care capacity, it is reasonable to conclude that most deaths would occur there.

What is now believed is that the current outbreak of the virus began in one of three fowl populations (geese, duck, or quail), spreading among all three before infecting chickens. Ducks, for example, can generally carry HPAI H5N1 without showing any symptoms; yet, the virus is lethal to chickens. Cross-infections among these four species and clean populations allowed the virus to spread further, as did the infection of wild fowl groups. Moreover, H9N2 co-infection or inoculation can mask symptoms of HPAI H5N1 even though the HPAI H5N1 virus particles are still excreted, paving the way for re-emergence of the virus in an otherwise "clean" site.

37. "Thailand Drafts Emergency Plan Warning Bird Flu Pandemic 'Imminent'," BBC Monitoring Asia Pacific—Political, January 25, 2005.

38. Eugene Low, "Yes; UN Official Sticks to His Warning of 150m Deaths If Avian Flu Takes Hold," *Straits Times*, October 29, 2005.

As has been seen in the recent spread of the virus through Africa, West Asia, and South Asia, the potential for migratory avian species to carry the virus to new regions and to intermix with other species is a particular concern for public health officials, although the main transmission vector remains exports of infected livestock. In the African outbreaks, for example, it is now thought that transmission was through poultry exports from China of infected one-day old chicks because there have been almost no outbreaks in the Rift Valley (Kenya) or the Okavango Delta (Botswana), the main migratory destinations. Further, wild migration routes tend to be north-south, but spread of HPAI H5N1 has been mostly east-west, suggesting that poultry movements are more responsible, infecting wild populations along the way. Both pathways then overlap, continuing transmission of the virus.

However, even as HPAI H5N1 was detected in an increasing number of avian species it had not, until recently, been detected in other animals. Of special concern was the possible acquisition by pigs.[39] This has always been a concern with the current outbreak, because pigs are genetically similar to humans and may act as a "mixing vessel," carrying and recombining human and other animal diseases into new, more lethal strains. The 1979 outbreak of avian influenza (H1N1) in Europe became established in pig populations, while the 1993 influenza outbreak in the Netherlands was shown to be caused by the H3N2 virus circulating in European swine.[40] In Asia a 1996 study identified the presence of H1N1 in pigs from southern and central China.[41] Going back further, pigs have probably been mixing vessels for avian influenza viruses for over 100 years.

No genetic mutations are required for pure avian viruses and pure human viruses to infect pigs. Once a pig is co-infected, opportunities exist for both viruses to swap genes, generating potentially new strains. Other species, such as humans or other mammals are aberrant hosts, not the preferred hosts. Aberrant hosts make the virus work harder to survive and thereby can drive in aberrant species the evolution of viruses, sometimes increasing their virulence, lethality, or transmissibility among human beings. Humans being aberrant hosts are

39. For more on this point, see Ian Brown, "The Pig as an Intermediate Host for Influenza A Viruses between Birds and Humans," *International Congress Series* 1219 (2001), pp. 173–78.

40. Y. Guan, K. F. Shortridge, S. Krauss, P. H. Li, Y. Kawaoka, and R. G. Webster, "Emergence of Avian H1N1 Influenza Viruses in Pigs in China," *Journal of Virology* 70:11 (November 1996), pp. 8041–46; and E. C. J. Claas, Y. Kawaoka, J. C. de Jong, N. Masurel, and R. G. Webster, "Infection of Children with Avian-Human Reassortant Influenza Virus from Pigs in Europe," *Virology* 204:1 (October 1994), pp. 453–57.

41. Y. Guan et al., "Emergence of Avian H1N1 Influenza Viruses in Pigs in China." In terms of the transnational spread of infectious diseases, it is important to highlight that while these pigs were from mainland China, they were sampled in Hong Kong, demonstrating that it is not just birds that can carry diseases across borders.

not easily infected with current strains of H5N1 and transmissibility between humans takes place only on rare occasions. Indeed, ever since the outbreak of HPAI H5N1 was confirmed, the WHO has stated that its main mission is to minimize the evolution of human-to-human transmissible strains.

Once the virus was officially acknowledged in Vietnam, local and WHO authorities were quick to warn people to stay away from pig manure to prevent transmission of the virus "from chickens to pigs to humans."[42] Despite such warnings, in early 2005 Indonesian authorities confirmed the first cases of HPAI H5N1 in pigs. The virus was limited to traces rather than provoking a full-body infection.[43] On May 10, pigs on a farm in Java—adjacent to a poultry farm—were confirmed to be infected with HPAI H5N1.[44] Until this point, the fact that the virus had not yet spread from avian species to pigs was believed to be one limiting factor in the development of a pandemic.[45] Although no pig-to-human cases have been confirmed, the presence of the virus in these pigs clearly demonstrates the potential of the H5N1 virus to mutate across species. Data from tests carried out in Thailand and Vietnam in 2004 indicate that HPAI H5N1 is not readily transmitted between pigs, suggesting that—unlike the H1N1 virus—there may be more restrictions on viral capacity to cross this particular species barrier,[46] although the virus easily infects cats, ferrets, and martens and can easily spread between cats.

Even as they become more regionally integrated, most East Asian states are still building advanced political and economic systems. The underdeveloped nature of these countries has meant that they face a significant shortfall in their capacity to deal with infectious diseases. This capacity gap has been revealed in a variety of ways in different countries as the current outbreak has progressed. In a number of instances, information was not passed among central, provincial, and/or local authorities in a timely manner. Nor was it transmitted quickly to the relevant international or regional organizations, even though all regional states are members of the OIE (Office International des Epizooties,

42. Ben Rowse, "Vietnam Appeals for UN Help to Contain Worsening Bird Flu Epidemic," Agence France-Presse, January 13, 2004.

43. "Indonesia Detects Bird Flu in Pigs," Global News Wire—Asia Africa Intelligence Wire, April 13, 2005. In another case, in mid-2004 a Chinese official declared that H5N1 had been detected in pigs in China but no followup was made to this announcement. See Keith Bradsher, "Avian Flu Jumps to Pig Herds in China; Official Disclosure Raises Worry on Risk of Human Infection," *International Herald Tribune*, August 21, 2004.

44. Chris Brummitt, "Indonesia Finds Bird Flu in Pigs, Raising Fears It Could Easily Spread to Humans," Associated Press, May 14, 2005.

45. Another way this could happen is if the virus jumped from an infected person into a pig.

46. Y. K. Choi, T. D. Nguyen, H. Ozaki, R. Webby, P. Puthavathana, C. Buranathal, A. Chaisingh, P. Auewarakul, N. Hanh, S. Ma, P. Hui, Y. Huan, M. Peiris, and R. G. Webster, "Studies of H5N1 Influenza Virus Infection of Pigs by Using Viruses Isolated in Vietnam and Thailand in 2004," *Journal of Virology* 79:16 (August 2005), pp. 10821–25.

World Organization for Animal Health) and WHO and most are members of the FAO and have agreed to abide by agreed upon protocols.[47]

Problems have also arisen in terms of the technical capacity of frontline medical staff to identify and treat avian flu cases; many of the poorer countries also lack appropriate testing and training facilities. In Vietnam in April 2005, for example, Japanese researchers retested 30 blood samples of people declared to be free of the virus only to discover that seven had actually been infected.[48] Beyond issues of surveillance, equipment, and staff training is the simple fact that the underdeveloped nature of these countries means they have limited surplus financial capacity to redirect or stem the outbreak. While it is in these areas that regional and international cooperation can bolster a state's ability to respond to an infectious disease outbreak, ultimately it is state policies and practices that will have to eradicate the virus.

One area where governments have been quick to respond to the threat of contagion has been in the banning of imported poultry products from countries with confirmed outbreaks. Smuggling, though, remains largely unchecked. Although prohibition is a sensible measure it gives rise to the question of what should be the appropriate set of responses if a pandemic occurs. With the SARS outbreak as well as with earlier epidemics, the movement of people and goods was either restricted or forbidden. However, as the region becomes more deeply integrated, and as its countries become more intertwined with global processes, similarly severe measures could cripple national economies. As a 2004 ADB analysis concluded, "If the epidemic remains confined to animals, as has been the case up to now, it is likely that the aggregate impact on the economies of the region will be relatively limited and hardly perceptible given the underlying strong growth trends projected for the Asian and Pacific region in 2004." However if HPAI H5N1 were to mutate to allow human-to-human transmission, the economic impact would be far greater. The ADB analysis noted that

> the impact of the SARS epidemic lasting one quarter was of a magnitude of about $18 billion in terms of regional GDP (0.8%) or $59 billion in terms of business losses (measured as total final expenditures). It is clear that if the avian influenza mutates to a human virus, these estimates would provide a floor for expected losses.[49]

47. See Jason Gale, "Asian Bird Flu Cases Not Being Reported Fast Enough, Donors say," Bloomberg, June 6, 2006.

48. Charles Piller, "Many Scientists Fear Bird Flu Cases Exceed Data; Minimal Reports from Laos and Cambodia and Unreliable Test Results Elsewhere Suggest that the Virus' Progress Has Been Underestimated," *Los Angeles Times*, March 16, 2005.

49. John-Pierre Verbeist and Charissa Castillo, *Avian Flu: An Economic Assessment for Selected Developing Countries in Asia*, ERD (Economics and Research Department) Policy Brief Series, no. 24 (Manila: ADB, March 2004), pp. 6–7.

Measures and Their Effect

Apart from future macro-level calculations on the impact of an avian flu pandemic, current control measures are already generating economic consequences in affected communities. In Thailand and Vietnam, in particular, where poultry is a key domestic and export industry, the culling of livestock and change in consumption patterns are materially affecting the poorer urban and rural populations. People on the economic margins are slipping into poverty, and this process could spill over to harm other sectors. As was shown in the country studies, the unwillingness of the Bangkok and Hanoi governments to pay a reasonable price for culled poultry diminished the effectiveness of policies designed to limit the spread of diseased fowl. The impact these policies are having on people's livelihoods is an especially pressing concern in Southeast Asian countries and China, where significant percentages of the populations are employed in low-paid, rural-based industries.

Public awareness and the engagement of civil society are important factors in combating the spread of HPAI H5N1. As the country level case studies show, the unwillingness of governments to appropriately inform the public and respond to contradictory concerns raised at the grassroots level directly contributed to the spread of the virus and can be considered a significant factor in the early deaths. Conflicting data distributed in the early stages of the outbreak by governments, on the one hand, and local groups, on the other, also encouraged an imperfect understanding of the crisis, which may have exacerbated individual responses to the virus's presence (for example, the panic selling of infected poultry by Vietnamese farmers). In addressing underlying social customs, it is critical for governments to engage their societies. In Thailand and Indonesia, social support for the sport of cockfighting helped to thwart efforts to restrict shipments of domesticated avian species between infected and non-infected areas. And in Vietnam, the continued consumption of duckblood pudding also potentially exposes people to new infections.

Conversely, at the regional level there has been a clear willingness to draw upon expert groups and to form region-wide communities of medical specialists, public health officials, policymakers, and researchers. Although the nature of the overarching regional body affects the effectiveness of communities formed, within ASEAN these groups have played (and continue to play) a significant role in advising on responses to the outbreak. This domestic/regional disjuncture is another issue that needs to be addressed, not only to resolve the current threat but also successfully to combat future infectious disease outbreaks. In Thailand and Vietnam both governments have sought to address these issues outside of a domestic framework through bilateral meetings of government officials and health specialists. Within regional civil society, Red

Cross organizations in Cambodia, Laos, and Vietnam have begun to develop cooperative programs to address avian flu across their borders.[50]

According to the Asia-Pacific Economic Cooperation (APEC) group, "[R]egional strategies of prevention and control are critical as avian infections have spread across borders, and results of mathematical modeling suggest that if an avian strain developed the ability to spread between people, efforts to contain the outbreak would need to be implemented regionally in order to be successful."[51] Developing such a standard regional approach to the challenges a virus can pose to state systems is a key issue arising from the current avian flu outbreak. This can be seen in the regional debate over whether to vaccinate people against the spread of HPAI H5N1. Although a number of states favored vaccination, Thailand chose not to follow suit, on the basis that its trading partners would then ban imports of Thai poultry. Without a common approach on such issues, regional states risk creating reservoirs of the virus in non-vaccinated populations. And imperfect vaccination regimes could produce virus strains that are resistant to prophylactic measures, augmenting the threat to the region and beyond. To develop a common approach across East Asia is more problematic because concrete action would require a compromise—or even surrender—of sovereignty that many states oppose.

A related problem is underreporting of infectious disease outbreaks. As the examples of Thailand and Vietnam clearly demonstrate, domestic politics and economics can easily play a decisive role in whether or not a country declares an infectious outbreak. Such decisions not only endanger the lives of the local citizenry but—given the numerous channels through which a virus can transcend national boundaries—the citizens of other states as well. With higher transmission risks existing among contiguous states, such decisions directly jeopardize the stability and prosperity of an infected state's regional partners, although broader trade flows can allow diseases to jump to more distant locales. These phenomena suggest that a mechanism for monitoring infectious disease outbreaks—beyond the immediate purview of a state—is required. A network was proposed at the East Asian Summit, but as the post-SARS experience demonstrates, any such structure should focus on prevention and address all types of infectious disease outbreaks, not just avian flu.

Conclusion

Historically, influenza viruses have repeatedly mutated, crossing species barriers and causing tens of millions of human and poultry deaths. The current

50. "Vietnamese, Lao, and Cambodian Red Crosses Promote Cooperation," Thai Press Reports, January 18, 2006.

51. USA APEC, "Progress Report: Pandemic Influenza Planning and Preparedness Situation Assessment," Second Health Task Force Meeting (Seoul), February 28, 2005.

outbreak of HPAI H5N1 has not yet reached this degree of lethality but there are concerns that it retains the potential to do so. Since mid-2003, successive waves of the virus have spread the disease throughout most of East Asia, moving from domesticated water fowl to chickens as well as wild avian species. Most recently new mutations have allowed the virus to infect other mammals. The capacity of pigs to easily accommodate both avian and human influenza viruses boosts the risk of gene mixing and the emergence of a reassorted virus with pandemic potential.

Since the SARS crisis in early 2003, East Asia has understood how quickly infectious diseases can spread around the region and to the wider world. The SARS experience showed that only by dealing with disease outbreaks in an open and timely manner can such diseases be stopped. To do otherwise, jeopardizes not only the safety of the infected state's citizens but also populations outside its borders, posing a moral as well as a political responsibility. These lessons appear to have been forgotten with HPAI H5N1. Domestic political and economic considerations combined to stop governments from reporting the virus in its early stages, allowing it to spread across borders and species.

The delay in state-level responses meant regional organizations were slow to react to the crisis. This ensured that states—often with insufficient bureaucratic, economic, or human resource capacities—together with some support from international organizations dealt with the virus in a primarily unilateral mode. Yet, the lesson from both SARS and HPAI H5N1 is that it is more efficient to deal with an infectious disease collaboratively than individually. It is a lesson supported by other regional crises, financial, environmental, or security-related, that East Asia has faced in the past decade. The conclusion therefore is that despite the pressure to the contrary, East Asia has yet to effectively regionalize its approaches to public health challenges. As with the other crises, the failure of East Asian states in general and Southeast Asian states in particular to collectively address the avian influenza threat leaves a sorry legacy of greater damage over a longer period of time than should have been the case.