

CRS Report for Congress

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U.S. and International Responses to the Global Spread of Avian Flu: Issues for Congress

Updated January 11, 2006

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Summary

One strain of avian influenza currently identified in Asia and Europe is known as Influenza A/H5N1. Although it is a bird flu, it has infected a relatively small number of people — killing around 50% of those infected. Scientists are concerned that H5N1 may cause the next influenza pandemic. Flu pandemics have occurred cyclically, roughly between every 30 and 50 years. Since 1997, when the first human contracted H5N1 in Hong Kong, the virus has resurfaced and spread to more than a dozen countries in Asia and Europe — infecting more than 140 people and killing approximately half. Britain and Taiwan both reported avian flu cases of H5N1 in 2005. In the latter cases, the infected birds were identified as imports, and died in quarantine.

A global influenza pandemic could have a number of consequences. Global competition for existing vaccines and treatments could ensue. Some governments might restrict the export of vaccines or other supplies in order to treat their own population. Some countries might face a shortage of vaccines, antiviral medication, or other medical equipment, because of limited global supply. Hospitality and airline industries, and international trade could be negatively impacted. If global travel and trade were to suddenly drop, there could be productivity losses and service disruptions. Essential workers might become ill or stay home out of fear of contracting the virus. Such workers could include law enforcement, medical personnel, mass transit drivers and engineers, and other crucial emergency personnel.

For FY2006, Congress has provided \$33.5 million for global disease detection through Labor, HHS, and Education appropriations; and reserved for international avian flu efforts a portion of \$3.8 billion through Defense appropriations.

Bills introduced in the 109th Congress would increase U.S. resources allocated to the global fight against avian flu; develop a “Pandemic Fund” to augment ongoing U.S. and international avian flu and pandemic preparedness initiatives; increase funding for preventing the spread among animals of the H5N1 virus; and strengthen surveillance capacity within affected countries.

This report will provide an up-to-date account of global H5N1-related human infections and deaths, outline U.S. government and international responses to the global spread of H5N1, discuss situations in various countries affected by H5N1, and present some foreign policy issues for Congress. This report will be periodically updated.

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U.S. and International Responses to the Global Spread of Avian Flu: Issues for Congress

Background

Bird (or avian) flu outbreaks have occurred at various times around the world.¹ One strain of avian influenza currently spreading across Asia and Europe is known as Influenza A/H5N1. Although it is a bird flu, it has also infected a relatively small number of people — killing around 50% of those infected. Until 1997, there were no known cases of humans contracting avian influenza. However, that year, 18 people in Hong Kong contracted the virus; of those 6 died. To stop its spread, 1.5 million birds were killed. Since 2003, scientists have closely monitored resurgent H5N1 outbreaks, which have infected chickens and ducks in a growing number of countries. The World Health Organization is particularly alarmed about the rapid spread of H5N1 in part, because this strain of bird flu has demonstrated the ability to cause high mortality rates among humans.

According to WHO, the hallmarks of a pandemic are: 1) a novel influenza virus strain emerges; 2) the strain causes human disease; and 3) person-to-person transmission is sustained. The pandemic steps usually occur in six phases. Table 1 shows the phases of an influenza pandemic, as described by WHO. The WHO considers the recent H5N1 outbreak to be in phase three pandemic alert phase, which means a virus new to humans is causing infections, but does not spread easily from one person to another.²

Since H5N1 is a bird flu, and has not commonly infected people, humans have no immunity against it. If H5N1 were to become transmissible among humans, an “influenza pandemic” (worldwide disease outbreak) could begin, potentially causing millions of deaths. Skeptics argue that predictions that H5N1 might cause a global pandemic are exaggerated, because if the virus were able to become efficiently transmissible among people it would have already transformed.

Still a growing number of health experts underscore that it is critical for governments to prepare for some form of an influenza pandemic. During the influenza pandemic of 1918-1919 (Spanish flu), estimates are that between 20 and 50 million people died, and between 200 million and 1 billion were infected around

¹ For a list of past avian flu outbreaks see CRS Report RS21747, *Avian Influenza: Agricultural Issues*, by Jim Monke.

² WHO, “Avian Influenza — New Areas with Infection in Birds — Update 34,” *Disease Outbreak News*, Oct. 13, 2005, at [<http://www.who.int/csr/don/en/>].

the world. If an influenza pandemic were to occur on the same scale as the Spanish flu, some estimate that between 30 million and 384 million people could die around the world,³ of which 1.9 million deaths could occur in the United States.⁴

Global Prevalence

Since 1997, when the first human contracted H5N1 in Hong Kong, the virus has resurfaced and spread to birds in fifteen countries, ten in Asia and five in Europe.⁵ In 2004, nine Asian countries reported H5N1 poultry outbreaks: Cambodia, China, Indonesia, Japan, Laos, Malaysia, Republic of Korea, Thailand, and Vietnam. By August 2005, birds in Mongolia had become infected with the virus. Two months later, in October, domestic birds in Russia and Kazakhstan had contracted H5N1 reportedly through contact with wild waterfowl at shared water sources. By late October 2005, H5N1 had spread progressively westward to affect six other regions in Russia, and had infected bird populations in Romania, Croatia, and Turkey. Health officials are wary about infection among migratory birds, as the birds are currently acting as vectors of the virus. Also, infection can potentially be controlled among domestic birds, but not among wild ones. The chart below shows the latest number of confirmed human H5N1 cases as reported by WHO as of January 10, 2006.⁶ The map in the Annex (Chart 1) illustrates the human H5N1 cases.

Table 1. Human Cases of Avian Influenza A/H5N1

Indonesia		Vietnam		Thailand		Cambodia		China		Turkey ^a		Total	
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
16	11	93	42	22	14	4	4	8	5	4	2	147	78

Source: WHO, *Cumulative Number of Confirmed Human Cases of H5N1*, January 10, 2006.

a. Although the chart replicated from WHO indicates 4 cases in Turkey, WHO has confirmed that 15 people have become infected with H5N1 avian influenza.
[http://www.who.int/csr/don/2006_01_10a/en/index.html]

³ Osterholm, Michael, "Pandemic Influenza: A Harbinger of Things to Come." Presentation at the Woodrow Wilson International Center for Scholars, September 19, 2005. [http://www.wilsoncenter.org/index.cfm?fuseaction=news.item&news_id=145329]

⁴ HHS Pandemic Influenza Plan, November 2005, [<http://www.hhs.gov/pandemicflu/plan/>]. For more information on issues related to domestic efforts to address H5N1 and pandemic influenza preparedness, see CRS Report RL33145, *Pandemic Influenza: Domestic Preparedness Efforts*, by Sarah A. Lister.

⁵ To date, H5N1 has been identified among birds in Cambodia, China, Croatia, Indonesia, Japan, Kazakhstan, Korea, Laos, Malaysia, Mongolia, Romania, Russia, Thailand, Turkey, and Vietnam. A bird in Britain was diagnosed with H5N1, however it was an isolated case found in an imported bird that died in quarantine. World Organization for Animal Health (OIE), "Update on Avian Influenza in Animals." December 21, 2005. [http://www.oie.int/eng/en_index.htm]

⁶ WHO, *Cumulative Number of Confirmed Human Cases of Avian Influenza A/H5N1*, January 10, 2006. [http://www.who.int/csr/disease/avian_influenza/country/en/]

Congressional Response

Congress provided \$25 million to support ongoing U.S. efforts to prevent and contain the spread of H5N1 through P.L. 109-13, *FY2005 Emergency Supplemental Appropriations*. The act, which passed in May 2005, also provided funds for domestic pandemic preparedness.⁷ Additionally, the act directed U.S. agencies to develop a coordinated response to the global spread of H5N1. Congress provided the funds to U.S. Agency for International Development (USAID). Pursuant to the statute, USAID transferred \$15 million of the \$25 million appropriation to CDC.

The conference report for P.L. 109-102, *FY2006 Foreign Operations Appropriations*, urges the United States Executive Director to the World Bank to use the voice and vote of the United States to increase support for using International Development Association (IDA) funds to help eligible countries prepare for and combat a potential avian influenza epidemic. Particularly, the report points out that funds could be used in Asia for programs to increase surveillance capacity, compensate small-scale farmers for timely reports of bird die-offs, modernize animal husbandry practices, and upgrade infectious disease infrastructure. The report also underscores that the \$25 million provided in P.L. 109-13 is the first step in a multi-year effort to contain, prevent, and prepare for the spread of avian influenza.

H.Rept. 109-337 for H.R. 3010, *FY2006 Labor, HHS, and Education Appropriations*, includes \$63.58 million for the Public Health and Social Services Emergency Fund (PHSSEF) to enhance federal, state, and local preparedness to counter potential biological, disease, chemical, and radiological threats to civilian populations. Additionally, \$33.5 million is directed to global disease detection. The bill does not include funds to support the President's FY2006 \$7.1 billion emergency request for avian flu and pandemic influenza preparedness. Instead, appropriators provided additional funds through FY2006 Defense Appropriations. The *FY2006 Defense, Disaster Assistance, and Avian Flu Preparedness Appropriations* conference report, H.Rept. 109-359, reserves a portion of the \$3.8 billion directed to avian flu activities for international avian flu efforts.⁸ The Senate passed the House version after removing a controversial provision related to oil drilling in Alaska. H.R. 3010 and H.R. 2863 were presented to the President on December 28, 2005.

⁷ For more information on the domestic response to H5N1, see CRS Report RL33145, *Pandemic Influenza: Domestic Preparedness Efforts*, by Sarah A. Lister, and CRS Report RS21747, *Avian Influenza: Agricultural Issues*, by Jim Monke.

⁸ The FY2006 Defense, Disaster Assistance, and Avian Flu Preparedness Appropriations conference report, H.Rept. 109-359, contains \$3.8 billion for avian influenza initiatives. \$3.3 billion of the \$3.8 billion is directed to the Department of Health and Human Services (HHS) (of which \$267 million is reserved for international initiatives, disease surveillance, vaccine registries, research, and clinical trials). An additional \$500 million is reserved for international assistance, monitoring and tracking, and research and development, of which \$131.5 million is directed to USAID, \$130 million to the Department of Defense, \$71.5 million to the Department of Agriculture, \$47.3 million to the Department of Homeland Security, \$20 million to FDA, \$27 million to the Department of Veterans Affairs, \$31 million to the Department of State, and \$11.6 million to the Department of the Interior.

Table 3 reflects FY2006 appropriations that include funding for global avian flu activities.

Press reports quote a number of Members expressing concern about funding the President's \$7.1 billion avian flu and pandemic preparedness request. The Chairman of the House Energy and Commerce Committee, Joe Barton, reportedly stated that he would not support funding for the bill if the President did not provide offsets for avian flu and pandemic preparedness spending.⁹ Others proposed that Congress spread out funding the request over a few years.

Some congressional Members argued that the Administration has allocated insufficient resources to the global fight against H5N1 and pandemic planning. Of the \$7.1 billion requested, approximately \$388 million would be reserved for global efforts. A number of Members have introduced legislation to increase U.S. resources allocated to the global fight against avian flu. Some bills, such as H.R. 4062, *Pandemic Preparedness and Response Act* and its Senate companion, S. 1821, propose developing a "Pandemic Fund" to augment ongoing U.S. and international avian flu and pandemic preparedness initiatives. Other bills, such as H.R. 4476, *Global Network for Avian Influenza Surveillance Act*, and its Senate companion, S. 1912, advocate greater support for initiatives that prevent the spread of H5N1 among animals. A number of bills, such as H.R. 3369, *Attacking Viral Influenza Across Nations Act*, and its Senate companion, S. 969, suggest the U.S. strengthen surveillance capacity within affected countries. Bills, such as H.R. 813, *Flu Protection Act*, and its Senate companion, S. 375, aim to boost influenza vaccine supply. Additionally, other legislation, such as H.R. 4245, *Influenza Preparedness and Prevention Act* encourage greater international cooperation.

Some Members of Congress have also expressed support for greater spending on global initiatives during congressional hearings. For example, during the House International Relations Committee hearing on pandemic flu in December 2005, Chairman Henry Hyde questioned whether the amount the President requested for international pandemic flu preparedness was sufficient. A number of other committees have also held hearings on avian flu and pandemic preparedness, including the Senate Foreign Relations and Appropriations Committees, House Agriculture Committee and a joint hearing by the House Homeland Security and Armed Services Committees.

U.S. Executive Branch Response

On November 1, 2005, the President released the National Strategy for Pandemic Influenza.¹⁰ One day later, on November 2, 2005, the Administration released the U.S. Department of Health and Human Services (HHS) Influenza Plan.

⁹ CQ Today, "Bush Flu Spending Request Meets Resistance from House Republicans." November 8, 2005. [<http://www.cq.com>]

¹⁰ For more information on U.S. government avian flu and pandemic preparedness see [<http://www.pandemicflu.gov>]

The HHS plan provided a detailed explanation of how the national strategy would be implemented. Some were disappointed by the relatively small proportion of funds reserved for international efforts. It has been argued that greater investment in pandemic influenza preparedness abroad could enhance domestic pandemic preparedness efforts. Of the \$7.1 billion requested, approximately \$388 million is reserved for global initiatives. Of the \$388 million, \$200 million is made available for HHS to bolster international surveillance capacity; \$131.5 million for USAID to implement avian influenza containment efforts globally; an additional \$18.5 million for the State Department for avian flu and pandemic preparedness activities in diplomatic arenas, \$20 million for the potential evacuation of U.S. government personnel and their dependents in the event of a pandemic; and \$18.3 million for the Department of Agriculture to provide technical assistance in international animal surveillance.¹¹ Table 2 summarizes the FY2006 emergency request.

HHS (and its relevant agencies), USAID, the Department of Agriculture, and the Department of Defense are the key U.S. departments and agency involved in containing the global spread of H5N1 and preparing for pandemic influenza. The Department of State plays a complementary role by raising the issue in diplomatic arenas. The unique role that each agency plays is described in order of presence on the ground.

Prior to 2005 — when Congress provided \$25 million for preventing the global spread of avian influenza and preparing for pandemic influenza — U.S. agencies had been enhancing laboratory capabilities, training health care providers, strengthening surveillance systems, and developing influenza pandemic plans. Through the FY2005 emergency appropriations, Congress directed U.S. agencies to revisit international influenza initiatives and ensure that there was a coordinated response to the global spread of H5N1. USAID and HHS (including its relevant agencies) undertook country planning visits to Vietnam, Cambodia, and Laos. After the trip, the team outlined in a report¹² a number of factors that have complicated efforts to contain the spread of H5N1 in Vietnam, Cambodia, and Laos, which included:

- Between 70% and 80% of poultry in the three countries are raised in small backyard farms, hindering national governments' ability to ensure health standards.
- Between 50% and 80% of poultry die from other avian infections, complicating efforts to identify unusual die-offs, and limiting farmers' likelihood of reporting bird deaths to authorities.
- Although culling is an essential element of controlling the spread of H5N1, poorer countries can not afford to systematically compensate

¹¹ FY2006 Emergency Request for Avian and Pandemic Influenza Preparedness. [http://www.whitehouse.gov/omb/budget/amendments/supplemental_11_01_05.pdf]

¹² Report from Country Planning Visits, "U.S. Government Emergency Response to Avian Influenza: A Plan of Action for Vietnam, Laos, and Cambodia." July 11-24, 2005. This report was provided to CRS by USAID.

farmers for lost stock, which also increases reluctance to report signs of infection.

- Wild birds and domesticated ducks are H5N1 reservoirs.
- Low levels of awareness exist among local farmers.
- There is little pandemic preparedness activity in the countries toured.
- The capacity to monitor and respond effectively to animal outbreaks is limited. Veterinary services are inadequate to deal with the scope, severity, and rapid spread of H5N1 epidemics, which has resulted in the disease becoming increasingly endemic among animal populations in the region. The lack of human resources for disease surveillance, diagnostics, and response also severely limits the capacity of human health systems, and continued human infections of avian influenza threaten to overburden already fragile public health infrastructures.

The report also included an action plan, which outlined the activities that each agency would implement. The agency-specific strategies are briefly described below. Table 4 provides a country-specific illustration of Department of Health and Human Services (HHS) and USAID spending for the FY2005 Emergency Supplemental Appropriations.

U.S. Department of Health and Human Services (HHS)

CDC is the key agency at HHS responsible for implementing U.S. anti-influenza activities around the world. The Coordinating Center for Infectious Diseases and the Field Epidemiology Training Program — a CDC-sponsored activity — are also critical components of HHS global pandemic preparedness initiatives. Activities with foreign governments or populations include pandemic preparedness and planning; training in avian influenza surveillance; laboratory safety and skills instruction; epidemiology training; developing and training rapid response teams; stockpiling support; and deployment of expert disease control teams.

It is not possible to disaggregate H5N1-specific funding, because H5N1, seasonal flu, and pandemic preparedness initiatives are interlocked. A significant part of H5N1 and pandemic influenza planning is funded through the Global Disease Detection (GDD) Initiative at CDC. GDD aims to recognize infectious disease outbreaks faster, improve the ability to control and prevent outbreaks, and detect emerging microbial threats. CDC estimates that in FY2004, it spent approximately \$5 million on activities related to international influenza through both its Infectious Diseases Control and GDD programs. In FY2005, CDC spent approximately \$6 million through these activities, in addition to the \$15 million emergency appropriations. In 2005, CDC expanded its GDD activities by creating new sites, improving early warning systems, researching new viral strains, and supporting international organizations. Congress provided \$21.4 million for GDD in FY2005. The HHS FY2006 budget request suggests increasing GDD funding by

\$12.1 million to \$33.5 million, of which a portion would be used for international bird flu initiatives.¹³ H. Rept.109-337, *FY2006 Labor, HHS, and Education Appropriations* directed \$33.5 million to GDD.

U.S. Agency for International Development (USAID)

USAID coordinates its global H5N1 and influenza response with other U.S. agencies. It also works closely with the WHO, the Food and Agriculture Organization of the United Nations (FAO), and other international governments and organizations to support national influenza and H5N1 prevention efforts. To date, the agency has spent \$13.7 million on avian influenza prevention and containment (\$10 million of which was funded through the FY2005 emergency appropriations).¹⁴ Specifically, the agency has:

- dedicated \$7.5 million to Cambodia, China, Indonesia, Laos, and Vietnam for strengthening disease surveillance, laboratory diagnosis, and rapid containment of animal outbreaks;
- provided \$2.85 million for communication campaigns in Laos, Cambodia, Vietnam, and Indonesia aimed at reducing animal handling practices that place humans at risk;
- committed over \$1.6 million to enhance national planning efforts, strengthen avian influenza control and outbreak response, and augment human disease surveillance systems and laboratories;
- granted WHO \$300,000 for international coordination efforts and for improving disease control and surveillance measures;
- provided WHO an additional \$250,000 for personal protective equipment (PPE) used in handling and disposing of infected poultry; and
- distributed some 10,000 sets of PPEs, which include manual sprayers to assist in decontaminating hospital rooms and equipment, Tyvek suits (protective coveralls used in hazardous situations), gloves, boots, masks, and eye protection in Cambodia, Thailand, Laos, Vietnam, and Indonesia.

The Administration's FY2006 emergency supplemental request allocates \$131.5 million to USAID for avian flu and pandemic preparedness initiatives abroad. The funds would be used to pre-position supplies and equipment that prevent and control the spread of avian influenza; launch awareness raising campaigns; and accelerate international planning and preparedness. The request proposes that \$2 million of the USAID funds be reserved for initiatives in Russia and Eastern Europe.

¹³ Interviews with CDC staff, October 13, 2005 and November 1, 2005.

¹⁴ USAID Fact Sheet "Avian Influenza Preparedness, Response, and Containment." October 27, 2005. [<http://www.usaid.gov>].

Department of State

On September 14, 2005, President Bush announced the International Partnership on Avian and Pandemic Influenza (IPAPI) at the U.N. General Assembly High-Level Plenary Session. IPAPI seeks to generate and coordinate political momentum and action for addressing the threats of avian and pandemic influenza based on a set of core principles. The principles are focused on enhancing preparedness, prevention, response, and containment activities (see Table 5). The Partnership brings key nations and international organizations together to improve global readiness by:

- elevating the issue of avian and pandemic influenza preparedness to the national level;
- coordinating efforts among donor and affected nations;
- mobilizing and leveraging resources;
- increasing transparency in disease reporting and surveillance; and
- building capacity to identify, contain, and respond to pandemic influenza.

The State Department works closely with regional organizations, including the Association of Southeast Asian Nations (ASEAN) and the Asia Pacific Economic Cooperation (APEC) forum, to address avian influenza and the threat of an influenza pandemic. The work includes efforts to encourage comprehensive national pandemic preparedness plans that address the multi-sectoral impacts of an influenza pandemic.¹⁵

In the FY2006 supplemental request, the President proposed that the State Department receive \$38.5 million in FY2006 for international response coordination; diplomatic outreach; exchanges of U.S. and foreign medical personnel; and for avian and pandemic influenza health support and protection of U.S. government employees and families at U.S. missions overseas. About \$20 million of those funds would be reserved for the potential evacuation of U.S. government personnel and dependents from overseas missions.

¹⁵ The State Department also implements influenza pandemic preparedness initiatives through the Office of International Health Affairs (OES/IHA), which works with agencies throughout the U.S. government to facilitate policy-making regarding bioterrorism and health security, environmental health, infectious diseases (e.g., SARS, Avian Influenza, Pandemic Influenza, Polio), health in post-conflict situations, and surveillance and response. [<http://www.state.gov/g/oes/c1874.htm>].

Department of Agriculture (USDA)

U.S. Department of Agriculture (and its related agencies) works closely with other U.S. agencies on the ground, as well as other international organizations to help nations take steps to address and control the spread of avian influenza. Dr. Ron DeHaven, Administrator, Animal and Plant Health Inspection Service (APHIS) of USDA stated that addressing avian flu at its source — in affected poultry abroad — and participating in international eradication efforts provide the best opportunity to reduce or eliminate the risk of an H5N1 pandemic.¹⁶ In that view, USDA and other analysts consider the department's efforts a critical element in the global fight against the spread of H5N1.

Through \$4 million in FY2003 emergency funding, APHIS launched an outreach campaign called "Biosecurity for the Birds," which provides poultry farmers with the latest information on biosecurity to prevent the spread of avian infections on farms. USDA is translating the brochures for use in southeast Asia.

Additionally, in the FY2006 emergency supplemental, the President requests \$91.3 million for USDA, of which \$18.3 million is reserved for international initiatives. The would be allocated as follows:

- \$8.0 million for wildlife, poultry and swine surveillance and diagnostics;
- \$1.75 million for biosecurity enhancement through education and information;
- \$1.05 million for technical assistance through training and avian movement control;
- \$3.8 million for training and education related to industry changes and food safety planning;
- \$1.05 million for training and education regarding poultry destruction and disposal methods;
- \$0.6 million for testing and evaluation of vaccine formulations; and
- \$2.1 million for in country expertise for longer term assistance.

Department of Defense (DoD)

The Department of Defense Global Emerging Infections System (GEIS) delivers health care to American armed forces around the globe.¹⁷ GEIS has a network of overseas medical research laboratories that track, prevent, and treat infectious diseases around the world. The objective is to protect the U.S. military and strengthen its ability to address the challenges related to a potential pandemic influenza, including compromised military force health and readiness. GEIS is also a critical partner in the WHO's Global Outbreak Alert and Response Network

¹⁶ USDA, Transcript of Technical Briefing regarding Avian Influenza. October 26, 2005. [<http://www.usda.gov/birdflu>]

¹⁷ GEIS website, [<http://www.geis.fhp.osd.mil/>].

(GOARN) (described below). Key DoD-GEIS activities to combat the spread of H5N1 and prepare for an influenza pandemic have included:

- providing a DoD staff veterinarian to serve as a member of the WHO GOARN Team in Laos, and to conduct training workshops in detecting and diagnosing avian flu cases;
- placing a U.S. Navy microbiologist at the Institute Pasteur in Ho Chi Minh City, Vietnam, to hold training sessions on rapid diagnostic test methodology;
- monitoring and preventing infectious disease emergence in southeast Asia through its Armed Forces Research Institute of Medical Sciences (AFRIMS).¹⁸

The Naval Medical Research Unit-2 (NAMRU-2) is another critical part of DoD's effort to prevent H5N1 from becoming a human pandemic and prepare for an influenza pandemic. NAMRU-2 supports the GEIS mission through four programs: emerging diseases, enteric diseases, parasitic diseases, and virology. NAMRU-2 is an overseas research laboratory based in Jakarta, Indonesia with related activities in Southeast Asia and the Pacific Islands. NAMRU-2 also supports a satellite laboratory in Phnom Penh, Cambodia, in collaboration with the Cambodian National Institute of Public Health. Key activities include:

- bolstering local, national, and regional diagnostic and epidemiological capacity;
- assisting in the development of new surveillance strategies, such as the novel syndromic surveillance initiative Early Warning Outbreak Recognition System (EWORS);
- implementing a comprehensive influenza surveillance project in Indonesia, which provides prevalence data and temporal, genotype data of circulating strains;
- collaborating with CDC in its FY2005 and FY2006 global influenza activities; and
- facilitating the transformation of outbreak response structures into more effective, multidisciplinary, centrally directed ones.¹⁹

The FY2006 emergency supplemental request would reserve \$10 million of the \$130 million allocated to the Department of Defense for procuring protective

¹⁸ DoD, Global Emerging Infections System Annual Report Fiscal Year 2004. [http://www.geis.fhp.osd.mil/GEIS/aboutGEIS/annualReports/GEIS_AR_04.pdf].

¹⁹ DoD, Global Emerging Infections System Annual Report Fiscal Year 2004. [http://www.geis.fhp.osd.mil/GEIS/aboutGEIS/annualReports/GEIS_AR_04.pdf].

equipment; laboratory diagnostic equipment; portable field assay testing equipment; and surveillance and communication equipment.

International Response²⁰

Overview of the Role of the World Health Organization

The World Health Organization, established in 1948, is the U.N. system's authority on international public health issues. It assists governments to improve national health services and establish worldwide standards for foods, chemicals, and biological and pharmaceutical products. WHO concentrates on preventive rather than curative programs, including efforts to eradicate endemic and other widespread diseases, stabilize population growth, and improve nutrition, sanitation, and maternal and child care. WHO works through contracts with other agencies and private voluntary organizations. The United States has been a member of WHO since its inception.

WHO is a central actor in the global response to the outbreak of H5N1 avian influenza. As in the case of SARS in 2003, WHO seeks to mitigate the risks avian influenza and infectious diseases pose to international public health, and to assure the availability of appropriate containment mechanisms, particularly since global travel has become the primary means of spreading disease around the world. With the exception of SARS and HIV/AIDS, H5N1 is viewed as the most serious challenge the WHO has faced in the last few decades.

WHO's Global Health Security

The Epidemic and Pandemic Alert and Response system is a critical part of WHO's global health security plan. Key aspects of the program include:

- **The Alert and Response Operations:** systematically track the development of diseases, share and disseminate information, and coordinate rapid outbreak response and logistics.
- **The Global Outbreak Alert and Response Network (GOARN):** provides an operational framework and aims to create a standardized international outbreak response system through 112 institutions and networks of people and technical resources.²¹
- **The Global Public Health Intelligence Network (GPHIN):** tracks Internet communications through a customized search engine, which effectively picked up telecommunicated alerts in China during the

²⁰ This section prepared by Rhoda Margesson, Analyst in Foreign Affairs.

²¹ For more information on the Global Outbreak Alert and Response Network, see [<http://www.who.int/csr/outbreaknetwork>].

SARS outbreak. WHO also uses the system to clarify or refute information that may create disruption or panic.

WHO Global Influenza Preparedness Plan²²

In September 2005, U.N. Secretary-General Kofi Annan appointed Dr. David Nabarro as the Senior U.N. System Coordinator for Human and Avian influenza. Dr. Nabarro, seconded from the WHO, is responsible for coordinating the avian influenza containment efforts of the various U.N. agencies. Dr. Nabarro is also tasked with encouraging global support and implementation of the WHO Global Influenza Preparedness Plan. The plan outlines WHO goals and actions, as well as recommended actions for individual nations, at each pandemic phase (see Table 1). The plan contains an annex of recommendations to nations for “non-pharmaceutical public health interventions,” such as isolation, quarantine and travel restrictions. The annex stresses the use of voluntary rather than compulsory measures. Additionally, it stresses that nations implement infection-specific responses, noting the lack of demonstrated utility of certain practices. For example, certain SARS control measures, such as temperature screening at airports, would not be expected to effectively control influenza spread.²³

WHO has requested \$150 million to establish a global stockpile of influenza vaccines and treatments. WHO officials underscore that wealthy and poor countries must develop pandemic preparedness plans collectively to reduce national and international viral transmission. The organization envisions using the stockpile to arrest a potential pandemic by containing the virus at the first sign of an outbreak. In the event of an outbreak, WHO asserts that a pandemic could potentially be averted if antiviral drugs were quickly distributed in a poor country without access to them.²⁴ To date, countries have pledged between \$20 million and \$30 million to fund the stockpile. Roche, the patent holder of Tamiflu, announced that it would donate three million courses of the drug to WHO²⁵. The company estimates that the three million courses would be ready before mid-2006.

Similarly, the U.N. General Assembly has established an emergency fund — Central Emergency Response Fund (CERF) — to provide quick initial funding during the early stages of emergencies and to minimize extra costs related to funding delays. The U.N. aims to have a \$500 million revolving budget that could be used within three to four days of the start of an emergency. To date, the United Nations

²² The WHO influenza pandemic preparedness Home Page is at [<http://www.who.int/csr/disease/influenza/pandemic/en/index.html>].

²³ See WHO, Department of Communicable Disease Surveillance and Response Global Influenza Programme, “Responding to the Avian Influenza Pandemic Threat: Recommended Strategic Actions,” WHO/CDS/CSR/GIP2005.8.

²⁴ WHO, “Donation of three million treatments of oseltamivir to WHO will help early response to an emerging influenza pandemic.” August 24, 2005. [<http://www.who.int/mediacentre/news/releases/2005/pr36/en/index.html>].

²⁵ Roche, “Roche donates 3 million treatments of antiviral Tamiflu to the WHO for use in an influenza pandemic.” August 24, 2005. [<http://www.roche.com/med-cor-2005-08-24>]

has received more than \$200 million for the fund, which will be launched in mid-January and should be operational by March.²⁶

Role of Other International Health Organizations

The U.N. Food and Agriculture Organization coordinates global surveillance and response activities for animal influenza strains with pandemic potential, such as H5N1.²⁷ To accomplish its mission, FAO works closely with the World Organization for Animal Health, known by its French acronym, OIE.²⁸ Rapid detection of avian influenza outbreaks is key to controlling the disease both in poultry and in people, and is therefore key to preventing and controlling a potential influenza pandemic. FAO, OIE, and WHO work closely to prevent and respond to the threat of an avian influenza pandemic. FAO has spent \$7.5 million on H5N1 initiatives since 2004. USAID is granting the UN organization \$6 million, and the German government has pledged \$20 million for 2005 and 2006 activities.²⁹ FAO is requesting an additional \$175 million from the international community, due to the rapid global spread of H5N1.

The World Bank provides low-interest loans to countries heavily affected by H5N1. Additionally, the Bank coordinates efforts between countries, and encourages them to develop pandemic plans that connect sectors, such as health and rural development. In September 2005, representatives from the WHO, FAO, OIE and the World Bank met with health experts from the United Nations, European Commission and H5N1-affected countries to discuss the global spread of H5N1, to emphasize the importance of pandemic planning, and to prepare a coordinated response. On November 4, 2005, the World Bank announced that it would provide \$500 million in loans to poor southeast Asian countries that are struggling to combat avian influenza. The funds will be used to supplement government resources, strengthen veterinary systems, and assist in culling and animal vaccination programs.³⁰ Although the World Bank has agreed to provide \$500 million in loans to affected countries, the Bank estimates that \$1 billion could be needed over the next three years.³¹ The \$1 billion does not include the cost of financing human or animal vaccine development, purchasing antiviral medicine, or compensating farmers for loss of income.

²⁶ United Nations, "U.N. Establishes New Emergency Fund," December 16, 2005. [<http://www.irinnews.org>]

²⁷ See FAO avian influenza home page at [http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/special_avian.html].

²⁸ See OIE avian flu home page at [http://www.oie.int/eng/AVIAN_INFLUENZA/home.htm]

²⁹ Interview with FAO official, October 31, 2005.

³⁰ World Bank Press Release, "New Global Program to Deal with Avian Flu." November 4, 2005. [<http://www.worldbank.org>]

³¹ UN News Service, "Bird flu: UN-sponsored conference draws up six-point action plan." November 9, 2005. [<http://www.un.org/apps/news/>]

The WHO, FAO, OIE, and the World Bank co-sponsored a meeting on avian influenza and human pandemic influenza on November 7-9, 2005, in Geneva, Switzerland, to develop an integrated global plan and to focus on funding initiatives.³² Participants agreed to a six-point global plan which called for:

- Controlling the virus at its source in birds;
- Strengthening surveillance, early detection, rapid response systems, and laboratory capacity;
- Training national staff in investigating animal and human cases, and planning and testing rapid containment activities;
- Building and testing national pandemic preparedness plans, conducting a global pandemic response exercise, and enhancing health systems;
- Developing integrated country plans that encompass all sectors; and
- Ensuring factual and transparent communications.³³

International Health Regulations

An outbreak of infectious diseases raises many public health questions including the application of international law, particularly as it affects three main areas — International Health Regulations (IHR); public health measures and civil and political rights; and principles of state responsibility.³⁴ This section will focus on the IHR because of its relevance to WHO.

On May 23, 2005, the World Health Assembly revised the IHR, adding novel influenza strains (those with pandemic potential) and SARS to the list of “notifiable diseases” that WHO urges countries to report. In addition, the revised IHR include a provision requiring notification of “events of international concern.” This mechanism could strengthen WHO’s ability to address emerging diseases, because it requires member States to report unusual health events whether or not they are attributable to a known pathogen. The updated IHR also include expanded requirements for disease surveillance and control activities at points of international travel (airports, border crossings, etc.), and urge developed countries to assist developing countries to gain the capacities needed to meet the new disease control guidelines.³⁵

The revised IHR are to replace the existing IHR (adopted in 1969) on June 15, 2007, when the revised regulations come into force. Considered an international legal instrument, the revised IHR will be binding on all WHO member States who

³² The World Bank Group, “Partners Meeting on Avian Influenza and Human Pandemic Influenza.” [<http://www.worldbank.org>]

³³ UN News Service, “Bird flu: UN-sponsored conference draws up six-point action plan.” November 9, 2005. [<http://www.un.org/apps/news/>]

³⁴ The American Society of International Law, *SARS and International Law*, April 2003, see [<http://www.asil.org/insights>].

³⁵ The revised International Health Regulations, approved by the World Health Assembly on May 23, 2005, are available at [<http://www.who.int/csr/ihr/en/>].

have not stated a reservation or rejected them altogether, and on non-member States that have notified the Director-General of WHO that they agree to be bound by the revised IHR.³⁶ Between now and June 2007, WHO and Member States may take concrete steps towards implementation of the revised IHR and to improve their capacity to respond to international health risks and emergencies.³⁷ The revised IHR do not include an enforcement mechanism. However, for states to respond appropriately and avoid potentially harmful consequences, much of the encouragement to comply will likely come from international pressure, as the SARS outbreak demonstrated.

Affected Countries' Response

Degree and sophistication of preparation for avian influenza vary widely among the affected countries. The more affluent governments have undertaken more extensive measures as well as committed national resources to hedge against the risk of a pandemic. Japan and Taiwan have reportedly both accumulated stockpiles of Tamiflu and are preparing to manufacture their own supply. Singapore has reportedly stockpiled antivirals for 10% of its population, enhanced surveillance, and put a detailed contingency plan in place. WHO officials praised an exercise run by South Korea which simulated how the government would respond to an outbreak.³⁸ On the other hand, the closed governments of Burma (Myanmar) and North Korea offer little reliable information about the presence of bird flu within their borders. Although both Yangon and Pyongyang have provided limited cooperation with the FAO, their officially rosy outlooks are treated with skepticism by international health experts and could constitute a weak link in the event of a pandemic.

The profiles below focus on countries that have had cases of human infection. Although Russia has had no human cases to date, an analysis of H5N1 cases has been included, because H5N1 has spread to other parts of Europe from there. H5N1 cases in birds have been confirmed in Romania, Turkey, Kazakhstan, the Ukraine, and Croatia,³⁹ and Turkey confirmed two deaths from the virus in early 2006. Britain and Taiwan both reported cases of H5N1 in 2005. However, the incidences are not discussed here, as experts concluded that the imported birds were identified and died in quarantine, and are believed unlikely to have spread the disease.

³⁶ If a State makes a reservation that is compatible with the "object and purpose of IHR (2005)" and at least one-third of other States have not objected to the reservation within six months of notification, the revised IHR will enter into force for that State, subject to its reservation. See WHO, "Frequently Asked Questions About IHR," at [<http://www.who.int/csr/ihr/howtheywork/faq>].

³⁷ See WHO, "Frequently Asked Questions About IHR," at [<http://www.who.int/csr/ihr/howtheywork/faq>].

³⁸ "The Front Lines in the Battle Against Avian Flu Are Running Short of Money," *New York Times*. October 9, 2005.

³⁹ OIE, Update on Avian Influenza in Animals, January 9, 2006. [<http://www.oie.int/>]

Cambodia⁴⁰

Between February and April 2005, four Cambodians were confirmed to have died from the H5N1 avian flu virus. All four victims lived in Kampot province, an area where 600 poultry reportedly had fallen ill and died in March 2005. Despite warnings, many villagers ate birds that had been sick because food is not plentiful. Health experts predict that more cases in Cambodia are likely, though the WHO has not reported any additional human cases. Health officials in Kampot are being taught how to identify symptoms of avian influenza and instructed to notify the provincial health department. In September 2005, more than 1,000 water birds were reportedly found dead in poultry farms in Batambang and several other provinces. None of the birds tested have been confirmed to have the H5N1 virus. The Cambodian government has cooperated fully with the WHO, but the government has limited capacity to contain outbreaks of the disease. Compared to Thailand, in Cambodia, poultry farms are smaller but more numerous, and many chickens roam freely, while transportation and communications links are far less developed; hence monitoring the nation's poultry stocks is more difficult. The U.S. government assessment team that visited Laos, Cambodia, and Vietnam in July 2005 reported that the U.S. government, FAO, and WHO have strong working relationships with relevant ministries in the Cambodian government, while over 200 international donors and NGOs operating in the country could play an effective role in mobilizing an effective response to an outbreak of avian flu. On October 12, 2005, U.S. Secretary of Health and Human Services Michael Leavitt, on a visit to Southeast Asia, signed a cooperation agreement with Cambodian officials pledging \$1.8 million to Cambodia to help the country guard against the spread of H5N1.⁴¹ United Nations experts estimated that Cambodia needs \$18 million to develop programs to stem the spread of the virus. In December 2005, Germany announced that it would provide \$3 million to the kingdom to help fight the disease.⁴²

People's Republic of China, Including Hong Kong⁴³

The November 2005 confirmation of the first human cases and deaths from H5N1 in China in 2005 renewed fears that the spread of H5N1 could accelerate within China.⁴⁴ The close proximity of millions of people, birds, and animals in southern China has made it a common breeding ground for deadly types of influenza viruses, including the H5N1 avian flu virus, that jump the species barrier to humans. Added to this, the PRC's poor public health infrastructure and the traditionally secretive, un-transparent policy approach of its communist government have made international health specialists particularly concerned about the PRC as a possible contributor to an H5N1 flu global pandemic. Health care specialists have cited the

⁴⁰ This section prepared by Thomas Lum, Specialist in Asian Affairs, 7-7616.

⁴¹ "U.S., Cambodian Health Ministers Sign Deal on Bird Flu Cooperation," *Agence France Press*. October 11, 2005.

⁴² "Cambodia Needs \$18 Million for Bird Flu Fight — UN," *Reuters*, December 16, 2005.

⁴³ This section was prepared by Kerry Dumbaugh, Specialist in Asian Affairs, 7-7683.

⁴⁴ As of January 1, 2006, there were 7 confirmed cases of avian flu and 3 deaths in China.

PRC government's early lack of cooperation during the outbreak of Severe Acute Respiratory Syndrome, or SARS — a previously unknown virus that surfaced in southern China in 2003 — as a principal cause for that virus' quick global spread before it was contained.⁴⁵ As of January 1, 2006, there have been 31 outbreaks of the H5N1 strain in Chinese poultry since late October 2005, heightening international health concerns.

Hong Kong in late 1997 is where the H5N1 avian flu virus for the first time was recorded as jumping directly from its traditional animal species to humans, infecting 18 people in Hong Kong and killing six. Although the Hong Kong government responded aggressively at that time, in three days exterminating its entire poultry population of 1.5 million birds, the 1997 outbreak marked the beginning of the cycle of H5N1 outbreaks that expanded on a much wider scale throughout Asia in late 2003 and early 2004. On January 27, 2004, a WHO official stated that a “staggering” number of birds, both migratory and domestic, were infected with the virus in at least ten Asian countries. That same day in 2004, the PRC became the tenth country to acknowledge ongoing outbreaks of avian flu within its borders. According to WHO, H5N1 is now considered endemic in parts of China. In addition to afflicting domestic poultry and migratory birds in isolated parts of China, H5N1 also has been documented in parts of China's pig population.⁴⁶

The 2003 SARS experience appears to have made PRC leaders more sensitive to potential catastrophic health issues. Consequently, Beijing has been far more assertive in enacting measures to combat the H5N1 virus. But even with the positive steps that have been taken, PRC officials face enormous problems in implementation. The PRC Ministry of Health reports it has established 63 influenza monitoring labs throughout most of China⁴⁷ and has crafted and published an emergency plan for an influenza pandemic, including a four-color-coded notification system.⁴⁸ On November 21, 2005, PRC agricultural officials at a press conference further announced the adoption and immediate implementation of contingency regulations to combat the spread of the disease and to punish government officials that delay or obfuscate medical and scientific reports about the virus. The regulations include requirements that provincial and municipal level officials notify the central government within four hours after a new flu outbreak.

By November 2005, PRC officials confirmed that they had either destroyed or vaccinated millions of healthy domestic poultry and that they were planning to inoculate the entire Chinese poultry population, a massive effort which would include

⁴⁵ For more on SARS — Severe Acute Respiratory Syndrome — see CRS Report RL32227, SARS, Avian Flu, and other Challenges for China's Political, Social, and Economic Transformation.

⁴⁶ According to the U.S. Centers for Disease Control and Prevention. See website at [<http://www.cdc.gov/flu/avian/outbreaks/asia.htm>].

⁴⁷ *Beijing Liaowang* in Chinese. Translated on September 26, 2005, in FBIS, CPP20051018050001.

⁴⁸ PRC Ministry of Health, “Preparations and Plan for an Influenza Pandemic Emergency,” September 28, 2005, translated in FBIS, CPP20051012335002 (October 12, 2005).

as many as 14 billion chickens, geese, and ducks.⁴⁹ As a logistical effort, the initiative faces daunting difficulties — first among them the sheer size of China’s poultry population and the fact that the poultry industry is widely scattered, including millions of rural households with a dozen or fewer chickens that roam free. Second, according to medical experts, the poultry vaccine to be fully effective must be given in two separate doses about a month apart, meaning the entire undertaking has to be performed twice for a single inoculation to be effective.⁵⁰ In addition, some health officials have expressed concern that such a broad campaign could backfire and actually contribute to spreading the disease further. Potential problems include the use of unlicensed or substandard vaccines (a problem announced in Liaoning Province in 2005) which could mask flu symptoms in birds but leave them still contagious;⁵¹ and the possibility that vaccinators themselves could spread the virus on their clothing or shoes unless rigid decontamination procedures are followed.⁵²

In another anti-flu initiative, on November 2, 2005, the Chinese government announced an earmark of 2 billion yuan (\$420 million) from China’s current budget to fight avian flu and the banning of poultry imports from 14 countries affected by avian flu. The Swiss manufacturer of Tamiflu, Roche, also announced it had reached an agreement with China on developing a generic version of Tamiflu.⁵³

Despite these preparations, some international health experts quietly continue to question the PRC’s transparency on avian flu issues. In late April and June 2005, for instance, PRC officials reported an unknown cause for the suspicious sudden deaths of thousands of migratory birds in western China’s Qinghai Lake. In July 2005, a virology team from Hong Kong reported in a scientific journal that their research showed the Qinghai bird deaths were from an H5N1 strain genetically similar to that originating in south China. The Hong Kong report was vigorously criticized as inaccurate by Jia Youling, an official with the PRC Ministry of Agriculture charged with coordinating avian-flu eradication.⁵⁴ On June 18, 2005, the *Washington Post* reported that Chinese farmers had been using one of two types of anti-influenza drugs (amantadine, a drug meant for humans) to treat poultry for the

⁴⁹ Cody, Edward, “China to vaccinate billions of birds; campaign aims to stem avian flu,” *Washington Post*, November 16, 2005, p. A15.

⁵⁰ Fountain, Henry, “How to vaccinate 14 billion birds,” *The New York Times*, November 20, 2005, p. 2.

⁵¹ Sipress, Alan, bird flu experts warn against bad vaccines; improper poultry inoculation may spread virus,” *Washington Post*, November 22, 2005, p. A24.

⁵² McNeil, Donald Jr., “Health experts fear Chinese flu vaccination plan could backfire,” *The New York Times*, November 20, 2005, p. 12.

⁵³ Wright, Tom, “Roche to Let Chinese Producer Make Flu Drug.” *New York Times*, December 13, 2005.

⁵⁴ The independent virology team was from the University of Hong Kong and included Dr. Guan Yi, a co-author of the scientific report published in *Nature* magazine on July 7, 2005. For reference to PRC official Jia Youling’s comments, see Sipress, Alan, “China has not shared crucial data on bird flu outbreaks, officials say,” in the *Washington Post*, July 19, 2005, p. A15.

H5N1 bird flu virus, potentially rendering the drug ineffective against the virus strain in humans — a story that PRC officials also have denied.⁵⁵

In its anti-flu efforts, China also remains burdened by perennial problems involving local and regional compliance with central government directives. This takes on new dimensions when potential remedies — such as the mandatory destruction of infected poultry flocks — may rob indigent farming families of their principal source of food or cash.

U.S.-PRC Cooperation. President George Bush and PRC President Hu Jintao have discussed greater avian flu coordination on several occasions — during a meeting at the U.N. summit in September 2005 and during Bush’s visit to Beijing in November 2005.⁵⁶ During the latter visit, the two sides initialed a joint initiative on avian flu, promising to participate in joint research on human and animal virus samples, establish a mechanism to share influenza strains for research purposes, and cooperate actively on a number of regional and international levels, including the WHO, the U.N. Food and Agriculture Organization, and the World Organization of Animal Health. In spite of this Sino-U.S. agreement, WHO officials on December 30, 2005 announced that as of that date, China still had not shared with international health officials flu virus samples from its infected poultry — a key step in tracking the virus’ mutation and devising an effective vaccine.

At this point, the level of cooperation also appears uncertain in another key area of the bilateral agreement — that involving cooperation on “influenza vaccine development.” China appears to have advanced on vaccine development — the PRC’s State Food and Drug Administration approved clinical trials for a Chinese-developed human avian flu vaccine in November 2005 — and the United States is separately working on a vaccine of its own.

Indonesia⁵⁷

Indonesia is viewed, along with Cambodia, Laos, and Vietnam, as a weak link in the effort to curb an outbreak of avian flu. A lack of resources, expertise, and a slow recognition of the problem has hindered Indonesia’s response. Indonesia has a population of some 1.3 billion chickens with as many as 400 million of those in informal settings. Indonesia has resisted mass culling of bird populations. In 2003, when H5N1 was first seen in the bird population, there was not much alarm in Indonesia as the virus was not generally viewed as a significant threat to humans. The virus is now considered endemic in the bird population of Indonesia and outbreaks

⁵⁵ *Washington Post*, June 18, 2005, p. A01. Some sources also have suggested that the virus’ apparent new resistance to known drugs may be the result of renegade pharmaceutical labs in China dispensing the wrong anti-viral medications, raising additional questions about the PRC government’s ability to exert control over a potential pandemic. *International Herald Tribune*, July 5, 2005, p. 3.

⁵⁶ King Jr., Neil, “Hu pledges efforts to ease U.S. strains — ,” *Asian Wall St. Journal*, September 15, 2005, p. A1.

⁵⁷ This section prepared by Bruce Vaughn, Analyst in Asian Affairs, 7-3144.

in birds have so far been reported in 25 out of Indonesia's 33 cities and provinces.⁵⁸ Concern grew in June 2005, when Indonesia saw its first human H5N1 fatality. WHO later confirmed H5N1 as the cause of death in July 2005. In October 2005, when a 38-year-old man and two of his children died of the disease in an affluent section of Jakarta, some began to speculate that the virus could spread from person to person, but to date this has not been verified.

There have been a number of questionable reports regarding the number of human cases of H5N1 infection. One report claimed that 85 people had been admitted to hospitals in Indonesia with suspected or confirmed cases of avian flu since the first case in June 2005 (though the man died in June 2005, the cause of death was not attributed to H5N1 until July, as indicated above).⁵⁹ However, WHO has only confirmed 16 human cases of H5N1 infection, of whom 11 have died.⁶⁰

While Indonesia was viewed as initially trying to cover up the outbreak, it has more recently moved to address the problem. Plans to stem the spread of the disease, should it mutate and spread more widely among human populations, involve rapid reaction and vaccine distribution. Such an approach is dependent on early detection and reporting by local health officials, and the availability of the resources necessary to treat an outbreak. On December 19, 2005, Indonesia announced a three-year national strategic plan to contain the avian flu virus. The plan will use such measures as culling, vaccination, and community-based surveillance of bird populations. Critics of the plan have pointed out that it does not address birds kept in informal settings.⁶¹ In addition, the government plans to establish a national commission for bird flu control that includes all ministries, private and non-governmental agencies, and the Red Cross.⁶²

The Indonesian government appears to be making limited progress in acknowledging and dealing with a large scale outbreak. Foreign Ministry Spokesman Yuri Thamrin has stated "we need international cooperation to fight the virus."⁶³ Agriculture Minister Anton Apriyanto has indicated that the government will slaughter poultry to stem serious outbreaks. The minister had reportedly earlier stated that the government did not have enough money to compensate farmers for their slaughtered animals. The government reportedly spent \$13 million in 2005 to

⁵⁸ "Indonesia Set to Form National Commission for Bird Flu Control," Thai News Service. January 10, 2006.

⁵⁹ "Indonesia Reduces Confirmed Bird Flu Death Toll to 3 from 6," *AFX Asia*. October 6, 2005.

⁶⁰ WHO, *Confirmed Human Cases of Avian Influenza A (H5N1)*. Accessed on December 30, 2005. [http://www.who.int/csr/disease/avian_influenza/country/en/]

⁶¹ "Toll UP but Indonesia Ready for Bird Flu," *ISI Emerging Markets*. January 2, 2006.

⁶² "Indonesia Set to Form National Commission for Bird Flu Control," Thai News Service. January 10, 2006.

⁶³ "Indonesia Calls for Intl Cooperation to Combat Bird Flu," *Dow Jones Newswire*. Sept. 30, 2005.

cull infected livestock.⁶⁴ According to WHO expert Gina Samaan, Indonesian hospitals are increasingly prepared and “the surveillance system has been enhanced, in the sense that there has been lots of training undertaken to ensure that surveillance of the health department in the provincial and district levels can respond and can initiate an investigation.”⁶⁵ Eleven companies in Indonesia account for 60% of Indonesian poultry and are reportedly reluctant to allow government monitoring of their birds for fear that they will not be compensated for birds killed to stem an outbreak of the H5N1 avian influenza. Indonesia’s poultry industry generated \$3.75 billion in revenue in 2004.⁶⁶

Health experts believe Indonesia does not have a sufficient supply of antiviral treatments for a country with more than 200 million people, and where H5N1 is endemic among the bird population. In September, Indonesia’s Minister of Health asked for international assistance and expressed concern that her country is not capable of containing the spread of H5N1.⁶⁷ Since then, the international community has pledged \$140 million in assistance, and the Indonesian Government has allotted just over \$60 million for bird flu prevention.⁶⁸ WHO officials have also called for countries to donate antiviral drugs to Indonesia. Additionally, Australian Foreign Minister Alexander Downer has warned that Indonesia is not prepared to respond to an avian flu outbreak amongst its human population. Australia has planned a meeting with Indonesian and WHO officials in Indonesia to strengthen Indonesia’s capacity to deal with avian flu. Australia has also pledged funding to Indonesia for the purchase of Tamiflu tablets to treat about 40,000 people.⁶⁹ India has also reportedly agreed to provide 1,000 doses, adding to Indonesia’s own supply of 10,000 doses.⁷⁰

Reporting indicates that Indonesian officials were aware of bird flu in the bird populations for two years but suppressed the information until humans began to become infected. It has been asserted that “the Indonesian government failed to take measures that could have broken the chain, [of the spread of bird flu] while discouraging research into the outbreak.” The outbreak was evidently suppressed due to lobbying by the poultry industry in Indonesia. There are also allegations that the

⁶⁴ Alan Sipress, “Indonesia Warns of Possible Bird Flu Epidemic,” *Washington Post*. September 21, 2005.

⁶⁵ “Indonesia Making Progress in Fight Against Bird Flu - WHO,” *AFX Asia*. September 30, 2005.

⁶⁶ Phelim Kyne and Fitri Wulandari, “Indonesian Poultry Cos Hobble Avian Flu Control Ops,” *Dow Jones Newswires*. October 5, 2005.

⁶⁷ Reuters, “Indonesia says bird flu outbreak may become epidemic.” September 21, 2005. [<http://www.alertnet.org>].

⁶⁸ “Indonesia Set to Form National Commission for Bird Flu Control,” Thai News Service. January 10, 2006.

⁶⁹ Nicholas Zaminska, “Asian Nations Start Critical Bird Flu Preparations,” *The Wall Street Journal*. October 3, 2005.

⁷⁰ Eaton, Dan and Telly Nathalia, “Indonesia says bird flu outbreak may become epidemic.” Reuters. September 21, 2005. [<http://www.alertnet.org/thenews/newsdesk/JAK58836.htm>].

Indonesian government has not funded its announced policy to vaccinate poultry against the virus.⁷¹

Laos⁷²

An outbreak of H5N1 avian flu in poultry was confirmed early 2004, but Laos has had no known cases in humans, according to the WHO. There have been no reports of avian influenza in birds or humans in Laos in 2005.⁷³ As of June 2005, the Lao government estimated that 60,000 birds had been lost to the infection and another 98,000 to culling. However, this number reflects only documentation from commercial farms; the vast majority of poultry-rearing in Laos takes place in smaller, family-run farms.

Some experts argue that there is an urgent need for foreign health organizations to focus upon and assist Laos, given its proximity to other countries with the disease and the lack of government capacity, particularly its weakness in surveillance. The central and local governments have limited capabilities for collecting and disseminating information, monitoring avian populations, and conducting laboratory analysis to confirm cases of the virus. In addition, according to a U.S. government assessment team that visited Laos, Cambodia, and Vietnam, the country's health care system faces "severe limitations" and would be "quickly overwhelmed" in the event of a large-scale human outbreak.⁷⁴ The FAO and the WHO reportedly have strong working relationships with the Lao government.⁷⁵ On October 13, 2005, U.S. Secretary of Health and Human Services Michael Leavitt, on a visit to Southeast Asia, signed a cooperation agreement with Lao officials pledging \$3.4 million to Laos for controlling outbreaks of avian flu.⁷⁶

Russia⁷⁷

The H5N1 strain spread into Central Asia in 2005 and was first diagnosed in southern Russia (in the Novosibirsk region) as well as in northern Kazakhstan in July 2005. Outbreaks in both countries were attributed to contact between domestic birds and waterfowl migrating from Southeast Asia. There have been no confirmed human

⁷¹ Alan Sipress, "Indonesia Neglected Bird Flu Until Too Late," *The Washington Post*, October 20, 2005.

⁷² This section prepared by Thomas Lum, Specialist in Asian Affairs, 7-7616.

⁷³ "WHO Urges Laos to Prepare for Deadly Human Version of Bird Flu," *Agence France Presse*, August 27, 2005.

⁷⁴ "U.S. Government Emergency Response to Avian Influenza: A Plan for Vietnam, Laos and Cambodia: Report from Country Planning Visits," July 2005.

⁷⁵ "WHO Urges Laos to Prepare for Deadly Human Version of Bird Flu," *Agence France Presse*, August 27, 2005

⁷⁶ "Intl Donors Pledge More Than \$17M to Help Southeast Asia Combat Bird Flu," *Forbes.com*, October 13, 2005.

⁷⁷ This section prepared by Jim Nichol, Specialist in Russian and Central Asian Affairs, 7-2289.

cases in Russia. The avian flu spread to eight southern regions of Russia, including two regions bordering the Caspian Sea,⁷⁸ but did not spread north toward Moscow. Besides Russia, avian flu was reported in 2005 in other countries bordering the Black Sea, including Romania, Turkey, and Ukraine, and human cases were reported in Turkey in early 2006. The WHO is concerned about the widening geographical spread of the avian flu into Russia and neighboring countries, because it increases opportunities for humans to catch the virus and for the virus to improve its transmissibility through mutation or reassortment.⁷⁹ The WHO's National Flu Center in St. Petersburg announced in August 2005 that it would work more closely with the Vektor Virology Center in southern Russia, which had been monitoring flu viruses among wild migratory birds for several years.

In response to the reports of outbreaks in Russia, the EU in late August raised "serious concerns" that the virus could spread to Western Europe and called on member-states to step up surveillance efforts. It also banned the import of poultry from Russia. Responding to rumors that the avian influenza had spread into western Russia, Germany in October temporarily ordered free-range poultry to be kept indoors, as did the Netherlands in August. Iran, in September 2005, banned the import of Russian wheat as feedstock.⁸⁰

Most observers judged Russia as fairly efficient in identifying avian influenza cases and working with international health organizations, at least at the outset. The areas where the outbreaks occurred were quarantined. No poultry or products were permitted to be exported beyond the areas, poultry in these areas exposed to H5N1 were slaughtered, and many people were examined and immunized. Russia's Deputy Foreign Minister Alexander Yakovenko asserted in early October 2005 that Russia had made a major contribution to countering the spread of avian flu and pandemic flu worldwide.⁸¹ Other observers raised concerns about Russia's ultimate capacity to respond to the spreading virus, or to deal with human cases. They warned that since Russia has devoted few budgetary resources in recent years to improving healthcare, it has not adopted many newer disease-control measures, such as employing fewer and more highly trained staff, using advanced disease-detection equipment, and relying more on primary healthcare. According to one commentator, "pandemic control requires prompt detection of cases and targeted interventions for the first clusters. But it remains doubtful whether Russia has the necessary capacity.... The country's huge size [also] is an obstacle to those services that do function well."⁸²

⁷⁸ The eight administrative areas are the Astrakhan, Chelyabinsk, Kurgan, Novosibirsk, Omsk, and Tyumen oblasts (regions), the Kalmyk republic, and the Altay kray (territory).

⁷⁹ World Health Organization. *Geographical Spread of H5N1 Avian Influenza in Birds: Situation Assessment and Implications for Human Health, Update 28*, August 18, 2005.

⁸⁰ *Agence France Presse*, August 22, 2005; *Foreign Broadcast Information Service (FBIS)*, September 3, 2005, Doc. No. IAP-11012.

⁸¹ *The Lancet*, August 27-September 2, 2005, p. 689; *Interfax*, October 4, 2005.

⁸² *The Lancet*, August 27-September 2, 2005, p. 689.

Among measures taken by Russian federal and local officials, Chief Health Inspector Gennadiy Onishchenko issued a directive in August 2005 to implement the May 2005 recommendations of WHO on controlling a possible influenza pandemic. According to WHO criteria, Onishchenko stated, Russia is in the second stage of the avian flu epidemic, when the virus is spreading among fowl and can cause human illness, although it has not become easily transmissible among humans (see Table 1). He called for regional officials to “introduce the necessary corrections into regional plans to prepare for a [human] flu pandemic,” including the “allocation of additional funds” for prevention and treatment, and to coordinate these plans with the federal government. In October 2005, he issued instructions to regional and health officials regarding the clinical pattern, differential diagnosis, and prevention and treatment of H5N1 influenza in humans. Regional officials complained that the regions had strained to shoulder the financial burden of compensating owners for the destruction of birds and of other containment measures. Consequently, regional representatives have called on the federal government to provide more funds for responding to possible new outbreaks among poultry, as well as humans. Some observers have also noted that the federal government could have played a greater role in coordinating regional outbreak responses. Analysts have noted that responses in each region were often divergent and not coordinated.⁸³

Some Russian doctors and officials have argued that the risk of a pandemic is low, but that the best methods to hedge against such a possibility are better medical care to boost the health of at-risk Russians, flu immunizations for these Russians, and reserve supplies of flu vaccine.⁸⁴ They suggest that existing human flu vaccines may help protect the population if H5N1 becomes readily transmissible among humans. In early September 2005, Vladimir Fisinin, the Vice President of the Russian Academy of Agricultural Sciences, called for the Russian government to allocate funds to produce 40 million doses of existing human flu vaccines, as well as 20 million reserve doses. At the same time, the St. Petersburg Institute of Influenza is working with WHO on the development of a human vaccine targeting the H5N1 influenza virus. The Institute in late 2005 reported promising tests in animals, and plans human clinical trials in 2006. The Moscow newspaper *Nezavisimaya gazeta* in late October 2005 urged the Russian government to also consider buying Tamiflu to treat humans in case of a pandemic.⁸⁵

Russian President Vladimir Putin called in November 2005 for the legislature to approve Russian membership in the U.N.’s FAO, in order to facilitate cooperation with member countries in combating epidemics, including avian influenza. Russia’s Federal Service for Veterinary and Plant Control (VPC) in September 2005 proposed that OIE, the European Commission’s Health and Consumer Protection Directorate, and U.S. veterinary officials launch a joint program in early 2006 to monitor avian influenza in water fowl as they migrate from places where they spend the winter — Southeast Asia, Africa, northern Australia and Oceania — to Europe, Asia and North

⁸³ *FBIS*, August 18, 2005, Doc. No. CEP-19027.

⁸⁴ *FBIS*, September 13, 2005, Doc. No. CEP-346004.

⁸⁵ *ITAR-TASS*, October 23, 2005; *ITAR-TASS*, October 27, 2005; *FBIS*, October 24, 2005, Doc. No. CEP-346001; December 6, 2005, Doc. No. CEP-346002.

and South America. The VPC warned that the H5N1 virus is likely to reappear in southern Russia in Spring 2006 and possibly infect birds migrating towards Central and Eastern Europe.⁸⁶

Thailand⁸⁷

Thailand, among the earliest and hardest hit by the avian flu, has emerged as a leader in fighting the spread of the virus. From the initial 2003 outbreak, 8 of Thailand's 12 reported human cases were fatal.⁸⁸ Fourteen of the 22 reported human cases have been fatal to date. As a major poultry exporter, Thailand's economy has suffered significantly from the impact on the industry. After an initially sluggish response, including allegations by the press that government officials covered up evidence of an outbreak⁸⁹, the Thai authorities have led the effort to respond to the problem and particularly to facilitate regional cooperation. During a meeting with Prime Minister Thaksin in September 2005, President Bush praised Thailand as a leader in fighting the disease and pledged further U.S. cooperation.

Considerable economic damage from the news of the influenza has spurred Bangkok to address the problem. Thailand's poultry exports, the fourth-largest in the world, bring in over \$1 billion annually; the loss this year contributed to a 4.4% year-on-year contraction of the agricultural sector in mid-2005.⁹⁰ Both domestic and international demand for chicken fell due to fears of infection. Thailand needs 90 days without outbreaks in order to receive certification from the World Organization for Animal Health (OIE) to resume exporting fresh poultry.⁹¹

Thai authorities have taken several steps to contain the spread of avian influenza. The Department of Livestock Development, Ministry of Agriculture and Cooperatives is the focal point for combating the virus, while Department of Disease Control, Ministry of Public Health is also a key player. The National Committee on Avian Influenza Control, under the supervision of a Deputy Prime Minister, was established in 2004 to map out national strategy. As part of the plan, over 40 million birds have been exterminated, and surveillance teams have been deployed throughout the country. In December 2005, the Ministry of Public Health announced that Oseltamivir, an antiviral treatment for influenza, would be produced and distributed

⁸⁶ *FBIS*, September 7, 2005, Doc. No. CEP-27067.

⁸⁷ This section prepared by Emma Chanlett-Avery, Analyst in Asian Affairs, 7-7748.

⁸⁸ WHO, *Cumulative Number of Confirmed Human Cases of Avian Influenza A/H5N1 Reported to WHO*, December 7, 2005. [http://www.who.int/csr/disease/avian_influenza/country/en/].

⁸⁹ "Thai Authorities Should Take Strong Action Against Bird Flu," *Bangkok Post* editorial. October 4, 2005.

⁹⁰ "Bird Flu: Asian Contagion?" *Economist Intelligence Unit*. July 25, 2005.

⁹¹ "Thailand Has First Avian Flu Outbreaks in 3 Months," CIDRAP News at [<http://www.cidrap.umn.edu>]. July 11, 2005.

to the public at subsidized prices.⁹² Bird smuggling from Cambodia was targeted by border authorities.⁹³ By mid-2005, over 11,000 poultry farms reportedly met the government's biosecurity standards. Thai officials acknowledge, however, that small farms with open-air facilities, which increase the risk of contamination, remain less regulated. Unlike China, Thailand bans the use of H5N1 vaccines in its poultry population. Law enforcement authorities cracked down on illegally imported bird flu vaccines from China; the H5N1 vaccine is prohibited because the government believes that its use in poultry could lead to further mutation of the virus.⁹⁴

After the re-surfacing of the flu in July 2005, the Agriculture and Cooperatives Ministry established guidelines for poultry farmers to get permission from local leaders before moving their flocks. The movement of fowl is considered to be a key concern of livestock officials. Mobile checkpoints were set up in the provinces most affected to enhance scrutiny of such movements.⁹⁵ Fighting cocks have been implicated as one of the main transmitters to humans. The sport is intensely popular in Thailand, with up to 30 million spectators annually.⁹⁶ The industry, resistant to any form of government control, eventually struck a compromise with the Thai government which allows for the registration of the birds and the stadiums, as well as measures to control their movement.⁹⁷

Thailand has promoted regional cooperation on containing the flu, proposing an ASEAN animal hygienic fund and pledging \$300,000 to start the project. The resulting center would enhance cross-border surveillance and control measures, as well as serve as an information distribution center for all ASEAN countries on the spread of the virus⁹⁸. Public Health Minister Suchai Charoenratanakul pledged that Thailand would contribute a minimum of 5% of its own supply to a proposed regional stockpile of antiviral drugs.⁹⁹ Thailand and Indonesia pledged to exchange information on influenza prevention and vaccine development. Thailand received one million baht (\$25,000) from FAO to set up laboratories and serve as a coordinating center for avian experts, and has received technical assistance from the European Union to improve networking between laboratories working on the avian influenza. Thailand also hosts platforms that are cited as key to the U.S. government

⁹² "Thai Public Health Minister Announced that Thailand Can Produce Oseltamivir," *Thai News Service*. December 8, 2005.

⁹³ "Squawking at the Bird Flu Warning," *Los Angeles Times*. September 1, 2005.

⁹⁴ "Thailand Cracks Bird Flu Vaccine Smuggling Syndicate," *BBC Monitoring Asia Pacific*. September 20, 2005.

⁹⁵ "Avian Flu - Fresh Outbreak," *Bangkok Post*. July 14, 2005.

⁹⁶ "Squawking at the Bird Flu Warning," *Los Angeles Times*. September 1, 2005.

⁹⁷ "Ministry cuts Deal of Fighting Cock Zoning," *Bangkok Post*. July 15, 2005.

⁹⁸ "Thailand Proposes Regional Bird Flu Control Center," *Thai News Service*. September 27, 2005.

⁹⁹ "Bird Flu Pandemic Risk 'Very High'," *CNN.com*. October 11, 2005.

response; USAID lists two Bangkok-based organizations as crucial implementing partners.¹⁰⁰

Turkey¹⁰¹

It is believed that in October 2005 migratory birds that flew westward across Asia brought H5N1 to Turkey. News reports indicated that shortly thereafter the Turkish Health Ministry announced that it would order 500,000 boxes of Tamiflu. However, physicians reportedly did not have the drug to treat the first two people who were infected with H5N1 and later died on January 1, and January 5, 2006, respectively.¹⁰² The deaths were the first from the virus outside of China and Southeast Asia. In an effort to contain the spread of H5N1, Turkish officials quarantined the Dogubayazit district (where the first human cases occurred), prohibiting any people or animals from moving in or out the district. Turkey also instituted culling drives and public awareness campaigns. Press reports indicate that Turkey culled some 300,000 birds.¹⁰³

One day after the second death, on January 6, 2006, some 100,000 treatment courses of Tamiflu were delivered to Turkey. The drug is being used to treat patients and prevent infection among persons at risk. On January 9, 2006, WHO announced that the Turkish Ministry of Agriculture had confirmed H5N1 outbreaks among birds in 10 of the country's 81 provinces.¹⁰⁴ The following day, on January 10, 2006, WHO substantiated Turkish claims that 15 people have been infected with the virus, most of them children in the eastern rural district of Dogubayazit.¹⁰⁵ WHO will add this figure to its chart which summarizes the number of confirmed human cases and deaths of H5N1 after verification from another laboratory. The WHO Director for its European office arrived in Ankara on January 11, 2006, to confer with the country's Minister of Health and develop effective containment strategies. WHO has also organized additional support for laboratory diagnostic work.

Vietnam¹⁰⁶

WHO reports that there have been 93 confirmed cases — including 42 deaths — of avian influenza in Vietnam since late December 2003. According to USAID,

¹⁰⁰ “U.S. Government Emergency Response to Avian Influenza: A Plan of Action for Vietnam, Laos, and Cambodia - Report from Country Planning Visits July 11-24, 2005.” United States Agency for International Development.

¹⁰¹ This section prepared by Emma Chanlett-Avery, Analyst in Asian Affairs, 7-7748.

¹⁰² A 14-year old boy was hospitalized on January 1, 2006, and died on that day. His 15-year old sister was also hospitalized on January 1, 2006 but died on January 5, 2006. WHO, *Avian Influenza - Situation in Turkey*. January 5, 2006.

¹⁰³ “*WHO Fears Turkish Bird Flu Will Spread.*” New York Times. January 11, 2006.

¹⁰⁴ WHO, *Avian Influenza - Situation in Turkey - Update 2*. January 9, 2006.

¹⁰⁵ WHO, *Avian Influenza - Situation in Turkey - Update 3*. January 10, 2006. [http://www.who.int/csr/don/2006_01_10a/en/index.html]

¹⁰⁶ This section prepared by Mark Manyin, Specialist in Asian Affairs, 7-7653.

the H5N1 virus is believed to be endemic in Vietnam's waterfowl population. The Vietnamese government estimates the country's total poultry population to be around 250 million birds, including 20 million to 60 million ducks and geese. Between 60% and 70% of the poultry population is raised in "backyard farms," in close proximity to other birds, and the government estimates that 65 per cent of farm households nationwide raise poultry. Poultry generally is sold live in local markets and is slaughtered at home. U.N. agencies have estimated that disease containment, including culling of poultry, have cost the Vietnamese economy an estimated \$200 million.¹⁰⁷ The wartime and tsunami supplemental (P.L. 109-13), which the House passed on May 5, 2005 and the Senate on May 10, 2005, provides \$25 million to help combat the disease, including approximately \$7 million to be used in Vietnam.

In 2005, the Vietnamese government began intensifying its response to the disease by establishing an interagency working group that includes the FAO and WHO. At the local level, inter-ministerial steering committees have been established within the Vietnamese Communist Party's people's committees, which operate throughout the country. However, the quality of inter-ministerial coordination, in addition to the capacity of Vietnam's local institutions to monitor, report, and handle disease outbreaks, have been called into question. The central government in Hanoi is developing a national pandemic preparedness plan, and as of mid-October 2005 had presented a draft to international health agencies and foreign aid donors. Since the first outbreak of avian influenza was reported, over 40 million birds have been culled, though low compensation for farmers appears to have acted as a disincentive for farmers to report signs of infection. In August 2005, Vietnam began a mass poultry vaccination program. In early January 2006, the Ministry of Agriculture and Rural Development (MARD) declared that under the program, all provinces and cities had completed two phases of vaccinations for over 240 million birds. Critics have called Vietnam's previous poultry vaccination programs ineffective. In October 2005, the government signed a bilateral health cooperation agreement with the United States and agreed with a number of U.N. agencies to conduct a joint prevention program.

There are conflicting reports on the willingness of the Vietnamese government to cooperate with international health workers. Many accounts praise the government for responding quickly and cooperatively, particularly in the winter and spring of 2005, when two sets of initial blood tests by Vietnamese and WHO officials indicated that dozens, and perhaps scores, of Vietnamese might have been infected with the virus. Subsequent testing revealed that the initial test results had been false positives.¹⁰⁸ Other accounts, which appear to be in the minority, have charged that the Vietnamese government has been uncooperative with international health agencies, particularly in the first months of the outbreak in 2004.¹⁰⁹

¹⁰⁷ USAID, "U.S. Government Emergency Response to Avian Influenza: A Plan of Action for Vietnam, Laos and Cambodia. Report from Country Planning Visits," July 11-24, 2005.

¹⁰⁸ See, for instance, Nicholas Zamiska, "Pandemic Watch: Inside U.N. Agency, Flu Data Sparked A Tense Debate," *The Wall Street Journal*, October 18, 2005.

¹⁰⁹ See, for instance, Adrian Levy and Cathy Scott-Clark, "Flu on the Wing," *The Guardian*, October 15, 2005.

Issues for Congress

Some experts point out that in order to effectively contain the spread of H5N1 and prepare for pandemic influenza, the U.S. government would need to develop a plan that integrates domestic and international policy. Some of the policy responses may originate domestically, but resonate globally. For example, issues related to U.S. drug policy, such as vaccine technology and intellectual property rights could impact access to antiviral drugs and vaccines in countries where H5N1 is endemic — particularly since some of the most affected countries do not have the capacity to produce or purchase sufficient quantities of the drugs.¹¹⁰ One article in the *Journal of Public Health Policy* pointed out that “almost 40% of the world’s supply of inter-pandemic influenza vaccines is used in countries that do not produce their own vaccines.”¹¹¹

Concurrently, some domestic issues are impacted by international developments. For example, some are concerned that the United States might not have enough antiviral medication if an influenza pandemic were to occur within the next year since it belatedly ordered Tamiflu (a drug effective in mitigating the course of illness caused by H5N1 infection in most cases). Senator Barack Obama is quoted as expressing concern in an interview that the United States would have to wait for its Tamiflu shipments after Britain, France, and Japan.¹¹² Some countries in Europe have reportedly ordered enough antiviral medication to treat 20% to 40% of their populations. For example, the Dutch Health Ministry has reportedly ordered enough Tamiflu to treat one-third of the population (5 million doses), and Britain is believed to have ordered enough Tamiflu to treat about 25% of its population (15 million people). Canada reportedly has stocks for just over 5% of its citizens.¹¹³ Current reported U.S. stocks are sufficient to treat slightly more than 1% of all Americans. However, in November 2005, the President announced through the National Strategy for Pandemic Influenza that the United States would procure enough medicine by the end of 2006 to treat 25% of the U.S. population. Below are some issues that particularly impact the most affected countries in Asia, and other parts of the world.

Patent Protections

Intellectual property rights has become an increasingly contentious issue in global health, particularly since companies began threatening to ignore patents for HIV/AIDS treatments. In an effort to expand global access to flu drugs, the United Nations had been encouraging Roche — the patent holder of Tamiflu — to license other companies to produce generic versions of the drug. Roche announced on

¹¹⁰ For more information on these issues see CRS Report RL33145, *Pandemic Influenza: Domestic Preparedness Efforts*, by Sarah Lister.

¹¹¹ Fedson, David, “Preparing for Pandemic Vaccination: An International Policy Agenda for Vaccine Development.” *Journal of Public Health Policy* 2005, Volume 26, Issue 1, April 2005. p.11.

¹¹² Harris, Gardiner, “Officials May Spend Billions to Stockpile Influenza Drug.” *New York Times*, October 7, 2005.

¹¹³ *Ibid.*

October 21, 2005 that U.S. pharmaceutical companies could manufacture a generic version of Tamiflu.¹¹⁴ Legislation introduced in the first session of the 109th Congress aims to permit the United States to invoke a compulsory license and export generic versions of the drug to non-producing countries.¹¹⁵ Some speculate that Roche has been increasing efforts to license its products in other countries, in part because an Indian pharmaceutical company, Cipla, has threatened to manufacture a generic version of the drug — in spite of Roche’s patent rights. Underscoring that Tamiflu is too expensive for many of the least developed countries, a Cipla representative said that the company would sell the generic version of Tamiflu “at a humanitarian price” in developing nations, and not in the United States or Europe.¹¹⁶ Two Indian pharmaceutical companies are reportedly negotiating with Roche to produce generic versions of Tamiflu.¹¹⁷ Roche also reached an agreement with a Chinese pharmaceutical company to make the drug.¹¹⁸

Health experts predict that patent protections will continue to be a contentious issue as poorer countries seek to protect themselves against virulent diseases. Some analysts contend that Congress faces an issue of whether to help countries where H5N1 is endemic gain greater access to generic versions of Tamiflu and other antivirals if licensed drugs are not accessible.¹¹⁹ Supporters assert that the precedent for greater access to generics by poorer countries had already been established on December 6, 2005, when World Trade Organization (WTO) members approved changes to the intellectual property agreement making permanent a decision on patents and public health¹²⁰. The General Council decision means that for the first time a core WTO agreement will be amended. The decision directly transforms the August 30, 2003 waiver to Section 31(f) of the Trade-Related Aspects of Intellectual Property Rights (TRIPS)¹²¹. The waiver permits a country without manufacturing capacity to obtain cheaper generic versions of patented medicines from countries under compulsory licenses. The waiver enables the country to receive generic

¹¹⁴ Alonso-Zaldivar, Ricardo, “Roche agrees to generic version of Tamiflu drug.” *Baltimore Sun*, October 21, 2005. [<http://www.baltimoresun.com>].

¹¹⁵ H.R. 4392, *To provide for the importation of pharmaceutical products under a compulsory license as provided for under the World Trade Organization*.

¹¹⁶ McNeil Jr., Donald, “Indian Company to Make Generic Version of Flu Drug Tamiflu.” *New York Times*. October 14, 2005. [<http://www.nytimes.com>].

¹¹⁷ Jack, Andrew, “India drugs groups in Tamiflu talks.” *Financial Times*. December 12, 2005. [<http://news.ft.com/home/us/>]

¹¹⁸ Wright, Tom, “Roche to Let Chinese Producer Make Flu Drug.” *New York Times*. December 13, 2005. [<http://nytimes.com>]

¹¹⁹ For more information on influenza and patent issues, see CRS Report RL33159, *Influenza Antiviral Drugs and Patent Law Issues*.

¹²⁰ WTO, “Members OK amendment to make health flexibility permanent.” December 6, 2005. [http://www.wto.org/english/news_e/pres05_e/pr426_e.htm]

¹²¹ Article 31(f) of the TRIPS Agreement says that production under compulsory licensing must be predominantly for the domestic market. The concern was that this could limit the ability of countries that cannot make pharmaceutical products from importing cheaper generics from countries where pharmaceuticals are patented.

versions of drugs in situations of “national emergency or other circumstances of extreme urgency.”¹²² A separate statement describes members’ “shared understanding” on how the decision is interpreted and implemented. Particularly, the statement points out that the decision will be used in good faith in order to deal with public health problems and not for industrial or commercial policy objectives.¹²³ Although the waiver was seen as a tool to enable largely poorer countries to import generic versions of licensed drugs, one piece of legislation proposes that the U.S. Trade Representative inform WTO that the United States declares itself an “eligible importing member” to import pharmaceutical products, largely because Roche is unable to meet the “public health needs” of the United States.¹²⁴

WTO members voted against delineating which drugs should be included in the waiver agreement. Consequently, there is not consensus on which drugs are considered critical in protecting public health. Advocates argue that in the event of a pandemic, the new WTO amendment should apply to antiviral drugs and H5N1 vaccines for use in animals. Opponents are concerned that some might abuse and undermine the agreement by reselling the drugs and vaccines for profit. In the event of a pandemic, Congress might be faced with the decision on whether to support or oppose the export of generic antivirals. Additionally, increased pressure might be placed on Congress to encourage USDA to share with other countries some of its H5N1 vaccine for use in animals.

Global Data Sharing

In spite of Tamiflu stockpiling efforts, it is unknown if the medicine will be broadly useful in treating human H5N1 victims in a pandemic scenario. Some health experts were reportedly alarmed when two patients in Vietnam who were infected with H5N1 and aggressively treated with Tamiflu later died. Some are beginning to question if the recommended dosage should be changed, as doctors reportedly adhered to the recommended regimen when treating the two patients.¹²⁵ Health experts point out that more information is needed on patients who have already been treated for H5N1 with Tamiflu. Data from the subjects would help in determining if the drug remains effective in fighting H5N1 and if changes to dosage regimens are required.

Those pressing for greater international data sharing point to new research that might counter previous findings on the limited effectiveness of amantadine. The New York Times reported in September 2005 that researchers found that amantadine was no longer effective against H5N1. WHO reportedly spent \$1.3 million to

¹²² For more information on this issue see CRS Report RS21609, *The WTO, Intellectual Property Rights, and the Access to Medicines of Controversy*, by Ian F. Fergusson.

¹²³ WTO, “Members OK amendment to make health flexibility permanent.” December 6, 2005. [http://www.wto.org/english/news_e/pres05_e/pr426_e.htm]

¹²⁴ H.R. 4392, *To provide for the importation of pharmaceutical products under a compulsory license as provided for under the World Trade Organization*.

¹²⁵ Chang, Alicia, “Bird Flu Victims Die After Drug Resistance.” Washington Post. December 21, 2005. [<http://www.washingtonpost.com>]

stockpile the drug when it was used during the 1997 H5N1 outbreak. The Times article asserted that in 2005, laboratory research found that all human viral samples of H5N1 were resistant.¹²⁶ Before 2000, almost no influenza virus was resistant to the drug. Some experts speculated that viral resistance occurred in part, because China reportedly used amantadine, intended solely for humans, on animals. (See “Affected Countries’ Response” section). However, the Wall Street Journal quoted Dr. Shu Yuelong, the Director of China’s national influenza laboratory, as stating that preliminary evidence indicates that amantadine might be effective in treating avian influenza in people.¹²⁷ Dr. Shu reported that all of the viral samples that have been isolated from patients in China were sensitive to amantadine. Those findings conflicted with previous research on virus samples that were taken from patients in Indonesia and found to be resistant to the drug. The new research has reportedly prompted WHO and other officials to consider whether amantadine might eventually play a role in fighting H5N1. The article underscores that there are currently too few samples to draw any firm conclusions.

Some believe that some countries are intentionally withholding viral samples of H5N1 cases. One article stated that countries with human H5N1 cases do not want to send viral samples to the WHO or other industrialized countries, because they fear the samples will be used to develop up-to-date vaccines which they will not have access to.¹²⁸ Others have speculated that China is withholding its samples, because it is trying to produce an H5N1 vaccine.¹²⁹

Some analysts propose that the United States and other countries should vote to provide WHO with enforcement mechanisms. Supporters argue that WHO should be able to force countries to share viral samples. Others contend that Congress should provide greater support and resources to WHO, particularly for strengthening global laboratory and testing capabilities. Skeptics point out that WHO has not provided transparent, detailed data on the adequacy of funds or how funds are spent.

Global Disease Surveillance

A number of analysts have argued that due to insufficient investment in disease surveillance and health care in many of the countries where H5N1 is endemic, a pandemic may progress before it is discovered. In this view, ill-equipped surveillance systems will be slow to determine the source of a pandemic, evaluate the rate of viral transmission, ascertain whether H5N1 has become efficiently transmissible among humans, or rate the effectiveness of anti-flu initiatives. Senate

¹²⁶ Rosenthal, Elisabeth, “Two Studies Find Flu Treatments Fall Far Short.” September 22, 2005. [<http://www.nytimes.com>].

¹²⁷ Zamiska, Nicholas, “Scientists Says Bird-Flu Virus Appears to Be Stable in China; No Signs that Avian Strain Is Easily passed by People; Old Drug Shows Promise.” December 12, 2005.

¹²⁸ Globe and Mail, “Chinese officials haven’t shared samples of H5N1: experts.” November 18, 2005. [<http://www.theglobeandmail.com>].

¹²⁹ China Daily, “China: Bird flu vaccine for human use developed.” November 15, 2005. [http://www.chinadaily.com.cn/english/doc/2005-11/15/content_494593_3.htm].

Majority Leader Bill Frist has proposed \$1 billion for a real-time international threat detection system.¹³⁰

USAID and other U.S. government officials suspect that the lack of documented human cases of H5N1 in Laos has more to do with inadequate surveillance and reporting systems than an absence of infection.¹³¹ Some health experts believe that H5N1 transmission could already be underway in Laos, since surrounding countries have already had human and animal outbreaks. Key U.S. agencies and international organizations have determined that Laos is a country that needs critical prevention, monitoring, and surveillance support in order to prevent full-blown human-to-human transmission of H5N1 that could emerge and sweep across the region without warning.¹³²

Some experts have expressed increasing concern about the capacity of poorer countries that have not yet had H5N1 cases to effectively contain the spread of the virus and plan for pandemic influenza, particularly in sub-Saharan Africa. FAO has recently warned that the risk of H5N1 spreading to the Middle East and Africa has markedly increased. FAO is particularly wary of the virus reaching Eastern Africa, as the surveillance capacities and veterinary services in those countries are limited. According to Reuters, a WHO representative declared that an H5N1 outbreak would likely be missed in Africa, as bird nutrition is poor and high mortality among poultry is common. Concurrently, human cluster cases are likely to be missed due to poor surveillance systems. South Africa is reportedly the only country in sub-Saharan Africa to have drawn up a pandemic preparedness plan.¹³³ Some experts fear that an unabated H5N1 outbreak in East Africa could make the bird flu endemic there. “If the virus were to become endemic in eastern Africa, it could increase the risk that the virus would evolve through mutation or reassortment into a strain that could be transmitted to and between humans.”¹³⁴

The press reported on December 20, 2005 that a bird suspected of having contracted H5N1 in Ethiopia, tested negative of the virus.¹³⁵ Experts are concerned that birds in Ethiopia and other countries in the Rift Valley, including Kenya, Tanzania, and Uganda, are at particular risk of avian flu infection due to the large numbers of migratory birds that fly to the region during the European winter. Those concerned about insufficient surveillance and diagnostic equipment and expertise,

¹³⁰ Honorable Bill Frist website, “First Addresses National Press Club on Avian Flu — Pandemic: The Economy Killer.” December 8, 2005. The Senate passed S. 2170 on December 22, 2005.

¹³¹ Interview with USAID official, October 11, 2005.

¹³² Ibid.

¹³³ Reuters, “Bird Flu in Africa Could Swamp Health Systems: WHO.” November 27, 2005. [http://www.nlm.nih.gov/medlineplus/news/fullstory_27731.html]

¹³⁴ “UN agency says risk of bird flu spreading to Middle East, Africa rises markedly.” U.N. News Center, October 19, 2005. [<http://www0.un.org/apps/news/story.asp?NewsID=16037&Cr=bird&Cr1=flu>]

¹³⁵ Reuters Foundation, “ETHIOPIA: Birds Test Negative for avian flu.” December 20, 2005. [<http://www.alertnet.org>]

point out that Ethiopia had to use health experts and equipment from Egypt to determine what caused a rash of bird deaths in December 2005. USAID with support from the U.S. Navy Medical Research Unit (NAMRU) in Cairo reportedly provided \$15,000 in emergency funding to analyze the viral samples of dead pigeons found in Addis Ababa and the Eastern Somali region for H5N1 infection. Additionally, USAID has reportedly reprogrammed \$600,000 from existing surveillance funds for bird flu initiatives in Ethiopia.¹³⁶ The funds are to help provide technical assistance to the Ministries of Agriculture and Health, develop laboratory and communications capacity, and procure Personal Protective Equipment for first responders.

Many of the countries in which H5N1 is endemic have complained that they can not afford to implement the strategies recommended by the international community. Furthermore they are hesitant to divert their limited budgets — already struggling to contend with AIDS, child and maternal health, tuberculosis, and other health challenges — to something that might not occur. Advocates of greater assistance to the region, point out that countries with more resources for pandemic planning than neighboring poorer countries have also acknowledged difficulties in responding to the H5N1 threat. A news report cited a South Korean health worker who stated that his country is ill-equipped to respond to a pandemic citing insufficient supplies of medication, hospital beds, and ventilators.¹³⁷

On December 22, 2005, the Senate passed S. 2170, which would help developing countries bolster their disease surveillance programs, and establish fellowships for citizens of those countries to study epidemiology and public health in the United States. Additionally, some in Congress have advocated for greater U.S. spending on fighting the global spread of H5N1 avian flu. Press reports quoted Representatives Henry Hyde and Tom Lantos, Chairman and Ranking Member of the House International Relations Committee respectively, stating concern about the level of funding the Administration proposes to provide for global efforts in FY2006¹³⁸. Advocates assert that the \$388 million the Administration requests for international H5N1 initiatives will not be enough to fund the significant amount of assistance needed by countries with H5N1-endemic stocks. Particularly, experts add that the threat of an H5N1 or other influenza pandemic illuminates the neglect that health care systems in many southeast Asian countries have faced over the last couple of decades. Proponents argue that if the United States would increase its funding to support global health care systems the global community could benefit from efficient outbreak reporting and control measures, accurate diagnoses, enhanced case management, and improved disease surveillance and monitoring.

¹³⁶ USAID, *H5N1 Avian Influenza (AI) Most Recent Developments and Actions*. November 26 - December 19, 2005.

¹³⁷ Grudgings, Stuart, "Rich-poor divide hobbles Asia's bird flu plans." Reuters, September 13, 2005. [<http://www.reuters.com>]

¹³⁸ GovEXEC.com, "House panel calls plan for tracking avian influenza 'inadequate'." December 7, 2005. [<http://govexec.com/dailyfed/1205/120705cdpm2.htm>]

Global Pandemic Planning

Some experts caution that pandemic preparedness plans must extend beyond procuring and stockpiling antiviral drugs and vaccines. In this view, governments must also develop detailed vaccine and treatment distribution plans. Particular attention has been paid to H5N1-affected countries that have communication and infrastructure barriers, especially between urban and rural areas (where many of the backyard poultry farms exist). Many Asian countries have significant income and infrastructure gaps between rural and urban areas. In the rural areas, there are often few hospitals and treatment centers. Equipment can be outdated or lacking. Veterinary and animal health services can be limited. Additionally, in many cases rural governments operate independently from urban governments, which tend to receive larger portions of national resources. Farmers in rural areas may not adhere to government H5N1 initiatives, exacerbating the problem. One infectious disease expert in Hong Kong asserted that the communication problem is particularly acute in China. “I trust and believe the central government has very good intentions, but unfortunately, it is a very big country. At the district, regional levels, the failure to communicate continues.”¹³⁹

Responses by East Asian Regional Groupings. As Southeast Asia’s major multinational forum, the Association of Southeast Asian Nations (ASEAN) has taken some steps to improve transnational coordination in combating the spread of a potential pandemic, and limiting the spread of the H5N1 virus. To this end, ASEAN members have created a number of institutional arrangements, including a Highly Pathogenic Avian Influenza (HPAI) Taskforce, an ASEAN Expert Group on Communicable Diseases, the ASEAN Animal Health Trust Fund, and the ASEAN Plus Three¹⁴⁰ Emerging Infectious Diseases Programme. At the eleventh ASEAN summit in Kuala Lumpur, Malaysia, in December 2005, ASEAN leaders discussed establishing a regional network of stockpiles of antiviral drugs.

Drafting an avian influenza declaration was the single tangible achievement of the inaugural meeting of East Asia’s newest regional grouping, the East Asia Summit (EAS), which met in Kuala Lumpur in December 2005 immediately following the ASEAN summit.¹⁴¹ In their Summit Declaration on Avian Influenza Prevention, Control and Response, EAS leaders committed to “ensure rapid, transparent and accurate ...communications,” establish information sharing protocols among member countries and multilateral organizations, create a regional network of stockpiles of antiviral, and to establish regional avian influenza and pandemic preparedness strategies backed by supporting national legislation.

¹³⁹ Grudgings, Stuart, “Rich-poor divide hobbles Asia’s bird flu plans.” Reuters. September 13, 2005. [<http://www.reuters.com>]

¹⁴⁰ ASEAN Plus Three consists of the ASEAN countries plus China, Japan, and South Korea.

¹⁴¹ Participants in the first EAS included the ten ASEAN members (Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam), the “plus three” states (China, South Korea, and Japan), as well as Australia, New Zealand, and India. For more on the summit, see CRS Report RS22346, *East Asian Summit: Issues for Congress*, by Bruce Vaughn.

Pandemic planners are warning that no country has the surge capacity to meet national demands for consumer products and medical services for the full term of an influenza pandemic (an estimated six months to a year). The United States, and other industrialized nations, rely on a range of critical products from H5N1-affected countries, such as medical supplies, military parts, and sanitation equipment. These supply chains are replenished “just-in-time” to minimize costs. If an outbreak were to occur, hospitals, food and water systems, and the military could all be vulnerable to interrupted supply due to absenteeism, border closures, and other supply chain disruptions. Therefore, the private sector, as well as national and international trade organizations have been urged to participate in pandemic planning.

Some analysts argue that resources allocated to containing the spread of H5N1 have been insufficient in part, because many countries have funded the response primarily through the ministries of agriculture and health. Some experts point out that an influenza pandemic will likely impact the animal and health sectors, as well as trade, security, hospitality, and labor. Consequently, they say, governments should develop pandemic plans that utilize the resources of other ministries that are often better funded, such as ministries of trade, tourism, and commerce. Some analysts note that U.S. officials, such as the U.S. Trade Representative and the Secretary of Commerce should be engaged in U.S. international pandemic influenza planning efforts. Others would like Congress to encourage public-private partnerships that augment U.S. international avian flu and pandemic preparedness efforts.

Combating Bird Flu Among Animals in Affected Countries

Most countries have used mass culling to prevent viral spread when avian influenza outbreaks are detected. However, some countries have not been able to rely on this process as a primary containment measure, because the governments might not have been able to compensate farmers for slaughtering their stocks. Scientists have also found that mass culling is sometimes not feasible when wild birds are involved in transmission. Some health experts assert that there should be more research on more affordable methods of preventing pandemics at their source — in the animals that carry the virus. Strategies such as implementing cleaning days (when all live markets are simultaneously emptied and cleaned), and separating ducks and chickens in live poultry markets may decrease viral transmission among animals. Some countries (including China) propose using vaccination to control avian influenza in poultry. Skeptics warn that animal vaccination is a risky strategy, as it is often difficult to distinguish infected from vaccinated animals, complicating efforts to track the disease. Additionally, vaccination campaigns, if not carried out properly, could result in entrenchment of the disease rather than eradication, further threatening public health.¹⁴²

Cost of Culling. It has been suggested that a global fund should be established to compensate farmers for culling their poultry in countries whose governments can not afford to compensate the farmers. The WHO has already expressed concern that some farmers in poorer countries may not cull their poultry,

¹⁴² Ilaria Capua and Stefano Mangano, “Vaccination for Avian Influenza in Asia,” *Vaccine*, Vol. 22, 2004, pp. 4137-4138.

because their livelihoods depend on poultry farming. For example, Indonesia has carried out only a limited culling drive, because it lacks the funds to compensate farmers.¹⁴³ Farmers in some parts of Romania reportedly failed to cull their birds despite government orders to do so. In some affected countries, public and animal health authorities are reluctant to destroy their population's dominant protein source and income. A number of bills, such as H.R. 4062 and its counterpart S. 1821, have been introduced that support the concept of a "Pandemic Fund", which could include funds for farmer compensation.

The World Bank announced that it would provide \$500 million in loans to poor countries struggling to fund national avian flu and pandemic preparedness plans — a portion of which could be used to support poor farmers.¹⁴⁴ However, the Bank noted that \$1 billion could be needed over the next three years to help countries contain the spread of H5N1. The Asia Development Bank (ADB) also announced that it is prepared to provide at least \$470 million to support Asian anti-H5N1 and pandemic preparedness efforts.¹⁴⁵

Some have suggested that the United States target some foreign aid funds to help the affected governments — including Vietnam, Indonesia, Cambodia, and Laos — cover the cost of compensating individuals and companies for the destruction of their birds. In this view, such assistance could help the image of the United States in the region by demonstrating American concern and could minimize reluctance to slaughter infected flocks. Others would like to see increased assistance to prevent the spread of H5N1 among animals.

Global Economic Impacts

The health and non-health related costs of a global influenza pandemic could be very high, though difficult to estimate. For example, Canadian and Asian hospitality and tourism sectors were considerably impacted during the SARS outbreak. In 2002 and 2003, SARS cost the Asia-Pacific region about \$40 billion.¹⁴⁶ Additionally, flights to the region fell by about 45%, crippling the airline and hotel industries. Canada estimated that it lost approximately \$1.2 billion, with about \$763 million spent on the health-care system.¹⁴⁷ In the event of a flu pandemic, researchers expect Britain, Greece, Spain, Italy, and other countries that rely heavily on tourism, to be most affected economically. One economist estimated that a flu pandemic could

¹⁴³ Perry, Michael, "Poor Asian farmers are weak link in bird flu fight." Reuters. September 19, 2005. [<http://www.alertnet.org/thenews/newsdesk/SYD28137.htm>]

¹⁴⁴ World Bank, "New Global Program to Deal with Avian Flu." November 4, 2005. [<http://www.worldbank.org>]

¹⁴⁵ ADB, "ADB Support for Asia's Fight Against Avian Flu Could Reach \$470 Million." November 9, 2005. [<http://www.adb.org/Documents/News/2005/nr2005173.asp>]

¹⁴⁶ Osterholm, Michael, "Preparing for the Next Pandemic." Foreign Affairs, July/August 2005. [<http://www.foreignaffairs.org>].

¹⁴⁷ Ibid. Country-specific SARS-related information, including costs and fatalities can be found in CRS Report RL32072, *Severe Acute Respiratory Syndrome (SARS): The International Response*, by Rhoda Margesson and Tiaji Salaam.

force Britain's GDP to fall by 8% or \$168 billion (about 95 billion pounds), and result in the loss of almost 1 million jobs (about 3% of all employment).¹⁴⁸

The World Bank estimates that a global influenza pandemic could cost the global economy about \$200 billion in one quarter or \$800 billion over a year (about 2% of the global GDP). The Bank based its estimate on the economic losses induced by the SARS pandemic, which caused GDP to fall by 2% in Asia over a three month period in 2003. However, the Bank underscored that it is virtually impossible to accurately determine how much a global influenza pandemic would cost the world, because experts assume that the immediate shock during a flu epidemic could be larger and last longer than SARS. The 1918 pandemic, for example, came in three waves, and spread over two years.¹⁴⁹ Some economists have advised the United States to identify source countries for key imports and develop a detailed plan that would ensure continuity.

Economists point out that an Asian economy crippled by an influenza pandemic could impact the U.S. economy, even if a significant number of Americans was not sickened or killed by H5N1. According to U.S. Trade Representative (USTR) Robert Portman, South Korea and Malaysia are the 7th and 10th largest trading partners for the United States, respectively. The United States earned \$72 billion and \$40 billion from South Korea and Malaysia, respectively, in 2004. Both countries have had H5N1 cases among their flocks.¹⁵⁰ Additionally, U.S. exports to China, one of the most threatened countries, grew 76 percent between 2000 and 2003, while sales to the rest of the world declined by 9 percent. China is now the sixth largest market for U.S. exports and America's third largest trading partner overall — surpassing Japan in 2003.¹⁵¹ In 2004, U.S. exports to China grew to \$33 billion, more than double the level in 2001.¹⁵² Therefore, any pandemic related disruption of bilateral trade could have a large impact. Alternatively, some economists predict that U.S. poultry exports could increase as countries move to ban imported birds from countries with H5N1-endemic stocks.

CLSA Asia-Pacific Markets, the Asian investment banking arm of Crédit Agricole of France, estimates that H5N1 has already cost the region between \$8 billion and \$12 billion, citing the prolonged poultry ban by the European Union from eight Asian countries and the death or destruction of some 140 million chickens and

¹⁴⁸ Nordland, Rod and George Wehrfritz, "A Costly Disease: Europe and the rest of the world braces for the economic fallout of a possible bird-flu pandemic." October 24, 2005. [<http://msnbc.msn.com/id/9711926/site/newsweek/>]

¹⁴⁹ World Bank East Asia and Pacific Region, "Spread of Avian Flu Could Affect Next Year's Economic Outlook." November 2005. [<http://siteresources.worldbank.org/INTEAPHALFYEARLYUPDATE/Resources/EAP-Brief-avian-flu.pdf>]

¹⁵⁰ U.S. Trade Representative Robert Portman discussion at the US-ASEAN Business Council Second Annual Asia Forum, November 1, 2005.

¹⁵¹ USTR website, "America's Trade with China." April 21, 2004. [<http://www.ustr.gov>]

¹⁵² USTR website, "Real Results in U.S. Trade with China." September 9, 2004. [<http://www.ustr.gov>]

other poultry. The Prime Minister of Thailand stated that the avian flu has already cost his country some \$1.09 billion, in addition to the \$55.78 million the government paid to farmers for a mass chicken cull.¹⁵³

Some analysts caution that Congress should be prepared to respond to the impact that potential fluctuations in supply and demand from key Asian markets might have on the U.S. economy. Particularly, some would like Congress to direct the U.S. Trade Representative to prepare a report that comprehensively analyzes the potential economic gains and losses to the U.S. economy in a pandemic scenario due to changes in Asia's economy. Experts point out that the Congressional Budget Office (CBO) report *A Potential Influenza Pandemic: Possible Macroeconomic Effects and Policy Issues* focuses on possible supply and demand changes in the U.S. economy if an H5N1 pandemic were to reach the United States.¹⁵⁴ The Wall Street Journal reported that the U.S. poultry industry currently exports about 15% of its chicken meat annually, earning \$2.2 billion in 2004. The article asserted that some poultry-industry executives are concerned that importing countries might reject poultry from states that have vaccinated the animals.¹⁵⁵ Consequently, many executives in the poultry industry are opposed to vaccinating chickens intended for export. Some would like Congress to require USDA to present clear guidelines on how and when poultry would have to be vaccinated.

Global Biosafety

In October 2005, scientists reported that the 1918 influenza pandemic that had killed between 20 million and 50 million people worldwide may have emerged from an avian flu strain. Health experts have debated whether the genetic sequence of the 1918 influenza should be published. Some were concerned that the information could be used to construct a biological weapon. However, other scientists argued that sharing such important findings is critical to efficiently identifying dangerous viruses, and to finding ways to disable them. Ultimately, the genetic sequence was published.¹⁵⁶ Dr. Anthony Fauci, Director of the National Institute of Allergy and Infectious Diseases, and Dr. Julie Gerberding, Director of the CDC, said in a joint statement, "The new studies could have an immediate impact by helping scientists focus on detecting changes in the evolving H5N1 virus that might make widespread transmission among humans more likely." Furthermore, the HHS National Science Advisory Board for Biosecurity "voted unanimously that the benefits [to making the

¹⁵³ Bullion, Alan, "Threats on the Wing." *The World Today*, August/September 2005. Also see, Bradsher, Keith, "Some Asian Bankers Worry About the Economic Toll From Bird Flu." *New York Times*. April 5, 2005. [<http://www.nytimes.com>]

¹⁵⁴ CBO, *A Potential Influenza Pandemic: Possible Macroeconomic Effects and Policy Issues*. December 8, 2005. [<http://www.cbo.gov/ftpdocs/69xx/doc6946/12-08-BirdFlu.pdf>]

¹⁵⁵ Kilman, Scott, "Vaccine Remains Sticking Point in U.S. Defense Against Bird Flu." December 12, 2005. [<http://www.wsj.com>]. Basic screening tests for bird flu used by many importing countries leave ambiguous whether a bird testing positive is infected with H5N1 or has been vaccinated against it.

¹⁵⁶ Kolata, Gina, "Experts Unlock Clues to Spread of 1918 Flu Virus." *New York Times*, October 6, 2005. [<http://www.nytimes.com>]

results public] outweighed the risk that it would be used in a nefarious manner.”¹⁵⁷ However, the Administration acknowledged that the influenza virus could be used as a biological weapon and added the virus to the Select Agent list on October 20, 2005.¹⁵⁸ Congress authorized the Select Agent program in the late 1990s to track the movement of certain bacteria and viruses that could potentially be used as bioterrorist weapons.¹⁵⁹

Health specialists caution that lab safety must be a top priority as other countries begin to develop their own research and vaccine capacities. Some are closely watching Taiwan in its effort to build its own influenza vaccine factory.¹⁶⁰ Japan, already accomplished in viral research, is reportedly helping Vietnam build a biosafety lab to work with the influenza virus.¹⁶¹ If global influenza vaccine production is to increase, disease experts caution that some form of oversight must first be established. Some scientists advocate the development of an international influenza research facility. Supporters envision a global laboratory that could rapidly identify influenza threats, and produce appropriate vaccines. It also could, they say, streamline existing flu monitoring systems. Opponents of this idea believe that current technology, such as the WHO’s Internet-based FluNet, is fully capable of obtaining the same goal. Furthermore, critics believe that scientists might lose interest in sharing viral samples, if they believe their analytical and research capacities will be taken away.¹⁶²

S. 1873, *The Biodefense and Pandemic Vaccine and Drug Development Act*, would address production of pandemic products. The bill would authorize funding for surge capacity of manufacturing vaccines. It would also authorize funding for research and development of flu vaccines, counter measures, and pandemic products.

¹⁵⁷ Ibid.

¹⁵⁸ CDC, “Possession, Use, and Transfer of Select Agents and Toxins — Reconstructed Replication Competent Forms of the 1918 Pandemic Influenza Virus Containing Any Portion of the Coding Regions of All Eight Gene Segments.” 70 Federal Register 61407, October 20, 2005.

¹⁵⁹ For more information, see the CDC Select Agent Program page at [<http://www.cdc.gov/od/sap>] and CRS Report RL31719, *An Overview of the U.S. Public Health System in the Context of Emergency Preparedness*, by Sarah A. Lister.

¹⁶⁰ Altman, Lawrence and Keith Bradsher, “Vaccine Alone Won’t Stem Avian Flu, Experts Warn.” New York Times. August 8, 2005. [<http://www.nytimes.com>]

¹⁶¹ Interview with State Department staff, October 18, 2005.

¹⁶² Abbott, Alison, “The flu HQ.” Nature, Volume 414, November 1, 2001. [<http://www.nature.com>]

Appendix

Figure 1. Map of Human and Animal H5N1 Cases



Source: Information based on the World Health Organization (WHO) website, and the World Organization for Animal Health (OIE) website.
Adapted by CRS. (K.Yancey 1/11/06)

Table 2. WHO Pandemic Phases

Phase	Description	Overarching Public Health Goals
Interpandemic Period		
Phase 1	No new influenza virus strains have been detected in humans. A virus strain that has caused human infection may be present in animals. If so, the risk of human infection is considered to be low.	Strengthen global influenza pandemic preparedness at the global, regional and national levels.
Phase 2	No new influenza virus strains have been detected in humans. However, a circulating animal influenza virus strain poses a substantial risk of human disease.	Minimize the risk of transmission to humans; detect and report such transmission rapidly if it occurs.
Pandemic Alert Period		
Phase 3	Human infection(s) with a new strain, but no human-to-human spread, or at most rare instances of spread to a close contact.	Ensure rapid characterization of the new virus strain, and early detection, notification and response to additional cases.
Phase 4	Small cluster(s) with limited human-to-human transmission, but spread is highly localized, suggesting that the virus is not well adapted to humans.	Contain the new virus within limited foci or delay spread to gain time to implement preparedness measures, including vaccine development.
Phase 5	Larger cluster(s), but human to human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).	Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.
Pandemic Period		
Phase 6	Pandemic: increased and sustained transmission in the general population	Minimize the impact of the pandemic.

Source: World Health Organization.

Table 3. FY2006 Emergency Supplemental Request
(\$ millions)

AGENCY	ACTIVITIES	AMOUNT
Department of Health and Human Services	Increase vaccine manufacturing capacity so that 25% of Americans would have access to antiviral medication, and the entire U.S. population would have access to pandemic influenza vaccines within a six-month period.	6,700.0
Department of Agriculture	Research and development, domestic surveillance and diagnosis of live bird markets, wildlife and bird flyways, smuggling and waterfowl, planning and preparedness training and modeling of scenarios, and the production of 40 million doses of animal vaccine.	91.4
Department of Defense	Purchasing avian influenza vaccines, increasing world wide surveillance of the virus, and upgrading surveillance, laboratory, information management equipment. Additionally, \$10 million of the \$130 million is intended to assist military partner nations in procuring protective equipment, laboratory diagnostic equipment, portable field assay testing equipment surveillance, and essential communication equipment.	130.0
Department of Homeland Security	Pandemic scenario modeling, personal protective equipment, private sector pandemic assistance planning, and exercises and training for DHS frontline staff.	47.3
Department of the Interior	For the U.S. Geological Survey (USGS), the U.S. Fish and Wildlife Service, the National Park Service, and other Federal agencies to begin an interagency effort to detect avian influenza in wild birds, with an initial focus on early detection activities in Alaska and coastal areas.	11.6
Department of State	International response coordination, including foreign governments and non-governmental organizations, diplomatic outreach, exchanges of U.S. and foreign medical personnel, and for avian and pandemic influenza health support and protection of U.S. government employees and families at U.S. missions overseas. \$20 million of the funds would be reserved for the potential evacuation of U.S. government personnel and dependents from overseas missions.	38.5
Department of Veterans Affairs	Increasing avian influenza surveillance programs and establishing real-time surveillance data links with CDC.	27.0
USAID	Pre-position supplies and equipment to prevent and control the spread of avian influenza (within one year of receiving funds); increase awareness of risks and appropriate behaviors to reduce transmission among humans and animals; improve surveillance and response; and accelerate international planning and preparedness. \$2 million of the funds are reserved for Russia and Eastern Europe.	131.5
GRAND TOTAL		7,177.3

Source: Prepared by CRS from FY2006 Emergency Request.

Table 4. FY2006 Appropriations Providing Funds for Global Initiatives

Legislation	FY2006 Senate Appropriations	FY2006 House Appropriations
<i>H.R. 3010</i> , Labor, HHS, Education	\$60 million for global surveillance.	\$36.5 million to combat the spread of the avian flu in Asia, and to enhance global surveillance and response network for infectious diseases.
<i>H.Rept. 109-337</i> provides \$183.5 million for the Public Health and Social Services Emergency Fund (PHSSEF), of which \$120 million would be available until expended. Presented to the President for signature on December 28, 2005.		
<i>P.L. 109-102</i> , Foreign Operations	\$10 million , control the spread of the avian flu.	No similar language.
<i>H.Rept. 109-265</i> indicates that the \$25 million provided in P.L. 109-13 was the first step in a multi-year effort to combat the spread of H5N1. Expects the Peace Corps to use funds for appropriated under the heading for expenses related to avian flu. Conferees believe the International Development Association (IDA) of the World Bank should help countries to prepare for and combat against a possible avian flu epidemic. Urges the U.S. Executive Director to the World Bank to use the voice and vote of the United States to increase support for avian flu initiatives, and directs the Secretary of Treasury to report not later than 90 days after the enactment of P.L. 109-102 of the Bank's plans to do so.		
<i>H.R. 2863</i> , Department of Defense	\$33 million , avian flu global surveillance;	No similar language.
<i>H.Rept. 109-359</i> provides \$3.8 billion for avian flu initiatives, of which \$3.3 billion is directed to the Public Health and Social Services Emergency Fund. \$267 million of the \$3.3 billion is reserved for international initiatives, disease surveillance, vaccine registries, research, and clinical trials. An additional \$500 million is reserved for international assistance, monitoring and tracking, and research and development. The conference report, <i>H.Rept. 109-359, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico and Pandemic Influenza</i> , provides \$3.8 billion for avian influenza initiatives. Specifically, the bill directs \$3.3 billion to PHSSEF, \$131.5 million to USAID, \$130 million to the Department of Defense, \$71.5 million to APHIS, \$47.3 million to the Department of Homeland Security, \$20 million to FDA, \$27 million to the Department of Veterans Affairs, \$31 million to the Department of State, and \$11.6 million to the Department of the Interior. Presented to the President for signature on December 28, 2005.		

Source: Prepared by CRS from FY2006 appropriations legislation.

Table 5. Country Allocations for FY2005 Supplemental

COUNTRY	CDC FUNDING	USAID FUNDING
Vietnam	\$2.634 million	\$ 3.45 million
Indonesia	\$0.25 million	\$ 3.15 million
Cambodia	\$1.858 million	\$ 2.25 million
Laos	\$1.858 million	\$ 1.60 million
China	\$0.00	\$ 0.50 million
Regional	\$3.35 million	\$ 2.75 million
TOTAL	\$9.95 million	\$13.7 million

Sources: USAID Press Release, October 27, 2005 and CDC Washington Office, November 8, 2005. CDC Funding reflects spending from FY2005 Emergency Supplemental. USAID Funding includes reallocated funds from other programs.

Table 6. International Partnership on Avian and Pandemic Influenza (IPAPI) Core Principles

1. International cooperation to protect the lives and health of our people;
2. Timely and sustained high-level global political leadership to combat avian and pandemic influenza;
3. Transparency in reporting of influenza cases in humans and in animals caused by strains that have pandemic potential, to increase understanding, preparedness and, especially to ensure rapid and timely response to potential outbreaks;
4. Immediate sharing of epidemiological data and samples with the World Health Organization (WHO) and the international community to detect and characterize the nature and evolution of any outbreaks as quickly as possible, by utilizing, where appropriate, existing networks and mechanisms;
5. Rapid reaction to address the first signs of accelerated transmission of H5N1 and other highly pathogenic influenza strains so that appropriate international and national resources can be brought to bear;
6. Prevent and contain an incipient epidemic through capacity building and in-country collaboration with international partners;
7. Work in a manner complementary to and supportive of expanded cooperation with and appropriate support of key multilateral organizations (WHO, Food and Agriculture Organization, World Organization for Animal Health);
8. Timely coordination of bilateral and multilateral resource allocations; dedication of domestic resources (human and financial); improvements in public awareness; and development of economic and trade contingency plans;
9. Increased coordination and harmonization of preparedness, prevention, response and containment activities among nations, complementing domestic and regional preparedness initiatives and encouraging where appropriate the development of strategic regional initiatives;
10. Actions based on the best available science.

Source: State Department Press Release, "U.S. Launches International Partnership on Avian and Pandemic Influenza." September 22, 2005. [<http://www.state.gov/r/pa/prs/ps/2005/53865.htm>]