THE PANDEMIC INFLUENZA CHALLENGE

Multilateral Perspectives on Preparedness, Response Planning, and Areas for Cooperation

A Research Report & Workshop Summary

January 2007
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Report prepared by
James L. Schoff
Associate Director of Asia-Pacific Studies, IFPA
Marina Travayiakis
Research Associate, IFPA

Principal Project Investigators
Dr. Jacquelyn K. Davis
Dr. Charles M. Perry

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On September 27, 2006, government officials, military officers, and foreign policy experts from the United States, Japan, and the Republic of Korea (ROK or South Korea) gathered for a one-day workshop in Tokyo, Japan, to discuss the threat of a potential pandemic influenza crisis in the Asia-Pacific region. Policy makers and military experts shared national strategies and military response plans and explored options for augmenting a coordinated regional response to a possible avian flu outbreak. Participants also discussed means to leverage existing partnerships, enhance interoperability, and integrate planning efforts in order to minimize the health and economic impact, including related security challenges and social implications, of a pandemic influenza contingency, and by extension, other natural disaster, pandemic disease, or biohazard events.

The event, Pandemic Influenza Workshop: Multilateral Perspectives on Preparedness, Response Planning, and Areas for Cooperation, was co-sponsored by the Institute for Foreign Policy Analysis (IFPA), based in Cambridge, Massachusetts, and Washington, D.C., the Institute of World Studies at Takushoku University, located in Tokyo, Japan, and United States Pacific Command (PACOM), based in Honolulu, Hawaii. IFPA is grateful to all of the workshop speakers and participants who gave their valuable time and considerable expertise to this initiative.1

Increasingly, health experts, government officials, military planners, and regional and international bodies have engaged in pandemic influenza

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1 The conclusions of this report do not necessarily represent the opinions of all of the workshop participants or their organizations. This is not a consensus document, nor have the participants or co-sponsoring organizations reviewed it prior to publication. IFPA is responsible for the content of this report.
The Pandemic Influenza Challenge

The workshop coincided with the first meeting of the World Health Organization Influenza Pandemic Task Force (WHO IPTF), whose membership has been assigned to advise the WHO on potential public health concerns related to avian and pandemic influenza, including issues such as definition of the phases of an influenza outbreak, declaration of an influenza pandemic, and suitable international response measures. The workshop also took place a few months after the Asia-Pacific Economic Cooperation (APEC) ministerial meeting on avian and influenza pandemics, and a few weeks before a three-day tabletop pandemic influenza exercise in Seoul, in which over 250 individuals participated, including some present at the workshop in Tokyo.

The workshop agenda focused on the nature of a potential pandemic influenza crisis in the Asia-Pacific theatre. Participants discussed the necessary emergency planning and response activities of the United States, Japan, and South Korea in preparation for a coordinated regional or multilateral response to the impending crisis (see appendix B for a detailed workshop agenda and appendix C for a complete list of workshop participants).

The first session of the workshop briefly outlined the preparedness activities already under development, including the guidelines and recommendations of the WHO for prevention, response planning, surveillance, and containment. Participants also highlighted several key areas that require more attention, such as the role of the private sector in disaster response, the potential disruption to government services and critical infrastructure, the threat to national security, the limitations of effective health treatments, and the disturbing gap between the capacity of developed and developing countries to respond to an avian flu outbreak. The second session reviewed the national strategies of the United States, Japan, and South Korea, assessed the strengths and limitations of the planning efforts, and identified areas for improvement, support, and cooperation, such as bio-medical surveillance, crisis coordination, and antiviral and vaccine development and distribution. Session 3 examined the military preparedness plans of the three countries and discussed the potential role of the military in support of the initial response efforts of civilian agencies during a pandemic. Military planners also shared lessons learned from past crisis management simulations, tabletop exercises, and live operations, including the avian influenza outbreaks among poultry in Japan and South Korea, as well as the military response to the Asian tsunami disaster in December 2004. Finally, the fourth session focused on areas of enhanced cooperation and planning, identified essential tasks and opportunities for government and military coordination, such as regional crisis coordination centers, communication networks, future joint exercises, training, and follow-on workshops and seminars.

Frank and spirited discussion following each session revealed the multiple policy priorities of each country. All participants recognized that policy coordination, including military-to-military cooperation, is critical to combating the emerging threat of a pandemic. Specifically, participants identified areas that each country’s political and military leadership could focus on in order to improve regional and multilateral response mechanisms in disaster relief. For example, participants agreed that periodic tabletop exercises and expert meetings among key partners from the government, military, private sector, civil society, nonprofit organizations, and regional and multilateral agencies will help identify the gaps and opportunities for enhanced cooperation, as well as specify the chains of command with regard to notification and communication. Participants also acknowledged exercises and exchanges should include other key regional players, particularly Australia and Singapore.

Despite the significant expertise of the WHO, participants agreed that the agency was severely underfunded to tackle pandemic influenza alone. Participants addressed various initiatives to support WHO efforts, such as the launch of a
web-based central information clearinghouse to filter reports and provide real-time satellite imagery on avian flu incidents worldwide. Participants also identified measures to strengthen regional communication networks, including the creation of coordination crisis center. Although such initiatives were well received at the workshop, several participants stressed that the failure to promote local awareness and address the gap between the ability of developed nations and of less developed nations to respond to an influenza pandemic renders all other prevention measures practically useless. Moreover, participants acknowledged that contingency plans, particularly for the United States, Japan, and South Korea, should address response measures for isolated countries such as North Korea, as well as prepare for possible terrorist attacks during a pandemic, including the use of the H5N1 virus as the weapon.

The pages that follow offer a thorough review of the nature of the pandemic influenza crisis that threatens to emerge and summarize the international efforts undertaken thus far to combat this threat, specifically in the Asia-Pacific region. Insights gained from the workshop sessions and group discussions have been integrated into the workshop summaries in this research report. The data referenced in this report is based on information publicly available as of December 2006.
It is only a matter of time before an avian flu virus - most likely H5N1 - acquires the ability to be transmitted from human to human, sparking the outbreak of human pandemic influenza. We don’t know when this will happen. But we do know that it will happen. This is the time to build global consensus. This is the time for every country to prepare their national action plan - and act on it…If we are unprepared, the next pandemic will cause incalculable human misery. Both directly from the loss of human life, and indirectly through its widespread impact on security. No society would be exempt. No economy would be left unscathed.

Former WHO Director-General Dr. Lee Jong-wook
November 7, 2005

Nature of an Avian Influenza Crisis
Outbreaks of avian influenza (H5N1, avian flu, or bird flu) in Asia, Europe, and Africa have increased concerns that an influenza pandemic is imminent. Epidemiological models estimate that if such a pandemic were to occur, it would paralyze the global economy, overwhelm international vaccine and antiviral supplies, cripple national healthcare systems, and disrupt social order, with the greatest impact occurring among less developed countries because of their limited surveillance and healthcare resources, as well as the overall poorer health of their populations (WHO 2004a). Moreover, an influenza pandemic could cause massive economic losses and social unrest around the world regardless of the severity of the outbreak or number of actual deaths. For example, the
economic impact of the Severe Acute Respiratory Syndrome (SARS) outbreak in 2002-03, a relatively mild and isolated outbreak, was severely disproportionate to the number of total infections and deaths. The SARS outbreak infected about 8,500 people globally, of which only 813 died.\(^2\) Economic losses in East Asia, however, reached $18 billion, or 0.6 percent of gross domestic product (Bloom, de Wit, and Carangal-San Jose 2005, 1). Canada, which also had SARS-related deaths, reported combined economic losses and health costs of over $1.1 billion (Osterholm 2005). In addition, indirect costs associated with the outbreak, such as hospital and school closings, restricted travel, and voluntary and enforced quarantines, were disproportionately high. Countries not directly affected by SARS also experienced large economic losses, including the United States. Overall, global economic losses reached $50 billion (U.S. News & World Report 2005). In short, the significant economic loss and social unrest caused by SARS clearly demonstrated that even a disease with a small health impact can have a massive economic effect.

An influenza pandemic could create a major crisis management situation unprecedented in scale and cost. The global healthcare system could suffer from high shortages of staff, hospital beds, and supplies. Hospital morgues, medical examiners, and mortuary services would become overwhelmed. High absenteeism from work could disrupt critical infrastructure, such as transportation, public works, trade and commerce, utilities, energy, and communication networks. Moreover, a pandemic could threaten global security, the rule of law, the continuity of government services, and food security, as well as negatively affect international trade and the private sector, especially airline industries, small businesses, and food supplies. To prevent this, governments must develop local, national, regional, and international emergency preparedness plans to prevent, manage, and control an outbreak within and beyond their borders, maintain essential social services such as health and law enforcement, and reduce the total economic and social impact of a pandemic. Since no single government or institution has the capacity to combat an influenza pandemic alone, preparedness and emergency planning require a serious intergovernmental and civil-military response, especially in the Pacific region as the area is the most susceptible and likely source of a future influenza pandemic.

Government officials, military planners, and policy experts from the United States, Japan, and the ROK gathered at the September workshop agreed that the health and security risks surrounding a potential pandemic in the Asia-Pacific theater required that the three countries take the lead in planning for a regional or multilateral response in the region. One participant noted, “We need to share our national preparedness plans now in order to understand how we will respond to a pandemic. We need to know how we will cooperate and integrate our three countries in order to respond to and lessen the effects of a potentially devastating health, economic, and security crisis.”

There are three types of influenza virus: A, B, and C. Type C viruses cause mild illness in humans. Types A and B, however, cause epidemics or seasonal flu outbreaks within a community or region over a given period. Type A viruses are found in a number of different animals, such as chickens, ducks, pigs, and horses, as well as among humans, whereas type B viruses typically circulate only among humans. Three known type A viruses (H1N1, H1N2, and H3N2) are currently circulating among humans. A type A virus can cause a pandemic when three conditions are met: 1) a new influenza A virus emerges in the human population, 2) the strain causes serious human illness or fatality, and 3) the strain spreads easily from person to person worldwide (U.S. CDC 2006a).

The avian flu is an infection caused by influenza type A viruses that occur naturally among

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\(^2\) Out of 8,497 reported SARS cases in 30 countries, only 813 people died. SARS deaths occurred in Canada (38), China (730), France (1), Malaysia (2), Philippines (2), Singapore (32), South Africa (1), Thailand (2), and Vietnam (5) (WHO 2003).
wild birds. Although wild birds carry type A viruses, they are silent carriers and thus do not get sick from the viruses. However, domesticated birds, such as chickens, ducks, and turkeys, do become very ill when infected by type A viruses. Since infected wild birds shed the influenza virus in their saliva, nasal secretions, and feces, domesticated birds may become ill through direct contact with the infected wild birds or through direct contact with surfaces that have been contaminated with the virus. Typically, a highly pathogenic form of an avian influenza virus spreads quickly among bird flocks and poultry, killing 90 percent to 100 percent of those infected within forty-eight hours (U.S. CDC 2006b).

A new type A influenza strain circulating among wild birds, referred to as H5N1, was first detected in Hong Kong in May 1997 after authorities linked the death of a three-year-old boy to a viral outbreak on three rural chicken farms in Hong Kong. By August 1997, an additional seventeen human cases of H5N1 were reported, of which five were fatal. In response, authorities slaughtered all 1.6 million chickens present in poultry markets and farms within Hong Kong to prevent any further contamination and human infection (Snacken et al. 1999). No more human cases were reported thereafter. The virus, however, continued to mutate and quietly spread among chicken flocks in China, eventually reemerging and rapidly affecting poultry in eight other Asian nations by late 2003.3

In order to prevent the spread of the disease to humans and other geographic areas, hundreds of millions of poultry have been destroyed in South East Asia since 2003. Despite multiple attempts to contain the virus, however, WHO confirmed 49 human cases of avian influenza in Thailand and Vietnam in 2003-04, of which 35 were fatal. By the end of 2005, an additional 95 human cases were reported in Cambodia (4), China (8), Indonesia (17), Thailand (5), and Vietnam (61), of which 41 were fatal. What is most alarming, however, is the expanded geographic reach of the disease among animals and humans to parts of South Asia, Europe and Eurasia, the Near East, and Africa. To date, about sixty countries have reported cases of avian influenza in animals. As of December 2006, the WHO had confirmed 116 new human cases of avian influenza in 2006 in Azerbaijan (8), Cambodia (2), China (13), Djibouti (1), Egypt (18), Indonesia (56), Iraq (3), Thailand (3), and Turkey (12), of which 80 have been fatal. Since 2003, 263 human cases have been reported, of which 158 have been fatal—a 60 percent mortality rate (WHO 2006a). The actual number of infected people with the H5N1 virus, however, may well exceed current figures since milder cases may not have been reported to health officials. As a result, the mortality rate may be slightly exaggerated though it has jumped nevertheless from 33 percent in 1997 to 69 percent in 2006.

Despite the growing number of human cases, several countries, Vietnam and Thailand in particular, have made great strides to halt the spread of the avian flu within their borders. Vietnam, which accounted for 65 percent of all confirmed human cases through the end of 2005, vaccinated 220 million chickens in 2005 and culled tens of thousands of suspect fowl. Moreover, the Ministry of Agriculture and Rural Development banned poultry farming in towns and cities such as Hanoi and Ho Chi Minh City, in addition to raising public awareness, stockpiling antiviral drugs, and establishing information and surveillance networks. Farmers, however, were not compensated adequately, forcing some to smuggle birds to urban centers for illegal sales. Nevertheless, Vietnam did not have any human cases of the H5N1 virus in 2006.

Thailand, on the other hand, did not carry out large vaccinations, fearing other countries would ban the import of its poultry. Instead, the government culled wide areas around infected flocks, compensated farmers generously, and appointed an individual in every village to report sick poul-

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3 Affected countries included Cambodia, China, Indonesia, Japan, Lao People’s Democratic Republic, the Republic of Korea, Thailand, and Vietnam (WHO 2005a).
try (McNeil 2006). The government did vaccinate all fighting cocks and issued them travel papers with vaccination records. For the first six months of 2006, Thailand had not reported any human cases of H5N1. Unfortunately, the virus resurfaced in Thailand in late 2006, infecting three more people.

Since 1997, H5N1 has mutated from a low pathogenic avian influenza (LPAI) strain to a highly pathogenic avian influenza (HPAI) strain with limited transmission to humans from infected poultry. To date, the H5N1 strain has not mutated into a form that could easily spread between humans. Although a few cases involving limited human-to-human transmission were confirmed in Vietnam and Thailand in 2004, the virus never spread beyond the initial family unit. A family cluster in Indonesia in May 2006, however, raised health concerns of a possible human-to-human strain after a thirty-seven-year-old woman contracted the illness and infected seven other family members, including one family member who was not in direct contact with her. In response to this outbreak, Indonesian and WHO health officials placed the immediate area under quarantine and distributed antiviral medications to surviving family members and close contacts. In the end, WHO officials confirmed that the H5N1 virus had mutated, but there was no evidence of increased or sustained human-to-human transmission beyond the initial family cluster. Despite this finding, officials have confirmed an additional thirty human cases of H5N1 in Indonesia though none were related to the family cluster. Overall, Indonesia has accounted for most of the human cases of avian influenza in 2006. The country has been under fire for moving slowly to stamp out the disease when it first appeared in 2003, but it has since increased the vaccination or culling of birds in infected areas. Nevertheless, the disease is endemic in the bird population of Indonesia.

Although the avian flu has not been classified as a pandemic, it has nevertheless met two of the three conditions necessary for a pandemic to occur. “First, a new strain of the virus, called A (H5N1), has emerged, and humans have little or no immunity to it. Second, this strain can jump between species. The only remaining obstacle is that A (H5N1) has not yet mutated into a form that is easily transmitted from human to human” (Obama and Lugar 2005). However, reports have confirmed cases involving some mammals not previously considered susceptible to the disease, such as domestic cats, indicating the virus has mutated and could eventually emerge into a new viral form with sustained human-to-human transmission.

To date, almost all human cases have involved individuals with direct contact with diseased poultry and ducks in household flocks as opposed to commercial flocks. Vulnerable populations include market workers, poultry farmers, workers in other related fields with frequent contact with infected birds, and healthcare professionals. As a result, adult workers are at most risk even though typical influenza viruses usually affect the very young, elderly, and immuno-compromised individuals. Symptoms of human infections of avian influenza are similar to seasonal flu symptoms (high fever, sore throat, cough, malaise); however, bacterial or viral pneumonia, acute respiratory failure, and other serious lethal complications also develop. In most cases, the disease has affected multiple organs and systems, with rapid clinical deterioration and high mortality. Almost all infected patients to date have developed pneumonia.

**A Pandemic Impact**

A global outbreak of a new human influenza is a rare but recurrent event. According to historical data, pandemics occur roughly every thirty to fifty years. Although estimates vary widely, the WHO and World Bank have predicted anywhere from 5 million to 150 million deaths globally in the event of a pandemic influenza, with the majority of deaths likely to occur in developing countries. “Even in one of the more conservative scenarios, it has been calculated that the world will face up to 233 million outpatient visits, 5.2 million hospital admissions,
and 7.4 million deaths globally” (WHO 2005b). If the last three major flu pandemics, which also mutated from forms of avian influenza, can serve as a guide, a new avian influenza pandemic could cause catastrophic economic and social crises at national, regional, and global levels. The Spanish flu (1918-19) killed an estimated 500,000 people in the United States and 20 million to 50 million people worldwide. Almost half of those who died were between the ages of twenty and thirty-five. Moreover, roughly 200 million to 1 billion were infected worldwide. The Asian flu (1957-58), which originated in China, killed approximately 70,000 people in the United States and 2 million people worldwide. The Hong Kong flu (1968-69) caused roughly 34,000 deaths in the United States and 3 million worldwide. Although the development of vaccines helped slow the spread of the viruses and decrease the total number of deaths, the Asian and Hong Kong flu’s combined cost over $34 billion in health care and lost productivity (CNN.com 2003).

Although health experts are uncertain about the timing, virulence, and geographic scope of a future influenza pandemic, most predict that it will have the same health and economic impact as the Hong Kong flu of 1968. One workshop participant projected, “Based on a 35 percent attack rate, an avian flu pandemic could result in up to 500 million cases with 875,000 to 1.6 million requiring medical care, 6.4 million to 28.1 million hospitalizations, and 2 million to 7.4 million deaths. Moreover, the pandemic would occur during a few weeks and over several waves.” In fact, an influenza pandemic usually strikes in two or more waves, either during the same year or in successive influenza seasons. Each pandemic wave usually lasts eight weeks, and each subsequent wave brings about greater morbidity and mortality than the preceding wave. A February 2006 report by the Lowy Institute for International Policy in Australia studied the impact of an influenza pandemic on the global economy under four different scenarios: mild, moderate, severe, and ultra.4 According to the report, a mild pandemic could kill an estimated 1.4 million people and cost roughly 0.8 percent (or $330 billion) in lost economic output worldwide. Under an ultra scenario, the loss to global GDP could reach 12.6 percent (or $4.4 trillion) with over 142.2 million deaths (McKibbon and Sidorenko 2006, 1). The above table illustrates the impact of a pandemic on the United States, Japan, and the Republic of Korea (McKibbon and Sidorenko 2006, tables 1-7).

Workshop participants estimated that in addition to a devastating human health impact, an influenza pandemic could cost the world economy up to $2 trillion in economic losses. The projected healthcare costs for the United States are about $70 to $166 billion. In Asia alone, a sustained human-to-human spread of the H5N1 virus could cost anywhere from $110 billion to $300 billion in economic losses (Asian Development Bank 2006). To date, the current H5N1 outbreak has had direct economic costs in Southeast Asia of $8 billion to $12 billion (WHO 2006b). In addition to the direct costs of treating patients and culling infected animal flocks, numerous indirect costs are associated with the prevention and management of a pandemic. Such costs include the development of a system of surveillance and containment, as well as the research, development, production, and distribution of vaccines and antiviral medications. Moreover, a pandemic would likely disrupt basic social service-

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4 A mild scenario is similar to the 1968-69 Hong Kong flu; a moderate scenario is similar to the 1957-58 Asian flu; a severe scenario is similar to the 1918-19 Spanish flu; and an ultra scenario is worse than the Spanish flu.
es and cause panic and unrest. During the SARS outbreak, for example, people tried to minimize interaction “resulting in a severe demand shock for services sectors such as tourism, mass transportation, retail sales, hotels, and restaurants, as well as a supply shock due to workplace absenteeism, disruption of production processes and shifts to more costly procedures” (Brahmbhatt 2005). In the event of a pandemic, the rate of workplace absenteeism is expected to reach 40 percent, and will likely increase when certain public health measures, such as school closings or quarantines, are implemented (Homeland Security Council 2006, 25).

**Medical Prevention and Treatment**

Although research studies are underway, there is no vaccine currently available to protect individuals against the H5N1 virus. Even if one were to become available, influenza viruses constantly mutate and evolve each year, leaving treatments virtually ineffective for any future mutations. Furthermore, current influenza vaccine production is based on an outmoded and lengthy process that uses chicken eggs. It takes up to six months after the onset of a pandemic to develop an effective vaccine using this egg-based technology. Given the lag time between the identification of a viral strain, the production of a vaccine, and the final delivery of a product, as well as the finite manufacturing capacity, no company will be able to meet production targets and satisfy national demand, let alone global demand, if a pandemic strain were to hit. Several countries are exploring cell-based vaccine technologies to expand manufacturing speed and production. Moreover, in anticipation of a pandemic strain, pharmaceutical companies are developing “pre-vaccines” based on the current animal influenza strains that have caused human infections. However, since influenza viruses constantly mutate, a pre-vaccine may not necessarily provide any protection against a potential pandemic influenza strain. “Severe shortages of vaccines are expected, especially during the early stages of a pandemic, and since influenza viruses constantly mutate, no vaccine will be able to completely wipe out the virus,” commented one workshop participant.

The current manufacturing capacity for influenza vaccines is concentrated in Australia, Europe, Japan, and North America, raising concerns over the affordability, supply, and potentially inequitable distribution of an H5N1 vaccine to less developed countries. The WHO has hosted several informal meetings with influenza vaccine manufacturers and government representatives to discuss the obstacles to pandemic vaccine development. Participants have recommended several solutions, such as facilitating the exchange of non-proprietary information, coordinating national regulatory processes, and developing antigen-sparing strategies to complement limited vaccine supplies. Fifteen pharmaceutical companies in Australia, Austria, Canada, France, Germany, Italy, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States have approximately thirty-one pandemic avian influenza vaccines in human or clinical trials (Fox 2006).

Pending the availability of a vaccine to combat the H5N1 virus, antiviral medications may provide a good defense against infection, or at minimum, mitigate the severity of influenza symptoms if taken within forty-eight hours of the onset of flu symptoms. Four antiviral drugs are approved to treat influenza: amantadine, rimantadine, oseltamivir (Tamiflu®), and zanamivir (Relenza®). However, recent studies have shown that the H5N1 virus may be resistant to both amantadine and rimantadine.

Although it is difficult to predict the effectiveness of antiviral medications against a human-to-human strain of the H5N1 virus, countries around the world are nevertheless stockpiling Tamiflu® and Relenza®.5 Hoffman-La Roche and GlaxoSmithKline, the pharmaceutical manufacturers of Tamiflu® and

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5 The FDA has approved Tamiflu® (capsule) for both the treatment and prevention of influenza in adults and children, whereas Relenza® (oral inhaler) was approved to treat flu symptoms only.
Relenza® respectively, have received orders from governments around the world to stockpile enough drugs to cover 20 percent to 40 percent of national populations (Roche 2005a). The WHO does recommend that governments worldwide stock enough antiviral agents to treat at least 25 percent of their populations. Current global supplies can only treat 2 percent of the world population (Chosun Ilbo 2005).

To ensure the availability of antiviral agents to countries in need, the WHO signed an agreement with Roche to create an international stockpile of Tamiflu® (Roche 2005b). In April 2006, Roche announced that the rapid response stockpile, which consists of three million treatment courses of Tamiflu® (or thirty million capsules) reserved for WHO use, is available for delivery. Facilities in the United States and Switzerland will house the international stockpiles, which are reserved for the exclusive use of the WHO at the site of the pandemic outbreak in order to contain the virus or slow its spread to other areas. Under a separate agreement, Roche donated an additional two million courses to the WHO for the creation of regional stockpiles.

Roche has established relationships with over fifty partners and has doubled manufacturing capacity in recent years. The company hopes to produce over three hundred million treatment courses of Tamiflu® annually by 2007, a ten-fold increase in production since 2003. Moreover, Roche signed several licensing and sublicensing agreements in late 2005 with countries or companies interested in producing the drug locally, including China, Japan, South Korea, and India.

Although many governments around the world are building national stockpiles of antiviral medications and other personal protective equipment, few developing countries have taken any steps to prepare for an avian flu outbreak, raising concerns that an isolated outbreak in one country could quickly turn into a global epidemic if the infected country is unprepared to contain the event. Unfortunately, pandemic influenza planning requires a significant financial investment, which most countries are unwilling to make, especially since a pandemic influenza crisis, although possible, is not necessarily a guaranteed event. Moreover, antiviral medications are expensive. For example, the cost to stockpile enough courses of Tamiflu® (at $15 per treatment course) to treat 30 percent of the five billion people living in the developing world is approximately $22.5 billion. Given this high cost, it is unlikely that developing countries will stockpile enough antiviral agents to treat 25 percent to 30 percent of their populations or that the more developed countries will do so on their behalf. Moreover, even if some developed countries do donate (as some already have) funds, antiviral agents, or protective personal equipment, such as masks, gloves, and sprayers to assist in decontaminating hospital rooms, developing countries suffer from far more lethal infectious diseases that compete for the same resources. One workshop participant argued, “It is unreasonable to expect developing countries to invest money into pandemic influenza planning. The developing world lacks basic health services and faces far greater health concerns than avian influenza, such as HIV/AIDS, malaria, and tuberculosis.”

Another workshop participant suggested that perhaps one way both to prepare less developed countries for an avian flu outbreak and to address other infectious disease concerns is to make a basic investment in the overall healthcare systems of the developing world. To this end, the WHO, Food and Agriculture Organization (FAO), and the World Organization for Animal Health (OIE) have introduced some long-term prevention strategies to minimize the risk of human avian influenza and reduce the threat of future infectious disease outbreaks, such as increasing human and food safety, improving rural development, strengthening veterinary controls, and restructuring the farming industries to improve bio-security. Other workshop participants agreed that such long-term measures would strengthen the developing world’s ability to prevent and contain future outbreaks of infectious disease.
However, there still exists an immediate need to develop appropriate response measures against a potential influenza pandemic, especially since any capacity-building measures would require several years to take effect. Since many third world countries lack the capacity to address pandemic influenza planning today, governments from developed countries need to provide the necessary resources to prevent and manage an avian flu outbreak, such as reinforcing international and regional stockpiles, strengthening local laboratory and health systems, and introducing health training and education measures. “We need to address the immediate gap between the rich and poor, not only for ethical and humanitarian reasons, but also from a national security perspective. If vaccines, antiviral medications, or other prophylaxes are limited to the rich, countries in the developing world will not be able to respond effectively to an avian influenza outbreak within their borders. If left untreated, the avian flu will quickly spread to other countries and turn what could have been a localized outbreak into a devastating pandemic,” cautioned one participant. “However, short- and mid-term solutions will not profoundly strengthen the ability of less developed countries to respond to a pandemic or improve the inequitable access to pandemic vaccines and antiviral medications, leaving the majority unarmed against the avian flu,” countered another workshop participant.

**Emergency Preparedness and Planning**

Although it is uncertain if, and when, an influenza pandemic will occur, H5N1 is nonetheless an animal virus with extremely high pandemic potential and devastating health, economic, and security consequences. An influenza pandemic, especially if followed by a shortage of vaccines and antiviral medications – a highly probable scenario – will force governments to restrict travel, establish quarantines, and close borders, which one workshop participant warned “gives a false sense of security and are ineffective means to stopping the spread of an infectious disease.” In order to effectively combat an influenza virus with pandemic potential, ensure the equitable distribution of vaccines and antiviral medications, and reduce the economic and social impact of an outbreak, governments and their partners should prepare influenza pandemic plans at the national, regional, and international level, as well as test their planning efforts with simulations and tabletop exercises.

In addition, government officials should improve risk communication, develop public awareness campaigns, and integrate non-health entities, including the private sector, law enforcement, and critical infrastructure such as transportation, utilities, energy, and communications networks, into planning efforts. “It is the responsibility of the government to operate independently and in harmony with other partners, to collaborate, to integrate response plans, and to develop alliances with healthcare organizations, unions, the media, and private sector companies,” advised one participant. In order to mitigate the potential economic, governance, and humanitarian consequences of a pandemic, governments must adopt a multi-sectoral approach to pandemic planning and focus response plans on the following objectives:

- Animal health surveillance and bio-security
- Public awareness and communication campaigns
- Incentives and compensation schemes for those affected by control measures
- Human health surveillance
- Continuity of governance and services under pandemic conditions
- Coordination of local, national, regional, and international stakeholders for avian human influenza action and response
- Engagement of private and volunteer sectors
United Nations System Influenza Coordination

The Office of the United Nations System Influenza Coordination (UNSIC) was created within the United Nations Development Group (UNDG) to support the different initiatives of the UN system and coordinate the UN response to the avian flu and the threat of a human pandemic. The main tasks of the United Nations system influenza coordinator, Dr. David Nabarro, include the implementation of a comprehensive unified strategy for the UN system on prevention, preparedness, and response to pandemic influenza, as well as to help develop and test country and regional preparedness strategies and contingency plans. Additional responsibilities of UNSIC include:

- Maintaining communication between the various UN agencies, governments, and donor agencies
- Briefing the international community on key issues and developments
- Raising public awareness and updating the media with situation reports
- Improving the availability of antiviral medications, vaccines, and other essential protective equipment for humans and poultry
- Tracking the availability of funds needed for prevention and preparedness
- Advocating resource mobilization

UN agencies working with UNSIC include the WHO, FAO, and OIE.

In March 2006, the UN secretary general asked all UN offices, including headquarters, UN country teams (UNCT), and UN missions, to complete their pandemic contingency plans by the end of May 2006. About 125 of the 148 UNCTs had submitted their pandemic contingency plans by the end of June. After reviewing each of the submitted plans, UNSIC will prepare and distribute a summary of the best practices and strategies identified from the UNCT plans. UNSIC also plans to upgrade the UN influenza web portal to announce upcoming conferences and improve access to communication tools and coordination procedures. A link to information about UNSIC is available on the UNDG website, http://www.undg.org.

World Health Organization

The WHO, headquartered in Geneva, is the United Nations specialized agency on human health. As such, the WHO is the central actor for coordinating the global response to an avian influenza outbreak, advising countries to develop national preparedness plans, create or strengthen surveillance systems, and coordinate national and international efforts. In 1952, the WHO established the WHO Global Influenza Surveillance Network to serve as a global alert mechanism designed to identify influenza viruses with pandemic potential. This network, which includes four WHO Collaborating Centres located in Australia, Japan, the United Kingdom and the United States, and 112 National Influenza Centres (NICs) around the world, has taken the lead in monitoring the current pandemic influenza threat. As part of this network, the WHO also created the Global Outbreak Alert & Response Network (GOARN) in 2000 to serve as a technical collaboration clearinghouse of human and technical resources for the rapid identification of and response to infectious disease outbreaks. The GOARN international team, which includes epidemiologists, infection control experts, and laboratory technicians from over 100 partner institutes, such as the U.S. Centers for Disease Control and Prevention (CDC), the European Programme for Intervention Epidemiology Training Network, the Institut Pasteur Network (France), the Institute for Infectious Disease Control (Sweden), the National Institute of Infectious Diseases (Japan), and other national and international agencies, has traveled to countries to report on avian influenza outbreaks, conduct field research, and collect data. The team’s goal is to contain all outbreaks of avian flu through the rapid identification, verification, and communication of threats, as well
as the prompt delivery of necessary technical assistance to the outbreak site.

In 2002, the Global Agenda on Influenza Surveillance and Control was developed to raise public awareness over the health threat of influenza. Measures adopted to increase influenza surveillance and control have included improved guidance on the use of vaccines and other preventative tools, the development of national, regional, and global pandemic preparedness plans, and the distribution of studies to enhance global understanding of the health and economic burden of influenza. The WHO hosted a training workshop on influenza surveillance and control in Tokyo in May 2004 and in Kuala Lumpur, Malaysia in April 2005. The primary objective of both workshops was to update participants on WHO influenza surveillance guidelines, share national preparedness plans, report on the status of vaccine and antiviral drug development, and discuss the establishment of NICs in countries without influenza surveillance centers. In addition, the WHO has published multiple reports that outline the responsibilities of the WHO and national authorities during a pandemic, such as the WHO Guidelines on the Use of Vaccines and Antivirals during Influenza Pandemics (2004), WHO Global Influenza Preparedness Plan (2005), and WHO Checklist for Influenza Pandemic Preparedness Planning (2005). A complete listing of pandemic influenza reports, general information, surveillance and infection control guidelines, and country updates is available on the WHO website: www.who.int/csr/disease/avian_influenza/en/

The WHO website also displays submitted national influenza pandemic plans, including the response plans of Australia, France, Hong Kong, Japan, Singapore, and Thailand to name a few. To date, neither the Republic of Korea nor the United States have submitted their national preparedness plans to the WHO website (though the United States has submitted the pandemic plan issued by the Department of Health and Human Services).

The WHO Global Influenza Preparedness Plan (2005) identified six phases of increasing public health risk associated with the emergence of an influenza subtype that could pose a pandemic threat. The six phases were grouped into three periods: the interpandemic period (Phases 1-2), the pandemic alert period (Phases 3-5), and the pandemic period (Phase 6). The distinction between each phase within a given period depends on the risk of human infection or pandemic. The WHO preparedness plan also outlined specific objectives and actions for national authorities and the WHO

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<tr>
<th>Interpandemic Period</th>
<th>Overarching Public Health Goals</th>
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<td><strong>Phase 1.</strong> No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human infection or disease is considered to be low.</td>
<td>Strengthen influenza pandemic preparedness at the global, national, and subnational levels.</td>
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<td><strong>Phase 2.</strong> No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.</td>
<td>Minimize the risk of transmission to humans; detect and report such transmission rapidly if it occurs.</td>
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<th>Pandemic Alert Period</th>
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<td><strong>Phase 3.</strong> Human infection(s) with a new subtype, but no human-to-human spread, or at most, rare instances of spread to a close contact.</td>
<td>Ensure rapid characterization of the new virus subtype and early detection, notification, and response to additional cases.</td>
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<td><strong>Phase 4.</strong> Small cluster(s) with limited human-to-human transmission, but spread is highly localized, suggesting that the virus is not well adapted to humans.</td>
<td>Contain the new virus within limited foci or delay the spread to gain time to implement preparedness measures, including vaccine development.</td>
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<tr>
<td><strong>Phase 5.</strong> 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).</td>
<td>Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.</td>
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<td><strong>Phase 6.</strong> Pandemic: increased and sustained transmission in general population.</td>
<td>Minimize the impact of the pandemic.</td>
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to take during each phase. The six phases were broken down further into five categories: planning and coordination, situation monitoring and assessment, prevention and containment, health system response, and communications. The WHO has classified the current global situation as phase 3.

On May 23, 2005, the World Health Assembly revised the International Health Regulations (IHR 2005) to require member states to develop and maintain core surveillance and response capacities, report public health events to the WHO, and respond to public health emergencies. The IHR (2005) also requires the WHO to evaluate member states’ emergency response plans, facilitate technical cooperation, provide logistical support, and mobilize financial resources in order to build local capacity in surveillance and response. The IHR (2005) will enter into force on June 15, 2007. Until that time, the WHO Influenza Pandemic Task Force (IPTF) will advise the WHO on potential public health issues of international concern related to avian and pandemic influenza. The IPTF met for the first time in Geneva on September 26, 2006, to iron out administrative issues and operational procedures, clarify the criteria for moving between pandemic alert phases, define critical clinical and epidemiological data on human cases of avian influenza, develop a list of important data elements (e.g., the geographic extent of the event and control measures implemented on the ground), and endorse the WHO proposals for best practices in sharing influenza viruses and genetic sequences (WHO 2006c).

**World Health Organization – Western Pacific Region**

The WHO regional office for the Western Pacific Region (WPRO) developed a framework to assist countries in the region with the development of national emergency response programs to combat communicable diseases and manage natural or human-generated disasters. “Creating and Tracking Pandemic Preparedness Plans: A Guide” (WHO 2006d) outlines the process for constructing pandemic preparedness plans and identifies key issues and tasks that should be adopted during each phase of a pandemic. In addition to the planning guide, the WPRO published the “Exercise Development Guide for Validating Influenza Pandemic Plans” (WHO 2006e) to encourage governments to conduct national and regional exercises in order to assess their national influenza pandemic preparedness plans. The guide identifies the key partners and stakeholders that should be included in any exercise, such as:

- National and regional health authorities
- Environmental officials
- Veterinary authorities
- Media relations and risk communications experts
- Pharmaceutical industry representatives
- Social services administrators; military and civil defense personnel
- Forensic specialists
- Health ethicists
- NGO and private sector representatives
- Government health, finance, transport, and civil affairs officials

The guide also defines five general types of emergency exercises (orientation, drill, tabletop, functional, and full-scale) and offers sample scenarios and suggested questions for discussion. Several countries have conducted simulation exercises to

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7 WHO Western Pacific Region represents Australia, Brunei Darussalam, Cambodia, China, Cook Islands, Fiji, Japan, Kiribati, Laos, Malaysia, Marshall Islands, Micronesia, Mongolia, Nauru, New Zealand, Niue, Palau, Papua New Guinea, the Philippines, the Republic of Korea, Samoa, Singapore, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Vietnam. The WHO has another five regional offices: Africa, the Americas, Southeast Asia, Europe, and Eastern Mediterranean.
test national preparedness plans based on the recommendations of WPRO.

**Food and Agriculture Organization and World Organization for Animal Health**

The WHO has worked closely with the FAO and the OIE to coordinate global surveillance and response activities to animal influenza outbreaks and disease control. In April 2005, the FAO and OIE launched OFFLU, a scientific worldwide network to support veterinary services in the control of avian influenza. OFFLU encourages scientists from around the world to participate in the network, exchange H5N1 virus strains and other biological materials, and share research findings. OFFLU institute partners and veterinary experts from Australia, Brazil, China, France, Italy, Japan, the Netherlands, the United Kingdom, and the United States also offer training in the techniques of avian influenza isolation.

In July 2006, the WHO, FAO, and OIE jointly established the Global Early Warning and Response System (GLEWS) to track trans-boundary animal diseases. The organizations also monitor the migratory patterns of wild water birds to track the spread of avian influenza. Outbreaks of H5N1 in Europe and the Middle East in late 2005 and early 2006 indicated that the H5N1 virus was spreading northwestward and was not restricted to Southeast Asia. However, the legal and illegal trade of birds also contributed to the spread of H5N1. Nevertheless, the FAO warned that the recent resurgence of the virus in China and Russia suggests that the pattern may be repeating since Central and Eastern Europe are crisscrossed by overlapping migration flyways, and their shorelines provide sanctuary for wild fowl (Bloomberg.com 2006).

Unfortunately, many cases of avian influenza have been confirmed in countries with a poor public health infrastructure and insufficient veterinary services to manage the widespread outbreak. In November 2005, the WHO, FAO, OIE, and World Bank co-sponsored a meeting on avian and human pandemic influenza in Geneva, Switzerland. Officials present at the meeting pledged to improve veterinary services, including culling and vaccination; strengthen early detection and rapid response systems; plan and test rapid containment activities, strengthen laboratory and health systems capacity, integrate national preparedness plans; conduct global pandemic exercises; and improve communication networks. The current budget estimate to implement these activities over three years is approximately $882 million, up from the $476 million estimate presented at the November 2005 meeting (FAO 2006a). The main reason for the budget increase is that the H5N1 virus has expanded its geographic reach and increased the number of infected and at-risk countries since the proposal was first presented in late 2005.

Within the global framework for the control of trans-boundary animal diseases, the FAO and OIE developed a strategy paper, “A Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza” (FAO and OIE 2005), to serve as a road map for diminishing the risk of human avian influenza by controlling the spread of the virus from domestic poultry to humans. The strategy paper outlined a ten-year plan to minimize the risk of human avian influenza by stabilizing poultry production, restructuring regional and international trade in poultry, increasing human and food safety, and improving rural development. Under this program, the FAO released another proposal in March 2006, “Avian Influenza Control and Eradication: FAO’s Proposal for a Global Programme,” in collaboration with the OIE and World Bank, for the control and eradication of avian influenza in poultry (2006b). In addition to proposing capacity building, training, and education measures, the proposal promoted long-term prevention strategies, such as the restructuring of the poultry industry to improve bio-security and reduce the overall risk of future outbreaks.
Global Initiative on Sharing Avian Influenza Data (GISAID)

In August 2006, a group of leading scientists from around the world announced the formation of a consortium designed to improve the sharing of avian influenza isolates and data and to enhance WHO/FAO/OIE efforts to better understand the spread, evolution, and transmissibility of the H5N1 virus. The GISAID consortium is open to all scientists from a variety of disciplines, such as animal and human virology, bioinformatics, epidemiology, and intellectual property, provided that they agree to share their data, analyze findings jointly, and publish results collaboratively. Data collected under the initiative will be deposited in three publicly available databases participating in the International Nucleotide Sequence Database Collaboration within six months of final analysis and validation.\(^8\)

The World Bank

The World Bank has estimated that the total cost of combating the spread of avian influenza in affected countries could reach $1 billion over the next three years, not including the cost of financing human and animal vaccine development, purchasing antiviral medication, and compensating farmers for lost income. The World Bank has developed two mechanisms to help affected and at-risk countries deal with the threat of avian influenza in animals and humans. The first program, announced in November 2005 at the Geneva Conference, is a global funding program, formally referred to as the Global Program for Avian Influenza (GPAI). Under this program, the World Bank has agreed to provide $500 million in low-interest loans, credits, or grants to countries affected by H5N1 in order to supplement government resources, strengthen veterinary resources, and assist in culling and animal vaccination programs.\(^9\) Over twenty-five countries will receive financing under this program by the end of 2006 (World Bank 2006a).

The second program under development is the multi-donor Avian and Human Influenza Facility (AHIF) to assist countries lacking adequate resources and capacity in financing their national preparedness plans. As of May 2006, the total funds committed to this program were $75 million. AHIF donors include Australia, China, the European Commission, Iceland, South Korea, Russia, Slovenia, and the United Kingdom. The inaugural meeting of the AHIF advisory board was held in June 2006.

Through its Global Development Learning Network (GDLN), the World Bank also offers a series of inter-regional distance learning seminars on avian and human influenza planning to governments, donors, nonprofit organizations, technical agencies, and other stakeholders. The first seminar, held on July 12, 2006, addressed the importance of integrating country emergency response plans. The second videoconference seminar, sponsored by the U.S. Centers for Disease Control and Prevention on September 26, focused on strategic communications. Country representatives shared their national response and communications plans and discussed plans to establish a regional health communications network. Participants included representatives from Cambodia, China, Indonesia, Laos, Japan, Switzerland, Thailand, Turkey, Vietnam, the United States, the World Bank, UNICEF, WHO, and other partners.

International Partnership on Avian and Pandemic Influenza

In September 2005, the United States launched the International Partnership on Avian and Pandemic

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\(^8\) The International Nucleotide Sequence Database Collaboration (INSD) consists of the DNA Data Bank of Japan (DDBJ), the European Molecular Biology Laboratory Nucleotide Sequence Database (EMBL), and GenBank (USA). The three databases regularly exchange new and updated data on DNA and RNA sequences.

\(^9\) At the Beijing donors’ conference in January 2006, the World Bank pledged $500 million. It is unclear if this pledge is separate from the $500 million already committed in November 2005.
Influenza to coordinate efforts among donor and affected countries, mobilize and leverage international resources, and build the local capacity to identify, contain, and respond to an influenza pandemic. Representatives, foreign officers, and health and agricultural officials from eighty-eight countries and nine international organizations, including the WHO, FAO, OIE, World Bank, Asian Pacific Economic Cooperation Forum (APEC), and the Association of Southeast Asian Nations (ASEAN), attended the implementation meeting in Washington, D.C., in October 2005. At this meeting, participants identified three priority areas for collaboration: stockpiling antiviral drugs and supplies, developing vaccines and distribution plans, and implementing rapid response and containment measures. Participants further stressed the need to develop local capacity-building measures since most countries lack adequate resources to rapidly identify, contain, and respond to an avian influenza pandemic.

In January 2006, the government of China, the European Commission, and the World Bank, in coordination with the WHO, FAO, and OIE, co-sponsored the International Pledging Conference on Avian and Human Influenza in Beijing. At this conference, the international community pledged $1.9 billion in aid to stockpile protective equipment, improve communication networks, and develop capacity-building measures such as laboratory diagnostics. The top five country donors were the United States ($334 million), the European Union ($265 million), Japan ($159 million), Australia ($56 million), and Norway ($39 million) (World Bank 2006b). The World Bank and Asian Development Bank also donated $500 million and $468 million, respectively. In many cases, however, donors specified which country, region, international organization, or special purpose activity would receive the pledge money. As a result, only a few million dollars of unrestricted funds were made available to Africa, the Middle East, and Latin America. Moreover, the total amount disbursed to date of the $1.9 billion pledged is less than $350 million (Nabarro 2006). Japan is among the few countries to have disbursed the full amount that it promised at Beijing. Senior ministers and officials addressed this funding gap in Vienna on June 6-7, 2006 and in Bamako, Mali, on December 6-8, 2006. In preparation for the Bamako ministerial conference, the United Nations and the World Bank recommended the international community raise an additional $1.3 billion to $1.6 billion to fight H5N1 over the next two to three years (Associated Press 2006a). Despite this recommendation, only $476 million was pledged in Bamako (Associated Press 2006c).

Asia-Pacific Economic Cooperation

To date, the H5N1 virus has affected birds in nine and humans in four of the twenty-one-member Asia-Pacific Economic Cooperation (APEC) economies.10 In order to contain the virus and minimize the social and economic costs, APEC leaders have undertaken a number of collaborative activities to increase public awareness and strengthen regional response systems. For example, the APEC Emerging Infections Network (EINet) issues biweekly news alerts and news briefs to APEC members on avian influenza and other emerging infectious diseases in the Asia-Pacific region. In September 2006, APEC leaders met in Vietnam at the APEC Health Task Force Symposium to discuss the economic consequences of a potential pandemic influenza and identify strategies to minimize its economic impact. At the thirteenth APEC economic leaders’ meeting in Busan, South Korea, in November 2005, member countries adopted the APEC Initiative on Preparing for and Mitigating an Influenza Pandemic, which committed all APEC members to develop national influenza preparedness plans by November 2006. Specifically, the initiative called for member countries to:

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10 APEC member countries include Australia, Brunei Darussalam, Canada, Chile, China, Hong Kong - China, Indonesia, Japan, Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, Chinese Taipei, Thailand, United States, and Vietnam.
- Implement WHO recommendations
- Enhance regional cooperation and collaboration
- Strengthen surveillance systems
- Rapidly report on suspected and confirmed animal and human cases
- Promote transparency
- Assess economic impacts
- Develop protocols for the continuity of business, trade, and essential services
- Identify regional experts
- Improve communication and information-sharing networks, including epidemiological data and laboratory samples

An effective response to an influenza pandemic requires an integrative and comprehensive plan that streamlines local and regional efforts between governments, international organizations, and representatives from the veterinary, agriculture, and human health sectors. To this end, the initiative encouraged APEC member countries to conduct regional desktop simulation exercises of a human-to-human transmission of a pandemic influenza virus in order to assess the effectiveness of international arrangements for emergency management, regional communication networks, and domestic preparedness plans. Australia and Singapore co-hosted a round-the-clock desktop simulation exercise on June 7-8, 2006 (APEC Pandemic Response Exercise 2006), to test regional communication preparedness during a pandemic. All twenty-one APEC member countries participated in the simulation. Eight APEC member countries served as primary participants, including Japan, China, and South Korea. The exercise lasted twenty-six hours across eight time zones and included calls from New Zealand to Washington, D.C. Singapore hosted a lessons-learned workshop in August 2006. A preliminary report containing recommendations was circulated to exercise participants for comment in November 2006.

At the APEC Ministerial Meeting on Avian and Influenza Pandemics on May 4-6, 2006, APEC leaders adopted the APEC Action Plan on the Prevention and Response to Avian and Influenza Pandemics. The action plan focuses regional efforts on five principal areas: 1) improving multi-sectoral cooperation and coordination, 2) establishing best practices and common approaches to risk communications, 3) mitigating negative effects on agriculture and trade, 4) working with the private sector to ensure continuity of business, trade and essential services, and 5) strengthening regional and international cooperation. Together, these five principal areas aim to prevent the spread of the virus from animals to humans by restructuring farming techniques and improving industry standards in poor countries. The private sector, therefore, has a critical role in mitigating the social and economic costs of an influenza pandemic in the Asia-Pacific region. Specifically, the action plan calls for the private sector to implement disease control strategies, such as culling, vaccinations, and bio-security and movement controls, as well as to develop protocols to facilitate the continuity of business, essential services, and trade.

### Association of Southeast Asian Nations

The Association of Southeast Asian Nations (ASEAN) has created a number of institutional arrangements to improve transnational coordination in combating the spread of the H5N1 virus and hedge the risk of a pandemic, such as the Highly Pathogenic Avian Influenza (HPAI) Taskforce, the ASEAN Expert Group on Communicable Diseases, the ASEAN Animal Health Trust Fund, and the ASEAN+3 (i.e., ASEAN plus China, Japan, and...
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the Republic of Korea) Emerging Infectious Diseases Programme.12

The HPAI Taskforce was established to help in the implementation of definite measures and areas of cooperation to control HPAI in the animal health sector. In September 2005, the HPAI Taskforce proposed the Regional Framework for Control and Eradication of Highly Pathogenic Avian Influenza, which directs eight strategic areas on the prevention, control, and eradication of HPAI. The HPAI Taskforce also assigned Thailand, Malaysia, Indonesia, the Philippines, and Singapore to coordinate the eight strategic areas, which include disease surveillance and alert systems, effective containment measures, stamping-out policy and strategic vaccination, enhanced diagnostic capabilities, establishment of disease-free zones, harmonized information sharing, ASEAN emergency preparedness planning, and public awareness and communication campaigns. The total funding requested at the International Pledging Conference on Avian and Human Influenza in Beijing to execute the proposed HPAI Taskforce projects was $94.7 million; however, ASEAN received only $47.4 million for all projects proposed (ASEAN 2006).

As for the public health sector, China, Japan, and the Republic of Korea agreed to create the ASEAN+3 Emerging Infectious Diseases Program to help improve the institutional capacity of the ASEAN Disease Surveillance Network, enhance national and regional laboratory and epidemiological surveillance, develop early warning systems, and improve rapid response plans. Moreover, at the ASEAN summit in Kuala Lumpur, Malaysia, in December 2005, ASEAN leaders agreed to establish a regional pandemic influenza vaccine stockpile to assist the most affected countries in the region in controlling the disease. Malaysia also announced plans to set up a WHO headquarters to help coordinate regional plans to contain the spread of the H5N1 virus.

Japan-ASEAN Integration Fund

In May 2006, Japan donated $47 million to launch the Japan-ASEAN Integration Fund (JAIF) to strengthen influenza surveillance and develop containment measures among ASEAN members, including the large-scale administration of antiviral agents and implementation of quarantine and travel restrictions.13 Through this fund, the government of Japan donated five hundred thousand courses of Tamiflu® and seven hundred thousand sets of medical protective equipment to frontline avian influenza fighters (TMICnet 2006). Before Japan made this donation, the only stockpile of antiviral agents and protective medical equipment reserved for international use were in the United States and Switzerland. Although several countries are creating national strategic stockpiles, an international stockpile reserved for Southeast Asia in Singapore will serve as a safety net to countries in the region unable to meet national demands in the event of a pandemic.

Asian Development Bank

As part of the $1.9 billion pledged at the January 2006 international conference in Beijing, the Asian Development Bank (ADB) committed $470 million (roughly $70 million in grants and $400 million in loans) to support regional capacity development. As part of this pledge, ADB, in association with the WHO, OIE, FAO, and ASEAN, approved a $38 million grant project to address the risk of avian human influenza in the Pacific region, improve regional collaboration among technical agencies, and establish an emergency fund ($14.5 million) to help countries fill funding gaps. Japan contributed $10 million to this grant project. In addition to regional grant assistance projects, ADB has funded projects at the country level, such as a $1.2 million grant to provide technical assistance and improve

12 ASEAN member countries include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

13 The $47 million donation is part of the $159 million donated by Japan at the international donors’ conference in Beijing.
national surveillance and response systems in the Philippines, Indonesia, and Malaysia.

**East Asia Summit**

The inaugural meeting of the East Asia Summit (EAS) immediately followed the ASEAN summit in Kuala Lumpur in December 2005. At this meeting EAS leaders endorsed the East Asia Summit Declaration on Avian Influenza Prevention, Control and Response, which committed ASEAN member countries, Australia, China, India, Japan, the Republic of Korea, New Zealand, and participating countries of the EAS to:

- Eradicate and contain avian influenza
- Ensure rapid, accurate, and transparent risk communications
- Establish information sharing protocols
- Create a regional network of stockpiles of antiviral drugs and vaccines
- Prepare avian influenza pandemic preparedness plans backed by national legislation
- Strengthen institutional capacities and increase bilateral and multilateral cooperation in areas such as surveillance, research and development, risk communications, and vaccine production
National Strategies

Although the WHO is the central actor for coordinating the global response to an avian influenza outbreak, its limited budget competes with other health programs to treat a variety of illnesses, such as malaria, resurging tuberculosis and poliomyelitis, the global AIDS pandemic, and other respiratory and infectious diseases. Given the current health challenges, as well as increasing demands to tackle avian influenza and epidemic response planning, the WHO proposed program budget for 2006 and 2007 was $3.3 billion, a 17.3 percent increase over the previous two-year period (WHO 2006f). However, the fifty-eighth World Health Assembly only appropriated $995 million to the WHO for all of its health programs, forcing the organization to rely on voluntary contributions to fill the widening gap. “We need to remember that the WHO budget is roughly the size of a medium-sized hospital in the United States,” noted a workshop participant. “We cannot expect the WHO to address pandemic influenza preparedness alone. In order to confront the emerging threat of an avian and human influenza, we need to prepare at the local level, understand what each country can and cannot do, integrate our plans, and collaborate under the WHO flag.”

United States

According to the CDC, approximately 200,000 people are hospitalized each year in the United States from flu complications, 36,000 of whom die from the illness. On average, the seasonal flu costs the U.S. economy about $12 billion per year in direct medical costs and loss of productivity (Garrett 2005). While these costs are significant, the health and economic impact of a human-to-human outbreak of the H5N1 virus in the United States could be far more...
disastrous, potentially overwhelming health and medical facilities, killing hundreds of thousands of people, hospitalizing millions, and generating billions of dollars in economic losses. One 1999 study calculated that even with vaccine-based interventions, a pandemic influenza in the United States could result in 89,000 to 207,000 deaths, 314,000 to 734,000 hospitalizations, 18 million to 42 million outpatient visits, 20 million to 47 million related illnesses (Meltzer, Cox, and Fukuda 1999). The present value of economic losses associated with this level of death and illness for the United States is $100 billion to $200 billion (in 2004 dollars) (World Bank 2005).

In November 2005, the U.S. government unveiled the National Strategy for Pandemic Influenza, to guide national preparedness and response plans in order to prevent or limit the spread of H5N1 to and within the United States, sustain critical infrastructure, and mitigate the potential economic and social impact of the virus on the U.S. and international community (Homeland Security Council 2005). The twelve-page document describing the strategy centers the federal government’s responsibilities on three pillars: 1) preparedness and communication, 2) surveillance and detection, and 3) response and containment. Specific tasks include plans to expand the in-country medical, veterinary, and scientific capacity; develop state and local preparedness plans; integrate private sector and critical infrastructure entities into the planning process; coordinate efforts with multilateral and regional organizations; produce and stockpile vaccines and antiviral medications; and design effective risk communication campaigns. Recognizing that no single entity can prevent or mitigate the impact of a pandemic, the National Strategy for Pandemic Influenza underscores the critical role of the federal and state authorities, the nonprofit and multilateral institutions, the private sector, and individuals to prepare for the emerging threat of an influenza pandemic.

The U.S. government released the implementation plan for the national strategy for pandemic influenza (Homeland Security Council 2006) in May 2006. Specifically, the implementation plan outlines the U.S. government response at each pandemic alert phase and details the roles and responsibilities of the federal and local governments, law enforcement agencies, and critical-infrastructure and private-sector entities. Actions outlined to prevent and contain H5N1 outbreaks include the following:

- **Guidance on government continuity** (e.g., sustain infrastructure, modify laws to facilitate response and monetary policy to mitigate economic impact)
- **Human and animal health protection** (e.g., cull infected flocks, activate pandemic plans, and distribute personal protective equipment, antiviral medications, and vaccines)
- **Transportation and border control** (e.g., sustain critical transportation services, develop screening protocols, and identify the operational feasibility and the medical, social, and economic challenges of border closure)
- **Public safety and security measures** (e.g., joint training and coordination of the National Guard, law enforcement, legal authorities, and public health officials)
- **Public and private sector continuity plans** (e.g., community containment measures, communication planning, and identification of key stakeholders)

The implementation plan also directs the U.S. government to coordinate surveillance and rapid response efforts with international partners given the limited global capacity to detect and contain avian influenza. Moreover, the Departments of State and Homeland Security are designated as the lead agencies for coordinating an international and domestic response, respectively, to pandemic influenza.

In March 2006, the Department of State established the Avian Influenza Action Group to collaborate efforts with international organizations.
(WHO, FAO, and OIE) and key federal agencies, including the Department of Defense, the U.S. Agency for International Development (USAID), and the CDC. The action group oversees U.S. participation in the International Partnership on Avian and Pandemic Influenza. Ambassador John E. Lange serves as senior coordinator of the action group and is the Department of State’s special representative on avian and pandemic influenza.

To date, the U.S. government has committed a tremendous amount of resources at home and abroad to combat the emerging threat of an influenza pandemic. Shortly after announcing the National Strategy for Pandemic Influenza, President Bush requested $7.1 billion in aid to fund domestic and international avian flu initiatives over several years. Congress approved $3.8 billion and $2.3 billion for fiscal years 2006 and 2007, respectively. At the 2006 International Pledging Conference on Avian and Human Influenza in Beijing, the United States committed approximately $334 million in grants and technical assistance to support international organizations and countries threatened by H5N1. This support will fund public outreach and communication campaigns, the development of national preparedness plans, laboratory diagnostics and supplies, and the stockpiling of antiviral medications, protective equipment, and other emergency health commodities. At the plenary session of the International Partnership on Avian and Pandemic Influenza in Vienna on June 7, 2006, the United States committed an additional $28 million.

In collaboration with the WHO, FAO, OIE, and other partners, U.S. federal agencies have investigated animal and human cases of avian influenza around the world and funded activities to support national preparedness and emergency plans in over forty-six countries. USAID, along with the Departments of State, Agriculture, Defense, and Health and Human Services (HHS), has provided material and technical assistance to affected or at-risk countries, including laboratory equipment, reagents, and over thirty-six thousand sets of protective equipment to first responders, healthcare workers, veterinarians, and field technicians. Moreover, USAID has funded communication and public awareness campaigns in over thirty-four countries and sent scientists, veterinarians, and emergency personnel to help build laboratories, diagnose avian influenza, and advise on poultry surveillance and vaccination programs. In June 2006, USAID awarded a $5 million grant to develop a global network to monitor the role of migratory birds and track the spread of avian influenza. The Global Avian Influenza Network for Surveillance (GAINS), directed by the Wildlife Conservation Society, will follow key migratory routes and analyze laboratory samples to identify genetic mutations of the virus in birds. The U.S. CDC contributed an additional $1 million to this initiative.

Recognizing that human health protection is one of the primary means to prevent the rapid and lethal spread of avian influenza, HHS has taken the lead in outlining public health and medical support preparedness plans to reduce the health impact, including morbidity and death, in the event of a pandemic. HHS also manages a U.S. government website on avian influenza (http://www.pandemicflu.gov or http://www.avianflu.gov), which serves as a media outlet for information on global outbreaks, business, school, and healthcare response activities, as well as providing information on federal, state, and international pandemic preparedness plans and activities.

In November 2005, HHS published the HHS Pandemic Influenza Plan to serve as a blueprint for all HHS pandemic response activities and provide public health guidance to federal, state, and local policy makers and health officials. Part 1 of the HHS Pandemic Influenza Plan reviews the WHO, federal, and public health operation plans in place, such as domestic vaccine and production capacity plans, antiviral medications distribution plans, and epidemiological and clinical research activities. Part 2 outlines guidance plans for state and local health departments in eleven areas: surveillance, laboratory diagnostics, healthcare
planning, infection control, clinical guidelines, vaccine distribution and use, antiviral distribution and use, community disease control and prevention, travel-related risks of disease, public health communications, and workforce support. Part 3 is under development and will outline the operational plans of key agencies within HHS, such as the CDC, the Office of the Surgeon General, the National Vaccine Program Office, and the Office of Global Health Affairs.

Of the $3.8 billion Congress appropriated in fiscal year 2006 to fund preparations for pandemic planning, the U.S. government allocated $3.3 billion to HHS for influenza monitoring and surveillance, vaccine development, antiviral stockpiling, state and local preparedness, and communication planning. HHS allocated the majority of the $3.3 billion for vaccine research and development activities ($1.8 billion) and for the stockpiling of antiviral medications ($731 million) to treat at least 25 percent of the U.S. population, or roughly seventy-five million people. As of March 2006, the United States strategic national stockpile contained nearly twenty-six million courses of Tamiflu® and Relenza® (twenty-two million courses of Tamiflu® and four million of Relenza®), with plans to acquire a total of eighty-one million treatment courses (sixty-four million and sixteen million treatment courses of Tamiflu® and Relenza®, respectively) by 2008 (CIDRAP News 2006).

In 2005, Michael O. Leavitt, secretary of health and human services, awarded a government contract to Sanofi Pasteur and Chiron Corporation, valued at $100 million and $62.5 million, respectively, to advance vaccine-manufacturing technologies and produce an experimental avian influenza vaccine. In May 2006, HHS awarded additional contracts to Solvay Pharmaceuticals, GlaxoSmithKline, Novartis, MedImmune, and Dynport Vaccine, worth $1 billion, to produce cell-based vaccines to target both seasonal and avian influenza. The U.S. government plans to stockpile enough pre-pandemic vaccines to immunize twenty million people against influenza strains that present a pandemic threat. Moreover, since 40 percent of the current annual domestic supply of influenza vaccines is manufactured abroad, all of which will most likely be unavailable in the event of a pandemic, the U.S. government plans to expand the domestic vaccine manufacturing capacity for the production of enough vaccines to treat the U.S. population within six months after the onset of a pandemic (Homeland Security Council 2006, 104).

On September 26, 2006, the U.S. House of Representatives passed the Biodefense and Pandemic Vaccine and Drug Development Act of 2006 (H.R. 5333), which appropriated $160 million to HHS for fiscal years 2006 and 2007 and authorized HHS to create the Biomedical Advanced Research and Development Authority (BARDA) to oversee the research and development of products to defend against bioterrorism and pandemic influenza and provide technical assistance to drug manufacturers (Congressional Budget Office 2006). The bill also established the National Biodefense Science Board to provide scientific guidance to HHS on issues involving chemical, biological, radiological, and nuclear agents.

**Japan**

Assuming that the H5N1 virus infects 25 percent of the Japanese population over eight weeks, the government of Japan estimates that 13 million to 25 million Japanese will visit medical facilities during an influenza pandemic, with approximately 530,000 to 2 million hospitalizations and 170,000 to 640,000 fatalities, depending on the severity of the disease (Government of Japan 2005, 3). The final health impact of the virus will depend on the preparedness and response systems of the Japanese government, including the development and distribution of vaccines and antiviral medications to the general population. The National Institute of Infectious Diseases in Japan is one of the four WHO collaborating centers around the world studying the disease. In addition to conducting epidemiological surveillance and distributing reagents, antigens,
and recombinant viruses to laboratories and vaccine producers, the National Institute of Infectious Diseases is responsible for providing technical assistance for the development of national and regional health programs. Moreover, Japan has introduced new communicable-disease-control measures and revised existing legislation on infectious-disease prevention, including the Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infections (herein referred to as the Infectious Diseases Law). The Infectious Diseases Law was revised recently to promote measures against new infectious diseases and incorporate provisions concerning the development and stockpiling of antiviral medications and vaccines. The law categorizes the different types of infectious diseases based upon their infectiousness and seriousness of symptoms. Since June 2006, human cases of H5N1 have been classified as a specially designated infectious disease, requiring infected patients to be admitted to a designated infectious-disease hospital until fully recovered.

The government of Japan established the Interministerial Avian Influenza Committee to enhance response planning and coordination among the relevant government bodies, which include the Cabinet Secretariat, the Ministries of Foreign Affairs, Finance, Environment, Transport, and Health, the Japan Defense Agency, Coast Guard, National Police Association, and Small and Medium Enterprise Agency. The Japanese government also created the Headquarters for Pandemic Influenza Countermeasures, chaired by the Ministry of Health, Labor, and Welfare (MHLW), to facilitate interagency collaboration, adopt influenza response policies, and coordinate efforts with relevant international and local organizations, such as health care and animal health workers, medical institutions, the mass media, and private and nonprofit corporations. The MHLW also heads the Expert Committee on New Influenza, whose members are health and policy experts.

In November 2005, Japan released the Pandemic Influenza Preparedness Action Plan of the Japanese Government, which adheres closely to the WHO Global Influenza Preparedness Plan. Japan’s Pandemic Influenza Preparedness Action Plan also mirrors the six pandemic alert phases of the WHO Global Influenza Preparedness Plan, but further distinguishes each alert phase to reflect whether an outbreak has occurred in Japan. Regardless of where an outbreak occurs, the Pandemic Influenza Preparedness Action Plan assigns responsibilities to government bodies and health and animal experts at each pandemic alert phase. These responsibilities include:

- Issuing alerts to citizens and overseas travelers
- Terminating the importation of birds from nations or regions with outbreaks
- Disposing of infected animals and restricting the movement surrounding poultry flocks
- Strengthening the capacity of designated medical facilities
- Initiating cluster surveillance at schools and workplaces
- Instituting quarantine measures
- Distributing antiviral medications and prototype vaccines

In addition, the government’s preparedness plan directs the Interministerial Avian Influenza Committee, headed by the MHLW, to coordinate the exchange of information among government bodies, ministries, prefectures, and health and policy experts in surveillance, prevention and containment, medical response, risk communication, and international response. The minister of health, labor, and welfare is responsible for directing the country’s response to avian influenza through pandemic alert phase 4. After that point, the prime minister will step in to lead Japan’s response.14

On September 12, 2006, the government of Japan conducted a tabletop exercise with central government agencies and ministries to test the

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14 Additional information is available at the MHLW website (http://www.mhlw.go.jp/english/index.html).
country’s national preparedness plan for a pandemic alert phase 4 and phase 5 scenario. The government also plans to conduct an additional drill with local government participants for a pandemic alert phase 6 scenario.

Although it is unclear how many doses of antiviral medications the Japanese government has stockpiled to date, Japan hopes to stockpile enough Tamiflu® and Relenza® to treat 25 million and 750,000 people, respectively. During a regular influenza season, Chugai Pharmaceutical Co. imports enough Tamiflu® to treat 12.5 million people. Since approximately 4 million doses on average remain at the end of a regular flu season, the government will need to stockpile an additional 21 million doses in order to meet its 25-million-dose target (Asahi Shimbun 2005). The Japanese Pandemic Influenza Preparedness Action Plan ordered Japan’s prefectures to stockpile 10.5 million doses, leaving the central government responsible for the remaining 10.5 million doses. As of November 2006, the central government had stockpiled 7.5 million doses of Tamiflu®, and the prefectures plan to purchase enough doses to treat 5.25 million by May 2007 (Associated Press 2006b). As for the antiviral medication Relenza®, approximately 150,000 doses remain in Japan at the end of a regular flu season, 600,000 doses short of the target amount. The Japanese pharmaceutical company, Sankyo Co. Ltd., received a $5.6 million grant from the National Institutes of Health (NIH) in the United States to begin development of an advanced version of Relenza®.

To date, Japan has committed substantial resources to assist the international community, and Asian countries in particular, with the fight against avian and human influenza. On January 12-13, 2006, Japan co-hosted an international conference with the WHO to discuss the necessary measures for early containment of an avian and human influenza outbreak. A week later at the international donors’ conference in Beijing, Japan pledged, and has since disbursed, approximately $158.97 million to assist countries with stockpiling antiviral medications, surveillance, research, communication campaigns, and training. Japan’s pledge was targeted as follows:

- $47 million to launch the Japan-ASEAN Integration Fund to strengthen influenza surveillance and develop containment measures among ASEAN members
- $49 million to the WHO and United Nations Children’s Fund (UNICEF) to support a communication campaign in rural areas and provide high-risk groups with influenza vaccines
- $2 million to the WHO to enhance its surveillance capacity and support antiviral medication distribution planning
- $19 million to the OIE and FAO for the development of national veterinary services, a notification system, and contingency plans
- $20 million to support joint research between four Japanese infectious-disease institutes and their counterparts in Vietnam, Thailand, and China
- $20 million to the World Bank and the Asian Development Bank to fund projects that assist developing countries with the formulation and implementation of their national preparedness plans

Japan also plans to provide developing countries with necessary laboratory equipment and to train over one hundred professionals from Asia, particularly health workers, animal health experts, and researchers, in order to assist governments with building the local capacity to prepare for and respond to an influenza pandemic.

Republic of Korea

Health and policy experts estimate that the potential disease burden of a pandemic influenza in South Korea could overwhelm its resources, paralyze the economy, and cause severe health consequences. Assuming a 20 percent to 40 percent attack rate, workshop presenters from South Korea projected that an influenza pandemic would
generate 6 million to 12 million outpatient visits, 157,000 to 315,000 hospitalizations, and 36,000 to 73,000 deaths. To prevent this, South Korea has taken a number of steps to mitigate the negative consequences of an avian influenza outbreak and enhance the country’s capacity to respond to the emerging public health threat. In the past few years, the country has adopted legal frameworks and introduced manuals for pandemic preparedness, such as the Framework Act on the Management of Disasters and Safety, Basic Guideline for National Crisis Management (Presidential Decree no. 124, July 2004), Standard Manual for National Crisis Management (September 2004), Practical Manual for Communicable Disease Response (September 2004), and Measures and Activities to be taken by Government Agencies/Institutes in Crisis Settings (November 2005). Moreover, legal provisions for medical service and communicable-disease control, such as the Quarantine Act, the Emergency Medical Service Act, and the Communicable Disease Prevention Act, provide the legal basis for pandemic preparedness and response. In anticipation of an emerging influenza crisis, South Korea has attempted to:

- Integrate the national crisis and communicable disease management systems
- Train and educate personnel
- Stockpile antiviral medications, personal protective equipment, and pre-pandemic vaccines
- Strengthen critical infrastructure to ensure the continuity of central and local government, businesses, schools, military, and other essential services
- Build capacity for vaccine production
- Enhance infrastructure for risk communication

The ROK’s Pandemic Influenza Preparedness and Response Plan, introduced in 2006, assigned responsibilities to government bodies and health and animal experts in seven areas: 1) command, control, and coordination, 2) risk communication, 3) surveillance, 4) healthcare service, 5) vaccines and antiviral medications, 6) public health measures, and 7) education and research (Ministry of Health and Welfare 2006).

According to the pandemic influenza response plan, the command and control system during a national crisis comprises the following:

- The National Security Council, headed by the president
- The Central Crisis Management Committee, headed by the prime minister
- The Head Office for Crisis Management, headed by the minister of health and welfare (MOHW)
- The Head Office for Communicable Disease Management, headed by the Korea Center for Disease Control and Prevention (KCDC)
- The local government offices for Crisis Management and Communicable Disease Management.

In addition, the Crisis Assessment Committee and the Pandemic Advisory Committee, which include officials from the MOHW and KCDC (a division of the MHLW), are the two main decision-making organs during a crisis. Although the MOHW technically decides when and how to respond to an influenza outbreak, the National Security Council and the Central Crisis Management Commitment officially trigger and execute the national influenza response plan, particularly in a phase 6 scenario.

Actions outlined in the pandemic influenza response plan include guidance on the development of transparent and effective risk communication tools in order for public health officials to convey complex information clearly and simply to government officials, human and animal health workers, media outlets, the private sector, and individuals. With regard to surveillance strategies, the government plans to enhance its many surveillance systems, some of which suffer from poor utilization and underreporting. The surveillance systems
in South Korea include the rumor surveillance system, the infection specialist network, the emergency-room-based syndrome surveillance system, the laboratory-based surveillance, and the sentinel surveillance system, which tracks influenza cases and school absenteeism. Finally, the Korea Influenza Surveillance Scheme (KISS) monitors influenza activities to detect epidemics and it contributes to the development of influenza control measures and influenza vaccines. In addition, KISS issues weekly reports on laboratory data and clinic admissions for influenza-like illnesses (ILI) and pneumonia. The government plans to establish a new surveillance system to monitor hospital admissions for and mortalities from ILI and pneumonia.

In addition to strengthening surveillance systems, the pandemic influenza response plan includes strategies to contain the H5N1 virus by establishing quarantines; restricting movement; and introducing border control measures such as entry and exit health screening, health alert notices, and the issuance of health declaration cards. In collaboration with the Korea Medical Association and the Korea Hospital Association, the government plans to designate treatment hospitals, develop hospital preparedness and response plans, and train medical and laboratory personnel, healthcare workers in clinics and quarantine stations, and other first responders in charge of patient triage, patient care, and infection control.

The pandemic influenza response plan also identifies three tools to prevent, contain, and manage an avian and human influenza pandemic: antiviral agent acquisition, influenza vaccine development, and public health intervention. South Korea has established a national pandemic stockpile of antiviral medications, and the government has budgeted $13 million through 2007 to secure additional doses since the current amount in circulation is less than several thousand and the country lacks the capacity to produce antiviral agents domestically. To date, Korea has stockpiled roughly one million doses of Tamiflu® and plans to stockpile enough to treat 20 percent of its population, or roughly ten million doses, which some experts argue is too low. In late 2005, Roche agreed to sublicense Tamiflu® to Korea, and eleven pharmaceutical companies expressed interest in producing a generic version of the drug jointly with Roche. In April 2006, Roche agreed to license the drug to the South Korean drug maker Yuhan Corporation. It is unclear if Roche continues to negotiate with other local pharmaceutical companies.

With regard to the development of pandemic influenza vaccines, South Korea plans to build domestic capacity for vaccine production, stockpile pre-pandemic vaccines, and increase the seasonal influenza vaccination rate, which already targets over 30 percent of the population. The domestic vaccine production capabilities are limited and no pre-vaccines are currently available in South Korea. Recently, the Ministry of Commerce, Industry, and Energy has authorized the Green Cross Corporation to build a facility for vaccine production by 2009. Moreover, the Korea National Institute of Health (KNIH), the National Veterinary and Quarantine Service (NVRQS), the Ministry of Science and Technology, and several private vaccine companies are conducting research projects on vaccine development.

The government plans to develop guidelines and education material to promote public health measures to help reduce the potential burden on the medical system. In 2005, the Korea Medical Association began an ongoing education campaign to encourage respiratory etiquette, hand washing, and good hygiene. In the event of an influenza pandemic, the government also plans to introduce social distancing measures such as quarantines and school closings, restrict movement and mass gatherings, and distribute personal protective equipment. To date, South Korea has stockpiled 300,000 sets of personal protective equipment for use at the central level and an additional 110,000 N95 masks for use at the provincial level. Unfortunately, no

A N95 mask is a disposable mask made of cloth that blocks 95% of particles that are 0.3 microns in size or larger.
sound evidence exists to suggest that the masks will provide any protection during a pandemic. Nevertheless, the government plans to stockpile additional sets of personal protective equipment and masks.

Finally, the national influenza response plan also urges government agencies to test response measures with annual simulations and tabletop exercises, as well as conduct research projects on the economic and disease burden, risk communication, the effectiveness of public health measures and medical services, the psychosocial aspects of a crisis and its aftermath, and the legal and ethical issues of pandemic influenza.

As a member of the WHO Global Influenza Surveillance Network and a designated WHO National Influenza Center, the KCDC conducts research and monitors influenza activity in South Korea. It also launched a website, http://avian.cdc.go.kr (not available in English), to help raise public awareness and disseminate pertinent information about the H5N1 virus. Since 2004, the KCDC has hosted several tabletop exercises to test the national pandemic preparedness and response plan, identify weaknesses, and revise the plan accordingly. In fact, South Korea is one of the few governments in the western Pacific region that has run such elaborate simulations for central and local government agencies and international experts. In December 2004, the KCDC conducted its first tabletop exercise in crisis management for emerging infectious diseases. A second tabletop exercise to test the existing standard operating procedures in response to an emerging infectious disease was conducted in March 2005. Over 150 participants from various government agencies, including the Ministries of National Defense, Agriculture and Forestry, and Health and Welfare; national intelligence; police; emergency management; and the armed forces medical command were involved in the March simulation. Representatives from sixteen cities and provinces, medical institutions, and civil groups were present. Observers included policy and military game experts, officials from the MHLW of Japan, and WHO representatives. The simulation exercise identified major obstacles to prevention and containment, such as the lack of public health workers for infection control, low supply of protective medical equipment and antiviral medications, and inadequate methods of distributing central stockpiles.

Lessons learned from the tabletop exercise were shared with other APEC leaders at the APEC Emerging Infectious Network (EINet) virtual symposium on pandemic influenza preparedness and response in January 2006, as well as with the WHO at another international meeting. Since the simulation, the government has implemented some of the lessons learned, including measures to promote interagency collaboration and cooperation, optimize decision-making channels, reinforce relevant laws such as the Communicable Disease Prevention Act, and establish critical infrastructure such as rapid response teams, adequate medical resources, and an increased number of isolation facilities. The government plans to invest $20 million to increase the total number of isolation facilities at treatment hospitals from 519 to roughly 1,000 by 2009. Moreover, the KCDC has established several rapid response teams and a public health crisis response and exercise team.

On October 11-13, 2006, the KCDC hosted a follow-up simulation exercise and international workshop, Crisis Response Exercise for Pandemic Influenza, to test the crisis management and decision-making process in the event of an avian influenza outbreak. Organizers prepared exercise manuals for the response teams, control teams, and virus teams. The overarching goal of the exercise was to test several policy issues that address when and how to distribute reserved resources and antiviral drugs, secure hospital beds and medical practitioners, limit social gatherings and restrict movement, conduct risk communication with mass media and the general population, communicate effectively between central and local respondents, and apply current response manuals. The tabletop exercise and international workshop involved
over three hundred delegates from the Ministry of Health and Welfare, KCDC, public health centers and related institutions, and sixteen metropolitan areas and provinces in South Korea. Also present were over fifty observers and international experts from the WHO, UN, World Bank, RAND, the private sector, the United States, Germany, Japan, China, Indonesia, Singapore, Germany, and other APEC economies.16

16 Additional information on past pandemic influenza exercises is available at the KCDC website (http://exercise.cdc.go.kr).
Major disaster relief operations, such as the responses to the December 2004 tsunami and the October 2005 earthquake in Pakistan, demonstrated the prowess of the military to respond to natural disasters and calls for humanitarian assistance. Despite the well-executed military response, however, significant organizational and operational challenges complicated response efforts, such as the political constraints on the use of military assets, divergent operational cultures, and insufficient civil-military and military-to-military coordination. Growing interest in and support for disaster relief missions have impelled government officials and military planners to improve response planning and coordination in disaster response and crisis management activities, especially given the emerging threat of an influenza pandemic.

Since the majority of avian and human infections of the H5N1 virus to date are within the Asia theater, experts believe a pandemic is imminent and that it will originate in the Pacific region. Military planners in the United States, Japan, and the Republic of Korea have taken steps accordingly to formalize military response plans, leverage existing partnerships, enhance interoperability, and integrate planning efforts in support of civilian agencies and other first responders with initial response efforts.

A coordinated, collaborative response effort, however, necessitates an open dialogue among military planners in order to minimize the potential health and economic impact, including related security challenges and social implications, of a pandemic influenza contingency, and by extension, other natural disaster, pandemic disease, or biohaz-
ard events. One workshop participant noted, “As military planners, we need to get into the details. We need to exchange plans to understand what our partners can and cannot do in response to a crisis. We may choose to react differently to a crisis, but we must aim for interoperability if not integration, because no one group has the answers or resources to manage a disaster alone. We can’t organize once a crisis has occurred; we need to iron out the details now that we have time on our side.”

United States

Although not designated as a lead agency in the national response to avian influenza, the Department of Defense (DoD) is intimately involved in assisting civil authorities, international partners, and foreign governments with global surveillance and emergency preparedness. For example, the DoD Global Emerging Infections Surveillance and Response System (DoD-GEIS) supports military training, public health research, and outbreak response to emerging infectious disease threats. DoD-GEIS has a rich network of overseas medical research laboratories and treatment facilities that detect, research, and treat infectious diseases, as well as monitor incidents of influenza among military populations. Moreover, DoD-GEIS shares epidemiological data, laboratory samples, and surveillance reports with the CDC, WHO, and other international partners. In addition to influenza surveillance activities, DoD-GEIS has assisted affected and at-risk countries with pandemic preparedness and response plans, provided diagnostic support, and trained healthcare workers and other first responders. DoD also plans to create U.S. rapid response teams and to develop joint military training and exercises with other countries for pandemic influenza preparedness and response. In 2006, DoD received $130 million in emergency supplemental appropriations for avian flu activities; however, the fiscal year 2007 budget request did not include funding for avian flu programs (Congressional Research Service 2006, 13).

Despite the military’s commitment to provide domestic and international support to civil authorities, international partners, and foreign governments, DoD’s top priority in the fight against avian influenza is safeguarding U.S. defensive capabilities, specifically maintaining force health protection and operational readiness. To this end, DoD has developed educational tools, published travel advisories, standardized laboratory data management at military hospitals, improved interagency communication networks, and launched a pandemic flu website (http://www.deploymentlink.osd.mil) to keep service members, civilian workers, and family members abreast of avian influenza outbreaks, medical research, and in-theater surveillance. Moreover, DoD and each of the combatant commands are developing their own preparedness and response plans for pandemic influenza in addition to observing the guidelines and recommendations outlined in the National Strategy for Pandemic Influenza and Implementation Plan for the National Strategy for Pandemic Influenza. In November 2005, the chairman of the Joint Chiefs of Staff (CJCS) issued guidance on the implementation of policies to prepare for, prevent, and contain the effects of avian influenza on the military forces and wider defense community. The Department of Defense also released its pandemic influenza implementation plan in August 2006, but the document remains classified.

Of all the major combatant commands, U.S. Pacific Command (PACOM) has been in the forefront in planning for a potential pandemic, largely because the majority of animal and human avian influenza outbreaks to date have occurred in the Pacific theater and therefore within PACOM’s area of responsibility. In addition to preparing a PACOM plan for pandemic influenza, supporting preparedness plans for foreign and domestic response also are being developed by the Combined Support Force-503 (CSF-503 Marine Forces Pacific), the Joint Task Force-Homeland Defense (JTF-HD), the service components, the subordinate unified commands, such as U.S. Forces Korea, Alas-
A focus of PACOM influenza pandemic preparedness plans is force health protection and operation readiness. In addition to enhancing DoD activities in education, surveillance, and laboratory data management, PACOM has mandated routine influenza vaccinations, developed quarantine and isolation measures, obtained a limited quantity of the H5N1 pre-vaccine, established stockpiles of antiviral medications and personal protective equipment, and directed medical treatment facilities under PACOM control to develop expansion plans and identify the key equipment needed for surge capacity. For example, PACOM plans to stockpile six million treatment courses of Tamiflu® and expand both the number of hospital beds at military bases in the Pacific, from 588 to over 1,300, and aboard hospital ships, from 1,000 to 6,000 (Moszkowicz 2005).

With regard to evacuating U.S. citizens to safe havens, PACOM may conduct noncombatant evacuation operations during a pandemic if directed. However, military planners are uncertain whether the best means to contain the spread of the disease is to shelter individuals in place or evacuate them prior to exposure. Some workshop participants feared that noncombatant evacuation operations would increase the risk of disease transmission to surrounding areas, especially if U.S. military forces required the use of foreign runways and seaports en route to United States territory. When one official from Japan asked whether PACOM plans to evacuate noncombatants from South Korea to the United States through Japan, for example, U.S. officials did not have a direct answer, but did stress that the U.S. military would not undertake such missions without the consent of the host nation. One PACOM official added, “This issue continues to come up and needs to be determined, because noncombatant evacuation operations are a real possibility.” The exchange among workshop participants on the issue of noncombatant evacuation operations offered a glimpse as to the number of outstanding political issues that need to be addressed now to avoid difficult and tense exchanges between governments and militaries during a pandemic.

Although maintaining force health protection and operational readiness remains the top priority, PACOM also plans to respond to U.S. government and host nation requests for medical, logistic, engineering, and security support. To date, PACOM has conducted several deliberate planning-and-exercise programs in support of civil authorities in Asia, including tabletop exercise and regional capacity-building programs, such as developing medical surveillance and laboratory assistance programs. In October 2005, PACOM sponsored an influenza seminar in Pearl Harbor to educate and inform public health emergency officers from across the Pacific about the risks and challenges of avian influenza, as well as the potential effects of the virus on military operations and deployments. PACOM also hosted a tabletop exercise to test military readiness and response in November 2005. The exercise included over 125 military and civilian participants from U.S. Forces Japan, U.S. Forces Korea, the Office of the Secretary of Defense Health Affairs, U.S. Central Command, and nongovernmental organizations. One of the lessons learned from the exercise was that the military tends to over-classify information and use military jargon, which limited communication between participants and delayed effective response activities. In June 2006, roughly 60 select individuals from PACOM, U.S. Marine Corps Forces Pacific, and other U.S. government agencies, including medical professionals, operational planners, and communication and technical experts, conducted a three-day tabletop exercise at the Asia-Pacific Center for Security Studies in Hawaii to explore means for enhancing interagency coordination in preparation for a pandemic outbreak of H5N1.

To avoid poor risk communication in the event of an outbreak, PACOM has proposed to host a Pacific region coordination crisis center (PCCC) to
manage communications and information sharing among the governments, militaries, international organizations, and U.S. interagency representatives in the forty-three nations within PACOM’s theater. One workshop participant wondered whether PACOM could perhaps establish a new coordination crisis center or simply imitate the model erected during the 2004 tsunami disaster relief operation in which military personnel, government officials, NGO representatives, and UN agencies, (such as the Office for the Coordination of Humanitarian Affairs (OCHA), World Food Programme (WFP), and WHO), interfaced daily through the Combined Coordination Center. However, unlike the 2004 tsunami, which was a sudden and unexpected event that demanded an immediate multilateral response, an influenza pandemic will occur community by community, and therefore, necessitates preparedness, coordination, and communication at the local level. “We are in a pre-crisis stage and should focus on providing explicit guidance to ensure local preparedness. How a nation or the international community will coordinate and respond to a pandemic depends on what is happening in each community, which includes military installations. The effectiveness of a regional coordination center will depend on the local communication networks on the ground,” argued one workshop participant in favor of strengthening local risk communications versus promoting a PACOM-led or tsunami-like coordination center.

**Japan**

Unlike the United States Department of Defense, the Japan Defense Agency (JDA) has not prepared a pandemic influenza response plan to supplement the Pandemic Influenza Preparedness Action Plan of the Japanese Government. Instead, the JDA relies on existing protocols for crisis management and disaster relief response. In response to an avian flu incident and only at the request of local government officials, the JDA will authorize the nation’s Self Defense Forces (SDF) to provide support services to local officials in the form of Disaster Relief Operations or Epidemic Prevention Operations by Entrustment. The type of operation initiated depends on the severity of the event and the risk to human life and property. For a severe event, natural calamity or other disaster, the SDF responds in the form of a disaster relief operation, whereas if the event is minor, less severe, or easy to contain the SDF works under the framework of an epidemic prevention operation. In either case, the local government oversees and manages the work of the SDF, as well as provides the SDF with the appropriate personal protective equipment and clothing.

As of December 2006, the SDF had conducted two operations in response to avian flu outbreaks at commercial poultry farms. In both cases, experts believe infected wild birds contaminated the cage surfaces of the commercial flocks. In late February 2004, officials at the Asada Farm in the Kyoto prefecture reported the mass death of poultry due to an outbreak of a highly pathogenic strain of the H5N1 virus. Soon, similar cases of H5N1 and animal deaths were reported in neighboring poultry farms (Takada, Murata, Mizuho, YM, Nakatan, and Yamamoto Sangyo). At the request of the prefectural governor, the SDF responded to each avian flu incident. At the Murata, Mizuho, YM, Nakatan, and Yamamoto Sangyo poultry farms, the SDF worked under the framework of an epidemic prevention operation and disinfected the birdcages, vehicles, and other facilities on the poultry farms. At the Asada and Takada poultry farms, the SDF worked under the framework of a disaster relief operation, which in addition to decontaminating the poultry farms required the SDF to dispose and bury the infected birds nearby in ditches lined with resin sheets and covered with top soil and plastic to limit the risk of pollution. In addition to disinfecting and depopulating the poultry farms, movement controls were strictly enforced and not lifted until mid April. The Takada farm began operations in August 2004, but the Asada farm remains closed even though the area is disease free. In total, the SDF dispatched approximately 2,060 personnel and
disposed of 240,000 birds in the Kyoto prefecture. To prevent infection, Tamiflu® was distributed to SDF personnel involved in the mission.

In September 2005, two poultry farms in the Ibaraki municipality reported cases of a mild pathogenic form of avian influenza. For the most part, local government officials handled the matter themselves, but invited the SDF to assist. Working again under the framework of a disaster relief operation, the SDF dispatched two thousand personnel, disinfected both poultry farms and facilities, and disposed of approximately 440,000 infected birds. In total, local government authorities culled roughly 6,000,000 birds in the immediate and surrounding areas. SDF personnel also received courses of Tamiflu®, but treatments ended once authorities realized the viral strain was not H5N1 but H5N2, a much less virulent form of avian influenza with no known human infections.

Overall, Japan’s strategy for managing and containing outbreaks of avian influenza is to strengthen the local capacity to respond to the incident and dispatch the SDF for support when requested by the prefectural governors. However, JDA representatives present at the workshop noted that although the SDF successfully completed both missions, there were significant challenges in coordinating a response with local government officials. As a result, the JDA plans to improve local communication networks and train SDF personnel for future missions.

Republic of Korea

The Republic of Korea has adopted a slightly different approach to military planning and preparedness for pandemic influenza than the United States or Japan. The Armed Forces Medical Command (AFMC) has developed a surveillance system to monitor emerging infectious diseases and detect incidents of avian influenza and biohazard threats. The AFMC’s surveillance system consists of three different structures to screen for influenza and other infectious diseases among military personnel: the Notifiable Infectious Disease Reporting System, the Pneumonia Surveillance System, and the Emergency Room Surveillance System.

The Notifiable Infectious Disease Reporting System monitors various infectious diseases designated by the infectious disease prevention law, such as typhoid fever, malaria, tuberculosis, yellow fever, and other newly reported infectious diseases, in order to contain the spread of the disease through early recognition, patient isolation, and reinforcement of preventive measures. The infectious disease prevention law classifies the various infectious diseases into five categories based on the severity of the disease, the availability of vaccines, and the requirements for notification, surveillance, and monitoring. Pandemic influenza is included in group 4, along with yellow fever, dengue fever, smallpox, and botulism, and requires immediate notification once detected. About twenty military hospitals and institutions report infectious disease cases to the AFMC through this system in addition to providing secondary medical care to patients transferred from medical battalions and field hospitals. The AFMC then issues weekly status reports and analyses on the diseases reported by the network hospitals.

In 2004, the AFMC introduced the Pneumonia Surveillance System to closely monitor febrile and pneumonia patients admitted to the military hospitals in order to detect emerging infectious diseases. The system was reinforced recently, after outbreaks of avian influenza at home and in neighboring countries. Again, the AFMC issues weekly status reports on the number of admissions and patient symptoms.

The most innovative and advanced of the three surveillance systems is the Emergency Room Surveillance System, which detects certain infectious diseases by monitoring the symptoms and clinical conditions of patients visiting emergency care centers at the military hospitals. The twenty participating hospitals report daily to the AFMC on the number of patients and the clinical conditions observed even if final diagnoses have yet to
be made. To detect either an emerging infectious disease, such as SARS, food-borne infection, or pandemic influenza, or the presence of an infectious disease used as a biological terror weapon, such as smallpox, anthrax, or plague, the Emergency Room Surveillance System monitors and reports on five syndromes (acute rash syndrome, acute neurologic syndrome, hemorrhagic syndrome, acute respiratory syndrome, and acute diarrhea syndrome). With regard to suspected influenza cases, the military hospitals use rapid influenza diagnosis kits for daily testing of 20 percent of patients suffering from upper respiratory illnesses.

With regard to crisis management, the National Security Council developed the National Disaster Management Guideline on Infectious Diseases, which outlined the national crisis management and response system for infectious disease, as well as tasked each government agency, including the Ministry of National Defense (MND), to develop its own disaster field response manual. In November 2005, the MND released its infectious disease field response manual.

In response to a pandemic influenza outbreak (pandemic alert phases 4-6 or during any other natural disaster or biohazard event), the MND would stand up a disaster response center and a central military infectious disease control center, headed by a disaster management and health policy team, respectively. Each service component (army, navy, air force) also would set up a disaster response center and infectious disease control center and report to the MND. In addition, the AFMC would assemble a military hospital infectious disease control team, and the Armed Forces Medical Research Institute (AFMRI) would run a laboratory-based surveillance center. Both the AFMC and the AFRMI would report to the MND health policy team. The MND requires the AFMC and each of the service components to cooperate, share information, and communicate results and status reports immediately with each other and with the MND. Finally, the MND would work intimately and in cooperation with the National Security Council, the MOHW, and other government agencies throughout each stage of the pandemic influenza attack.

The military response system for pandemic influenza also reclassified the WHO pandemic alert phases as observation (code blue), caution (code yellow), alert (code orange), and critical (code red). For each stage, the MND has identified key measures for the military to assume. South Korea is currently at the observation stage, and the military is reinforcing its three surveillance systems, determining the medical capacity of the military hospitals to treat infected patients, and providing educational tools and training programs to medical personnel and service members. At the caution stage, the military would form a central epidemic investigation unit and advisory board, develop emergency disinfection systems, establish an early evacuation system to move suspected patients to military hospitals, and introduce isolation and quarantine measures. At the alert stage the military would expand the availability of disinfection equipment and materials, activate the disaster response center, and launch a twenty-four-hour emergency disinfection system. Finally, at the critical stage, the military would establish an emergency disinfection operation at each military hospital, reinforce cooperative networks with the NSC, MOHW, and other government agencies, and execute measures to maintain social order and prevent panic among the general population and military.

South Korea continues to prepare for an avian influenza pandemic. In October 2006, the military participated in a tabletop exercise sponsored by the KCDC. The military also plans to schedule future crisis management exercises. Moreover, in order to

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17 The observation stage is equivalent to WHO phases 1-3 if no human infections have occurred in South Korea; otherwise, it is equivalent to WHO phases 1-2. The caution stage is equivalent to WHO phases 4-5 if no human infections have occurred in South Korea; otherwise, it is equivalent to WHO phase 3. The alert stage is equivalent to WHO phase 6 if no human infections have occurred in South Korea; otherwise, it is equivalent to WHO phases 4-5. The critical stage is equivalent to the WHO phase 6 and is reached when human infections in South Korea have occurred.
Military Response Plans | The Pandemic Influenza Challenge

protect military personnel against avian influenza, the MND has for the past two years been running seasonal influenza vaccination programs for military recruits and medical personnel. To date, eight thousand service members have participated in this program and the MND plans to expand the number of military participants. Moreover, the military plans to stockpile enough Tamiflu® (250,000 capsules) to treat thirty thousand military personnel by the end of 2007; Plans are also in place to prepare guidelines on the distribution of antiviral agents to military and medical personnel given the limited supply of Tamiflu®. In 2005, the military also issued thirty thousand sets of personal protective sets to the military hospitals, including respiratory protectors and protective suits and gloves. Finally, in cooperation with the KCDC, the military plans to increase the number of isolation wards and treatment facilities at military hospitals in order to quarantine pandemic influenza patients. In the meantime, these facilities will be used to isolate respiratory infectious disease patients. To date, one hospital has fifty medical isolation beds, and the military hopes to add an additional fifty such beds at each military hospital per year through 2009.

The ROK military has conducted several crisis management operations. During the SARS outbreak in 2003, the military sent 176 military medical personnel to quarantine suspected individuals and to screen passengers at Incheon International Airport, Kimhae Airport, and at quarantine stations in Incheon and Pusan for a period of sixty-seven days. The military also installed infrared monitoring cameras at the airports to detect fevers. Over 475,000 people were quarantined during that time even though there were no human cases of SARS in South Korea.

From December 2003 to March 2004, about 392 poultry farms from ten different regions in South Korea reported animal cases of avian influenza. The military sent over five thousand personnel and 163 sets of equipment to cull and dispose of over 5.6 million chickens and ducks at a cost of $48 million (Yonhap News 2006a). There were no reports of any human infections of avian influenza during that time.

Less than three years after the 2004 outbreak, South Korea confirmed the presence of a highly pathogenic strain of H5N1 in November 2006 after roughly 6,500 poultry died at a commercial farm in the southern city of Iksan, an area located in the hub of the poultry industry. Authorities immediately culled more than 236,000 chickens and ducks at six farms within a five-hundred-meter radius, along with 300 pigs and 577 dogs within the area (Yonhap News 2006b). Quarantine officials, backed by police and soldiers, also cordoned off a ten-kilometer radius around the outbreak site. About 236 soldiers in protective gear were deployed to seventeen checkpoints around the quarantine area to control the movement of people and vehicles. Soldiers involved in the operation also received vaccine injections and Tamiflu® (Agence France-Presse 2006). On December 1, officials confirmed additional cases of H5N1 at a second farm within a three-kilometer radius of the initial outbreak site. As a result, over 180 government officials began culling an additional 600,000 chickens on over thirty-five farms in an attempt to stem the spread of the virus. Moreover, local officials have stepped up public awareness campaigns to assure the public that it is safe to eat well-cooked chicken meat. There have been no reports of infected residents, poultry workers, or quarantine officials to date.
The extensive geographical spread and tenacious morbidity of the H5N1 virus in the past three years have increased the probability that a pandemic will occur. As of December 2006, the H5N1 virus had infected over 263 humans and killed 158, a 60 percent mortality rate. Scientists cannot predict whether the virus will retain its present virulence should it acquire the ability to spread easily among humans. Nevertheless, the number of human infections increased in 2006 over the previous three years despite international efforts to contain the virus, suggesting H5N1 continues to circulate among wild birds and infect humans. Pandemics are unstoppable once the international spread of an airborne, endemic virus emerges. Experts expect that the next pandemic will reach all parts of the world within three months. Experiences during the SARS outbreak in 2003 suggest that a pandemic will cause abrupt surges in people seeking medical care, temporarily overwhelming healthcare services. Moreover, high rates of work absenteeism will disrupt essential services, such as law enforcement, transportation, government services, and economic productivity. The social and economic impact of a pandemic will be amplified given today’s interdependent systems of trade and commerce, potentially costing the world economy up to $2 trillion in losses.

The only reliable defense against pandemic influenza is the improvement of existing structures and mechanisms and the development of warning and communication systems, rapid containment strategies, and preparedness plans. The national pandemic influenza response plans and military strategies outlined in the preceding sections demonstrate the different approaches adopted by the United States, Japan, and the Republic of Korea in combating the emerging threat of a pandemic influenza. Each country has developed
plans that leverage its existing capabilities, technology, and networks. For example, the United States has poured a significant amount of resources into vaccine research and development, whereas Japan has directed aid to improve regional networks to detect and respond to avian flu incidents, and the Republic of Korea has expended capital to improve domestic surveillance systems and conduct multilateral tabletop exercises. Although policy planners have made significant progress in preparing for a pandemic influenza crisis, challenges remain with regard to coordinating and integrating planning efforts, leveraging existing partnerships, enhancing interoperability, combining resources, and identifying areas for enhanced cooperation within a multilateral context.

On the surface, pandemic influenza planning appears high on the agenda, but except for a handful of countries, pandemic influenza planning overall has not been a top priority or concern to wider government or military circles given their existing health and security challenges. Moreover, the private sector, local communities, and healthcare facilities have paid little attention to the issue despite efforts to encourage continuity planning. Public awareness also remains low in most corners of the world in spite of the numerous educational campaigns initiated by the WHO and other regional and multilateral partners. Finally, although the WHO is designated to lead the international response to an influenza pandemic, the organization is severely under funded and under staffed to act alone. As such, the organization relies on leading regional actors to coordinate response measures, including in countries outside areas of national interest, such as in remote dwellings in Africa. Moreover, since the WHO will depend on national governments to assist with rapid containment measures, such as vaccine distribution, quarantines, travel restrictions, and border closings, national governments should decide in advance how, when, and under what circumstances to do so given the political and economic consequences of implementing such measures.

Practice Makes Perfect

True, the United States, Japan, and the Republic of Korea have committed resources and time to preparing for a pandemic, but despite the planning efforts, numerous questions remain unanswered. “How are our partners responding to the emerging threat? What is everyone doing? Who is best equipped to do what? If there is a pandemic, who do we call, for what, and when?” wondered one workshop participant. For example, the “WHO Pandemic Influenza Draft Protocol for Rapid Response and Containment” (2006g) outlines recommended preparedness actions and tasks for rapid response, as well as charts an activity checklist for WHO assistance and access to the global stockpile of Tamiflu®, but few governments are even aware of such resources. “We need to understand what is out there, distinguish who is the most prepared, and identify which areas are the most vulnerable,” added another participant. In short, pandemic influenza plans are worthless if they are not widely understood and accepted. Tabletop exercises, simulations, and workshops are the most effective means to iron out the details and integrate response efforts. The exchange of disaster response plans helps pinpoint weaknesses and identifies the gaps and opportunities for enhanced cooperation, especially since counties and regions have developed different approaches to pandemic influenza planning. “We need to scrutinize each other’s plans to understand how we will integrate ourselves in response to a pandemic,” stated a workshop participant.

To date, South Korea, and specifically the KCDC, has taken the lead in organizing regional tabletop exercises to help participants refine plans. However, governments could conduct more exercises and promote wider participation. Workshop participants argued for additional exercises, especially between the United States, Japan, and South Korea, to test an avian influenza outbreak scenario in the Asia-Pacific theater. Participants also stressed the need to reach out to other regional partners and stakeholders, such as Australia and Singapore, which
have demonstrated in the past a strong capacity to respond to catastrophic disasters, such as the 2004 tsunami and the 2005 Pakistan earthquake. Moreover, both countries have intensified regional efforts to prepare for a pandemic influenza. For example, Australia and Singapore co-hosted the APEC round-the-clock desktop simulation exercise in June 2006 (APEC Pandemic Response Exercise 2006), which tested regional communication networks. In August 2006, the two countries also co-sponsored a lessons-learned workshop. A preliminary after-action report was circulated to APEC economies in November 2006. Moreover, Singapore houses the WHO stockpile of antiviral medications and protective equipment reserved for Southeast Asia.

Although the WHO, in concert with governments and civilian agencies, will lead the international response to a pandemic, military personnel will assist first responders in initial response efforts. Given the military’s expected lead role, civil-military and military-to-military exercises are essential to identifying military logistics, resources, and capabilities. For many countries, military assets are either limited or restricted from use and therefore unavailable to assist first responders during the initial waves of attack. Workshop participants agreed that periodic multilateral training and combined planning focused on military relief efforts for a pandemic influenza contingency would help militaries to enhance interoperability, operationalize pandemic influenza response plans, and implement the lessons learned into field training exercises.

Knowledge is Power
Timely and reliable information is critical to effective collaboration and coordination among regional and multilateral agencies, partners, and foreign governments and militaries. “Our best weapon is information, but if it is floating around, out of date, and not properly assessed or broadcast, then it is useless and unreliable,” stressed one workshop participant. To date, multiple government and multilateral agencies have launched websites to announce information on the avian flu. However, each website has tailored the information to fit its audience. To see the big picture of the situation around the world, therefore, it is necessary to browse through dozens of internet sites and portals. Although the WHO website includes links to pandemic influenza reports, general information, surveillance and infection control guidelines, national influenza pandemic preparedness plans, and situation country updates, it is not a clearinghouse of all available information. Some workshop participants suggested that the international community develop an unclassified pandemic influenza website to identify country capabilities, list best practices and approaches for risk communication, reference WHO, government and military points of contact, and provide on-the-ground situation updates. Others suggested that such a site include live chat rooms to accelerate the exchange of information. However, a website in which individuals or agencies can post information periodically without first developing means to filter that information may add to the confusion and undermine the credibility of the information posted. On the other hand, a pandemic influenza website modeled on a central bank or information clearinghouse may help enhance information sharing and improve communication networks. Perhaps an even better solution would be to improve existing networks, specifically the WHO website, to meet the current demands for additional information. Although countries cannot depend on the WHO apparatus alone for information, given funding constraints, it is practical to improve existing networks rather than to create an entirely new information resource.

The Humanitarian Information Unit within the Bureau for Intelligence and Research at the United States Department of State has been working since 2002 on creating a portal to share unclassified, usable information across the government and with international organizations, NGOs, and the private sector in preparation for and response to complex humanitarian emergencies worldwide. Information collected includes best practices for
humanitarian information management and real-time satellite imagery of migration movements or war-torn areas.

For the most part, public awareness and media attention to date have remained quite low despite the increasing numbers of human infections in 2006. Few realize that the total number of deaths in 2006 is equal to the combined deaths in 2003-05. Even fewer are aware that the surge of human infections in the past few months has come out of Indonesia, or that the recent resurgence of the virus in wild birds in China and Russia suggests that the H5N1 virus may spread northwestwards (as it did in late 2005) and appear in Central and Eastern Europe in time for the next influenza season. “I doubt the general population, or their governments and leaders for that matter, really know much about pandemic influenza,” posited one workshop participant.

Since a pandemic will occur community by community, public action in anticipation of and in response to local outbreaks of avian influenza can help mitigate the impact and spread of the disease. Specifically, governments should engage the public as partners in responding to avian flu incidents by using effective education tools, providing timely information and guidance, and encouraging voluntary compliance with government plans, including school closings, home quarantines, and social distancing measures. Moreover, education materials for preventing the spread of H5N1 in animals and for limiting human exposure through improved sanitation of backyard farms, proper hygiene, and self-reporting will help contain the virus. As demonstrated during the SARS outbreak, public awareness campaigns that encourage self-reporting and screening of influenza-like illnesses reduces the time between symptom onset and case detection. In addition, new equipment and technology for thermal screening at exit and entry points were developed and public hotlines were activated to ensure quick information sharing. For example, Thailand has adopted such an approach by appointing individuals in villages to report cases of sick poultry. Similarly, governments should encourage local health officials to notify national authorities as soon as preliminary information suggests a sustained human-to-human transmission of the H5N1 virus. However, one workshop participant warned, “Community plans are critical, but there is no containment strategy if the virus strain breaks out in a major city. National authorities should support local communities, but also prepare worst-case scenario contingency plans.”

**Vaccines are Not Magic Bullets**

Since influenza viruses constantly mutate, experts agree that no vaccine will provide complete protection against a pandemic, especially since severe shortages are expected during the initial waves of avian and human influenza outbreak. In fact, scientists recently discovered a new variant of the H5N1 virus in southern China that appears to sidestep current vaccines in poultry. Nevertheless, countries continue to pour resources into animal and human vaccine research and development. The United States, for example, has committed over $1 billion to vaccine development. In October 2006, the WHO warned that the world was billions of doses short of the vaccine amount needed to prepare for pandemic influenza and urged the international community to boost vaccine yields and production capacity from $2 billion to $9 billion (APEC EINet 2006). One could question the rationale for investing so much money into vaccination programs given the likelihood that the virus will mutate and the competing financial demands for other preventive measures, such as improved surveillance techniques, containment strategies, and laboratory data systems.

**Cash is King**

At the International Pledging Conference in Beijing, the international community pledged over $1.9 billion in aid, but the total amount disbursed to date is less than $350 million (Nabarro 2006). Moreover,
developing countries in Africa, the Middle East, and Latin America only received a few million dollars of the pledge money despite their evident lack of resources to prepare for a pandemic. Although developing countries will receive some of the funds donated to international agencies, the WHO, FAO, and OIE will prioritize recipient countries according to risk. For now, the most at-risk countries are in Asia. “We forget that an outbreak outside our respective borders is as much of a threat to us as an outbreak within our borders. Are we prepared to respond to an avian flu incident in Africa?” wondered one workshop participant. UN agencies have introduced some long-term prevention strategies to minimize the risk of human avian influenza and reduce the threat of future infectious disease outbreaks, such as increasing human and food safety, improving rural development, strengthening veterinary controls, monitoring the trade and marketing of live chickens, and restructuring the farming industries to improve bio-security, but immediate response mechanisms remain scarce. Following the first outbreaks of avian flu in Africa, for example, about twenty countries received only $45,000 each in emergency funds, with an additional $1.5 million promised to both Nigeria and Ethiopia for the purchase of technical and disease surveillance equipment (FAO 2006c). Such inequities, coupled with the continent’s inadequate access to education, economic resources, and healthcare services may allow the avian flu virus to spread unchecked and eventually threaten countries beyond its borders.

Efforts to mobilize additional resources for the WHO also have been weak despite the agency’s role in leading the international response to pandemic influenza. For example, the total money pledged – though not yet disbursed – to the WHO in Beijing was $77 million. However, funding requirements for 2006-07 reached $100 million, not including the cost of vaccine research and development (WHO 2006h). Funding shortfalls such as these increase the potential for an isolated avian flu outbreak to develop into a widespread pandemic. Although the United Nations and the World Bank recommend the international community raise an additional $1.3 billion to $1.6 billion at the Bamako ministerial conference in December 2006 to fight H5N1 over the next two to three years, only $476 million was pledged (Associated Press 2006a, 2006c).

Hidden Threats

Over and above the devastating health and economic impact of a potential influenza pandemic, additional threats could arise to menace global security. For example, how does the international community respond to countries that fail to report avian flu incidents? Some experts claim that the Indonesian government was aware of the presence of H5N1 in the country for two years, but failed to slaughter poultry in infected areas. Indonesian officials only reported incidents of avian flu once humans were infected. International health authorities have also suspected China of underreporting avian flu incidents in poultry and humans. The lack of transparency on avian flu issues in some countries dramatically increases the risk of a sustained human-to-human transmission of the H5N1 virus.

Military planners present at the workshop also agreed that pandemic contingency plans should perhaps account for scenarios in which terrorists use H5N1 as a weapon. Terrorists could easily exploit a pandemic influenza outbreak and inflict widespread damage by using their own bodies to attack and spread the virus among dense populations. Moreover, outbreaks of avian influenza in hermit or isolated countries, such as North Korea or Iran, also pose a significant risk to neighboring countries and regions.

The Way Ahead

Rapid detection and response efforts will determine the extent to which a human-to-human transmission of H5N1 can be contained, which requires efficient coordination among the initially affected nation, responsible international agencies, and other countries in the region assisting as needed. Within this latter group, the United States, Japan,
and South Korea will play a key role (along with a few other countries such as Australia and Singapore), working in support of the affected nation and UN agencies, and they can function more effectively if they respond as a well-prepared and well-coordinated core group. In order to prepare themselves, the core group nations’ ministries of foreign affairs, health, and defense, along with foreign officials and forces stationed abroad, should spend time as a group to consider their respective roles in implementing rapid containment measures.

Beyond core group cooperation in support of affected countries, the United States, Japan, and South Korea share a unique situation in the region such that U.S. military forces (and their families) are permanently stationed in those two countries. Will the Japanese and ROK governments request assistance from U.S. forces stationed within their borders? How will such response efforts be coordinated with government officials and national defense forces? Moreover, if military personnel are to support civilian agencies in initial response efforts, then national pandemic preparedness plans should address in more detail the potential role of the military, the rules of engagement, the legal or constitutional constraints on the use of military equipment and personnel, as well as the expectations of host nations and civil authorities. Particularly, government officials should consider how military forces stationed abroad will respond to requests for assistance from host nations.

U.S. troops stationed in Japan and South Korea, for example, are prepared to support host governments (if requested) with rapid containment operations when directed by the secretary of defense. After all, many of their own family members will be living in the affected communities – not to mention the number of local residents that work on U.S. military installations, so it will be difficult to separate U.S. bases from the response equation. Moreover, military bases have vital resources, such as medical personnel and equipment, which may assist the local community during the initial phases of the potential health crisis. However, the extent of U.S. assistance is uncertain given the competing demands to focus on force health protection, maintain operational readiness, and support U.S. domestic containment operations for pandemic influenza. Government officials and military planners should address these issues now to avoid any misunderstandings or loose critical time during initial response efforts of a human-to-human outbreak of H5N1.

As discussed earlier in this report, each country has adopted a different military strategy for pandemic influenza response. How will troops stationed abroad respond to requests for assistance? How will host countries respond to offers of assistance? How will host nations react to the evacuation of foreign noncombatants through their territory? How will host nations respond to an outbreak of a sustained human-to-human transmission of the H5N1 virus on a foreign military base? Will foreign militaries assist host nations during phase 6? How will host and foreign military services enforce quarantines or maintain the rule of law? How will foreign militaries prioritize multiple requests for assistance? Central and local government officials should work with military installations to coordinate response plans and address such issues. Militaries need a better understanding of the mandate and plan for humanitarian assistance and disaster response missions. Militaries also need to identify the logistical and infrastructural capabilities of the nations requesting assistance in order to match the needs of the afflicted area. Tabletop exercises, particularly military-to-military and multilateral exchanges, help planners identify the expectations of host nations and address the different political and legal dimensions of a military response to pandemic influenza. Most workshop participants agreed that periodic training focused on disaster relief efforts would be beneficial, as well as standardized operating procedures and memoranda of understanding on the use of ports and airfields.
In addition to improving military-to-military coordination, institutional linkages among animal and human health experts should be strengthened to improve information exchange across laboratory and communicable-disease networks. Moreover, partnerships with all stakeholders in the public and private sectors should be developed to ensure national and regional coordination for pandemic response. Partnerships with the private sector, (such as tourism, communications, food suppliers, airline industries, financial services, and other trade and industry), encourage business continuity plans, maintain public confidence, and mitigate the negative economic impact of a pandemic influenza. Moreover, partnerships with pharmaceutical manufacturers increase the capacity of nations and regions to stockpile vaccines and other treatment medications. Partnerships with nongovernmental organizations, such as the United Way and the Red Cross, also guarantee additional support services in meeting the basic food, shelter, and medical needs of individuals isolated or quarantined during a pandemic. Raising public awareness and engaging the public as partners also increases the effectiveness of and compliance with government containment measures.

Finally, the recommendations for pandemic influenza preparedness planning have wider biodefense policy implications. Improving laboratory surveillance techniques and risk communication networks, drafting business continuity and emergency response plans, strengthening regional and multilateral networks, enhancing interoperability, and creating information-sharing systems help prevent and control other security challenges, including natural disasters, terrorism, and any future biological and chemical threats. Such threats demand the same planning and response as pandemic influenza, that is, a focus on threat awareness, prevention, surveillance, detection, and recovery. Whether the international community is prepared to meet such future challenges depends on the planning and coordination done today.
Areas for Enhanced Cooperation | The Pandemic Influenza Challenge


The Pandemic Influenza Challenge

Appendix A:

International Meetings on Avian Flu

The following table lists key regional and multinational meetings, workshops, and exercises on avian influenza in the past year. Not all events focused on pandemic influenza are represented in the table below.

<table>
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<tr>
<th>Date / Location</th>
<th>Meeting / Exercise</th>
<th>Description</th>
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<tbody>
<tr>
<td>2007 New Delhi, India</td>
<td>International Partnership on Avian and Pandemic Influenza (IPAPI)</td>
<td>IPAPI delegates will convene in New Delhi in 2007 to review international preparedness plans for a potential human pandemic, discuss means to enhance international coordination, and address funding needs.</td>
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<tr>
<td>Dec. 6-8, 2006 Bamako, Mali</td>
<td>The Bamako Ministerial Conference</td>
<td>The International Ministerial Conference in Bamako organized by the Inter-African Bureau for Animal Resources of the African Union AU/IBAR in coordination with the European Union, the European Commission, and several technical agencies of the United Nations. The meeting's objectives included: 1) strengthen the global partnership against avian and pandemic influenza; 2) review what has been achieved since the January 2006 Beijing conference; 3) share technical experience; and 4) mobilize additional resources through an international pledging conference at Bamako.</td>
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<td>Oct. 11-13, 2006 Seoul, ROK</td>
<td>Crisis Response Exercise for Pandemic Influenza</td>
<td>Tabletop exercise and international workshop on pandemic influenza with over 250 participants from the South Korean Ministry of Health, KCDC, and central and provincial governments. The exercise also included over 50 observers and international experts from the WHO, UN, World Bank, U.S., Germany, APEC economies, RAND, and private the sector.</td>
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<tr>
<td>Sept. 27, 2006 Tokyo, Japan</td>
<td>Pandemic Influenza Workshop: Multilateral Perspectives on Preparedness, Response Planning, and Areas for Cooperation</td>
<td>Government officials, military officers, and foreign policy experts from the United States, Japan, and South Korea gathered to discuss the threat of a potential pandemic influenza crisis; share national strategies and military response plans; and explore options for launching a coordinated regional response to a possible avian flu outbreak in the Asia-Pacific theater. The workshop was co-sponsored by the Institute for Foreign Policy Analysis, the Institute of World Studies at Takushoku University, and PACOM with the support of the Defense Threat Reduction Agency.</td>
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<td>Sept. 26, 2006 Videoconference</td>
<td>Communications Planning</td>
<td>A videoconference-based seminar on communications planning organized by the U.S. CDC, the World Bank, UNICEF, WHO, and other partners. The aim of the seminar was to help refine each country's own response and communications plans and establish a regional health communications network. Participating countries included Cambodia, China, Indonesia, Laos, Japan, Switzerland, Thailand, Turkey, Vietnam, and the United States.</td>
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<td>Sept. 25, 2006 Geneva, Switzerland</td>
<td>WHO Influenza Pandemic Task Force (IPTF)</td>
<td>This task force is a temporary body whose mission is to advise the WHO on potential public health issues of international concern related to avian and pandemic influenza until the International Health Regulations 2005 (IHR 2005) come into force on June 15, 2007. The task force met for the first time to iron out administrative issues, such as its role and responsibilities.</td>
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<td>Sept. 10-11, 2006 Da Nang, Vietnam</td>
<td>APEC Health Task Force Symposium on Functioning Economies in Times of Pandemic</td>
<td>APEC leaders met to discuss the potential economic consequences of a pandemic influenza and identify strategies to minimize its economic impact.</td>
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<td>July 18-20, 2006 Manila, Philippines</td>
<td>First Meeting of the Asia Pacific Technical Advisory Group on Emerging Infectious Diseases</td>
<td>Officials from the regional office for the western Pacific gathered to establish the technical advisory group, discuss pandemic preparedness and other emerging infectious diseases, and review the IHR 2005.</td>
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<td>Date</td>
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<td>Event Description</td>
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<tr>
<td>June 20-23, 2006</td>
<td>Jakarta, Indonesia</td>
<td>Avian Influenza Expert Consultation Meeting</td>
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<td>June 20-22, 2006</td>
<td>Honolulu, Hawaii</td>
<td>Tabletop Exercise</td>
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<td>June 7-8, 2006</td>
<td>Geneva, Switzerland</td>
<td>APEC Pandemic Response Exercise 2006</td>
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<td>June 6-7, 2006</td>
<td>Vienna, Austria</td>
<td>International Partnership on Avian and Pandemic Influenza: Vienna Senior Official Meeting</td>
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<td>May 4-6, 2006</td>
<td>Da Nang, Vietnam</td>
<td>APEC Ministerial Meeting on Avian and Influenza Pandemics</td>
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<td>May 4-5, 2006</td>
<td>Geneva, Switzerland</td>
<td>WHO Meeting on Clinical Trials of Influenza Vaccines</td>
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<td>May 3, 2006</td>
<td>Hong Kong</td>
<td>Business Continuity Planning and Disaster Preparedness for Avian Influenza</td>
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<td>May 2-3, 2006</td>
<td>Geneva, Switzerland</td>
<td>WHO Consultations on Influenza Vaccines</td>
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<tr>
<td>May 2-3, 2006</td>
<td>Da Nang, Vietnam</td>
<td>APEC Pandemic Preparedness Communication Workshop</td>
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<tr>
<td>April 27, 2006</td>
<td>Geneva, Switzerland</td>
<td>WHO/OIE/FAO Consultations on Influenza Vaccines</td>
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<tr>
<td>March 20, 2006</td>
<td>Libreville, Gabon</td>
<td>UN System Meeting on Avian Influenza</td>
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<tr>
<td>March 6-8, 2006</td>
<td>Geneva, Switzerland</td>
<td>International Meeting on Influenza Pandemic Containment Strategy</td>
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<tr>
<td>Feb. 14-16, 2006</td>
<td>Bangkok, Thailand</td>
<td>Asia Regional Risk and Emergency Communication for Avian Influenza and Pandemic Preparedness Workshop</td>
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<tr>
<td>Jan. 17-18, 2006</td>
<td>Beijing, China</td>
<td>International Pledging Conference on Avian and Human Influenza</td>
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<tr>
<td>Jan. 12-13, 2006</td>
<td>Tokyo, Japan</td>
<td>East Asia Summit</td>
</tr>
<tr>
<td>Nov. 18-19, 2005</td>
<td>Busan, ROK</td>
<td>13th APEC Economic Leaders Meeting</td>
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<td>Nov. 15-16, 2005</td>
<td>U.S. Pacific Command</td>
<td>U.S. Pacific Command Tabletop Exercise</td>
</tr>
<tr>
<td>Nov. 7-9, 2005</td>
<td>Geneva, Switzerland</td>
<td>Global Meeting on Avian Influenza and Human Pandemic</td>
</tr>
<tr>
<td>Oct. 31 - Nov. 1, 2005</td>
<td>Brisbane, Australia</td>
<td>Avian and Pandemic Influenza Preparedness and Response</td>
</tr>
<tr>
<td>Oct. 24-25, 2005</td>
<td>Ottawa, Canada</td>
<td>Global Pandemic Influenza Readiness: International Meeting of Ministers of Health</td>
</tr>
<tr>
<td>Oct. 6-7, 2005</td>
<td>Washington, D.C.</td>
<td>International Partnership on Avian and Pandemic Influenza (IPAPI)</td>
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</table>
Session 1: The Pandemic Influenza Crisis
08:45-10:00  The purpose of this session is to discuss the nature of a potential pandemic influenza crisis and frame the key issues to be considered in greater depth during the workshop. Panelists will briefly outline the emergency response, planning, and containment activities already under development and point to areas that require additional attention and reflection. Since the Pacific region is the most susceptible to a potential pandemic influenza outbreak, there is a pressing need for the United States, Japan, and the Republic of Korea to take the lead in planning for a regional or multilateral response to this crisis.

Key topics for this session include:
- World Health Organization (WHO) guidelines and recommendations for prevention, response planning, surveillance, and containment
- Planning activities and the role of national governments, military, international, regional, and multilateral agencies, nongovernmental organizations, and the private sector (e.g. pharmaceutical companies and companies that operate critical services and infrastructure)
- Multilateral opportunity to prevent, contain, respond to, and manage an outbreak in order to minimize the health, economic, social, and security impacts of a pandemic

Presenters:
- Dr. Hitoshi OSHITANI, M.D., Professor, Department of Virology, Tohoku University Graduate School of Medicine, and former WHO official in Manila
- Dr. LEE Duk-Hyoung, M.D., Director General, Center for Epidemic Surveillance and Response, Korea Center for Disease Control and Prevention, Ministry of Health and Welfare

10:00-10:15  Tea/Coffee Break (I-House Lecture Hall)

Session 2: National Strategies for Pandemic Influenza
10:15-12:00  The goal of this session is to review the national strategies of the governments of Japan, Korea, and the United States in order to understand each country’s response planning and identify key areas for improvement, support, and cooperation. This session will also review the lessons learned from past disasters and recent simulations, such as the APEC...
Key topics for this session include:

• Logistics, capabilities, and plans for the continuity of critical resources, such as government, healthcare, communication, transport, infrastructure, trade and commerce, public works, utilities, and energy services
• International efforts and areas for joint collaboration, such as bio-medical surveillance, crisis coordination, antiviral and vaccine distribution
• Coordination with the World Health Organization, United Nations, and the International Partnership on Avian and Pandemic Influenza

Presenters:
• Dr. Ken STALEY, M.D., Director for Biodefense Policy, White House Homeland Security Council
• Dr. HUR Young Joo, M.D., Director of the Division of Epidemic Intelligence Service, Department of Disease Investigation and Surveillance, Korea Center for Disease Control and Prevention, Ministry of Health and Welfare
• Dr. KANARI Yumiko, M.D., Technical Officer, Tuberculosis and Infectious Disease Control Division, Health Service Bureau, Ministry of Health, Labor, and Welfare

Session 3: Military Preparedness and Response Plans for Pandemic Influenza
13:00-14:45
In the event of a pandemic influenza, military personnel will support civilian agencies in initial response efforts. This session will review the military planning efforts of the United States, Japan, and South Korea. A particular emphasis will be given to the lessons learned from past disasters, simulations, and tabletop exercises.
Key topics for this session include:

• Enhancing partnership capabilities and improving interoperability
• Military logistics, resources, and infectious disease control measures, such as surveillance and antiviral medication and vaccine distribution plans
• Force health protection measures to maintain operational readiness
• Ensuring the ability to continue regional transportation of essential goods and personnel by developing precautionary measures that are commonly understood, and implementing them in a manner that is trusted across countries and organizations
• Assessment of military exercises and simulations

Presenters:
• Lieutenant Colonel Clay SUTTON, J57, United States Pacific Command
• Dr. YANAGIDA Yasuo, Assistant Director, Health and Medical Division Bureau of Personnel and Education, Japan Defense Agency
• Lieutenant Colonel PARK In Ho, ROK AFMC, Chief of Preventive Medicine, Armed Forces Medical Command

14:45-15:00
Tea/Coffee Break

Session 4: Areas of Enhanced Cooperation and Response Planning
15:00-17:00
The purpose of this session is to engage all participants in an open discussion on the areas for improvement and enhanced cooperation.
Topics for this session include:

• Identification of essential tasks, priorities, gaps, and opportunities for government and military cooperation
• Future joint and combined exercises, training, and follow-on workshops
• Regional crisis coordination centers
• Enabling civil-military cooperation

Some designated commentators from each country will provide brief observations of the day’s dialogue before opening for general discussion.
17:00-17:30  **Executive Summary and Final Comments**
- Mr. Jim SCHOFF, Associate Director of Asia-Pacific Studies, Institute for Foreign Policy Analysis
- Brigadier General Steven A. HUMMER, USMC, Commanding General, Marine Corps Base Hawaii and Deputy Commander, Marine Forces Pacific
- Dr. KAWAKAMI Takashi, Professor, Institute of World Studies at Takushoku University

18:00-21:00  **Cocktail Reception and Buffet Dinner**
Appendix C

Workshop Participants
(In Alphabetical Order by Country)

JAPAN

Mr. BANNO Akihiko
Official, Japan-U.S. Security Treaty Division
North American Affairs Bureau
Ministry of Foreign Affairs

Commander DOMOTO Hideharu, MC, JMSDF
Medical Staff, Office of Surgeon General and
Director of Medicine, Maritime Staff Office
Japan Defense Agency

Rear Admiral FUJITA Kazuyuki, MC, JMSDF
Surgeon General and Director of Medicine
Maritime Staff Office, Japan Defense Agency

Rear Admiral HATADA Junichi, MC, JMSDF
Commanding Officer
SDF Hospital Yokosuka

Mr. HORIE Yoshiteru
Secretary General / Managing Director
Association for Aid and Relief, Japan

Dr. KANARI Yumiko, M.D.
Technical Officer, Tuberculosis and Infectious Disease
Control Division, Health Service Bureau
Ministry of Health, Labor and Welfare

Dr. KAWAKAMI Takashi
Professor, Institute of World Studies
Takushoku University

Dr. KISO Keisuke, M.D.
Director, Health and Medical Division
Japan Defense Agency

Ms. KONO Minako
Policy Coordination Division
Foreign Policy Division
Ministry of Foreign Affairs

Lieutenant Colonel KURIHARA
Deputy Director for Logistics (Medical), J-4 Staff

Mr. MARUYAMA Ichiro
Senior Foreign Policy Coordinator
Foreign Policy Bureau,
Ministry of Foreign Affairs

Mr. MORI Hirohisa
Deputy Director, Health and Medical Division
Bureau of Personnel and Education
Japan Defense Agency

Professor MORIMOTO Satoshi
Director, Institute of World Studies
Faculty of International Development
Takushoku University

Ms. NAKAJIMA Chie
Official, Specialized Agencies Division
International Cooperation Bureau
Ministry of Foreign Affairs

Ms. OSHIMA Noriko
Official, Status of U.S. Forces Agreement Division,
North American Affairs Bureau
Ministry of Foreign Affairs

Dr. OSHITANI Hitoshi, M.D.
Professor, Department of Virology
Tohoku University Graduate School of Medicine

Dr. SATO Heigo
Professor, Institute of World Studies
Takushoku University

Lieutenant Colonel TANIDA Tadashi, JGSDF
Defense Policy Division, Bureau of Defense
Japan Defense Agency

Dr. TANIGUCHI, Kiyosu M.D.
Chief, Infectious Disease Surveillance Center
National Institute of Infectious Diseases
Ministry of Health, Labor and Welfare

Mr. TOKUCHI Hideshi
Director, Tokyo Defense Facilities Administration Bureau, Defense
Facilities Administration Agency Japan Defense Agency

Lieutenant General YAMAGUCHI Noboru, JGSDF
Commanding General
GSDF Research and Development Command

Ms. YAMAMOTO Rika
Chief, Programming Unit
Peace Winds Japan
Dr. YAMAMOTO Taro, M.D.
Deputy Director, Global Issues Cooperation Division, International Cooperation Bureau
Ministry of Foreign Affairs

Captain YANAGIDA Shigeki, MC, JMSDF
Senior Medical Staff, Office of Surgeon General and Director of Medicine, Maritime Staff Office
Japan Defense Agency

Dr. YANAGIDA Yasuo
Assistant Director, Health and Medical Division
Bureau of Personnel and Education
Japan Defense Agency

REPUBLIC OF KOREA

Dr. CHA Du-Hyeogn
Research Fellow
Director of Defense Issues Task Force
Korea Institute for Defense Analyses

Captain HONG Jee Young, ROKA
Action Officer, Preventive Medicine
Health Policy Team, Health and Welfare Bureau
Ministry of National Defense

First Lieutenant HUH Sik, ROK AFMC
Patient Statistics Analysis Officer
Health Operations Division
Armed Forces Medical Command

Dr. HUR Yong, M.D.
Director General, Incheon Airport National Quarantine Station
Ministry of Health and Welfare

Dr. HUR Young Joo, M.D.
Director, Division of Epidemic Intelligence Service, Department of Disease Investigation and Surveillance
Korea Center for Disease Control & Prevention
Ministry of Health and Welfare

Mr. KANG Sung-Heup
Director, Health Policy Team
Health and Welfare Bureau
Ministry of National Defense

Mr. KIM Jin-hae
First Secretary
Embassy of the Republic of Korea, Tokyo
Major General KIM Rock Kwon, ROK AFMC
Commander
Armed Forces Medical Command

Dr. LEE Duk-Hyoung, M.D.
Director General, Center for Epidemic Surveillance and Response
Korea Center for Disease Control & Prevention
Ministry of Health and Welfare

Dr. LEE Seoksoo
Professor, Korean National Defense University

Lieutenant Colonel PARK In Ho, ROK AFMC
Chief of Preventive Medicine
Armed Forces Medical Command

Mr. PARK Young-kyu
Deputy Director, Security Policy Division
Policy Planning Bureau
Ministry of Foreign Affairs and Trade

Mr. KIM Jin-hae
First Secretary
Embassy of the Republic of Korea, Tokyo
Major General KIM Rock Kwon, ROK AFMC
Commander
Armed Forces Medical Command

Mr. KIM Rock Kwon, ROK AFMC
Commanding General, Marine Corps Base HI
Deputy Commander, Marine Forces Pacific

United States

Lieutenant Colonel Peter G. BREED, USAF
Chief, Force Health Protection, J07
United States Pacific Command

Commander Kari A. BUCHANAN, USN
Director for Public Health Services
US Naval Hospital Yokosuka
United States Forces Japan

Rear Admiral Thomas BURKHARD, USN
Surgeon, J07
United States Pacific Command

Lieutenant Commander Kenneth CHRISTOPHER, USN
Deputy Command Surgeon
United States Forces Korea

Mr. Bart D. COBBS
Deputy Counselor for Environment, Science, and Technology
Embassy of the United States of America, Tokyo

Mr. John Du TOIT
Korea Desk Officer
Strategic Plans and Policy Directorate, J5
United States Pacific Command

Mr. Michael K. EVENSON
Director, Operations Enterprise
Defense Threat Reduction Agency

Brigadier General Steven A. HUMMER, USMC
Commanding General, Marine Corps Base HI
Deputy Commander, Marine Forces Pacific

Lieutenant Colonel Bret JACKMAN, USMC
Marine Forces Pacific, GS

Mr. Frank JANNUZI
International Affairs Fellow in Japan
The following table identifies select international, regional, and country agencies and resources with additional information on avian and human pandemic influenza. Not all organizations focused on pandemic influenza are represented below.

<table>
<thead>
<tr>
<th>Organization Name</th>
<th>Website Address</th>
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<tr>
<td><strong>International / Regional Body</strong></td>
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<tr>
<td>APEC</td>
<td><a href="http://www.apec.org/apec/apec_groups/som_special_task_groups/health_task_force/apec_information_on.html">http://www.apec.org/apec/apec_groups/som_special_task_groups/health_task_force/apec_information_on.html</a></td>
</tr>
<tr>
<td>APEC – Emerging Infectious Network (EINet)</td>
<td><a href="http://depts.washington.edu/einet/home.html">http://depts.washington.edu/einet/home.html</a></td>
</tr>
<tr>
<td>Global Avian Influenza Network for Surveillance (GAINS)</td>
<td><a href="http://www.gains.org/">http://www.gains.org/</a></td>
</tr>
<tr>
<td>Global Initiative on Sharing Avian Influenza Data (GISAID)</td>
<td><a href="http://www.gisaid.org/">http://www.gisaid.org/</a></td>
</tr>
<tr>
<td>OIE/FAO Network of Expertise on Avian Influenza (OFFLU)</td>
<td><a href="http://www.offlu.net/">http://www.offlu.net/</a></td>
</tr>
<tr>
<td>WHO Africa Region (AFRO)</td>
<td><a href="http://www.afro.who.int/csr/epr/avian_flu/index.html">http://www.afro.who.int/csr/epr/avian_flu/index.html</a></td>
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<td>WHO Region of the Americas (PAHO)</td>
<td><a href="http://www.paho.org/english/ad/dpc/cd/flu-avi.htm">http://www.paho.org/english/ad/dpc/cd/flu-avi.htm</a></td>
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<td>WHO Eastern Mediterranean Region (EMRO)</td>
<td><a href="http://www.emro.who.int/">http://www.emro.who.int/</a></td>
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<tr>
<td>WHO European Region (EURO)</td>
<td><a href="http://www.euro.who.int/flu">http://www.euro.who.int/flu</a></td>
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<tr>
<td>WHO Southeast Asia Region (SEARO)</td>
<td><a href="http://w3.whosea.org/en/Section10/Section1027.htm">http://w3.whosea.org/en/Section10/Section1027.htm</a></td>
</tr>
<tr>
<td>WHO Western Pacific Region (WPRO)</td>
<td><a href="http://www.wpro.who.int/health_topics/avian_influenza/">http://www.wpro.who.int/health_topics/avian_influenza/</a></td>
</tr>
<tr>
<td>World Organization for Animal Health (OIE)</td>
<td><a href="http://www.oie.int/eng/AVIAN_INFLUENZA/home.htm">http://www.oie.int/eng/AVIAN_INFLUENZA/home.htm</a></td>
</tr>
<tr>
<td>United Nations System Influenza Coordination (UNSIC)</td>
<td><a href="http://www.undg.org/content.cfm?id=1482">http://www.undg.org/content.cfm?id=1482</a></td>
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<tr>
<td><strong>Japan</strong></td>
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<tr>
<td>Infectious Disease Surveillance Center</td>
<td><a href="http://idsc.nih.go.jp/index.html">http://idsc.nih.go.jp/index.html</a></td>
</tr>
<tr>
<td>National Institute of Infectious Diseases</td>
<td><a href="http://www.nih.go.jp/niid/index-e.html">http://www.nih.go.jp/niid/index-e.html</a></td>
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### Republic of Korea

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<th>Website</th>
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<tr>
<td>Korea Center for Disease Control and Prevention (KCDC)</td>
<td><a href="http://avian.cdc.go.kr">http://avian.cdc.go.kr</a> (not available in English)</td>
</tr>
<tr>
<td>KCDC – Crisis Response Exercise for Pandemic Influenza</td>
<td><a href="http://exercise.cdc.go.kr">http://exercise.cdc.go.kr</a></td>
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### United States

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<tr>
<td>U.S. Department of State</td>
<td><a href="http://www.state.gov/g/avianflu/">http://www.state.gov/g/avianflu/</a></td>
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