

June 2007

INFLUENZA PANDEMIC

Efforts to Forestall Onset Are Under Way; Identifying Countries at Greatest Risk Entails Challenges





Highlights of [GAO-07-604](#), a report to congressional requesters

Why GAO Did This Study

Since 2003, a global epidemic of avian influenza has raised concern about the risk of an influenza pandemic among humans, which could cause millions of deaths. The United States and its international partners have begun implementing a strategy to forestall (prevent or delay) a pandemic and prepare to cope should one occur. Disease experts generally agree that the risk of a pandemic strain emerging from avian influenza in a given country varies with (1) environmental factors, such as disease presence and certain high-risk farming practices, and (2) preparedness factors, such as a country's capacity to control outbreaks.

This report describes (1) U.S. and international efforts to assess pandemic risk by country and prioritize countries for assistance and (2) steps that the United States and international partners have taken to improve the ability to forestall a pandemic.

To address these objectives, we interviewed officials and analyzed data from U.S. agencies, international organizations, and nongovernmental experts.

The U.S. and international agencies whose efforts we describe reviewed a draft of this report. In general, they concurred with our findings. Several provided technical comments, which we incorporated as appropriate.

www.gao.gov/cgi-bin/getrpt?GAO-07-604. To view the full product, including scope and methodology, click on the link above. For more information, contact D. Gootnick at (202) 512-3149 or gootnickd@gao.gov or M. Crosse at (202) 512-7114 or crossesem@gao.gov.

INFLUENZA PANDEMIC

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What GAO Found

Assessments by U.S. agencies and international organizations have identified widespread risks of the emergence of pandemic influenza and the United States has identified priority countries for assistance, but information gaps limit the capacity for comprehensive comparisons of risk levels by country. Several assessments we examined, which have considered environmental or preparedness-related risks or both, illustrate these gaps. For example, a U.S. Agency for International Development (USAID) assessment categorized countries according to the level of environmental risk—considering factors such as disease presence and the likelihood of transmission from nearby countries, but factors such as limited understanding of the role of poultry trade or wild birds constrain the reliability of the conclusions. Further, USAID, the State Department, and the United Nations have administered questionnaires to assess country preparedness and World Bank-led missions have gathered detailed information in some countries, but these efforts do not provide a basis for making comprehensive global comparisons. Efforts to get better information are under way but will take time. The U.S. Homeland Security Council has designated priority countries for assistance, and agencies have further identified several countries as meriting the most extensive efforts, but officials acknowledge that these designations are based on limited information.

The United States has played a prominent role in global efforts to improve avian and pandemic influenza preparedness, committing the greatest share of funds and creating a framework for managing its efforts. Through 2006, the United States had committed about \$377 million, 27 percent of the \$1.4 billion committed by all donors. USAID and the Department of Health and Human Services have provided most of these funds for a range of efforts, including stockpiles of protective equipment and training foreign health professionals in outbreak response. The State Department coordinates international efforts and the Homeland Security Council monitors progress. More than a third of U.S. and overall donor commitments have gone to individual countries, with more than 70 percent of those going to U.S. priority countries. The U.S. *National Strategy for Pandemic Influenza Implementation Plan* provides a framework for U.S. international efforts, assigning agencies specific action items and specifying performance measures and time frames for completion. The Homeland Security Council reported in December 2006 that all international actions due to be completed by November had been completed, and provided evidence of timely completion for the majority of those items.

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Abbreviations

CDC	Centers for Disease Control and Prevention of the Department of Health and Human Services
DOD	Department of Defense
FAO	United Nations Food and Agriculture Organization
HHS	Department of Health and Human Services
OIE	World Organization for Animal Health (Office International des Epizooties)
PPE	personal protective equipment
UN	United Nations
USAID	U.S. Agency for International Development
USDA	Department of Agriculture
WHO	United Nations World Health Organization

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United States Government Accountability Office
Washington, DC 20548

June 20, 2007

The Honorable Edward M. Kennedy
Chairman
Committee on Health, Education, Labor, and Pensions
United States Senate

The Honorable Daniel Akaka
Chairman
Subcommittee on Oversight of Government Management, the Federal
Workforce, and the District of Columbia
Committee on Homeland Security and Governmental Affairs
United States Senate

Since the end of 2003, a global epidemic of avian influenza¹ among poultry has raised concern about the risk of a global influenza epidemic—a pandemic—occurring among humans. Though initially confined to Southeast Asia, since mid-2005, this epidemic has spread to the Middle East, Europe, and Africa and has caused the deaths of more than 250 million poultry, either directly or as a result of culling programs designed to stop its spread. While thus posing a serious threat to farmer livelihoods, the H5N1 strain of influenza that is causing this epidemic has also demonstrated the ability to infect and kill humans. From 2003 through 2006, more than 260 humans contracted the H5N1 strain and more than half of them died.² Nearly all of these cases resulted from contact with infected poultry. However, if H5N1 develops the ability to pass easily among humans, an influenza pandemic could ensue. In contrast to the more moderate health threat presented by annual outbreaks of seasonal influenza,³ pandemic influenza poses a grave threat to global public health. Scientists estimate that the pandemic of 1918 to 1919 killed more than 50

¹In this report, we use the term avian influenza to refer to the highly pathogenic form of this disease, which can cause nearly 100 percent mortality in infected poultry. The disease can also occur in low pathogenic forms that cause only mild symptoms in infected birds.

²From December 2003 through the end of 2006, the World Health Organization confirmed 263 cases of H5N1 in humans and 158 deaths.

³The World Health Organization estimates that annual epidemics of seasonal influenza affect about 10 to 20 percent of the world's population each year, causing 3 million to 5 million cases of severe illness and 250,000 to 500,000 deaths.

million humans, including an estimated 675,000 Americans, although the last two pandemics (in 1957 and 1968) were milder.

Disease experts caution that it is not possible to predict when or where the next influenza pandemic will begin—or whether it will involve H5N1. Nonetheless, concern that H5N1 may spark a pandemic has increased as the virus has spread among countries with comparatively high levels of environmental and preparedness-related risk—that is, countries where

- the virus is already present, or is present in a neighboring country, and a range of conditions, such as high-risk poultry farming practices, are conducive to H5N1 spreading in poultry and infecting humans (environmental risk)⁴ and
- animal and human health systems are relatively unprepared to detect or respond appropriately to this virus (preparedness risk).

The United Nations World Health Organization (WHO) has concluded that the H5N1 epidemic in poultry has brought the world closer to an influenza pandemic than at any time in the last 40 years. Concern about this threat has prompted the United States and its international partners to launch efforts aimed at improving global preparedness to both forestall (prevent or at least delay) the onset of an influenza pandemic and cope with a pandemic should one occur. As agreed with your offices, we focused on U.S. and international efforts to forestall a pandemic. This report addresses (1) the extent to which U.S. agencies and their international partners have assessed the country-by-country risk of H5N1 sparking a pandemic and prioritized countries for international assistance and (2) the steps that U.S. agencies and their international partners have taken to improve global preparedness to forestall a pandemic.

In related work, we are examining constraints on the use of vaccines and antiviral drugs to help in forestalling a pandemic and efforts that are under way to overcome these constraints. Our analysis of these issues will be published in a separate report.

⁴More specifically, we use the term environmental risk to include risk from a range of factors, including known disease presence or proximity (such as the H5N1 virus being well-established among domestic poultry and the risk that the virus will be introduced from neighboring countries by unregulated trade in poultry and other birds, or by wild birds); large numbers of poultry being raised in heavily populated areas; and high-risk agricultural practices, such as allowing poultry unrestricted access to family homes and selling poultry in markets with inadequate cleaning and disinfection.

To address our objectives, we reviewed relevant Department of Agriculture (USDA), Department of Health and Human Services (HHS), Department of Defense (DOD), Department of State, and U.S. Agency for International Development (USAID) planning, funding, and reporting documents for avian and pandemic influenza programs and discussed them with agency officials. We examined and analyzed documents such as country risk and preparedness assessments, operational plans, and budget spreadsheets. We also analyzed the U.S. government's strategy and plan for addressing pandemic influenza and associated reports on progress through December 2006.⁵ In addition, we studied relevant documents from the United Nations (UN) and other international organizations, including WHO, the United Nations Food and Agriculture Organization (FAO), the World Bank, and the World Organization for Animal Health (OIE).⁶ Finally, we consulted with nongovernmental and academic experts on avian and pandemic influenza. We determined that the data provided to us were sufficiently reliable for the purposes of this report. We conducted our work from January 2006 through March 2007 in accordance with generally accepted government auditing standards. Appendix I provides a detailed description of our scope and methodology. A list of other GAO reports on pandemic preparedness, influenza vaccine development, and related topics is included at the end of this report.

Results in Brief

Assessments by U.S. agencies and international organizations have identified widespread environmental and preparedness-related risks in many countries and the United States has designated priority countries for assistance, but gaps in available information limit the capacity for comprehensive, well-informed comparisons of risk levels by country. Assessment efforts we examined, carried out by U.S. and international agencies, illustrate these gaps. For example, a USAID assessment categorized countries according to level of environmental risk, considering disease presence and the likelihood of transmission from nearby countries, but factors such as poor understanding of the role poultry trade and wild birds play in transmitting the disease constrained the reliability of

⁵According to U.S. agency officials, the Homeland Security Council is currently preparing a new report that provides updated information on U.S. efforts to improve both domestic and international pandemic influenza preparedness and response.

⁶OIE stands for Office International des Epizooties—the organization's original name, adopted at its founding in 1924. In 2003, the organization decided to begin using the name World Organization for Animal Health while retaining the OIE acronym. OIE is a multilateral organization but is not part of the UN system.

USAID's conclusions. USAID, the State Department, and the UN have administered questionnaires aimed at assessing country preparedness in areas ranging from national planning to the availability of antiviral drugs. The information collected has proven useful in planning for projects but has not been sufficiently detailed or complete to permit well-informed country comparisons. Similarly, World Bank-led missions have gathered more detailed information in a limited number of countries, but these efforts do not provide a basis for making complete or comprehensive global comparisons. Efforts to assemble better information are under way, but will take time to produce results. Despite these limitations, the U.S. Homeland Security Council has used available information to designate about 20 priority countries for U.S. assistance.⁷ In addition, U.S. agency officials stated that certain of these priority countries have emerged as being of especially high concern, and federal agencies are preparing interagency operating plans for these countries.

The United States has played a prominent role in global efforts to improve avian and pandemic influenza preparedness, committing the greatest share of funds and creating a framework for managing its efforts. Through 2006, the United States had committed about \$377 million to improve global preparedness for pandemic influenza, about 27 percent of the \$1.4 billion committed by all donors.⁸ U.S. agencies and other donors have reported committing funds to recipients at the global, regional, and country-specific levels, with more than 70 percent of country-specific funds going to U.S. priority countries. USAID and HHS have provided more than 90 percent of U.S. funding, while the State Department coordinates agency efforts. Specific efforts funded to date include, for example, stockpiling personal protective equipment kits and other commodities for outbreak investigations and response and training foreign health professionals to detect and respond to disease outbreaks. The U.S. *National Strategy for Pandemic Influenza Implementation Plan* provides a framework for

⁷The Homeland Security Council, with input from an interagency process, identified 19 priority countries in May of 2006, considering various risk and political factors; the list currently includes 21 countries, according to State Department officials.

⁸Data on commitments by donor, including the United States, were obtained from the World Bank. U.S. data reflect amounts reported to the World Bank by the United States. Some U.S. activities that also benefit international influenza preparedness, such as DOD laboratories abroad with significant diagnostic capacities, are not included in these amounts. The World Bank monitors international financial flows for influenza preparedness in terms of funds pledged, committed, and disbursed. As defined by the bank, commitments are roughly equivalent to U.S. agency planned funding levels—the budget projections that agencies use for planning purposes.

implementing U.S. international efforts, assigning agencies responsibility for completing specific actions, and in most cases specifying performance measures and time frames for determining whether the action items have been completed. The Homeland Security Council monitors agency efforts to implement the plan. It reported in December 2006 that all international action items due to be completed by November had been completed, and provided evidence of timely completion for the majority of these items.

USAID, HHS, and USDA provided written comments on a draft of this report, and the Department of the Treasury (Treasury) provided oral comments. These agencies generally concurred with our findings. USAID briefly reviewed progress to date in improving global preparedness, and emphasized that in the coming months the agency will be focusing in particular on developing more effective approaches to controlling the spread of H5N1 in small-scale “backyard farms” where high-risk agricultural practices are common.⁹ While acknowledging the information gaps that limit country-by-country risk assessment, HHS emphasized its support for targeting resources to priority countries as identified by the Homeland Security Council. In this context, HHS stressed the importance of improving information sharing among countries. USDA stated that it found the report accurate in its description of USDA’s role and involvement in global efforts to improve preparedness. In its oral comments, Treasury described its efforts to encourage and support efforts by the World Bank and other international financial institutions to address the threats discussed in this report, and emphasized that in addition to providing funds, these international institutions have contributed to the global response in other ways, such as tracking and reporting on donor commitments and helping countries develop national strategies. In addition, we received technical comments from HHS and Treasury, as well as the Department of State, DOD, WHO, the United Nations System Influenza Coordinator, FAO, OIE, and the World Bank. We incorporated these comments in the report as appropriate.

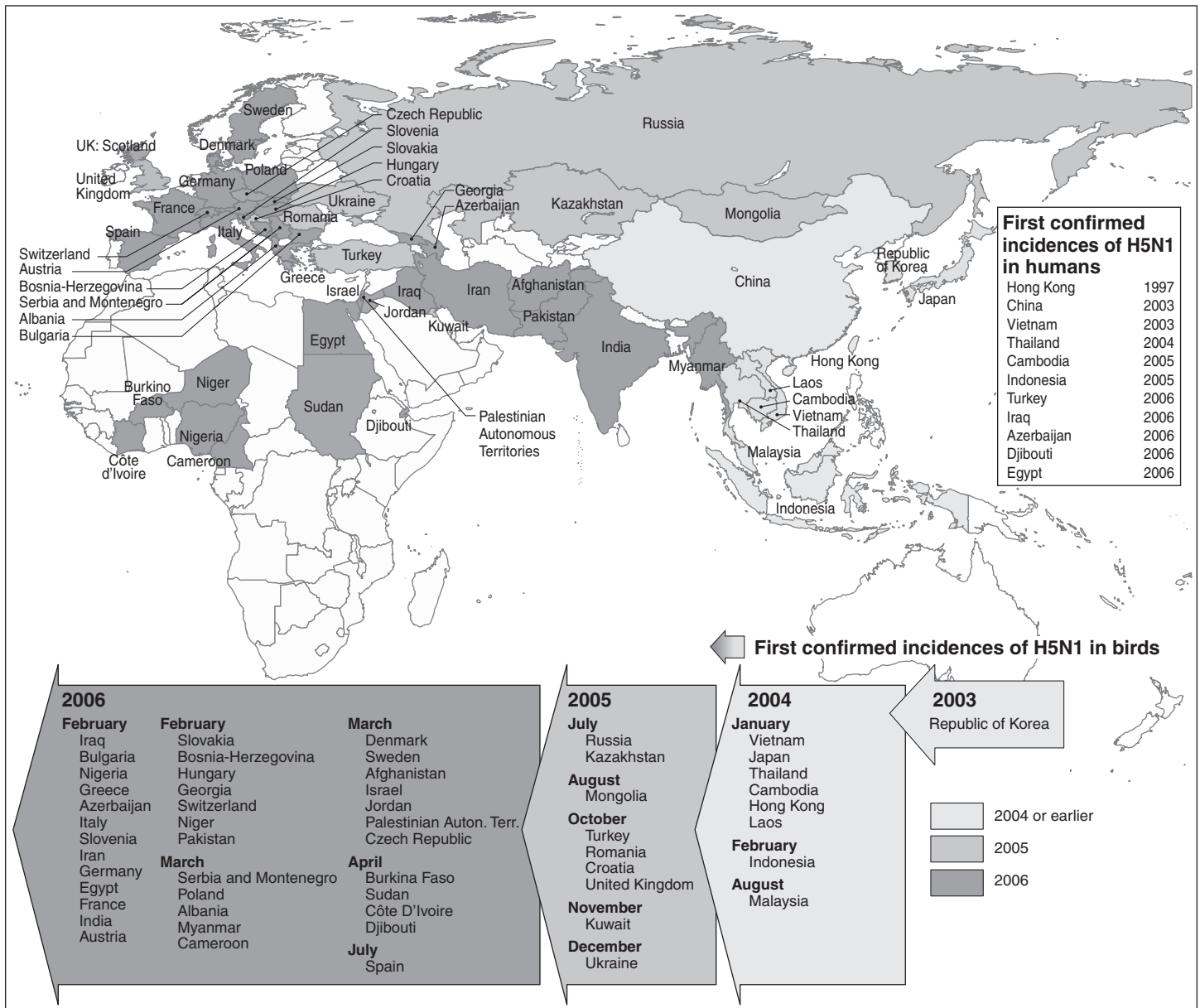
Background

H5N1 has spread to infect poultry and wild birds over a wide geographic area. After appearing in southeastern China and Hong Kong in 1996 and 1997, the virus reappeared in late 2003 and early 2004 in a number of other

⁹USAID also stated that it will be placing much greater emphasis on developing plans and capabilities for responding to an influenza pandemic—a matter that lies beyond the scope of this report.

Southeast Asian countries. In 2005 and 2006, it spread rapidly to countries in other parts of Asia and to Europe and Africa. Through December 2006, H5N1 had been detected in poultry and wild birds in nearly 60 countries. Figure 1 shows the progression of the disease across countries and also notes which of those countries have experienced human cases.

Figure 1: Locations of Reported H5N1 Infection in Poultry, Wild Birds, or Both and in Humans through December 2006



Source: GAO based on data and map assembled by the UN World Food Program.

Note: No new countries reported outbreaks among birds from July through December 2006. However, during the first 3 months of 2007 two additional countries—Bangladesh and Saudi Arabia—reported such outbreaks for the first time.

H5N1 has infected increasing numbers of humans. WHO confirmed only 4 cases of H5N1 infection among humans in 2003, and 3 of these occurred in one country, Vietnam. In contrast, WHO confirmed 115 human cases in 2006, in nine different countries. Table 1 shows how the number and distribution of human cases grew from 2003 through 2006. The largest numbers of human cases occurred in Southeast Asian countries where the virus is well established in wild and domestic birds.

Table 1: Confirmed Human H5N1 Cases by Country, 2003 through 2006

Countries by group		2003	2004	2005	2006	Total
Southeast Asian countries	Vietnam	3	29	61	—	93
	Indonesia	—	—	20	55	75
	Thailand	—	17	5	3	25
	China	1	—	8	13	22
	Cambodia	—	—	4	2	6
Other countries	Egypt	—	—	—	18	18
	Turkey	—	—	—	12	12
	Azerbaijan	—	—	—	8	8
	Iraq	—	—	—	3	3
	Djibouti	—	—	—	1	1
All countries		4	46	98	115	263

Source: WHO.

Note: Through June 12, 2007 WHO confirmed an additional 49 cases in six different countries. Of these cases, 24 occurred in Indonesia and 18 occurred in Egypt. The remainder occurred in Cambodia and in China, and in two countries that had not previously reported human case—Nigeria and Laos.

Pandemics can occur when influenza strains emerge that have never circulated among humans but can cause serious illness in them and can pass easily from one person to the next. H5N1 has shown that it can cause serious illness in humans, and could spark a pandemic if it evolves into a strain that has the ability to pass easily from one human to the next.¹⁰

H5N1 may evolve into such a strain gradually, through accumulation of a number of small mutations, or suddenly, through the introduction of

¹⁰According to HHS and WHO, there have been a limited number of human cases in which human-to-human transmission cannot be ruled out. However, H5N1 has not yet demonstrated an ability to spread efficiently and sustainably among humans.

genetic material from another influenza virus. Influenza A viruses, which cause both avian influenza outbreaks and human influenza pandemics, occur naturally in wild birds and can also infect pigs, humans, and other mammals. The various subtypes, including H5N1, mutate as they reproduce in their avian or mammal hosts. These small mutations continually produce new strains with slightly different characteristics. More rarely, when an animal or human is infected with two different subtypes, an entirely new subtype can emerge. Scientists believe that the 1957 and 1968 pandemics began when subtypes circulating in birds and humans simultaneously infected and combined into new subtypes in other host animals, most likely pigs.¹¹

Pandemic Risk Varies with Environmental Conditions and Preparedness

Disease experts caution that there are significant gaps in our understanding of the H5N1 virus in wild and domestic birds and in humans, and it is not possible to quantify the pandemic risk presented by this strain. However, they generally agree that the level of risk that H5N1 will spark a pandemic varies with (1) environmental factors, defined as the extent to which a country or region has already become infected with the virus—or may become infected from a neighboring country—and provides conditions in which the virus can spread in poultry and infect humans, and (2) preparedness factors, defined as the extent to which the country or region is prepared to detect the virus in poultry and humans and respond appropriately.

Taking both environmental and preparedness factors into consideration, the risk of a pandemic emerging from the current H5N1 epidemic in poultry is considered higher in countries or regions where

- the virus is well-established among domestic poultry;
- there is substantial risk that wild birds or unregulated trade in poultry and other birds will introduce the virus from neighboring infected countries;
- large numbers of poultry are raised in heavily populated areas;

¹¹H5N1 has been reported among pigs. Disease experts have also expressed concern about a pandemic virus emerging as a result of a human becoming simultaneously infected with H5N1 and one of the subtypes that commonly causes seasonal influenza.

-
- high-risk agricultural practices (such as allowing poultry unrestricted access to family homes and selling them in “wet markets”¹²) are common;
 - local authorities have little ability to detect, diagnose, and report H5N1 cases or outbreaks in either poultry or humans; or
 - local authorities have little ability to respond (apply control measures) and contain outbreaks when they occur.

In such conditions, outbreaks among humans or poultry are more likely to occur and to persist for prolonged periods before they are detected or investigated. This increases the potential for mutations, and thus the emergence of a pandemic strain.

Different Systems and Approaches Are Used to Control Influenza in Animals and Humans

The global community maintains separate systems for addressing influenza and other infectious diseases in animals and humans. At the country level, agricultural agencies are responsible for addressing disease threats to animals, while public health agencies are responsible for addressing disease threats to humans. International organizations support and coordinate these national efforts. In particular, OIE and FAO share lead responsibility for addressing infectious disease threats to animal health, while WHO leads efforts to safeguard humans. National agencies with technical expertise, such as USDA and HHS, assist in these efforts.

The animal and human health systems have traditionally approached influenza in different ways. The animal health system has emphasized measures to protect flocks from exposure to influenza—for example, by reducing contact with wild birds—and, when outbreaks nonetheless occur, taking action to contain them and eradicate threatening strains. Outbreak control measures include (1) identifying and isolating infected zones, (2) “stamping out” the virus by culling (killing) all poultry within these zones, and (3) cleaning and disinfecting facilities before reintroducing poultry. Vaccines that prevent clinical illness in poultry—and decrease the risk of transmission to both other poultry and humans—are available. However, these vaccines do not completely prevent

¹²FAO and OIE define a wet market as a “a place, either fixed or temporary, where members of the public go to buy small mammals and birds that are (a) live and slaughtered there, (b) live and taken home to be slaughtered, or (c) already slaughtered and sold as meat.” Some of these markets provide greater risks of disease transmission than others. High-risk practices in some of these markets include stacking cages on top of one another, inadequate cleaning and disinfection, and returning unsold birds (which may have been exposed to the virus) to the farms from which they came.

influenza viruses from infecting and replicating in apparently healthy poultry and veterinary authorities recommend their use only in conjunction with other disease control measures.¹³ No effective antiviral drugs are available for poultry and thus animal health agencies do not recommend their use.

The human health system's approach to both seasonal and pandemic influenza has traditionally emphasized development and application of vaccines to limit spread and protect individuals.¹⁴ However, while vaccines are likely to play a key role in mitigating the impact of the next pandemic, they are likely to play little role in forestalling its onset, barring major changes in technology. Prior to a strain being identified, the pharmaceutical industry cannot currently produce vaccines that are certain to be effective against it. Rather, when a new strain is identified, 6 months or more are required to develop and reach full production capacity for new vaccines. Therefore, a pandemic will likely be well under way before a vaccine that is specifically formulated to counteract the pandemic strain becomes available.¹⁵ Antiviral drugs are also used to treat and prevent seasonal influenza in humans and could be used in the event of a

¹³In March 2007 an international scientific conference organized by FAO and OIE, among other organizations, recommended that poultry be vaccinated against avian influenza, particularly in countries where the disease is well-established and where other control measures cannot stop the disease from spreading. However, the conferees added that any vaccination policy should include a strategy for eventually ending the vaccinations so that countries do not rely on costly, long-term vaccination campaigns, and recommended the use of tools to differentiate infected from vaccinated animals. An OIE official emphasized that the organization does not recommend across-the-board preventive vaccination in countries not yet affected by H5N1.

¹⁴Vaccines can provide full or partial immunity to influenza and thus help control the spread of the disease. Vaccines confer immunity by causing the body to produce antibodies to fight off particular strains. Vaccines that produce an adequate antibody response to a particular strain may prevent illness from that strain in 70 to 90 percent of healthy adults under the age of 65, with lower effectiveness among older adults.

¹⁵While specifically targeted vaccines cannot be produced until a pandemic strain is identified, efforts are under way in the United States and other countries to produce pre-pandemic vaccines—that is, vaccines that are designed to provide protection against influenza strains (such as H5N1 strains) that have caused isolated infections in humans and have pandemic potential. Since such vaccines are prepared prior to the emergence of a pandemic strain, they may be a good or poor match (and thus provide greater or lesser protection) for the pandemic strain that ultimately emerges. In April 2007 the U.S. Food and Drug Administration approved the first such pre-pandemic vaccine for human use in the United States against H5N1.

pandemic to contain or slow the spread of the virus.¹⁶ In contrast to the approach used with poultry, the human public health community has not generally attempted to contain an initial outbreak of a pandemic-potential strain or to eradicate it while it is still confined to a limited area.¹⁷

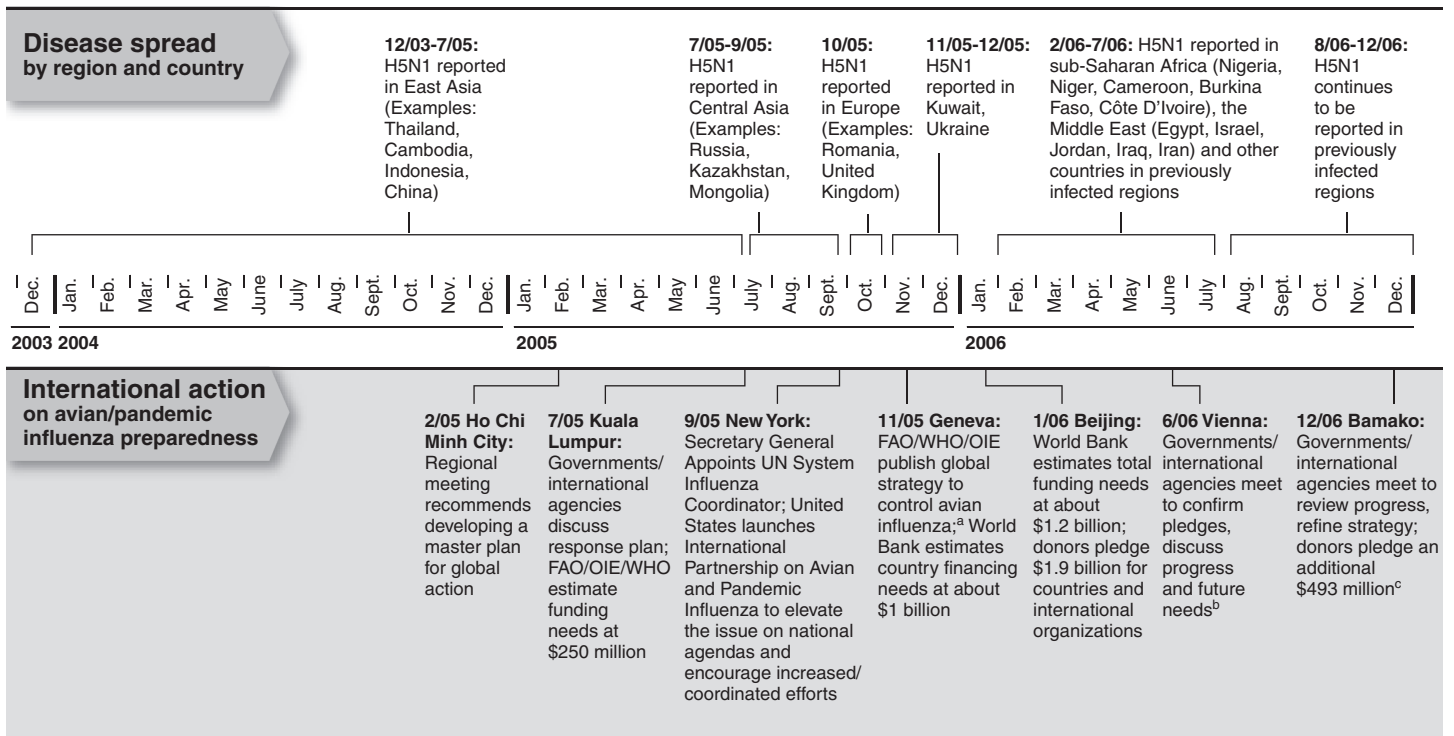
The United States and International Partners Have Adopted an Overall Response Strategy

The U.S. government has developed a national strategy for addressing the threats presented by H5N1, and has also worked with its international partners to develop an overall global strategy that is compatible with the U.S. approach. In November 2005 the Homeland Security Council published an interagency *National Strategy for Pandemic Influenza*, followed in May 2006 by an *Implementation Plan* that assigns responsibilities to specific U.S. agencies. The U.S. strategy, in addition to outlining U.S. plans for coping with a pandemic within its own territory, states that the United States will work to “stop, slow, or otherwise limit” a pandemic beginning outside its own territory. The strategy has three pillars that provide a framework for its implementation: (1) preparedness and communications, (2) surveillance and detection, and (3) response and containment. The United States has also worked with UN agencies, OIE, and other governments to develop an overall international strategy. Figure 2 shows key steps in the development of this international strategy in relation to the spread of the H5N1 virus. These steps included the appointment of a UN System Influenza Coordinator and periodic global conferences to review progress and refine the strategy. The most recent global conference was held in Bamako, Mali, in early December 2006.

¹⁶Antiviral drugs can be used both to prevent illness and as a treatment. Studies suggest that such drugs may be as effective as vaccines in preventing influenza illness in healthy young adults and, when used for treatment, to shorten its duration and severity.

¹⁷An exception was the U.S. government decision to mass vaccinate the public against an outbreak of swine flu in New Jersey in 1976. That effort was halted when a small apparent risk emerged of contracting Guillain-Barre syndrome—an inflammatory disorder that can cause paralysis—from the swine flu vaccine.

Figure 2: Global Response to the Spread of H5N1 through December 2006



Source: GAO.

^aFAO and OIE, in collaboration with WHO, *A Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza* (November 2005).

^bSee UN System Influenza Coordinator and World Bank, *Responses to Avian and Human Influenza Threats: Progress, Analysis and Recommendations January-June 2006*.

^cSee UN System Influenza Coordinator and World Bank, *Responses to Avian and Human Influenza Threats: Progress, Analysis and Recommendations July-December 2006* (January 2007).

At the global level, according to the UN coordinator, the overall strategic goal of avian and pandemic influenza-related efforts is to create conditions that enable all countries to (1) control avian influenza in poultry, and thus reduce the risk that it poses for humans; (2) watch for sustained human-to-human transmission of the disease (through improved surveillance) and be ready to contain it;¹⁸ and (3) if containment is not successful, mitigate the

¹⁸WHO has developed a strategy for containing an initial outbreak of pandemic influenza. For the most recent version of this strategy, see *WHO Interim Protocol: Rapid operations to contain the initial emergence of pandemic influenza* (May 2007).

impact of a pandemic. To guide efforts to improve capacity for performing these tasks, the UN System Influenza Coordinator has identified seven broad objectives. Four of these focus in large measure on improving capacity to forestall a pandemic:¹⁹

- Improve animal health practices and the performance of veterinary services.
- Sustain livelihoods of poorer farmers whose animals may be affected by illness or by control measures, including culling programs.
- Strengthen public health services in their ability to protect against newly emerging infections.
- Provide public information to encourage behavioral changes that will reduce pandemic risks.

Information Gaps Hinder Assessments of Comparative Risk and Identification of Priority Countries

Although U.S. and international assessments have identified serious and widespread environmental and preparedness-related risks in many countries, gaps in the available information on both types of risk have hindered comprehensive, well-informed comparisons of risk levels by country. Assessment efforts that we examined, carried out by U.S. and international agencies from late 2005 through late 2006, illustrate these gaps.²⁰ Efforts to assemble more comprehensive information are under way, but will take time to produce results. Despite these limitations, the Homeland Security Council has used available information to designate about 20 priority countries for U.S. assistance, and U.S. officials have determined that the United States should focus, in particular, on certain of these countries where pandemic risk levels appear comparatively high, including Indonesia, Nigeria, and Egypt.

¹⁹Two of the remaining three objectives focus on increasing preparedness for managing under pandemic conditions. The final objective focuses on coordinating national, regional, and international stakeholders in both areas. According to the World Bank, effective action against avian and pandemic influenza is multisectoral in nature and must involve players from many areas, including human health, agriculture, economics, and finance.

²⁰WHO, FAO, and other international, U.S., and foreign country agencies also have conducted a variety of assessment and assistance missions in individual countries. For example, WHO reported carrying out assessment missions in 29 countries during the first 6 months of 2006, often in collaboration with other agencies. Such missions provide useful information for planning preparedness improvement efforts. However, they have not been conducted in a comprehensive or uniform manner.

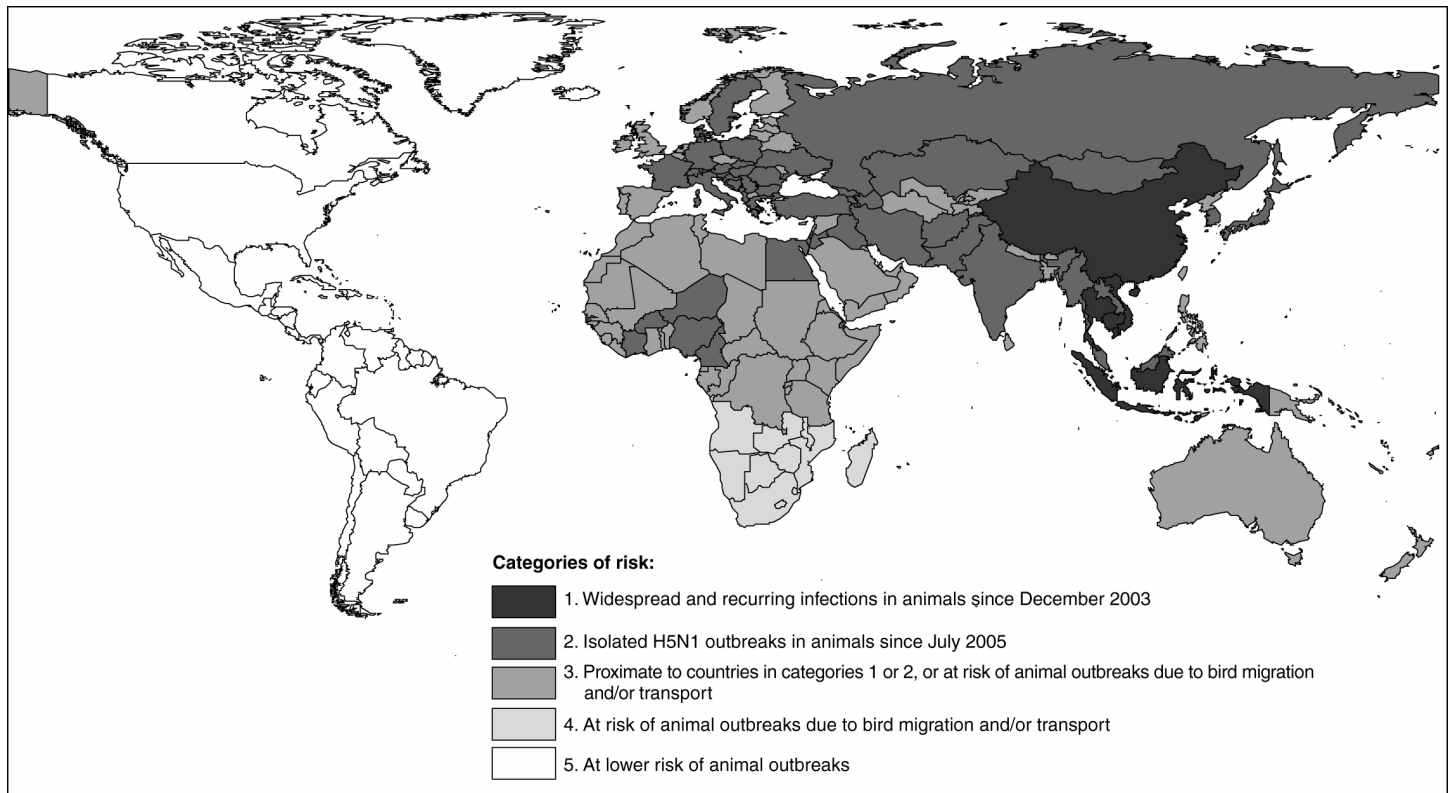
USAID Environmental Risk Assessment Illustrated Information Shortfalls

A global analysis based on environmental factors that USAID originally conducted during 2005²¹ identified areas at greater risk for outbreaks but revealed gaps in available information. USAID considered two factors in its analysis: (1) the extent to which H5N1 was already present in animals and (2) the likelihood that the virus will be introduced from another country through factors such as trade in poultry and other birds and bird migration. USAID undertook this assessment to inform its decisions about spending priorities in the initial phase of heightened concern about human pandemic risk from H5N1, when very little risk information was available, according to USAID officials. USAID used OIE data on reported animal cases. For countries that had not yet reported cases, USAID estimated the risk of introduction based on proximity to affected countries and available information on poultry trade and bird migration patterns. USAID concluded that the countries at highest risk for new or recurring H5N1 outbreaks, or both, were those in Southeast Asia where the disease was well-established, with widespread and recurring infections in animals since 2003 (see fig. 3). Countries that were comparatively distant from those that had already reported cases were deemed at lowest risk.²²

²¹USAID last updated this assessment in May 2006.

²²The World Bank conducted a similar risk assessment in December 2005, when H5N1 had been reported in fewer than 20 countries, mainly in Eastern and Central Asia. The subsequent detection of the virus in more than 30 additional countries, including several in Africa, rendered this earlier assessment invalid, and the World Bank has not redone its analysis.

Figure 3: USAID Assessment of Country-by-Country Risk of H5N1 Outbreaks



Sources: GAO, based on USAID data; map (Map Resources).

We identified three constraints on the reliability of these USAID categorizations. First, global surveillance of the disease among domestic animals has serious shortfalls. While OIE and FAO collaborate to obtain and confirm information on suspected H5N1 cases, surveillance capacity remains weak in many countries.²³ Second, estimates of risk for disease transmission from one country to another, as well as among regions within countries, are difficult to make because of uncertainties about how factors such as trade in poultry and other birds and wild bird migration affect the movement of the disease. Specifically, illegal trade in birds is largely undocumented and movement of the virus through the wild bird

²³Similar weaknesses hamper surveillance among humans. For example, one senior WHO official said that numerous “disease blind spots” around the world hamper the organization’s ability to identify H5N1 outbreaks.

population is poorly understood. Finally, these categorizations did not take other elements of environmental risk, such as high-risk agricultural practices, into account.²⁴

USAID, State Department, and UN Data Collection Efforts Have Found Widespread Preparedness Weaknesses but Have Not Resulted in Clear Country Comparisons

USAID, the State Department, and the UN System Influenza Coordinator²⁵ have each administered questionnaires to assess country-by-country avian and pandemic influenza preparedness. These efforts identified widespread preparedness weaknesses and provided information for planning improvement efforts in individual countries. However, the results did not provide information that was sufficiently detailed or complete to permit clear categorization of countries by level of preparedness.

USAID and State Department Data Collection on Country Preparedness

During 2005, USAID and the State Department collected country-level data that indicated widespread weaknesses in countries' ability to detect and respond to avian and pandemic influenza, but did not provide enough information to place the examined countries in preparedness categories. USAID and the State Department sent separate questionnaires to their respective missions around the world to obtain a quick overview of avian and pandemic influenza preparedness by country.²⁶ The two agencies requested information on key areas of concern, including surveillance, response, and communications capacity, and stockpiles of drugs and other

²⁴Analysts from the U.S. intelligence community have attempted to provide a more thorough analysis of risk arising from environmental factors. This work was initially conducted in late 2006 under the auspices of the Department of State, focusing on Southeast Asia. The intelligence community analysts subsequently extended this analysis to cover other countries. They developed a statistical model for identifying areas at greater risk, introducing corrections for disease underreporting in areas known to have poor surveillance, and employing data on four general factors significant to the spread of H5N1 in animals: commerce, farming practices, terrain, and seasonality. (For example, the model uses detailed data on proximity to roads, poultry populations, terrain ruggedness, and monthly minimum and maximum temperatures.) The analysis used statistical techniques to identify areas at greater or lesser risk for future H5N1 outbreaks. According to a State Department official, the model provides useful insights, but is of limited value for predicting new outbreaks and is not sufficiently robust to be relied upon as a basis for differentiating among countries or allocating resources to those presenting the greatest risk.

²⁵The UN effort was undertaken in collaboration with the World Bank.

²⁶USAID maintains country-specific missions in 80 developing countries and territories and regional offices in 6 such countries. The State Department maintains 258 embassies, consulates, and diplomatic missions in about 180 countries and territories.

UN Data Collection and
Analysis on Country
Preparedness

supplies. These efforts identified widespread preparedness shortfalls. Our analysis of a selection of the USAID and State Department results found, for example, that many of the countries had not prepared stockpiles of antiviral drugs or did not have plans for compensating farmers in the event that culling becomes necessary. Missions in African countries reported the greatest overall shortfalls. (See app. V for our analysis of the USAID and State Department preparedness responses.)

USAID disease experts used this information to rate each country according to a numerical “preparedness index,” but decided against using the results of the exercise to help establish U.S. assistance priorities. According to USAID headquarters officials, the information submitted by its missions provided insights on preparedness strengths and weaknesses in the examined countries but was not sufficiently complete or detailed to allow them to rate countries on a numerical scale. The officials noted that they had difficulty interpreting the largely qualitative information provided by their field missions and, in some instances, found that the responses did not match their experience in the relevant countries. In addition, the USAID exercise did not include developed countries or developing countries where the agency does not maintain a presence. The State Department did not use the information it had collected to categorize countries by preparedness level.

The UN System Influenza Coordinator, in collaboration with the World Bank, has completed two data collection and analysis efforts that provided useful information on country preparedness. However, this information was not sufficiently complete or comprehensive to allow clear country comparisons. These efforts, which surveyed UN mission staff in countries, were conducted before the June and December 2006 global conferences on avian and pandemic influenza preparedness, to inform discussion at the conferences. In collaboration with the World Bank, UN staff have used the information, in addition to information from government officials and the public domain, to summarize each country’s status with regard to seven “success factors.” The staff also analyzed the aggregate results for all countries and for specific regions.²⁷

Similar to the USAID effort, this exercise identified widespread shortcomings in country-level preparedness. For example, the UN found

²⁷The country summaries and analyses of the combined results are available at <http://www.undg.org/index.cfm?P=298>.

that about one-third of the countries lacked the capacity to diagnose avian influenza in humans. Figure 4 presents the UN's summary for a representative country, Bangladesh. The information indicates, for example, that programs were in place to strengthen Bangladesh's surveillance and reporting for avian influenza in both animals and humans, but capacity to detect outbreaks was still constrained.

Figure 4: UN Summary of Country Preparedness, December 2006 – Bangladesh

Country	Bangladesh
Summary	Current position: no direct experience of HPAI H5NI to date Specific resource and technical needs: capacity to direct AI infection in animals and in people, laboratory capacity and networks, evidence on clinical case management
Introduction	The country's 2005 GNI/c at PPP (\$2090) and 2001 HDI (0.502) place it around the 10th percentile for the region. Among countries in the region eligible for IDA, it has a median average 2005 IDA Resource allocation Index (3.4).
Success Factors	
1.	<i>Is there a strong commitment to ensuring AHI strategy implementation at the higher political level, accompanied by effective leadership of all concerned stakeholders?</i> ----- There is a national Task Force supported by a central coordinating body. The integrated national plan has been endorsed by government. The extent is unclear to which plans have been tested with simulation exercises. Government has engaged all non-governmental sectors in its planning, indicating effective leadership of all stakeholders.
2.	<i>Are there clear procedures and systems for managing the rapid implementation of priority actions?</i> ----- There are established mechanism for communicating public health messages and for information-sharing between government and international technical agencies. Information is being sought about standard procedures for communicating between government, agencies, and hospitals, about capacity to detect AI infection in animals and in people; and about the extent of the capacity for rapid implementation of priority actions.
3.	<i>Is attention being given to improve functioning of veterinary and human health services at all levels, with a transparent approach to the sharing and dissemination of information about suspected diseases outbreaks, immediate efforts to establish their cause and prompt responses (including restriction of movement of animals that are at risk)?</i> ----- There are programmers in place to strengthen all surveillance and reporting in animals and people. All controls on cross-border trade movement are planned or being implemented. Information is being sought about any plans for controls on contact between different bird species. However efforts to establish the cause of outbreaks will be limited by detection capacity. Information is being sought about issue of any clinical guidance for the management of human cases. Tracing of case contracts is planned. There is a strategy for acquiring anti-virals and pandemic vaccine.
4.	<i>Are incentives and/or compensation schemes being combined with effective communication to communities on the importance of immediately reporting disease outbreaks in animals to responsible authorities?</i> ----- Information on any compensation scheme is being sought. There are established public health communications systems, and mechanisms for sharing information with technical international agencies; the extent is unclear of effective communication on animal disease reporting.
5.	<i>Is there effective mobilisation of civil society and the private sector?</i> ----- The government has engaged civil society, private sector, national NGOs, technical international agencies and bilateral donors in its AHI planning. It is not yet clear how far the non-governmental sectors have been mobilized.
6.	<i>Have national mass communication campaigns (that promote healthy behavior and focus on reducing the extent to which humans might be exposed to HPAI viruses) been implemented successfully?</i> ----- There are established public health communication systems. Information on any mass HPAI communications campaigns being sought.
7.	<i>Is there coordination with and across external partners?</i> ----- The FAO and WHO are active in assisting on AHI. The World Bank has undertaken a unilateral mission to appraise AHI plans. ADB, USAID, JICA, and DFID have also been active. There is coordination with and across these partners.
Constraints to implementation	The cited constraints were: finance, limited laboratory capacity and networks, and lack of scientific evidence on clinical case management.

Source: Reproduced from *Responses to Avian and Human Influenza Threats, July-December 2006, Part 2: Country Profiles* (UN System Influenza Coordinator and World Bank, January 2007).

Legend: AI = avian influenza; ADB = Asian Development Bank; AHI = avian and human influenza; DFID = Department for International Development (of the United Kingdom); GDP = gross domestic product; GNI/c at PPP = gross national income per capita at purchasing power parity; HDI = human development index; HPAI = highly pathogenic avian influenza; IDA = International Development Association (of the World Bank); JICA = Japan International Cooperation Agency; NGO = nongovernmental organization.

Like USAID, the UN data-gathering effort encountered obstacles that preclude placing countries in preparedness categories. As shown in figure 4, for example, the UN mission in Bangladesh could not provide a clear response concerning the country's planning for farmer compensation in the event that poultry culling becomes necessary.²⁸ In addition, the UN sought information from its mission staff in about 200 countries, but obtained information on 141 of these in its first round of data gathering and 80 in its second. The UN cautioned that there had been no independent validation of the information obtained on individual countries, and that the information could not be used to compare countries to one another or to make a comprehensive evaluation of preparedness levels.

World Bank-Led Missions Have Provided Additional Information for Some Countries but Have Not Provided Basis for Comprehensive Comparisons

The World Bank has conducted more in-depth assessments of both environmental and preparedness-related risk factors in some countries (those that have expressed interest in World Bank assistance), but they do not provide a basis for making complete or comprehensive global comparisons.

The World Bank has developed guidance for its staff to apply in generating the information needed to design avian and pandemic influenza preparedness improvement projects in individual countries.²⁹ The guidance

²⁸In commenting on a draft of this report, the State Department stated that Bangladesh has had great difficulty in controlling the H5N1 outbreak that began in that country in February 2007. In addition, OIE commented that the UN assessments about preparedness in Bangladesh in table 4 are very optimistic. According to the State Department, like many nations facing severe budget constraints and with inadequate laboratory capacity and limited medical and animal health infrastructure, Bangladesh has not succeeded in developing precise plans for responding to avian influenza. According to the department, the UN mission's inability to get a clear response regarding compensation for culled birds reflected the fact that, despite government assurances that such a plan was forthcoming, no plan had been agreed upon and no compensation paid as of early May.

²⁹See World Bank, "Annex 2d: Country Preparedness Assessment Tool and Financing under the Adaptable Program Loan," *Program Framework Document for Proposed Loans/Credits/Grants in the Amount of US \$500 Million Equivalent for a Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response* (Washington, D.C.: December 2005).

instructs bank staff charged with preparing assistance projects to examine and take into account both environmental and preparedness-related risk factors. In preparing their projects, bank staff often work with officials from other organizations with technical expertise, including U.S. agencies, WHO, and FAO, and conduct fieldwork in the countries requesting bank assistance. As of December 2006, the World Bank reported that it had completed or was conducting assessments of national needs in more than 30 countries.³⁰

The following are examples of preparedness shortfalls in the human and animal sectors identified by World Bank teams:

Laos:

- District-level staff responsible for human disease surveillance typically are not qualified in epidemiology and lack the equipment needed to report health events in a timely manner.³¹
- Public health laboratories are not capable of diagnosing influenza in humans.³²
- The human health care system has insufficient professional staff and lacks essential drugs and needed equipment.

Nigeria:

- Veterinary services are inadequately equipped and trained to deal with large-scale outbreaks.
- Most available laboratory facilities are outdated, with laboratory staff needing substantial training.

Although the World Bank's assessment efforts generate information that is useful in designing country-specific programs, they do not provide a basis for making complete or comprehensive global comparisons of pandemic

³⁰As of the end of December, the World Bank reported having 17 avian and pandemic influenza preparedness projects under way—in Zambia, the West Bank and Gaza, Romania, Djibouti, Laos, Tajikistan, Albania, Moldova, Armenia, Georgia, Turkey, Nigeria, the Kyrgyz Republic, Vietnam, Azerbaijan, and the Middle East-North Africa region. According to Treasury, the World Bank reported that it had another 15 projects in preparation.

³¹According to the World Bank, Laos has 141 administrative districts.

³²According to HHS, this information is no longer accurate. With HHS assistance, Laos has established a national influenza laboratory that is capable of diagnosing H5N1 cases without outside assistance.

risk levels. The World Bank performs such studies only in countries that request bank assistance, and incorporates its findings into project documents as needed. That is, bank staff members cite assessment findings to support particular points in individual project plans.³³ The World Bank does not assess risk in countries that have not requested bank assistance, nor does it publish its assessment results in independent documents that employ a common format, and thus could be readily employed to make country-by-country comparisons.³⁴

Efforts to Assemble More Comprehensive Information on Country Preparedness Are Under Way but Will Take Time to Produce Results

U.S. government and international agencies have initiated several data-gathering and analysis efforts to provide more complete information on country preparedness levels. However, these efforts will take time to produce substantial results.

First, HHS's Centers for Disease Control and Prevention (CDC) is developing an assessment protocol or "scorecard" that the United States could employ to obtain systematic, and therefore comparable, information on pandemic preparedness levels by country. CDC officials explained that no such assessment tool currently exists. CDC officials are developing indicators that could be applied to rate core capabilities in key areas, such as differentiating among influenza strains and identifying clusters of human illness that may signal emergence of a pandemic strain. According to CDC officials, creating such a system would provide the United States with a basis for comparing preparedness in different countries, identifying response capabilities within countries that are particularly weak, and—over time—gauging the impact of U.S. efforts to address these shortcomings. CDC officials said that they hoped to begin testing these indicators before the end of 2007. They stated that their efforts have so far been limited to human public health functions, but they have discussed with USDA and USAID opportunities to incorporate animal health

³³See, for example, the technical annexes that describe the bank's influenza preparedness projects in Laos and Nigeria, available through the World Bank's Internet project information portal at <http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,menuPK:115635~pagePK:64020917~piPK:64021009~theSitePK:40941,00.html>.

³⁴The World Bank stated that the bank is prepared to work with national or international agencies undertaking global risk assessments by making relevant information from its project appraisal reports available to them. The World Bank also noted that, over time, implementation progress reports will become available from the World Bank's regular supervision of influenza-related programs and information from those reports will also be made available.

functions into this format once the prototype has been worked out for human health capabilities.

Second, the UN System Influenza Coordinator's staff has indicated that it is working with the World Bank to improve the quality of the UN's country preparedness questionnaire and increase the response rate. The goal is for their periodic efforts to assess global and country-level preparedness to generate more useful information. The impact of these efforts will not be clear until the staff publishes the results of its third survey prior to the next major global conference on avian and pandemic influenza, which is scheduled to take place in New Delhi in December 2007.

Third, in 2006 OIE published an evaluation tool that can be used to assess the capacity of national veterinary services.³⁵ While it has established standards for national veterinary services, the organization had not previously developed a tool that could be used to determine the extent to which national systems meet these standards. With assistance from the United States and other donors, OIE reports that it has trained over 70 people in how to apply its evaluation tool and has initiated assessments of veterinary services in 15 countries. A senior OIE official indicated that the organization intends to complete assessments of over 100 countries over the next 3 years.³⁶

Finally, under the terms of a 2005 revision of the *International Health Regulations*, WHO member countries have agreed to establish international standards for "core capacity" in disease surveillance and response systems and to assess the extent to which their national systems meet these standards. However, guidance on how to conduct such assessments is still being developed.³⁷ Such assessments would provide consistent information on preparedness in all participating countries. WHO is required to support implementation of these regulations in several ways, including supporting assessments of national capacity. The UN System Influenza Coordinator has identified development of national

³⁵This tool, *Performance, Vision and Strategy for Veterinary Services*, can be viewed at http://www.oie.int/eng/oie/organisation/en_vet_eval_tool.htm?e1d2.

³⁶The World Bank has indicated that it intends to rely upon this tool to evaluate veterinary systems in countries that have requested influenza-related assistance.

³⁷Annex 1 of the revised regulations defines core capacity requirements for national surveillance and response systems. For the revised regulations and the regulations as they stood prior to this revision, see <http://www.who.int/csr/ihr/en/>.

systems that comply with the new international standards as a key objective of global efforts to improve pandemic preparedness, and WHO has begun developing assessment tools. However, while the regulations enter into force in June 2007, member states are not required to assess their national capacities until 2009 and are not required to come into compliance with the revised regulations until 2012.³⁸

The United States Has Prioritized Countries Based on Available Information

The United States has prioritized countries for U.S. assistance, with the Homeland Security Council identifying about 20 “priority countries,” and agency officials have determined that the United States should focus in particular on certain of these countries where pandemic risk levels appear comparatively high.

In May 2006, the Homeland Security Council categorized countries, using the limited information available on environmental and preparedness-related risks from U.S. and international agencies, and also taking U.S. foreign policy concerns into account. The council differentiated among countries primarily according to available information on H5N1’s presence in these countries or their proximity to countries that have reported the disease. According to agency officials and planning documents, more detailed information on environmental risk factors and country preparedness would have provided a more satisfactory basis for differentiating among countries, but such information was not available.

In May 2006 the council grouped 131 countries into four risk categories:

- **At-risk countries:** Unaffected countries with insufficient medical, public health, or veterinary capacity to prevent, detect, or contain influenza with pandemic potential.
- **High-risk countries:** At-risk countries located in proximity to affected countries, or in which a wildlife case of influenza with pandemic potential has been detected.

³⁸The revised regulations specify that each state party shall assess its systems within 2 years of the regulations entering into force on June 15, 2007. They also specify that each state party shall develop systems that meet the new requirements as soon as possible, but no later than 5 years from the date the regulations enter into force. In certain circumstances, the revised regulations allow countries to request an extension of up to 4 years to develop systems that meet the requirements.

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- **Affected countries:** At-risk countries experiencing widespread and recurring or isolated cases in humans or domestic animals of influenza with human pandemic potential.
 - **Priority countries:** High-risk or affected countries meriting special attention because of the severity of their outbreaks, their strategic importance, their regional role, or foreign policy priorities.

Through this process, the Homeland Security Council initially identified 19 U.S. priority countries.³⁹ They include countries in Southeast Asia where H5N1 has become well-established (such as Indonesia) as well as countries that

- have experienced severe outbreaks (such as Egypt);
- have not yet experienced major outbreaks, but U.S. foreign policy considerations mandate their identification as a priority (such as Afghanistan); or
- are playing an important regional role in responding to the H5N1 threat (such as Thailand).

The council has updated the country categorizations, according to State Department officials, and there have been slight changes since the original list was completed. According to these officials, the council had designated 21 countries as priority countries as of March 2007.

In addition, U.S. agency officials stated that certain of these priority countries have emerged as being of especially high concern, and the State Department is coordinating preparation of interagency operating plans for U.S. assistance to these countries. Based on ongoing evaluation of both environmental and preparedness-related factors, agency officials stated that Indonesia, Egypt, Nigeria, and a small number of Southeast Asian countries present comparatively high levels of pandemic risk and thus merit greatest attention. According to the State Department, a plan for Indonesia has been completed and plans are being prepared for Egypt, Nigeria, and three additional Southeast Asian countries, as well as for U.S. assistance to international organizations such as WHO. According to State Department officials, each plan will provide information on a country's

³⁹According to U.S. officials, the list of priority countries has not been made public because of the sensitivity of the categorizations for some countries. With respect to the other three categories, the Homeland Security Council initially identified 63 at-risk countries, 39 high-risk countries, and 10 affected countries. The council did not categorize 62 countries that were viewed as not needing U.S. assistance. This group was composed primarily of high- or upper-middle-income countries and small island nations.

avian and pandemic influenza preparedness strengths and weaknesses and lay out a U.S. interagency strategy for addressing them, taking into account the actions of the host governments and other donors. The country plans are to be laid out according to the three pillars of the U.S. *National Strategy for Pandemic Influenza*: preparedness and communications, surveillance and detection, and response and containment.

The United States Has Played a Prominent Role in Global Efforts to Improve Preparedness

The United States has played a prominent role in global efforts to improve avian and pandemic influenza preparedness, committing more funds than any other donor country and creating a framework for monitoring its efforts. According to data assembled by the World Bank, U.S. commitments amounted to about 27 percent of overall donor assistance as of December 2006. U.S. agencies and other donors are supporting efforts to improve preparedness at the country-specific, regional, and global levels, and the bulk of the country-specific assistance has gone to U.S. priority countries. USAID and HHS have provided most of the U.S. funds, while the State Department coordinates the United States' international efforts. The U.S. *National Strategy for Pandemic Influenza Implementation Plan* establishes a framework for U.S. efforts to improve international (and domestic) preparedness, listing specific action items, assigning agencies responsibility for completing them, and specifying performance measures and time frames for determining whether they have been completed. The Homeland Security Council is responsible for monitoring the plan's implementation. The council reported in December 2006 that all action items due to be completed by November had been completed, and provided evidence of timely completion for the majority of the items.

The United States Has Been a Leader in Financing Efforts to Improve Global Preparedness

As shown in figure 5, the United States has been a leader in financing efforts to improve preparedness for pandemic influenza around the world.⁴⁰ Through December 2006, the United States had committed about \$377 million to improve global preparedness for avian and pandemic influenza.⁴¹ This amounted to about 27 percent of the \$1.4 billion committed by all donors combined; exceeded the amounts other individual donors, including the World Bank, the Asian Development Bank, and Japan, had committed;⁴² and was also greater than combined commitments by the European Commission and European Union member countries.⁴³ In terms of pledged amounts, the United States has pledged \$434 million, behind the World Bank and the Asian Development Bank, which offer loans and grant assistance.⁴⁴

⁴⁰Data on commitments by donor, including the United States, were obtained from the World Bank. U.S. data reflect amounts reported to the World Bank by the United States. Some U.S. activities that also benefit international influenza preparedness, including certain efforts that improve global response capacity for a range of infectious diseases, are not included in the amounts the United States reports.

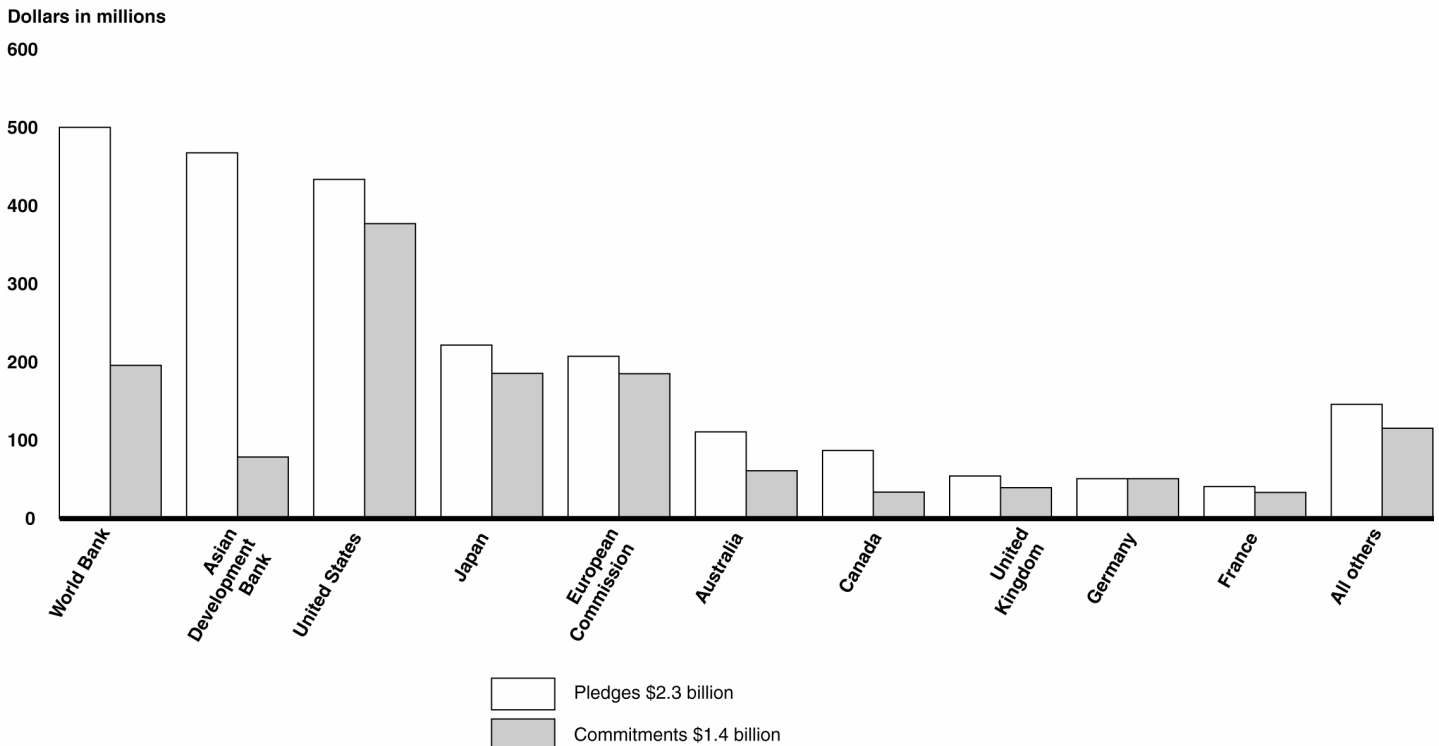
⁴¹Overall, Congress has appropriated about \$6.1 billion for avian and pandemic influenza-related preparedness, through the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief, 2005 (Pub. L. No. 109-13); the Department of Defense, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act, 2006 (Pub. L. No. 109-148); and the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Pub. L. No. 109-234). These appropriations provided funds for a variety of domestic and international purposes, including (in addition to the types of activities described in this report) support for developing vaccines and antiviral drugs.

⁴²As noted above, the World Bank is preparing a number of additional projects that will substantially increase the total that the bank has committed to avian and pandemic influenza preparedness.

⁴³According to the World Bank, the total amount committed by the European Commission and European Union member countries was about \$360 million.

⁴⁴The World Bank has provided nearly all of its funding in the form of loans, sometimes at highly concessional rates, to individual countries. Asian Development Bank financing has been more evenly divided between loans and grants. These institutions have also provided funds to concerned international organizations. For example, through October 2006 the World Bank has committed \$1 million to OIE, and the Asian Development Bank has committed a total of nearly \$19 million to WHO and FAO.

Figure 5: Pledges and Commitments for International Avian and Pandemic Influenza Assistance by Donor, as of December 2006



Source: GAO analysis of data from January 2007 report *Responses to Avian and Human Influenza Threats, July-December 2006*, published by the UN System Influenza Coordinator and World Bank.

Notes:

The World Bank defines a pledge as an indication of intent to mobilize funds for which an approximate sum of contribution is indicated. The World Bank defines a commitment as the result of an agreement between the donor and recipient for designated purposes or a firm decision, such as a legislative appropriation, that prevents the use of an allocated amount for other purposes.

These data reflect amounts reported to the World Bank by member countries, with some validation by the World Bank. Some U.S. activities that also benefit international influenza preparedness, including certain efforts that improve global response capacity for a range of infectious diseases, are not included in the amounts the United States reports.

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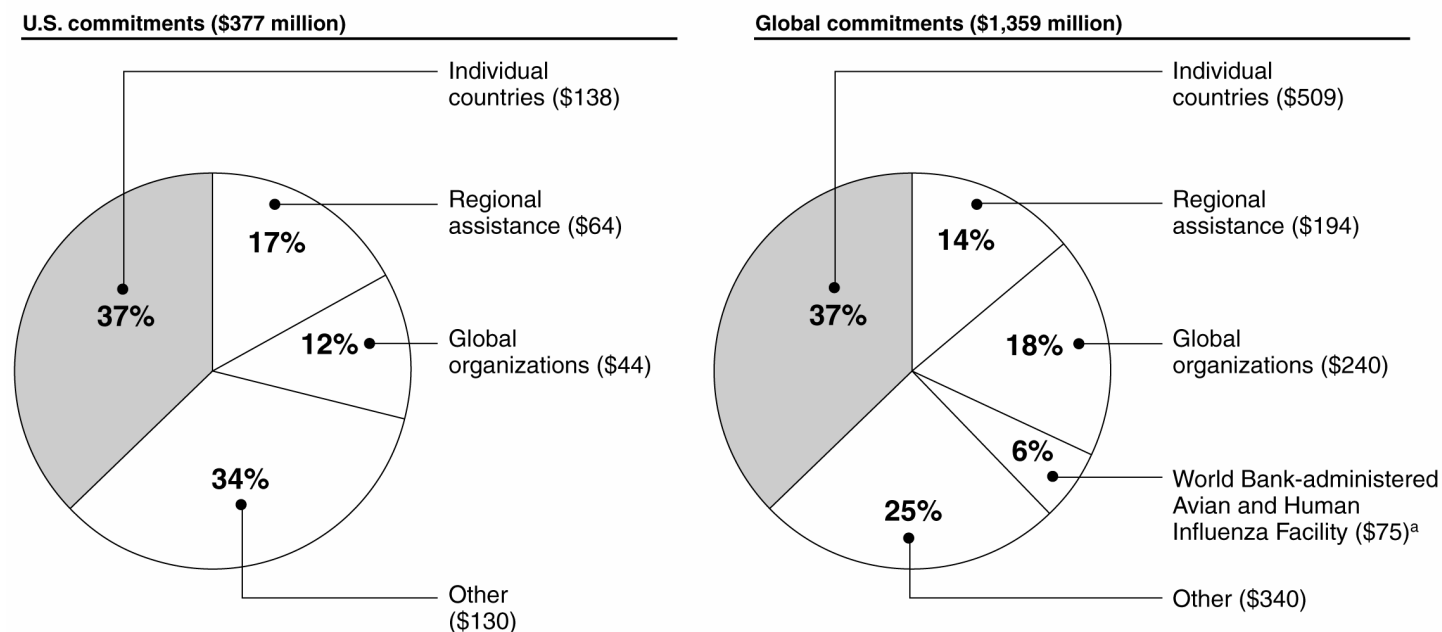
The pledge and commitment totals allocated to the World Bank in this presentation do not include the Avian and Human Influenza Facility—a World Bank-administered grant-making mechanism. Funds contributed to this facility are reflected in the totals for the European Commission, the United Kingdom, Australia, and other donors. The United States has not contributed to the facility.

See app. I for additional information on these data.

The United States and Other Donors Are Funding Efforts at Country, Regional, and Global Levels

The United States and other donors are supporting efforts to improve preparedness at the country-specific, regional, and global levels (see fig. 6). According to the World Bank, more than one-third of U.S. and total global commitments have gone to assist individual countries. Substantial shares of U.S. and global commitments also have been directed to regionally focused programs, with primary emphasis on the Asia-Pacific region, and to relevant global organizations, with primary emphasis on WHO and FAO (see app. VI for additional detail). More than half of U.S. funding in the “other” category has been used to stockpile nonpharmaceutical equipment, such as protective suits for workers involved in addressing outbreaks in birds or humans. The other category also includes support for research, wild bird surveillance, and a variety of other purposes.

Figure 6: Allocation of U.S. and Global Commitments for International Avian and Pandemic Influenza Assistance, as of December 2006



Source: GAO analysis of data from January 2007 report *Responses to Avian and Human Influenza Threats, July-December 2006*, published by the UN System Influenza Coordinator and World Bank.

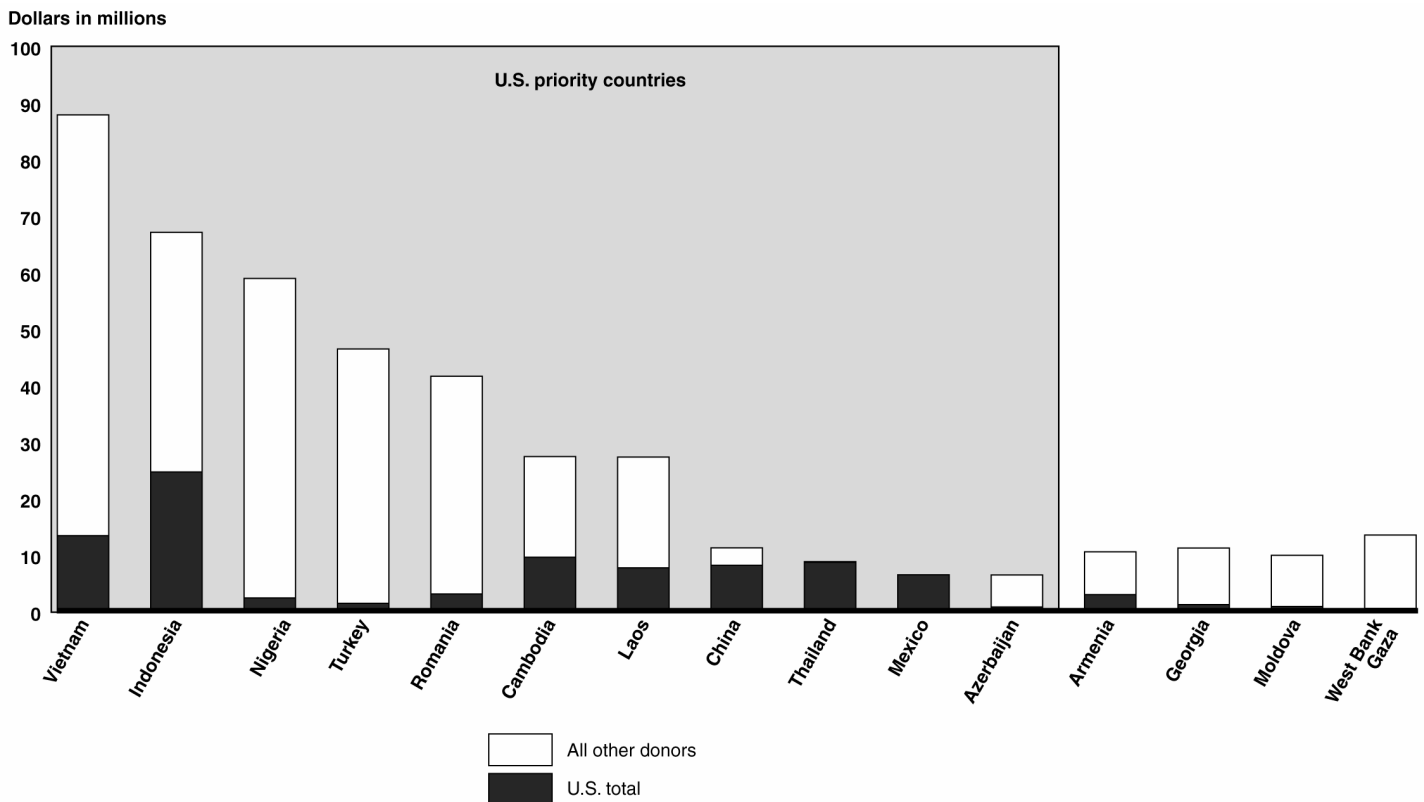
Notes: The World Bank defines a commitment as the result of an agreement between the donor and recipient for designated purposes or a firm decision, such as a legislative appropriation, that prevents the use of an allocated amount for other purposes. See app. I for additional information on these data.

^aThe World Bank-administered Avian and Human Influenza Facility can support country-specific, regional, and global projects.

Most Country-Specific Commitments Have Gone to U.S. Priority Countries

The bulk of U.S. and other donors' country-specific commitments have been to countries that the United States has designated as priorities, with funding concentrated among certain of these countries (see fig. 7). Of the top 15 recipients of committed international funds, 11 are U.S. priority countries. According to data compiled by the World Bank, about 72 percent of U.S. country-specific commitments and about 76 percent of overall donor country-specific commitments through December 2006 were to U.S. priority countries.

Figure 7: Top 15 Recipients of Committed, Country-Specific International Avian and Pandemic Influenza Funding as of December 2006



Source: GAO analysis of data from January 2007 report *Responses to Avian and Human Influenza Threats, July-December 2006*, published by the UN System Influenza Coordinator and World Bank.

Notes:

The World Bank defines a commitment as the result of an agreement between the donor and recipient for designated purposes or a firm decision, such as a legislative appropriation, that prevents the use of an allocated amount for other purposes.

Totals include funds from donor countries, international organizations, and the World Bank-administered Avian and Human Influenza Facility.

See app. I for additional information on these data.

As figure 7 shows, Vietnam and Indonesia have been the leading recipients of country-specific commitments from the United States and from other donors. Indonesia, which U.S. officials have indicated is their highest-priority country, has received the largest share of U.S. country-specific commitments (about 18 percent), followed by Vietnam and Cambodia.

USAID and HHS Implement Most U.S.-Funded Activities

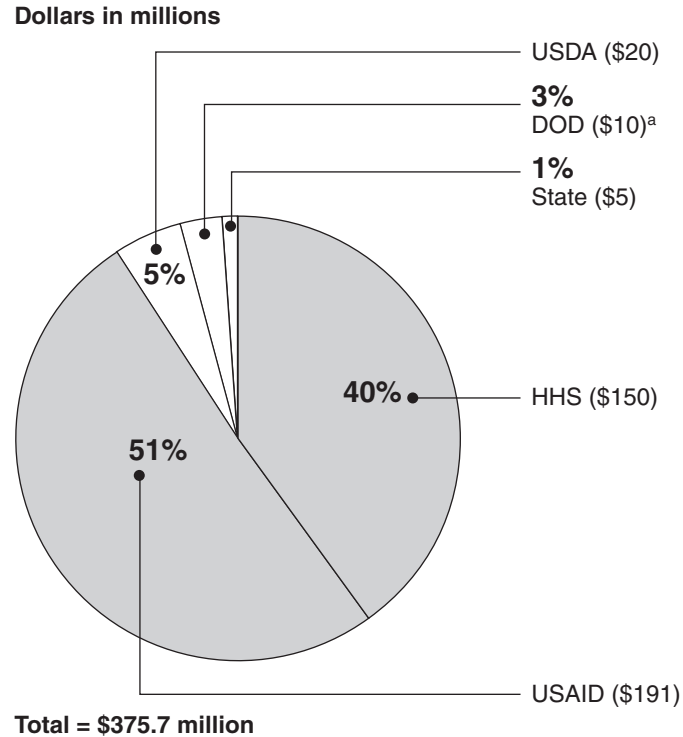
USAID, HHS, USDA, DOD, and the State Department carry out U.S. international avian and pandemic influenza assistance programs, with USAID and HHS playing the largest roles. According to funding data provided by these agencies, USAID accounts for 51 percent of U.S. planned spending, with funds going to provide technical assistance, equipment, and financing for both animal and human health-related activities.⁴⁵ HHS accounts for about 40 percent of the total, with the focus on technical assistance and financing to improve human disease detection and response capacity.⁴⁶ USDA provides technical assistance and conducts training and research programs, and DOD stockpiles protective equipment. The State Department leads the federal government's international engagement on avian and pandemic influenza and coordinates U.S. international assistance activities through an interagency working group.⁴⁷ Figure 8 shows planned funding levels by agency.

⁴⁵Planned funding levels indicate agency budget projections for planning purposes. According to U.S. agency officials, such figures are roughly equivalent to commitments as defined by the World Bank.

⁴⁶According to HHS, the focus of technical assistance and financing to improve surveillance in both humans and birds is to increase and enhance early recognition and reporting of outbreaks and facilitate sharing of virus samples.

⁴⁷In addition to DOD, HHS, the State Department, USAID, and USDA, representatives from the Department of Homeland Security, the National Security Council, the Homeland Security Council, and U.S. intelligence agencies attend working group meetings. Treasury has not been a regular participant. However, Treasury officials stated that their department has worked with U.S. executive directors at the World Bank, the Asian Development Bank, and other international financial institutions to encourage and support these institutions in their efforts to address avian and pandemic influenza threats.

Figure 8: U.S. Planned Funding for International Avian and Pandemic Influenza Assistance by Agency



Sources: DOD, HHS, State Department, USDA, and USAID.

Notes:

Planned funding levels indicate agency budget projections for planning purposes. According to U.S. agency officials, such figures are roughly equivalent to commitments as defined by the World Bank.

USAID and USDA provided planned funding levels through December 2006. The remaining agencies provided information on planned funding through September 2006. See app. I for additional information on these data.

^aThe DOD total does not include (1) \$5 million in Overseas Humanitarian, Disaster and Civic Aid programs to strengthen foreign military capacity for responding to a potential pandemic or (2) \$17 million in influenza-related support for DOD's Global Emerging Infections Surveillance and Response System. The United States did not include these funds in the information that it provided to the World Bank.

U.S. Implementation Plan Establishes a Framework for U.S. Action

The U.S. *National Strategy for Pandemic Influenza Implementation Plan*, adopted in May 2006, provides a framework for monitoring U.S. efforts to improve both domestic and international preparedness. The plan assigns agencies responsibility for completing specific action items under the three pillars of the overall U.S. strategy (preparedness and

communications, surveillance and detection, and response and containment) and, in most cases, specifies performance measures and time frames for determining whether they have been completed. The Homeland Security Council is responsible for monitoring the plan's implementation.

In its international component, the *Implementation Plan* identifies 84 action items. It designates HHS as the lead or co-lead agency for 34 of these, the State Department for 25, USAID for 19, USDA for 19, and DOD for 11.⁴⁸ Table 2 shows the distribution of planned funding by agency within each of the three pillars in the strategy. Appendix VII provides information on obligations by agency and pillar.

Table 2: U.S. Planned Funding for International Avian and Pandemic Influenza Assistance by Agency and by Pillar/Activity

Dollars in millions

Pillar/activity	Agency					Total by pillar/activity
	HHS ^a	USAID	DOD ^b	USDA	State	
Preparedness and communications	53	104	10	9	5	181
Surveillance and detection	48	51	0	5	0	104
Response and containment	34	36	0	6	0	76
Other	15	—	—	—	—	15
Total by agency	150	191	10	20	5	376

Sources: DOD, HHS, State Department, USDA, and USAID.

Notes:

Planned funding levels indicate agency budget projections for planning purposes. According to U.S. agency officials, such figures are roughly equivalent to commitments as defined by the World Bank.

USAID and USDA provided planned funding levels through December 2006. The remaining agencies provided information on planned funding through September 2006.

See app. I for additional information on these data.

⁴⁸The allocation of action items among agencies sums to more than 84 because in some cases the implementation plan assigns multiple agencies lead responsibility for individual items.

Preparedness and
Communications Actions
Include Creating Emergency
Stockpiles

^aAs the table shows, HHS did not designate a pillar for a portion of its planned funds, including about \$5 million to expand influenza-related staffing levels in key global, regional, and country-level facilities (such as WHO's regional offices for Africa and the Western Pacific and regional surveillance and response facilities in Thailand and Egypt), and about \$10 million for HHS headquarters management of its influenza-related initiatives.

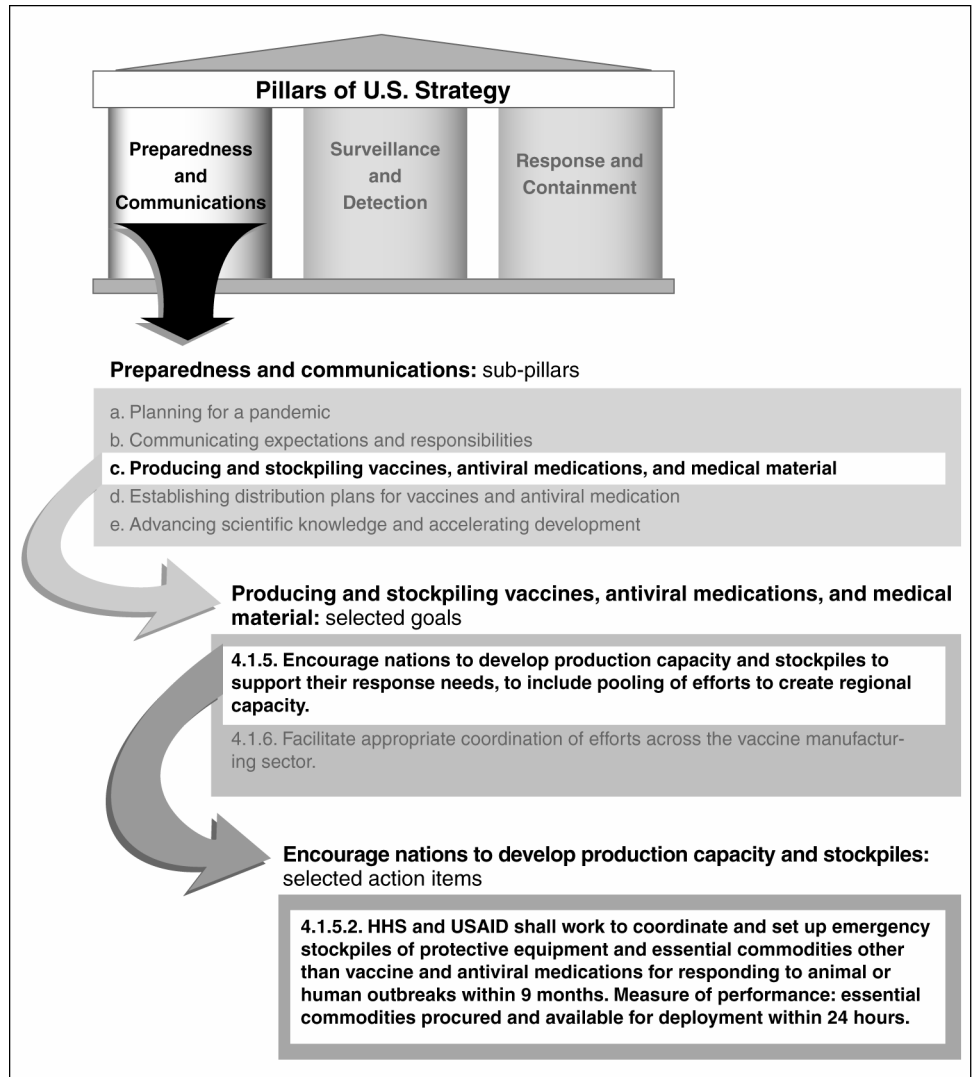
^bThe DOD total does not include (1) \$5 million in Overseas Humanitarian, Disaster and Civic Aid programs to strengthen foreign military capacity for responding to a potential pandemic or (2) \$17 million in influenza-related support for DOD's Global Emerging Infections Surveillance and Response System. The United States did not include these funds in the information that it provided to the World Bank.

Within the preparedness and communications pillar, the *Implementation Plan* assigns U.S. agencies responsibility for action items that focus on (1) planning for a pandemic; (2) communicating expectations and responsibilities; (3) producing and stockpiling vaccines, antiviral drugs, and other medical material; (4) establishing distribution plans for such supplies; and (5) advancing scientific knowledge about influenza viruses. For example, action item 4.1.5.2 assigns HHS and USAID lead responsibility for setting up stockpiles of protective equipment and essential commodities (other than vaccines and antiviral drugs) with action to be completed within 9 months—that is, by February 2007 (see fig. 9). Through fiscal year 2006, USAID reported spending about \$56 million to create a stockpile of personal protective equipment (PPE) kits and other nonmedical commodities to facilitate outbreak investigation and response.⁴⁹ The USAID stockpile consisted of 1.5 million PPE kits to be used by personnel investigating or responding to outbreaks, 100 laboratory kits, and 15,000 decontamination kits.⁵⁰ As of October 2006, USAID reported having deployed approximately 193,000 PPE kits for immediate or near-term use in more than 60 countries (see app. VIII).

⁴⁹Approximately \$40 million represents commodity purchases for this stockpile, with the remainder for logistical needs, such as deployment and storage.

⁵⁰A PPE kit consists of items such as a mask, protective suit, goggles, and hand sanitizer wipes. Laboratory kits include materials and instructions to collect and ship specimens to national or international reference laboratories for confirmation. A decontamination kit includes a backpack sprayer, disinfectant powder, and other items to clean affected equipment, vehicles, and so forth.

Figure 9: Selected Action Item for Preparedness and Communications—Creating Emergency Stockpiles



Source: GAO analysis of U.S. *National Strategy for Pandemic Influenza Implementation Plan*.

**Surveillance and Detection
Actions Include Training
Foreign Health Professionals**

To improve global surveillance and detection capacity, the *Implementation Plan* assigns U.S. agencies responsibility for action items that focus on (1) ensuring rapid reporting of outbreaks and (2) using surveillance to limit their spread. For example, action item 4.2.2.4 assigns HHS lead responsibility for training foreign health professionals to detect

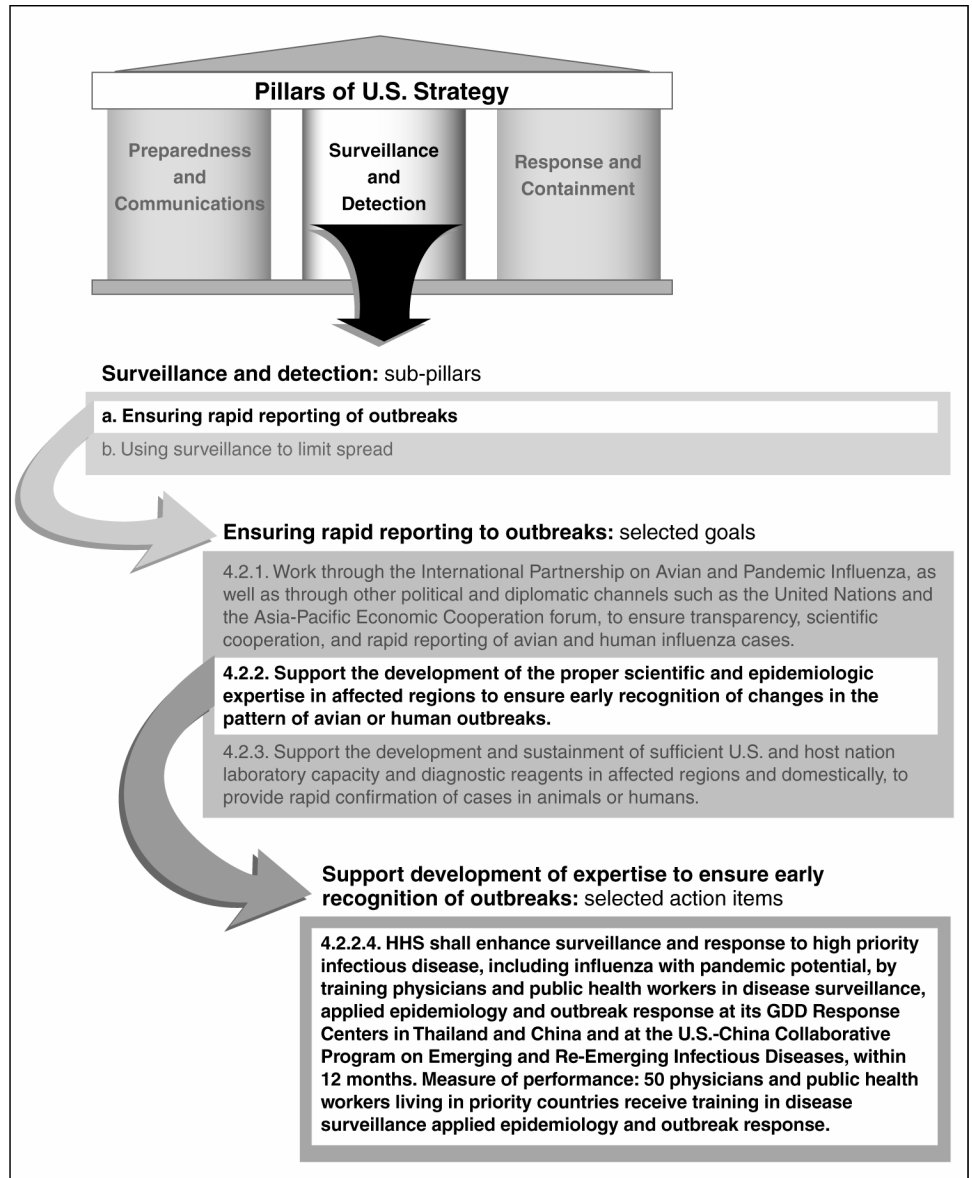
and respond to infectious diseases such as avian influenza with action to be completed within 12 months—that is, by May 2007 (see fig. 10).⁵¹ In 2006, HHS established or augmented five regional global disease detection and response centers located in Egypt (\$4.4 million), Guatemala (\$2 million), Kenya (\$4.5 million), Thailand (\$6.5 million), and China (\$3.9 million) to enhance global disease surveillance and response capacity.⁵² Among other things, these centers provide training in field epidemiology and laboratory applications. For example, in July 2006, the Thailand center conducted a workshop aimed at teaching public health officials what to do when investigating a respiratory disease outbreak that may signal the start of a pandemic. More than 100 participants from 14 countries participated in this workshop, which was cosponsored by WHO and Thai authorities.⁵³

⁵¹In addition to training activities, HHS officials stressed that development of effective surveillance and detection systems also requires improvements in laboratory capacity and development of effective rapid response protocols. The U.S. *Implementation Plan* includes action items in both of these areas.

⁵²According to State Department officials, this HHS funding to strengthen or establish global disease detection centers does not include additional funds provided through these centers to assist individual countries.

⁵³The goal of this course was to prepare participants to teach additional courses in their own countries to further build international capacity. In addition to the United States, participating countries were Bangladesh, Burma, Cambodia, China, Egypt, Guatemala, India, Indonesia, Kenya, Laos, South Africa, Thailand, and Vietnam. (Source: U.S. Embassy, Bangkok, and WHO Press Release, July 13, 2006).

Figure 10: Selected Action Item for Surveillance and Detection—Training Foreign Health Professionals



Source: GAO analysis of U.S. *National Strategy for Pandemic Influenza Implementation Plan*.

Response and Containment Actions Include Development of Outbreak Response Teams

To improve global response and containment capacity, the *Implementation Plan* assigns U.S. agencies responsibility for action items that focus on (1) containing outbreaks; (2) leveraging international medical and health surge capacity; (3) sustaining infrastructure, essential

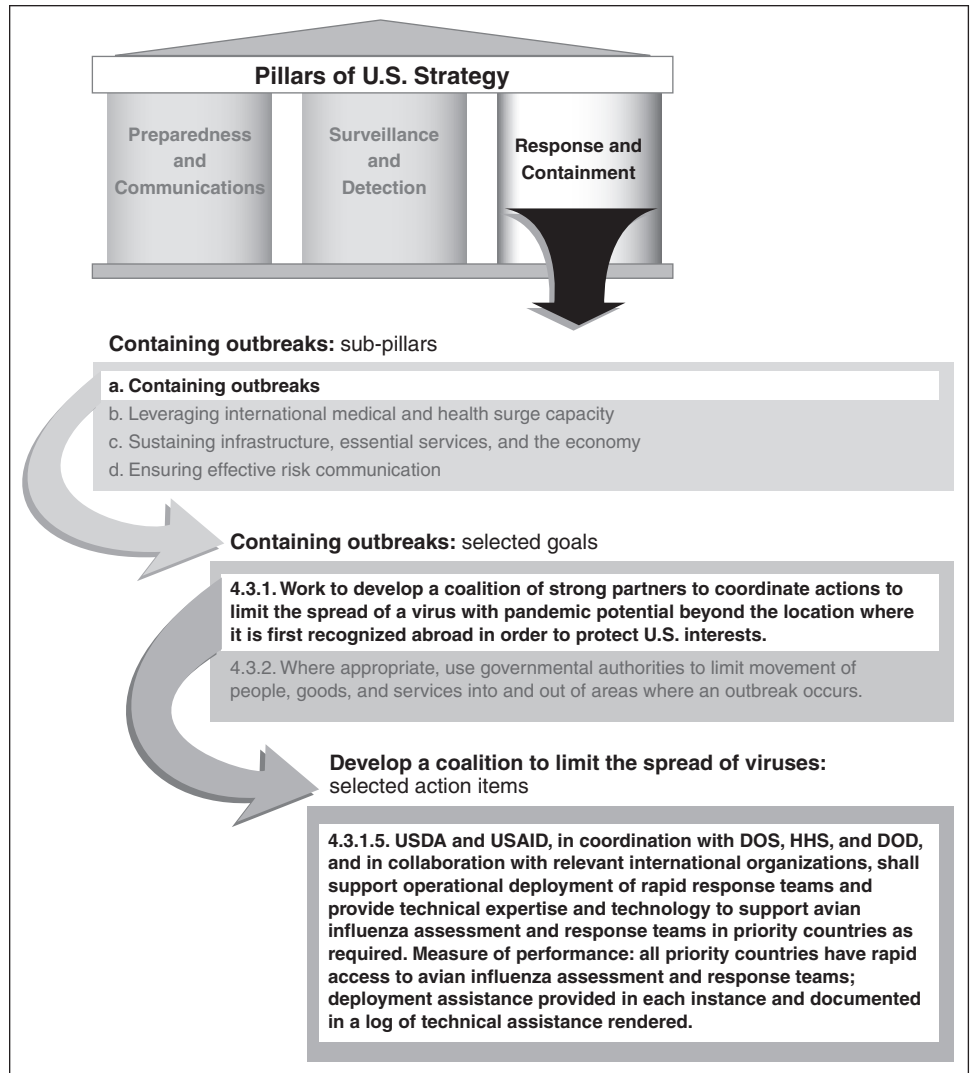
services, and the economy; and (4) ensuring effective risk communication. Action item 4.3.1.5, for example, assigns USDA and USAID lead responsibility for supporting operational deployment of response teams when outbreaks occur in poultry⁵⁴ (see fig. 11).⁵⁵ In 2006, USDA and USAID supported the creation of a crisis management center at FAO to coordinate and respond to avian influenza outbreaks globally. According to FAO, the center is able to dispatch its experts to any location in the world in under 48 hours. USAID and USDA have provided approximately \$5 million in support to the center.⁵⁶ USDA detailed three veterinary specialists to the center for headquarters operations as well as an official to serve as its deputy director. USDA is also providing experts to respond to outbreaks. USAID has directed its support toward enhancing coordination with WHO on rapid deployment of joint animal health/human health teams and facilitating operations in underresourced African countries.

⁵⁴Action item 4.3.1.3 assigns HHS lead responsibility for deploying surveillance and response teams to investigate potential human outbreaks, in coordination with other U.S. agencies and with WHO.

⁵⁵The *Implementation Plan* did not specify a time frame for completing this action.

⁵⁶According to FAO, other major donors include Germany and the Asian Development Bank.

Figure 11: Selected Action Item for Response and Containment—Developing Rapid Response Teams



Source: GAO analysis of U.S. *National Strategy for Pandemic Influenza Implementation Plan*.

Homeland Security Council
Reported Success on Action
Items to Be Completed by
November 2006

The Homeland Security Council’s first progress report on U.S. pandemic influenza-related efforts reported that agencies had completed all of the 22 international action items scheduled for completion by November 2006. In December 2006, the council issued a compendium of the action items in

the *Implementation Plan*, with updates on the corresponding performance measures.⁵⁷ The council reported that all 22 of the international action items in the *Implementation Plan* that agencies were to complete by November 2006 had been completed.⁵⁸ (The 84 action items in the international section of the *Implementation Plan* have time frames for completion that range from 3 months to 2 years.)

The Homeland Security Council's report did not clearly indicate the basis for determining completion in a number of cases, generally because the report did not fully reflect agency efforts or the wording of the performance measure made it difficult for agency staff to respond. Our review of the progress report found that for 14 of the 22 action items, the report directly addressed the specified performance measures and indicated that these measures had been addressed within the specified time frames. However, for 8 of the action items, the information in the progress report did not directly address the performance measure or did not indicate that the completion deadline had been met. Based on interviews and information we obtained from the responsible agencies, we determined that the lack of clarity in these cases was primarily because of omission of key facts on agency activities or agency difficulties in reporting on poorly worded performance measures.⁵⁹ For example, 1 action item directed DOD to prepare to limit the spread of a pandemic-potential strain by controlling official military travel between affected areas and the United States.⁶⁰ The performance measure was designation of military facilities that could serve as points of entry from affected areas. The council's report described the department's preparedness for

⁵⁷See the *U.S. Pandemic Influenza Strategy Implementation Plan: Summary of Progress, December 2006*, available on the Internet at <http://www.pandemicflu.gov/plan/federal/strategyimplementationplan.html>.

According to U.S. agency officials, a report providing updated information on U.S. efforts to improve domestic and international pandemic influenza preparedness and response is being prepared.

⁵⁸The council's report added that while determinations that action items had been completed meant that the indicated measure of performance had been met, this did not necessarily mean that work had ended. In many cases, the agencies were continuing their efforts.

⁵⁹State Department, DOD, and Treasury officials responded to our requests for information on the seven items for which they exercised lead responsibility. HHS officials declined to provide information on the remaining item, for which they held lead responsibility.

⁶⁰Action item 4.3.2.2.

controlling travelers' movements but did not state that DOD had identified facilities that could serve as points of entry. Our review of DOD documents indicated that the department had designated such facilities. A second action item assigned the State Department lead responsibility for developing plans to communicate U.S. avian and pandemic influenza objectives to key stakeholders.⁶¹ The performance measure was the "number and range of target audiences reached" and the impact of relevant efforts on the public. The council's report provided a rough estimate of the number of people reached through U.S. government communication efforts to date. However, State Department officials told us that the performance measure was difficult to address because they did not have the means to accurately estimate the effective reach or impact of their efforts.

Concluding Observations

Difficulties in obtaining and applying accurate and complete information present an overarching challenge to U.S. efforts to identify countries at greatest risk and effectively target resources against the threat presented by the H5N1 virus. In particular, although country preparedness is a primary consideration in determining relative risk levels, U.S. determinations on priority countries have relied primarily on information about environmental risks, which is itself incomplete. While the United States, the UN, and the World Bank, as well as WHO and OIE, are refining and expanding their efforts to gather useful information, substantial gaps remain in our understanding of both environmental and preparedness-related risks in countries around the world.

With strong leadership from the United States, the international community has launched diverse efforts to increase global preparedness to forestall an influenza pandemic. These efforts constitute a substantial response to the threat presented by H5N1. They reflect significant international cooperation, and the U.S. *National Strategy for Pandemic Influenza Implementation Plan* provides a useful framework for managing U.S. agencies' participation in these efforts. The Homeland Security Council's first update on U.S. efforts and UN reports on donor efforts in general suggest that U.S. and global efforts to improve preparedness are producing results, but challenges remain in accurately measuring their impact. Many countries remain relatively unprepared to

⁶¹Action Item 4.3.6.1.

recognize or respond to highly pathogenic influenza in poultry or humans, and sustained efforts will be required to overcome these challenges.⁶²

Agency Comments and Our Evaluation

USAID, HHS, and USDA provided written comments on a draft of this report. These comments are reproduced in appendixes II, III and IV. In addition, Treasury provided oral comments. HHS and Treasury also provided technical comments, as did the Department of State, DOD, WHO, the World Bank, and the United Nations System Influenza Coordinator. The Coordinator's comments included comments from FAO and OIE, and the latter organization also provided us with technical comments independently. These agencies generally concurred with our findings, and we incorporated their technical comments in the report as appropriate.

USAID briefly reviewed progress in improving global preparedness, citing, for example, reductions in outbreaks among poultry and humans in Vietnam and Thailand. The agency observed, however, that the practices employed in small-scale "backyard farms" continue to present a major challenge to efforts to control the spread of H5N1. USAID will therefore be paying particular attention to this challenge in the coming months.⁶³

While acknowledging the information gaps that limit capacity for comparing country-level risks, HHS emphasized its support for targeting resources according to the Homeland Security Council's country prioritization decisions. In this context, HHS stressed the importance of improved information sharing among countries, as called for under the revised *International Health Regulations*, and noted the particular importance of sharing influenza virus samples and surveillance data. In addition, HHS commented that limited human-to-human transmission of H5N1 could not be ruled out in some clusters of cases in Indonesia, and explained certain differences in the roles played by HHS, USDA and USAID under the response and containment pillar of the U.S. *National Strategy for Pandemic Influenza*. In response, we clarified the information in the background section of this report on human-to-human

⁶²In its technical comments on a draft of this report, HHS stated, in particular, that sustained financial and technical support for priority countries is needed to maximize the return on U.S. investments to date and to build sustainable laboratory and epidemiologic surveillance systems.

⁶³USAID also stated that it will be placing much greater emphasis on developing plans and capabilities for responding to an influenza pandemic—a matter that lies beyond the scope of this report.

transmission and our presentation on the roles played by the HHS, USDA, and USAID in responding to poultry and human outbreaks. In its technical comments, HHS elaborated upon our concluding observation regarding the need for sustained effort to overcome challenges in improving global preparedness. We added a footnote to our concluding observations to summarize the HHS comments in this area.

USDA stated that the report provides a comprehensive evaluation of pandemic influenza and global efforts needed to improve avian and pandemic influenza preparedness. USDA also stated that it found the report accurate in its description of USDA's role and involvement in global efforts to improve preparedness.

In oral comments, Treasury stated that it has been actively engaged in the U.S. government's efforts to respond to avian influenza and increase readiness to address a potential influenza pandemic, both internationally and within the United States. To coordinate the department's activities, Treasury created an informal avian influenza working group that includes staff from its domestic and internationally focused offices. Among other things, the working group ensures that Treasury is fully engaged in all Homeland Security Council-led initiatives against avian and pandemic influenza. Treasury also stated that, in coordination with U.S. executive directors at the various international financial institutions (including the World Bank), it has encouraged and supported these institutions in their efforts to develop adequate responses to the threat of an influenza pandemic. However, Treasury stated that its efforts in this area have been constrained by U.S. legislation that requires the United States to vote against multilateral development bank programs in cases where Burma might receive support. According to Treasury, this has occurred two times with respect to Asian Development Bank regionally-focused projects. While these matters were largely outside the scope of our report, we modified the text to acknowledge Treasury efforts to encourage and support international financial institution efforts against avian and pandemic influenza.

Treasury also stated that, building on experiences drawn from the 2003 severe acute respiratory syndrome outbreak, the international financial institutions (including the World Bank) have responded to the H5N1 epidemic by providing financing, and also by helping countries develop national strategies, providing relevant technical assistance and training, serving as focal points for donor and regional coordination, tracking and reporting on donor commitments, preparing impact analyses, and hosting international conferences. Treasury further noted that in addition to providing financing for individual countries, the multilateral development

banks have provided financial and technical support to international and regional technical organizations working in this area, including WHO and FAO.

We are sending copies of this report to the Secretaries of Agriculture, Defense, Health and Human Services, State, and the Treasury; the Administrator of the U.S. Agency for International Development; appropriate congressional committees; and other interested parties. We will also make copies available to others upon request. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staff have any questions, please contact David Gootnick at (202) 512-3149 or gootnickd@gao.gov or Marcia Crosse at (202) 512-7114 or crossem@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IX.



David Gootnick
Director, International Affairs and Trade



Marcia Crosse
Director, Health Care

Appendix I: Scope and Methodology

We provided relevant background information on the spread of the H5N1 virus, factors that may affect the comparative risk that this virus presents in different countries, methods that health systems traditionally employ to respond to influenza in animals and humans, and the overall strategy that the United States and its international partners have developed to respond to the threats presented by H5N1. To describe how H5N1 has spread internationally, we used country-specific data on cases among humans assembled by the United Nations World Health Organization (WHO), and on cases and outbreaks in humans and in wild and domestic birds assembled by the United Nations (UN) World Food Program. World Food Program officials told us their data on human cases were provided by WHO, while their data on cases in birds were provided by the World Organization for Animal Health (OIE) and the UN Food and Agriculture Organization (FAO). WHO, OIE, and FAO have cautioned that global surveillance is imperfect, and some human and animal cases and outbreaks may go unrecorded. However, these organizations work with a wide variety of global partners, including national governments, to identify and verify outbreaks of this disease. We determined that these data on human and animal outbreaks were sufficiently reliable for the purposes of this report, which were to convey a general sense of the manner in which the disease has spread across international boundaries and the extent to which it has infected humans. However, these data should not be relied upon to precisely identify countries where the disease has occurred or to indicate with absolute certainty the number of human cases that have occurred.

To identify and describe factors that affect the level of risk that H5N1 presents in different countries and the methods that animal and health systems generally employ against influenza, we interviewed officials and consulted documents produced by avian and human disease experts in relevant U.S. government agencies, international organizations, academic institutions, and nongovernmental organizations. To describe the overall strategy that the United States and its international partners have developed to respond to the H5N1 epidemic, we interviewed and examined relevant documents from U.S. and UN agencies, including the U.S. *National Strategy for Pandemic Influenza* and strategy statements and progress reports produced by the UN System Influenza Coordinator and the World Bank.

To examine the extent to which U.S. and international agencies have been able to assess the pandemic risk that H5N1 presents in individual countries and prioritize them for international assistance, we reviewed and analyzed assessments of environmental risk and preparedness.

Specifically, we reviewed assessments prepared by the U.S. Agency for International Development (USAID), the Department of State, the UN, and the World Bank and spoke with cognizant officials at these agencies and organizations about how they were conducted. These assessments evaluated country-level pandemic risk deriving from environmental conditions, country preparedness for responding to avian and pandemic influenza, or both. We analyzed a sample of 17 country-specific avian influenza preparedness assessments compiled by USAID and the State Department to provide summary information on capacity in several regions. (See app. V for a detailed description of the scope and methodology for our analysis of sampled USAID and State Department assessments.) We also reviewed the U.S. Homeland Security Council Country Prioritization Matrix as of May 3, 2006, which designates country priority levels for U.S. actions to address the avian and pandemic influenza threat. We discussed this priority ranking with officials from the State Department and USAID. We requested a meeting with officials from the council, but the council declined, stating that we could obtain needed information from other agencies and departments. In addition, we reviewed analyses of environmental risk factors prepared by U.S. intelligence community analysts during 2006 and early 2007 and discussed these analyses with U.S. agency officials. We also reviewed assessments of risks in particular countries prepared by a U.S. intelligence agency.¹

To determine the actions U.S. agencies and their international partners took to address these risks, we examined funding, planning, and reporting documents and spoke with cognizant officials. To determine the overall level of financial support that the donor community is providing for efforts to improve global avian and pandemic influenza preparedness, we examined World Bank and UN documents detailing donor pledges and commitments resulting from the international pledging conferences on avian and pandemic influenza, including funding levels by donor, by recipient, and by purpose. We also reviewed World Bank and UN documents describing recipient countries, regions, and organizations.

To describe the international activities of the U.S. government, we reviewed the *National Strategy for Pandemic Influenza* and the *National Strategy for Pandemic Influenza Implementation Plan*. We reviewed

¹Some of these assessments contained classified information. We do not discuss these assessments in this report so that our report remains unclassified and because the classified documents we reviewed did not lead to substantially different observations than the unclassified assessments we examined.

pertinent planning, reporting, and funding documents for U.S. international avian influenza control and pandemic preparedness assistance programs. We also consulted cognizant officials from USAID and from the Departments of Agriculture (USDA), Health and Human Services (HHS), Defense (DOD), and State about their efforts. We reviewed the international action items tasked to these U.S. agencies and assessed by the Homeland Security Council in its 6-month status report issued on December 18, 2006.² We independently compared the performance measures associated with each action item with the agency responses to it. Finally, we visited the WHO, OIE, and FAO headquarters in Geneva, Paris, and Rome, respectively.

To assess the reliability of the pledges and commitments data that national governments and other donors submitted to the World Bank, we spoke with World Bank officials responsible for maintaining these data and reviewed supporting documentation. The pledges and commitments data are self-reported by individual donor countries in response to a standard request template. The World Bank staff responsible for this data collection provided countries with standard definitions of key terms, such as pledges, commitments, and in-kind and cash payments. However, because countries' data reporting systems vary substantially, World Bank staff conduct ongoing discussions with donor countries to establish the correspondence between those systems and the World Bank terms. World Bank staff also stated that the pledges and commitments totals provided by countries may include funding not strictly related to pandemic influenza and may therefore be somewhat overstated. Therefore, based on our review, we use these data to identify general levels of pledges and commitments made by particular countries or organizations; they should not be relied upon to support precise comparisons of funding by donor or recipient. Overall, we concluded that the World Bank pledges and commitments data were sufficiently reliable for the purposes of this report.

To obtain data on U.S. agency funding for international avian and pandemic influenza preparedness by agency and by the three pillars of the overall U.S. pandemic strategy, we requested separate submissions from each of the five U.S. agencies, showing planned, obligated, and expended

²According to U.S. agency officials, a report providing updated information on U.S. efforts to improve domestic and international pandemic influenza preparedness and response is being prepared.

funds by pillar. Two of the five agencies (USAID and USDA) maintained funding data by pillar prior to our requesting these data. Two others (DOD and the State Department) found it relatively easy to comply with our request, since all of their reported activities fell within the preparedness and communications pillar.³ However, providing this information was comparatively complex for HHS. The various units within that agency (for example, the Centers for Disease Control and Prevention and the National Institutes of Health) support a wide variety of relevant programs, many of which involve more than one pillar. In addition, HHS can utilize other sources of funding in addition to influenza-specific appropriations for many of these programs. To respond to our request, the HHS Office of Global Health Affairs collected data from relevant HHS units. The Director of the Office of Global Health Affairs reviewed the final HHS submission for accuracy before reporting back to GAO. The pillar-specific totals HHS was able to provide were for planned funds and for obligated funds. Thus, the funding information by agency that we provide is for these two categories of funding data and not for expenditures.

We identified a number of limitations in the data that the agencies provided. First, the data are not from consistent periods. USDA and USAID provided information on planned funding levels and obligations through December 2006. HHS, DOD, and the State Department provided data through September 2006. In addition, DOD and the State Department received funding for international avian and pandemic influenza activities through appropriations in 2006 only; whereas, USAID, HHS, and USDA received funding through 2005 and 2006 appropriations. Second, the distribution of funds among the pillars is somewhat imprecise. When programs addressed more than one pillar, agency officials employed their professional judgment to decide which pillar was most significant. This limitation was most pronounced in the HHS data. While HHS decided how to allocate most of its funds, the agency did not specify a pillar for about \$15 million of its planned funds. This total included about \$5 million to expand staffing levels in key global, regional, and country-level facilities, including the WHO regional offices for Africa and the Western Pacific and

³The DOD total does not include (1) \$5 million in Overseas Humanitarian, Disaster and Civic Aid programs to strengthen foreign military capacity for responding to a potential pandemic or (2) \$17 million in influenza-related support for DOD's Global Emerging Infections Surveillance and Response System. The United States did not include these funds in the information that it provided to the World Bank. For more information on the Global Emerging Infections Surveillance and Response System, which includes units in Egypt, Indonesia, Kenya, Peru, and Thailand, see <http://www.geis.fhp.osd.mil>.

surveillance and response facilities in Thailand and Egypt, and about \$10 million for HHS headquarters management of its influenza-related initiatives.

Third, the total planned and obligated amounts are also somewhat imprecise. Some of the agency funds come from programs that are not dedicated specifically to avian or pandemic influenza. In such cases, agency officials used professional judgment to decide what portion of the funds should be designated as supporting avian or pandemic influenza preparedness.

Despite these limitations, we determined that these data were sufficiently reliable for the purpose of this report, which was to provide information on general levels of agency planned and obligated funding by pillar. However, we rounded the funding information that the agencies provided to the nearest million dollars.

We conducted our work from January 2006 through March 2007 in accordance with generally accepted government auditing standards.

Appendix II: Comments from the U.S. Agency for International Development



JUN 11 2007


Mr. David Gootnick
Director
International Affairs and Trade
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Gootnick:

I am pleased to provide the U.S. Agency for International Development's (USAID) formal response on the draft GAO report entitled *Influenza Pandemic: Efforts to Forestall Onset are Under Way; Identifying Countries at Highest Risk Entails Challenges* (GAO-07-604). We appreciate the time and effort GAO has put into producing this report. There are several points raised in the report on which we have enclosed further discussion.

Thank you for the opportunity to respond to the GAO draft report and for the courtesies extended by your staff in the conduct of this review.

Sincerely,



Mosina H. Jordan
Counselor to the Agency

Enclosure: Agency Comments on GAO Report

U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
www.usaid.gov

COMMENTS ON GAO 07-604

The re-emergence in late 2003 of H5N1 avian influenza as a highly pathogenic virus capable of infecting both poultry and humans raised immediate concerns about the threat of a global pandemic. Beginning in late 2005, the virus swept out of its original focus in Southeast Asia and across Eurasia, Europe, South Asia, the Near East, and Africa, dramatically signaling the start of an even more dangerous phase in the virus' evolution. It was at just this time that USAID received its first appropriation to address the threat posed by avian influenza (AI). The GAO document largely focuses on the challenges USAID and other U.S. agencies faced in setting its country priorities in the face of a rapidly evolving threat.

To date, animal outbreaks have been reported in 59 countries, with 12 countries having confirmed human cases. A total of 309 humans have been infected since 2003. Of these, 61% have been fatal. Since its emergence, the virus has continued to mutate and become increasingly more pathogenic. The increase in outbreaks in highly pathogenic AI in birds and humans since the beginning of 2007 has heightened concerns about the emergence and spread of a viral mutation that could spark a human pandemic.

In the face of these alarming developments, there has been notable progress made since the beginning of 2006 in response to the AI threat. Progress has been particularly significant in the case of Vietnam and Thailand, two of the most affected countries. During the two-year span between late 2003 and 2005, these two countries accounted for a total of 3,319 reported outbreaks of AI among birds (88% of the global total). In 2006, after introducing an aggressive package of control measures, total animal outbreaks fell to 209 (29% of the global total). On the human-health side, results are equally remarkable: During the 2003-2005 period Vietnam and Thailand recorded 115 cases (78% of the global total), but in 2006 there were just three total human cases (less than 3% of the worldwide total).

Even in the case of other countries infected in 2006, there has been noted progress. Compared to a year ago, the current 2007 "influenza season" has involved fewer outbreaks and infected far fewer poultry. While there are many factors that may be contributing to this shift, there has been tremendous progress,

with U.S. assistance strengthening “early-warning surveillance” and rapid response capacities in affected countries over the past year.

As a result of USAID and other U.S. government agency efforts, we are hearing about AI outbreaks sooner and are thus better able to launch more effective and timely responses. In many places, the time lapse between the onset of an outbreak and its being reported has been reduced from typically three to five weeks to 48 hours. Similarly, we are getting faster laboratory confirmation, which enables us to mount more successful mitigation measures. Intensive communications campaigns have also made communities more aware of the risks they face by improper rearing or handling of poultry, leading to more appropriate practices at the household level and earlier reports of outbreaks. Collectively, these measures have played an important role in limiting the size and spread of the outbreaks.

These successes have dramatically illustrated the effectiveness of the “package” of interventions being used for controlling the spread of AI, particularly in large- and medium-size commercial poultry farms. What has emerged as the greatest single challenge to effective control of the spread of the virus, however, is the more informal poultry setting characterized as “backyard farms”. In 2006, and so far in 2007, nearly all newly reported outbreaks have been among these small holdings. From Indonesia to Nigeria, it is the small poultry holdings of individual families – which on average range from 12-50 birds – that account for anywhere from 30% to 70% of the poultry in a country.

While economic self-interest and access to resources has proven critical in motivating the larger commercial farms to take action, it has proven far more difficult to transform the way small farm holders rear their poultry. These small holders largely fall into the lowest economic quintiles, with poultry rearing making significant contributions to household nutrition and livelihood. A combination of poverty, entrenched “traditional practices”, and lack of clear understanding about the risks posed by AI pose significant challenges in applying an effective package of bio-security measures.

In 2007, we will be bringing particular attention to meeting this challenge. In Indonesia, we have partnered with the U.N. Food and Agriculture Organization and local non-governmental organizations (NGOs) to develop a highly successful

4

community-based model for improving virus surveillance and the containment of the outbreaks. With its focus on “backyard farmers”, we anticipate this model will have a significant role in protecting small poultry holdings in many of the countries in which we are working.

In the coming year, we will also be placing much greater emphasis on developing plans and capabilities to respond to a global human influenza pandemic. Recent analysis of past global pandemics has led international experts to predict that in the event of a pandemic greater than 95% of the global death toll will occur in the developing world. We are working closely with the U.N. and other U.S. government partners to develop standard operating procedures and protocols for addressing both the health and non-health aspects of a humanitarian response. Special emphasis is being placed on building an international network of NGOs, private- and public-sector providers, and international donors that would be drawn upon to deliver a humanitarian response in the event of a global pandemic.

As highlighted in the GAO document, responding to the threat posed by AI has been very much “learning by doing”. Over the past two years, however, we have made significant progress in learning what works and what does not. As we go forward in 2007, we are strongly guided by these lessons learned both in setting priorities and in making decisions about program actions. With the recently appropriated 2007 supplemental funds for AI, we expect to build on our past successes over the coming year to reduce further the risks posed by AI.

Appendix III: Comments from the Department of Health and Human Services

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the Assistant Secretary
for Legislation

Washington, D.C. 20201

JUN 11 2007

Ms. Celia Thomas
Assistant Director
International Affairs and Trade
U.S. Government Accountability Office
Washington, DC 20548

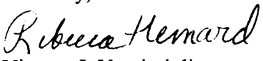
Dear Mr. Thomas:

Enclosed are the Department's comments on the U.S. Government Accountability Office's (GAO) draft report entitled, "Influenza Pandemic: Efforts to Forestall Onset are Under Way; Identifying Countries at Greatest Risk Entails Challenges" (GAO-07-604).

The Department has provided several technical comments directly to your staff.

The Department appreciates the opportunity to comment on this draft before its publication.

Sincerely,

for 
Vincent J. Ventimiglia
Assistant Secretary for Legislation

COMMENTS FROM THE U. S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) ON THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO) DRAFT REPORT: INFLUENZA PANDEMIC: EFFORTS TO FORESTALL ONSET ARE UNDER WAY; IDENTIFYING COUNTRIES AT HIGHEST RISK ENTAILS CHALLENGES (GAO-07-604)

General Comments:

The U.S. Department of Health and Human Services (HHS) is grateful for the opportunity to comment on the draft report from the Government Accountability Office (GAO) entitled *Influenza Pandemic: Efforts to Forestall Onset are Under Way; Identifying Countries at Greatest Risk Entails Challenges*.

HHS agrees with the overall assessment of the GAO regarding the challenges associated with identifying widespread environmental and preparedness-related risks among countries, and acknowledges the information gaps that limit the capacity for comprehensive comparative risk by-country. Despite these limitations, HHS supports the U.S. Government strategy of targeting resources and activities according to the U. S. Homeland Security Council's prioritization of countries. Furthermore, HHS contends that the allocation of funding to high-priority countries is pivotal in the development of capacity to detect influenza viruses.

Of equal importance to targeting resources, is complete and transparent information-sharing among countries as codified in the revised International Health Regulations (2005). This exchange of information should include the sharing of influenza viruses and surveillance data with the World Health Organization (WHO). We continue to call on countries everywhere to share influenza samples openly and rapidly without preconditions. HHS would like to emphasize that the early sharing of virus samples is essential for the development of vaccine candidates and for the accurate assessment of pandemic risk and potential severity. Included in the 434 million the U.S. Government has committed since 2005 to international efforts to contain the highly pathogenic H5N1 strain of avian influenza and prepare for a possible human pandemic are investments to help developing nations create the laboratory and public health infrastructure to track influenza and treat its victims, and to expand the number of manufactures of influenza vaccines to give more people access to the products of the WHO system.

HHS disagrees with the statement in this report that H5N1 has never circulated among humans. It is more accurate to note that H5N1 has not circulated widely among humans, but has shown that it can cause serious illness in them. For example, limited human-to-human transmission among a few clusters in Indonesia cannot be ruled out. Such viruses have not shown any significant genetic mutations or re-assortment, but they could spark a pandemic if they were to evolve into a strain that has the ability to pass easily from one human to the next.

See comment 1.

COMMENTS FROM THE U. S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) ON THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO) DRAFT REPORT: INFLUENZA PANDEMIC: EFFORTS TO FORESTALL ONSET ARE UNDER WAY; IDENTIFYING COUNTRIES AT HIGHEST RISK ENTAILS CHALLENGES (GAO-07-604)

In reference to the deployment of “outbreak response teams” supported by the U. S. Department of Agriculture (USDA) and the U. S. Agency for International Development (USAID), HHS has several comments. Outbreak-response teams supported by the USDA and USAID are veterinary (i.e., poultry-outbreak) response teams, and not public-health response teams. HHS mediates the U.S. Government’s assistance to countries with human cases of disease. These efforts support Ministries of Health through the training of rapid (public-health) response teams (RRTs) and often provide on-site assistance when health officials suspect human H5N1 cases. For example, between January 2006 and March 2007, HHS staff from the Centers for Disease Control and Prevention (CDC), Atlanta and the Department’s Global Disease Detection (GDD) Centers around the world assisted with on-site H5N1 investigations in Turkey, Nigeria, Romania, Djibouti, Indonesia, Kenya, China, Laos, Vietnam, and South Sudan. Investigative assistance included laboratory diagnosis, the identification of disease risk factors and the analysis of clusters of disease to establish whether human-to-human (i.e., second-generation) or human-to-human-to-human (i.e., third-generation) transmission was occurring. For example, in Indonesia in 2006, an HHS/CDC epidemiologist investigated a large family cluster of H5N1 cases in North Sumatra (eight cases, seven deaths), in which limited, non-sustained human-to-human-to-human transmission of H5N1 viruses likely occurred.

The following are GAO's comments on the Department of Health and Human Services letter dated June 11, 2007.

GAO Comment

1. HHS said that it is inaccurate to state, without qualification, that H5N1 has never circulated among humans; limited human-to-human transmission cannot be ruled out in a few clusters of cases in Indonesia. We agreed with the need to qualify this statement. We revised the background section of this report to acknowledge that limited human-to-human transmission cannot be ruled out in these cases.

Appendix IV: Comments from the Department of Agriculture



United States
Department of
Agriculture

Animal and Plant
Health Inspection
Service

Washington, DC
20250

JUN - 7 2007

Dr. David Gootnick, Director
International Affairs and Trade
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Dr. Gootnick:

The United States Department of Agriculture (USDA) has reviewed the U.S. Government Accountability Office's (GAO) draft report, "Pandemic Influenza: Efforts to Forestall Onset Are Under Way; Identifying Countries at Greatest Risk Entails Challenges" (07-604). USDA appreciates this GAO comprehensive evaluation of pandemic influenza with a concentration on the global efforts needed to improve avian and pandemic influenza preparedness. As the GAO report noted, USDA has responsibility for a variety of actions and activities related to the onset or containment of an occurrence of international avian and pandemic influenza. USDA has devoted various resources and has obtained funding to allow for readiness and preparedness.

While there were no recommendations for USDA, we appreciate the opportunity to review the draft report. We found the report accurate in its description of USDA's role and involvement in the global strategy. And lastly, USDA appreciates the opportunity to work with GAO on the evaluation of our efforts.

Sincerely,

W. Ron DeHaven
Administrator



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Appendix V: Analysis of Selected USAID and State Department Rapid Assessments of Avian Influenza Preparedness

This appendix presents the results of our analysis of avian influenza preparedness information submitted by USAID and State Department field staff from 17 of more than 100 countries surveyed by USAID and State Department headquarters during late 2005. These characterizations reflect our analysis of information gathered through assessment efforts at that time. For some countries, the assessments may not reflect current capabilities. As figure 12 shows, the field staff charged with providing information identified widespread shortcomings in national preparedness. However, the figure also shows that field staff often could not obtain sufficient information to provide clear or definitive information on every topic.

Appendix V: Analysis of Selected USAID and State Department Rapid Assessments of Avian Influenza Preparedness

Figure 12: Avian Influenza Preparedness—Analysis of Selected Indicators and Countries from USAID and State Department Rapid Assessments (October/November 2005)

	Asia							Africa		Eurasia and the Near East		Americas					
	Bangladesh	Cambodia	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam	Djibouti	Nigeria	Uganda	Egypt	Kazakhstan	Turkey	Brazil	Colombia	Guatemala
Preparedness and communications																	
National avian influenza plan	○	●	○	●	○	○	○	●	○	○	○	○	○	○	○	○	○
National avian influenza task force	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
National antiviral stockpile	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
National personal protective equipment (PPE) stockpile	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Public education efforts on avian influenza	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Surveillance and detection																	
Existing avian influenza surveillance activities in animals/humans	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Capacity to collect/transport animal samples	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Capacity to collect/transport human samples	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Capacity for in-country diagnosis of avian influenza (animal)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Capacity for in-country diagnosis of avian influenza (human)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Response and containment																	
Distribution plans for release of stockpiles	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Culling as a containment strategy	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Animal vaccination as a containment strategy	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Plan to provide compensation to farmers for culled birds	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Quarantine capacity	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

- Yes
- No
- Limited, or with qualifications
- USAID and/or State Department officials in the field did not provide sufficient information to allow conclusions on the matters in question

Source: GAO analysis of USAID and State Department cables regarding national preparedness for avian and pandemic influenza, from May through November 2005.

Note: The categorizations in this figure reflect GAO analysis of assessments done at a particular point in time. They do not necessarily reflect current capability.

The preparedness and communications section of the figure suggests that most of the countries in our sample were aware of the need to position themselves for effective action, 16 of the 17 were reported to have made at

least limited progress in preparing a national plan for responding to the threats presented by avian influenza, and 14 of 15 countries for which data were available were reported to have established national task forces to address these threats. However, the remainder of the figure suggests that there were at the time of the assessments widespread weaknesses in the elements of preparedness. For example, only 9 of the 17 countries were reported to have made at least limited efforts to educate the public about avian influenza. Only 4 of the 12 countries for which data were available were reported to have made at least limited progress toward preparing stockpiles of both antiviral drugs and PPE kits that could be used by those responding to poultry or human outbreaks. Most of the countries were found to be conducting at least limited surveillance for avian influenza. However, many countries were found to have gaps in their capacity to carry out key outbreak response activities. For example, only 4 of the 15 countries for which data were available were reported to have plans for compensating farmers in the event that culling became necessary.

The USAID and State Department officials who provided this information reported shortcomings in each of the 17 countries we reviewed. The officials identified multiple shortcomings in Cambodia, Indonesia, and Vietnam, where H5N1 is well-established. In addition, the figure illustrates why there is particular concern about weak capacity in Africa. USAID and State Department officials recorded negative responses in most categories for the 2 of the 3 African countries in the table (Djibouti and Uganda). Additionally, officials recorded limited or negative responses for 11 of 15 categories for Nigeria—the remaining African country in our analysis.

The figure also demonstrates the data-gathering and analysis difficulties that field and headquarters staff experienced in completing this exercise. The information provided by field staff was insufficient to allow us to arrive at definitive entries for about 15 percent (39 of 255) of the cells in the figure. Field staff had particular difficulty in providing clear information on response and containment measures, such as stockpile distribution and culling plans and quarantine capacity. Staff in some countries (for example, Vietnam) were able to provide comparatively clear information on all or nearly all issues, while others (for example, India) were unable to provide sufficient information on several matters.

Scope and Methodology

The study population for our analysis included rapid country avian influenza preparedness assessment reports prepared by USAID and State Department overseas missions from October to November 2005. USAID maintains country-specific missions in 80 developing countries and

regional offices in 6 such countries, and these missions provided USAID headquarters with information on more than 100 countries. The State Department maintains diplomatic missions in about 180 countries and territories. From the population of USAID missions, we drew a nonprobability sample of 17 countries. Of these countries, 14 had reports from USAID and the State Department, 3 had USAID reports only, and 1 had a State Department report only. State Department assessments were missing from the following countries: India, Pakistan, and Indonesia. USAID did not perform a country assessment on Thailand.

To select our sample, we took a variety of factors into account. To ensure geographic diversity, we included countries from four regions: Asia, Africa, Eurasia and the Near East, and the Americas. Based on influenza experts' opinions and congressional interest, we chose to oversample Asian countries and not represent North America or Europe. We sought to include countries in a variety of situations with regard to the presence of H5N1 in animals or humans, concentrations of poultry and humans living in proximity to each other, exposure to migratory patterns that could allow wild birds to transmit H5N1 into the country, political stability, and strength of the public health infrastructure. We did not include China in our table of countries because the relevant reports were classified.

USAID and the State Department conducted their assessments by sending out sets of questions to personnel at their respective missions. The questions asked in the two instruments differed in their wording, and as a consequence, our first step in developing our analysis was to identify a set of broader dimensions, or indicators, encompassing data from both sets of assessments. Through a review of these two sets of questions, as well as survey questions recently developed by WHO and the World Bank to assess country preparedness, we identified a set of 15 qualitative indicators covering a wide array of issues within the topic areas of preparedness and communications, surveillance and detection, and response and containment. These indicators then became the dimensions along which we analyzed the data contained in the USAID and State Department assessments.

We reviewed USAID rapid country assessments and State Department cables assessing the level of country preparedness for avian influenza. The analysis of the 17 USAID and State Department assessments was performed by two GAO analysts, reviewing the reports separately and recording answers, with justifications, in workpapers. To enhance inter-rater reliability in our analysis of the USAID and State Department assessments, we developed a code book to reflect the specific

characteristics needed for a country to be classified in one of three categories for each indicator: yes, no, or limited. Subsequently, the two analysts compared their answers and justifications, reconciled their analyses when they diverged, and modified the code book as needed to ensure consistent coding across indicators and countries. A methodologist performed a final check on the consistency and accuracy of the analysis.

The USAID and State Department instruments had a number of limitations. First, the information provided in these assessments is limited by the rapidly evolving dynamic of the H5N1 virus and ongoing efforts to improve capacity. As a consequence the information provided in them is already dated and should be understood as a snapshot of the countries assessed at a particular point in time (fall 2005), rather than directly reflecting the current status of country capacities. Second, the purpose of these assessments was to rapidly assess country capacities in this evolving environment, and as a result, the instruments developed were limited in the design of the questions asked, restricted primarily to open-ended questions that could be interpreted and answered in multiple ways. Third, the instruments were limited in the manner in which they were implemented. In particular, the data reported reflect the individualized data-gathering and assessment efforts of the point of contact at USAID or the State Department rather than a standardized approach to data gathering and assessment.

Fourth, while many respondents addressed the indicators we identified for analysis, because the questions were open-ended, there is inconsistency in the depth and coverage of responses. Furthermore, in some cases, the response to a question was simply “yes” or “no” without any details. When this occurred, we recorded the answer the respondent gave. Fifth, some indicators had only one source of information (they were addressed in one report but left blank in another), and we could not compare them for consistency. Sixth, in some instances, respondents did not answer questions sufficiently for us to make determinations or left them blank. We could not determine the level of these indicators based on available data and rated them as missing and left them blank in those cases. Despite these limitations, we determined that the data contained in these statements were sufficient for the purpose of our report, which was to provide information broadly demonstrating the limited capacities of countries at a particular point in time with implications for the challenges posed in subsequent periods.

Appendix VI: Assistance to Regional and Global Organizations

According to data submitted to the World Bank by the United States and other donors, Asia-Pacific regional initiatives have received the largest share of regionally focused funding from international donors, including the United States (see table 3). Approximately 67 percent of committed funds have gone to programs in this region. For example, donors reported providing the Association of Southeast Asian Nations about \$50 million in committed funds, including about \$47 million from Japan to procure antiviral drugs, PPE kits, and influenza test kits. Examples of support in other regions include HHS's provision of \$3.3 million in committed funds to support the Gorgas Institute, a laboratory network in Panama, and the European Commission's provision of about \$28 million to the African Union.

Table 3: Regional Recipients of Donor Assistance for International Avian and Pandemic Influenza Preparedness as of December 2006

Dollars in millions

Region	Commitments (U.S.)	Commitments (All other donors)	Total commitments
Asia-Pacific			
Asia-Pacific Economic Cooperation	—	\$7.6	\$7.6
Asian Development Bank	—	10.3	\$10.3
Association of Southeast Asian Nations	—	51.2	\$51.2
U.S. Global Disease Detection Centers	\$14.9	—	\$14.9
Pacific Island Nations	—	6.1	\$6.1
Research in Southeast Asia	18.0	—	\$18.0
Other regional assistance	7.5	15.5	\$23.0
Subtotal	\$40.4	\$90.7	\$131.1
Africa			
African Union	—	\$28.8	\$28.8
Partnership for Livestock Development, Poverty Alleviation and Sustainable Growth in Africa	—	10.2	\$10.2
U.S. Global Disease Detection Centers	\$8.9	—	\$8.9
Other regional assistance	2.5	0.1	\$2.6
Subtotal	\$11.4	\$39.1	\$50.5
Americas			
U.S. Global Disease Detection Center	\$2.0	—	\$2.0
Gorgas Memorial Institute of Tropical and Preventive Medicine	3.3	—	\$3.3
Other regional assistance	3.5	—	\$3.5
Subtotal	\$8.8	\$0	\$8.8

Appendix VI: Assistance to Regional and Global Organizations

Dollars in millions			
Region	Commitments (U.S.)	Commitments (All other donors)	Total commitments
Eastern Europe/Eurasia			
U.S. Government Regional Platform	\$1.1	—	\$1.1
Other regional assistance	2.9	—	\$2.9
Subtotal	\$4.0	\$0	\$4.0
Total	\$64.6	\$129.8	\$194.4

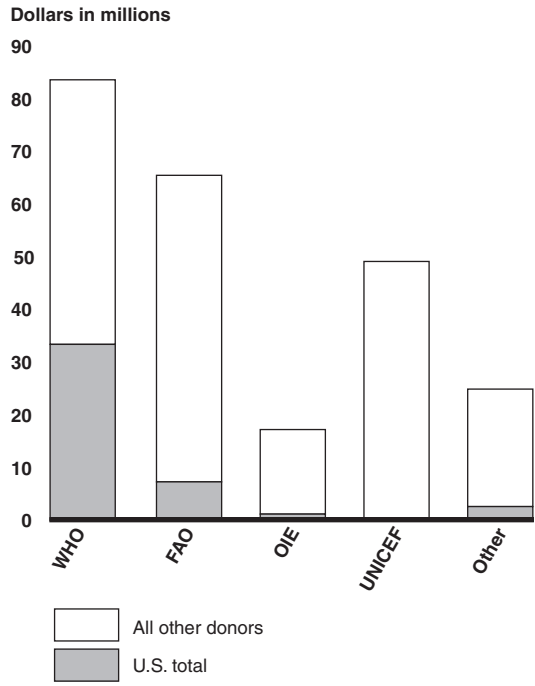
Source: GAO analysis of data from UN System Influenza Coordinator and World Bank, *Responses to Avian and Human Influenza Threats: Progress, Analysis and Recommendations July-December 2006* (January 2007).

According to data submitted to the World Bank, WHO and FAO have received the greatest shares of overall funding committed to global organizations (see fig. 13). Of the \$240 million in reported overall donor commitments for global organizations, the WHO and FAO shares constituted about 35 percent and 27 percent, respectively. U.S. agencies are supporting WHO and FAO with funds, staff, equipment, and technical assistance to improve these organizations' capacity to support countries. For example, HHS has provided funding to all six WHO regional offices. Some of this assistance is directed at improving collaboration on human and animal components of the response.¹ OIE, the UN Children's Fund, and the UN System Influenza Coordinator (among others) share the remaining \$91 million, with the Children's Fund accounting for more than half of this amount—about \$49 million from Japan, provided primarily to enhance communications on avian and pandemic influenza risks.

¹According to State Department officials, U.S. contributions to FAO and WHO do not include funds provided to those organizations to carry out programs in country or at the regional level. The United States counts those funds as bilateral or regional assistance.

Appendix VI: Assistance to Regional and Global Organizations

Figure 13: Global Organization Recipients of Donor Commitments for International Avian and Pandemic Influenza Preparedness as of December 2006



Source: GAO analysis of data from January 2007 *Responses to Avian and Human Influenza Threats, July-December 2006* published by the UN System Influenza Coordinator and World Bank.

Appendix VII: U.S. Agency Obligations Funding by Pillar

In response to our request, HHS, USAID, DOD, USDA, and the State Department reported having obligated about 64 percent of their planned funding for international avian and pandemic influenza-related assistance. However, the data are not from consistent time periods. HHS, DOD, and State Department data represent obligations through the end of fiscal year 2006 (that is, through the end of September 2006). USAID and USDA provided data on their obligations through December 2006. (See table 4.)

Table 4: U.S. Obligations for International Avian and Pandemic Influenza Assistance by Agency and by Pillar/Activity

Dollars in millions

Pillar/activity	Agency					Total by pillar/activity
	HHS ^a	USAID	DOD	USDA	State Department	
Preparedness and communications	21	96	10	5	2	134
Surveillance and detection	25	38	0	1	0	64
Response and containment	15	22	0	3	0	40
Other	1	—	—	—	—	1
Total by agency	62	156	10	9	2	239

Sources: HHS, USAID, DOD, USDA, and the State Department.

Notes:

Obligations create a legal liability for payment. For example, an agency incurs an obligation when it places an order, signs a contract, or awards a grant. See app. I for additional information on these data.

USAID and USDA provided obligated funds through December 2006. The remaining agencies provided information on obligated funds through September 2006.

^aAs the table shows, HHS did not designate a pillar for a portion of its obligations. These funds were devoted primarily to expanding influenza-related staffing levels in regional surveillance and response facilities in Thailand and Egypt.

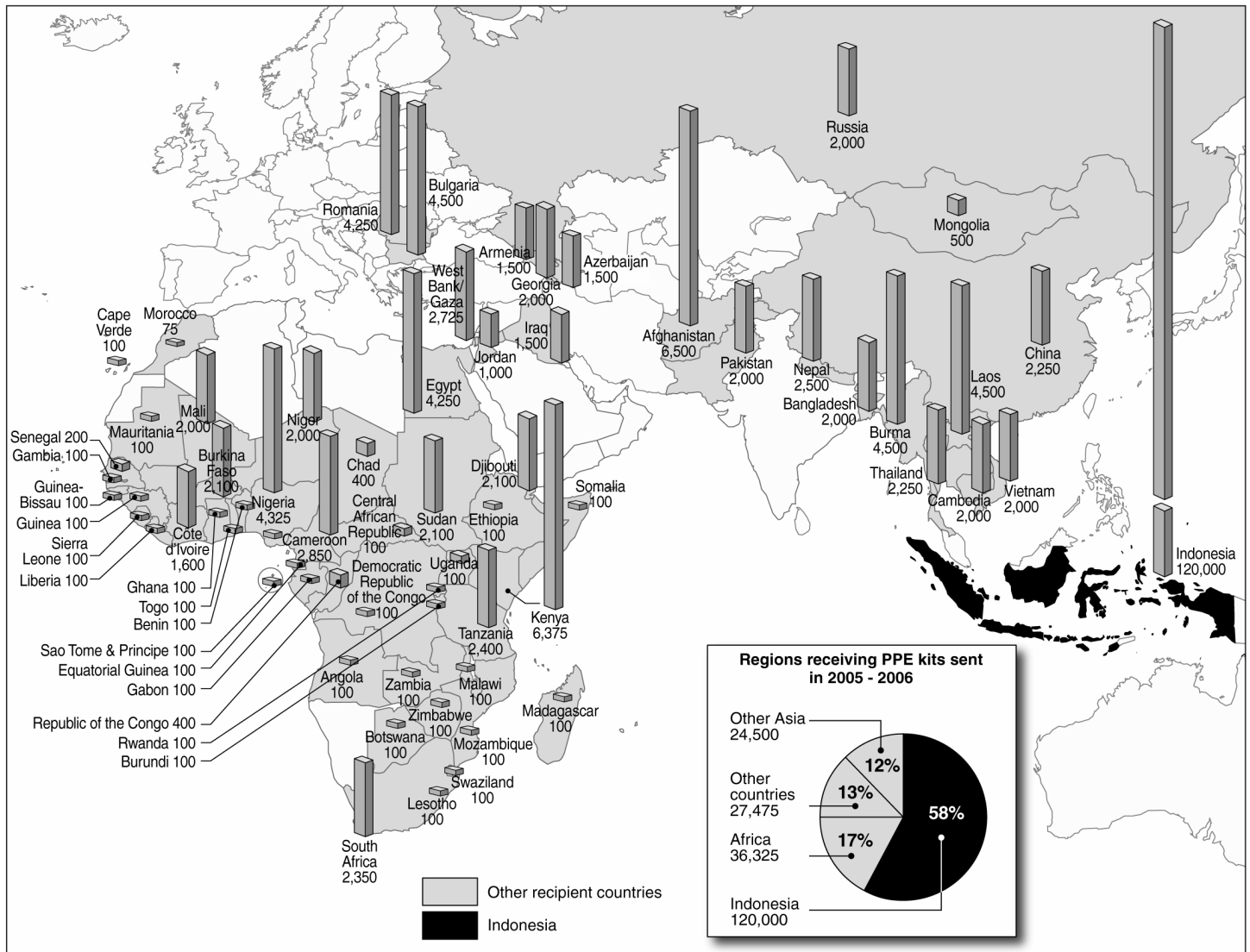
Appendix VIII: Distribution of USAID Personal Protective Equipment Kits

Figure 14 shows USAID's distribution of PPE kits by country as of the end of fiscal year 2006. As the figure shows, Indonesia accounted for the majority of these kits. According to a USAID official, approximately 193,000 PPE kits were distributed for immediate use in surveillance and response activities in more than 60 countries. Additionally, USAID had begun to create long-term stockpiles of PPE, laboratory, and decontamination kits in 20 countries.¹

¹USAID designated the following countries as having the greatest need for forward deployment of PPE kits: Nigeria, Cameroon, Côte d'Ivoire, Niger, Sudan, Democratic Republic of the Congo, Bulgaria, Romania, Moldova, Ukraine, Georgia, Armenia, Azerbaijan, Jordan, Egypt, Bangladesh, India, Nepal, Pakistan, and Indonesia. According to USAID, the agency selected these countries because they were in regions where outbreak risk remains high.

**Appendix VIII: Distribution of USAID
Personal Protective Equipment Kits**

Figure 14: Distribution of USAID PPE Kits as of October 2006



Sources: GAO, based on USAID information; map (Map Resources).

Appendix IX: GAO Contacts and Staff Acknowledgments

GAO Contacts

David Gootnick (202) 512-3149 or gootnickd@gao.gov
Marcia Crosse (202) 512-7114 or crossem@gao.gov

Staff Acknowledgements

Key contributors to this report were Celia Thomas, Assistant Director; Thomas Conahan, Assistant Director; Michael McAtee; Robert Copeland; R. Gifford Howland; Syeda Uddin; David Fox; Jasleen Modi; David Dornisch; Etana Finkler, Debbie Chung, Monica Brym, and Jena Sinkfield.

Related GAO Products

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