



# The 2009 Influenza A(H1N1) “Swine Flu” Outbreak: U.S. Responses to Global Human Cases

**Tiaji Salaam-Blyther**  
Specialist in Global Health

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## Summary

In April 2009, a novel influenza virus began to spread around the world. The World Health Organization (WHO) refers to the virus as Influenza A(H1N1). The U.S. Centers for Disease Control and Prevention (CDC) and other Administration officials refer to it as 2009 H1N1 flu. Throughout this report, the virus is referred to as H1N1. Although H1N1 does not appear to be as lethal as H5N1 avian influenza, which reemerged in 2005, the virus is slightly more lethal than seasonal flu and it continues to spread. Researchers are not yet clear to what extent H1N1 transmission will continue spread or how virulent the virus will be ultimately.

As of May 26, 2009, WHO confirmed that nearly 13,000 human cases of H1N1 had occurred in more than 40 countries, including 92 deaths. The United Nations Food and Agricultural Organization (FAO), the World Organization for Animal Health (OIE), and WHO agree that there is no risk of contracting the virus from consuming well-cooked pork or pork products. WHO asserts that limiting travel and imposing travel restrictions would minimally affect the spread of the virus, but would be highly disruptive to the global community.

The strain of H1N1 circulating the globe is treatable with two antiviral drugs, oseltamivir (brand name Tamiflu®) and zanamivir (brand name Relenza®), though there is no available vaccine. WHO has been maintaining a global stockpile of approximately 5 million adult treatment courses of oseltamivir that were donated by manufacturers and donor countries. This stockpile was initiated after the onset of H5N1 bird flu outbreaks. WHO has already distributed some of the treatments through the WHO Regional Offices and is distributing 3 million treatment courses from the stockpile to developing countries in need.

As of May 18, 2009, the United States had provided more than \$16 million to assist countries respond to H1N1 outbreaks. Global responses by U.S. agencies to H1N1 are conducted primarily by CDC and the U.S. Agency for International Development (USAID), though DOD does provide some support to global aid. CDC has sent experts to Latin America and the Caribbean to help the countries strengthen laboratory capacity and train health experts. HHS has already sent 400,000 treatment courses to Mexico, accounting for less than 1% of the total American stockpile. In total, the Administration aims to provide 2 million courses to Mexico. USAID announced on April 28, 2009, that it would provide an additional \$5 million to WHO and the Pan American Health Organization (PAHO) for interventions against H1N1 in Mexico and Central America. To date, USAID has provided \$6.2 million for international H1N1 assistance. The assistance includes support to FAO for animal surveillance efforts in Mexico and other parts of Central America, and the provision of personal protection equipment (PPE) kits from its avian and pandemic influenza stockpile to prevent first responders from contracting or spreading the disease. In May 2009, it distributed more than 100,000 PPE kits in Mexico City and announced that it had already pre-positioned 400,000 PPE kits in 82 countries in preparation of a possible influenza pandemic.

Investments that the United States and other stakeholders have made to prepare for a possible influenza pandemic, and to monitor the spread of other infectious diseases, have been applied to the most recent global response to H1N1. While health experts have made considerable gains against the disease, questions remain. Some health experts are concerned that poorer countries may not yet have the capacity to sufficiently monitor and respond to H1N1. Others warn that H1N1 transmission might accelerate in winter months. Questions still remain about whether the disease can change or reassort, particularly should outbreaks in countries simultaneously contending with H5N1 bird flu cases occur (such as Egypt, Vietnam, and Indonesia).

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## **Background Information on H1N1**

In April 2009, a novel influenza virus began to spread around the world.<sup>1</sup> Early in the outbreak, public reports referred to the virus as "swine flu," which reflected the dominant genetic makeup of the unknown disease. At the end of April, the World Health Organization (WHO) formally named the disease and explained how the disease emerged:

Pigs can be infected by avian (bird), human, and swine (pig) influenza (flu) viruses. When flu viruses from different species infect pigs simultaneously, the viruses can reassort (swap genes) and new viruses that are a mix of swine, human or avian flu viruses can emerge. This type of reassortment has already happened in pigs; avian and human genes have been circulating among swine in the United States since 1998. This type of reassortment can also occur in humans. The currently circulating influenza A (H1N1) virus is such a reassortment, composed of genes of swine, avian and human origin. This particular combination had not been seen in humans or in swine. The origin of this reassortment, and when and where it happened, is not known. This virus is now being transmitted from human to human in a sustained manner. The role of swine in the emergence of this virus is under investigation.<sup>2</sup>

WHO refers to the virus as Influenza A(H1N1). The U.S. Centers for Disease Control and Prevention (CDC) and other Administration officials refer to it as 2009 H1N1 flu. Throughout this report, the virus is referred to as H1N1. Although H1N1 does not appear to be as lethal as H5N1 avian influenza, which reemerged in 2005, the virus is slightly more lethal than seasonal flu and it continues to spread. Researchers are not yet clear to what extent H1N1 transmission will continue spread or how virulent the virus will be ultimately.

## **Brief Timeline of the Global Spread of H1N1**

On April 21, 2009, CDC reported that two children in California had recovered from a unique influenza strain, which contained gene segments from swine flu viruses. The children had not had contact with pigs.<sup>3</sup> Two days later, CDC reported five more H1N1 cases, three in California and two in Texas.

On April 24, 2009, Mexico's Health Ministry announced that a new strain of influenza was affecting the country, with just over 1,000 suspected cases. The Mexican government also announced that it was closing schools and canceling public gatherings such as sporting events and concerts in Mexico City and surrounding states through May 6, 2009. This was subsequently extended to all schools throughout the country.<sup>4</sup>

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<sup>1</sup> For more information on H1N1, see WHO H1N1 Homepage at <http://www.who.int/csr/disease/swineflu/en/index.html> and CRS Report R40554, *The 2009 H1N1 "Swine Flu" Outbreak: An Overview*, by Sarah A. Lister and C. Stephen Redhead for domestic responses to the virus.

<sup>2</sup> See WHO and FAO, "The influenza outbreak in humans caused by Influenza A/H1N1," press release, April 30, 2009, [http://www.who.int/foodsafety/fs\\_management/No\\_02\\_influenza\\_Apr09\\_en\\_rev1.pdf](http://www.who.int/foodsafety/fs_management/No_02_influenza_Apr09_en_rev1.pdf).

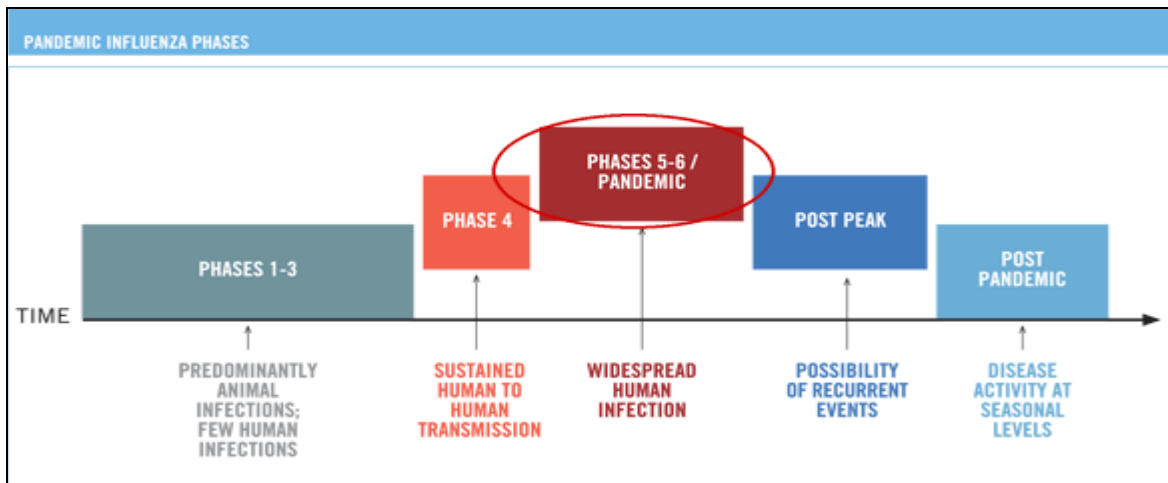
<sup>3</sup> See CRS Report R40554, *The 2009 H1N1 "Swine Flu" Outbreak: An Overview*, by Sarah A. Lister and C. Stephen Redhead.

<sup>4</sup> Taken from CRS Report RL32724, *Mexico-U.S. Relations: Issues for Congress*, by Mark P. Sullivan and June S. Beittel.

By April 27, 2009, WHO had reported that health officials in Canada and Spain had reported human cases with no deaths.<sup>5</sup> Two days later, WHO Director-General Dr. Margaret Chan raised the influenza pandemic alert level from Phase 4 to Phase 5 (**Figure 1**).<sup>6</sup> According to WHO,

Phase 4 is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause 'community-level outbreaks.' Phase 5 is characterized by human-to-human spread of the virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.<sup>7</sup>

**Figure 1. WHO Pandemic Influenza Phases**



**Source:** WHO, "Current WHO phase of pandemic alert," accessed on May 4, 2009.

As of May 20, 2009, WHO reported that more than 10,000 human cases of H1N1 had been confirmed in more than 40 countries, including 80 deaths (**Table A-1** and **Figure A-1**).<sup>8</sup> It is important to note that more people than officially reported may have contracted H1N1; the number of cases reflects only cases confirmed by laboratory testing and reported to WHO by foreign health authorities.<sup>9</sup> The United Nations Food and Agricultural Organization (FAO), the World Organization for Animal Health (OIE), and WHO agree that there is no risk of contracting the virus from consumption of well-cooked pork or pork products. WHO also advises that "limiting travel and imposing travel restrictions would have very little effect on stopping the virus

<sup>5</sup> See WHO, *Swine influenza - update 3*, April 27, 2009, [http://www.who.int/csr/don/2009\\_04\\_27/en/index.html](http://www.who.int/csr/don/2009_04_27/en/index.html).

<sup>6</sup> WHO, *Swine Influenza*, Statement by WHO Director-General, Dr. Margaret Chan, April 29, 2009, [http://www.who.int/mediacentre/news/statements/2009/h1n1\\_20090429/en/index.html](http://www.who.int/mediacentre/news/statements/2009/h1n1_20090429/en/index.html).

<sup>7</sup> WHO, *Current WHO Phase of Pandemic Alert*, [http://www.who.int/csr/disease/avian\\_influenza/phase/en/](http://www.who.int/csr/disease/avian_influenza/phase/en/).

<sup>8</sup> WHO, "Influenza A (H1N1) – Update 3," May 20, 2009, [http://www.who.int/csr/don/2009\\_05\\_20/en/index.html](http://www.who.int/csr/don/2009_05_20/en/index.html).

<sup>9</sup> Dan Jernigan, Deputy Director of CDC's Influenza Division, indicated that the number of human H1N1 cases in the United States may be upwards of 100,000. He explained that, "the estimates of the number of confirmed and probable cases in the United States are probably not the best indicator of transmission at this point ... early on, a lot of tests were done but now the amount of testing is more targeted. And so they likely are underestimates of the actual number of people infected." CDC, *CDC Telebriefing on Investigation of Human Cases of H1N1 Flu*, May 15, 2009, <http://www.cdc.gov/media/transcripts/2009/t090515.htm>.

from spreading, but would be highly disruptive to the global community.”<sup>10</sup> WHO does caution, however, that those who are ill should delay international travel.

## **Available Treatments and Vaccines to H1N1**

According to WHO, most people who have contracted H1N1 have experienced influenza-like symptoms, such as sore throat, cough, runny nose, fever, malaise, headache, and joint/muscle pain, and recovered without antiviral treatment. Drugs provided to H1N1 patients may reduce the symptoms and duration of illness, just as they do for seasonal influenza. They also may contribute to preventing severe disease and death. The strain of H1N1 circulating the globe is a new virus, and only a small number of people with the infection have been treated for it with antiviral drugs. WHO has tested those who received treatments in Mexico and the United States and found that older antiviral drugs have not been very effective against H1N1, though oseltamivir (brand name Tamiflu®) and zanamivir (brand name Relenza®) are.<sup>11</sup>

There is no available vaccine against the current strain of H1N1, though CDC, WHO, and others are working on developing one. Scientific evidence, though incomplete, suggests that currently available seasonal influenza vaccines will offer no protection against H1N1.<sup>12</sup> WHO and CDC are preparing vaccine candidate viruses and estimate that once the strain is modified, it could take between five and six months to mass-produce a vaccine against H1N1. Once a vaccine is developed, WHO estimates that at least 1 to 2 billion vaccine doses could be produced annually.

## **Global Responses to H1N1**

Most countries, with the exception of China, have adhered to the WHO recommendation against banning international travel or closing borders. China has reportedly quarantined and prevented a number of Mexican nationals, including those living in China at the time of the outbreak, from traveling.<sup>13</sup> Mexico reportedly responded by barring all flights to China until “concerns about discrimination were addressed.”

Though no other country has reportedly quarantined Mexican nationals or any other citizens from countries with outbreaks, some countries have warned against nonessential travel to the United States and Mexico. On April 27, 2009, the European Union Health Commissioner Androulla Vassiliou reportedly urged Europeans to postpone nonessential travel to the United States and Mexico.<sup>14</sup> On the same day, the CDC recommended that U.S. travelers avoid all nonessential

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<sup>10</sup> WHO, *No Rationale for Travel Restrictions*, May 1, 2009, [http://www.who.int/csr/disease/swineflu/guidance/public\\_health/travel\\_advice/en/index.html](http://www.who.int/csr/disease/swineflu/guidance/public_health/travel_advice/en/index.html).

<sup>11</sup> Information in this paragraph was summarized by CRS from WHO, *Use of antiviral drugs against influenza A(H1N1)*, May 5, 2009, [http://www.who.int/csr/disease/swineflu/frequently\\_asked\\_questions/swineflu\\_faq\\_antivirals/en/index.html](http://www.who.int/csr/disease/swineflu/frequently_asked_questions/swineflu_faq_antivirals/en/index.html) and CDC, "Antiviral Drugs and H1N1 Flu (Swine Flu)," press release, April 29, 2009, <http://www.cdc.gov/h1n1flu/antiviral.htm>.

<sup>12</sup> Unless otherwise indicated, information in this section was compiled by CRS from WHO, "Vaccines for the New Influenza A (H1N1)," press release, May 2, 2009, [http://www.who.int/csr/disease/swineflu/frequently\\_asked\\_questions/vaccine\\_preparedness/en/index.html](http://www.who.int/csr/disease/swineflu/frequently_asked_questions/vaccine_preparedness/en/index.html).

<sup>13</sup> Jamil Anderlini and Andrew Jack, "Mexico hits at China's quarantine policy," *Financial Times*, May 4, 2009, <http://www.ft.com/cms/s/0/13f4c296-38d6-11de-8cfe-00144feabdc0.html>.

<sup>14</sup> Associated Press, "Swine flu prompts EU warning on travel to U.S.," April 27, 2009, MSNBC online, (continued...)

travel to Mexico.<sup>15</sup> On May 15, 2009, it downgraded the recommendation to a "travel health precaution."<sup>16</sup>

In defending the decision not to close U.S. borders with Mexico, Homeland Security Secretary Janet Napolitano testified at an April 29, 2009, Senate Homeland Security Committee hearing that "closing the border [to Mexico] would yield only very marginal benefits; at the same time, closing the border has very high costs. The strain of the virus that was first detected in Mexico is already present throughout the United States, and there is no realistic opportunity to contain the virus through border closures, so our focus must now be on mitigating the virus."<sup>17</sup> Closing U.S. borders could involve a series of legal and logistical issues.<sup>18</sup>

A number of countries have reportedly installed or are in the process of installing "thermal (temperature) scanners" in airports to detect the body temperature of travelers and further screen those whose body temperature exceed 100 degrees Fahrenheit.<sup>19</sup> There is some debate, however, on the effectiveness of such measures.

In addition to public health measures, several countries have instituted actions to prevent the spread of H1N1 among animals. Egypt is reportedly the first country to order the slaughter of pigs, though there have been no confirmed H1N1 cases in the country at this time, and pigs have not yet been identified as a source of human transmission.<sup>20</sup> Several countries have also banned the import of pork and pork products from the United States, Canada, and Mexico.<sup>21</sup>

WHO has been maintaining a global stockpile of approximately 5 million adult treatment courses of oseltamivir that were donated by manufacturers and donor countries. This stockpile was initiated after the onset of H5N1 bird flu outbreaks. WHO has already distributed some of the treatments through the WHO Regional Offices and is distributing 3 million adult treatment courses from the stockpile to developing countries in need.<sup>22</sup>

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<http://www.msnbc.msn.com/id/30431245/>.

<sup>15</sup> CDC, "H1N1 Flu (Swine Flu) in the United States," press release, May 30, 2009, <http://wwwn.cdc.gov/travel/content/SwineFluUS.aspx>.

<sup>16</sup> CDC, "CDC Travel Health Warning for Novel H1N1 Flu in Mexico Removed," travel notice, May 15, 2009, <http://wwwn.cdc.gov/travel/content/travel-health-precaution/novel-h1n1-flu-mexico.aspx>.

<sup>17</sup> U.S. Congress, Senate Committee on Homeland Security and Governmental Affairs, *Swine Flu: Coordinating the Federal Response*, Testimony of Janet Napolitano, 111<sup>th</sup> Cong., 1<sup>st</sup> sess., April 29, 2009, p. 7, [http://hsgac.senate.gov/public/\\_files/042909Napolitano.pdf](http://hsgac.senate.gov/public/_files/042909Napolitano.pdf).

<sup>18</sup> See CRS Report R40560, *The 2009 Influenza A(H1N1) Outbreak: Selected Legal Issues*, coordinated by Kathleen S. Swendiman and Nancy Lee Jones, and CRS Report R40570, *Immigration Policies and Issues on Health-Related Grounds for Exclusion*, coordinated by Chad C. Haddal.

<sup>19</sup> "Asia: Action Taken Across the Region to Counter Swine Flu," *UN Office for the Coordination of Humanitarian Affairs*, April 29, 2009, <http://www.irinnews.org/Report.aspx?ReportId=84164>.

<sup>20</sup> "Egypt's pig cull a 'general health measure,'" *ABC News*, April 30, 2009, <http://www.abc.net.au/news/stories/2009/04/30/2557618.htm>.

<sup>21</sup> See CRS Report R40575, *Potential Farm Sector Effects of 2009 H1N1 "Swine Flu": Questions and Answers*, by Renée Johnson.

<sup>22</sup> WHO, *Use of antiviral drugs against influenza A(H1N1)*, May 5, 2009, [http://www.who.int/csr/disease/swineflu/frequently\\_asked\\_questions/swineflu\\_faq\\_antivirals/en/index.html](http://www.who.int/csr/disease/swineflu/frequently_asked_questions/swineflu_faq_antivirals/en/index.html)

## U.S. International Pandemic Preparedness Efforts and Responses to H1N1

On May 1, 2009, USAID established the Pandemic Influenza Response Management Team—composed of its Bureaus of Global Health and Democracy, Conflict, and Humanitarian Assistance—to coordinate the U.S. humanitarian response to H1N1 outbreaks.<sup>23</sup> As of May 18, 2009, the United States has provided more than \$16 million to assist countries in Latin America and the Caribbean respond to H1N1 outbreaks. U.S. aid focuses on H1N1 specifically, and builds on influenza pandemic preparedness efforts that began in earnest after the 2003 severe acute respiratory syndrome (SARS) outbreak. U.S. responses to global H1N1 outbreaks are conducted mostly by CDC and the U.S. Agency for International Development (USAID), though the Department of Defense (DOD) has also provided support (**Table 1**). Foreign assistance efforts largely focus on commodity delivery and disease detection and surveillance.

**Table 1. U.S. Assistance for International H1N1 Responses, FY2009**  
(U.S. \$)

Agency/Implementing Partner	Activity	Location	Amount
HHS/Government of Mexico	Health	Mexico	10,000,000
<b>HHS Total</b>			<b>10,000,000</b>
USAID/Government of Mexico	Emergency Relief Supplies	Mexico	875,000
USAID/Pan American Health Organization	Emergency Relief Supplies	Panama	262,000
USAID/Pan American Health Organization	Health	Central America	2,500,000
USAID/World Health Organization	Health	Central America	2,500,000
USAID	Administrative Support	Mexico	100,000
<b>USAID Total</b>			<b>6,237,500</b>
DOD/Ministries of Health	Emergency Relief Supplies	Central America	234,732
<b>DOD Total</b>			<b>234,732</b>
<b>Total U.S. Assistance</b>			<b>16,472,232</b>

**Source:** USAID, *Global—Influenza A/H1N1*, Fact Sheet # 3, May 18, 2009.

### Centers for Disease Control and Prevention

CDC has been engaged in efforts to respond to H1N1 outbreaks since the virus was identified. As one of four WHO collaborating centers around the world, the CDC influenza laboratory in Atlanta routinely receives viral samples from many countries, including Mexico.<sup>24</sup> CDC creates

<sup>23</sup> USAID, *Global—Influenza A/H1N1*, Fact Sheet # 3, May 18, 2009, p. 1, [http://www.usaid.gov/our\\_work/humanitarian\\_assistance/disaster\\_assistance/countries/pandemic\\_influenza/template/fs\\_sr/pandemic\\_influenza\\_fs03\\_05-18-2009.pdf](http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/pandemic_influenza/template/fs_sr/pandemic_influenza_fs03_05-18-2009.pdf).

<sup>24</sup> The other collaborating centers are in Britain, Japan, and Australia. For more information on WHO Collaborating Centers, see <http://www.who.int/csr/disease/influenza/collabcentres/en/>.



or develops reagents that are used to detect subtypes of influenza that are sent to national influenza centers around the world.<sup>25</sup> Once the subtype of influenza is identified, CDC generates testing kits that are sent to public health laboratories worldwide at no cost. At the onset of the outbreak, CDC sent experts out to the field to help strengthen laboratory capacity and train health experts to control the spread of a virus.

HHS Secretary Kathleen Sebelius announced on April 30, 2009, that the department "began moving 400,000 treatment courses—valued at \$10 million—to Mexico, which represent less than 1% of the total American stockpile."<sup>26</sup> In total, the Administration aims to distribute 2 million courses in Latin America and the Caribbean. In addition, CDC has deployed 16 staff to Mexico and one health expert to Guatemala, including experts in influenza epidemiology, laboratory, health communications, and emergency operations, including distribution of supplies and medications, information technology, and veterinary sciences. These teams work under the auspices of the WHO/Pan American Health Organization Global Outbreak Alert and Response Network and a trilateral team of Mexican, Canadian, and American experts. The teams aim to better understand the clinical illness severity and transmission patterns of H1N1 and improve laboratory capacity in Mexico. CDC's Emergency Operations Center also coordinates and collaborates with the European Centre for Disease Prevention and Control (ECDC) and the China CDC.

In addition to efforts related to H1N1, CDC directly or indirectly supports pandemic influenza preparedness efforts in more than 50 countries. In some cases, CDC sends an expert to work with a WHO country office or foreign ministry of health. In other cases, CDC forms cooperative agreements with groups through which it provides funding for country efforts.<sup>27</sup>

## **The U.S. Agency for International Development**

USAID announced on April 28, 2009, that it would provide an additional \$5 million to WHO and the Pan American Health Organization (PAHO) in support of efforts to respond to the H1N1 virus in the Latin America and the Caribbean, with particular emphasis placed on advanced disease surveillance and control measures.<sup>28</sup> As of May 18, 2009, USAID has provided \$6.1 million for international H1N1 assistance, with about \$0.9 million directed at H1N1 response efforts in Mexico, \$0.2 million in Panama, and \$5 million to the region, as indicated above.<sup>29</sup> The

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<sup>25</sup> Taken from CDC, "Press Briefing: CDC Media Availability on Human Swine Influenza Cases," press release, April 27, 2009, <http://www.cdc.gov/media/transcripts/2009/t090427.htm>.

<sup>26</sup> HHS, "Secretary Sebelius Takes Two Key Actions On Strategic National Stockpile," press release, April 30, 2009, <http://www.hhs.gov/news/press/2009pres/04/20090430a.html>. For information about the value of the 400,000 treatment courses, see USAID, *Global—Influenza A/H1N1*, Fact Sheet # 3, May 18, 2009, p. 2, [http://www.usaid.gov/our\\_work/humanitarian\\_assistance/disaster\\_assistance/countries/pandemic\\_influenza/template/fs\\_sr/pandemic\\_influenza\\_fs03\\_05-18-2009.pdf](http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/pandemic_influenza/template/fs_sr/pandemic_influenza_fs03_05-18-2009.pdf).

<sup>27</sup> U.S. Congress, House Committee on Foreign Affairs, Subcommittee on Africa and Global Health, *Global Health Emergencies Hit Home: The "Swine Flu" Outbreak*, Dr. Anne Schuchat, the interim deputy director for science and public health program at CDC, 111<sup>th</sup> Cong., 1<sup>st</sup> sess., May 6, 2009. For more on CDC's global health work, see CRS Report R40239, *Centers for Disease Control and Prevention Global Health Programs: FY2004-FY2009*, by Tiaji Salaam-Blyther.

<sup>28</sup> Information in this paragraph was summarized by CRS from USAID press release, "USAID Provides \$5M in Emergency Support as Swine Flu Spreads", April 28, 2009, <http://www.usaid.gov/press/releases/2009/pr090428.html>.

<sup>29</sup> USAID, *Global—Influenza A/H1N1*, Fact Sheet # 3, May 18, 2009, p. 1, [http://www.usaid.gov/our\\_work/humanitarian\\_assistance/disaster\\_assistance/countries/pandemic\\_influenza/template/fs\\_sr/](http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/pandemic_influenza/template/fs_sr/)  
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assistance includes support to FAO for animal surveillance efforts in Mexico and other parts of Latin America and the Caribbean and provision of commodities. In May 2009, it distributed more than 100,000 personal protection equipment (PPE) kits valued at more than \$1 million from its avian and pandemic influenza stockpile to protect first responders in the region from contracting or spreading the disease.<sup>30</sup> USAID also announced that it had already pre-positioned 400,000 PPE kits in 82 countries in preparation of a possible influenza pandemic.<sup>31</sup>

As part of its Humanitarian Pandemic Preparedness (H2P) Initiative, USAID held a three-day pandemic preparedness exercise at the end of April 2009 in Ethiopia.<sup>32</sup> The exercise brought together stakeholders and national authorities from nine countries in East Africa: Burundi, Djibouti, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda. Participants included civilian and military representatives who met to identify roles and responsibilities, establish coordination principles, develop a pandemic response action plan, and test existing ones. During the session, participants underwent a simulation exercise that allowed them to test their plans, identify their weaknesses, and improve and refine their preparedness plans.

The exercises not only help governments prepare for any influenza virus that might cause a pandemic, whether it originates from pigs, birds, or any other source, but they also help governments address cross-border movement of populations. At the regional events, national leaders can interact with each other and identify some possible issues that might arise with an influenza outbreak, such as those that arose between the United States and Mexico. USAID plans to conduct similar exercises in South Africa in June 2009 and Asia in August 2009.<sup>33</sup>

USAID is also reportedly working with the Department of Defense (DOD) and its Pacific and African combatant commands—PACOM and AFRICOM—to provide direct military-to-military assistance in 30 countries across Africa and Asia aimed at ensuring that militaries are prepared to cooperate with civilian authorities and fully prepared and capable of executing their responsibilities during a pandemic. In May 2009, USAID also plans to co-host with PACOM, AFRICOM, and the World Food Program (WFP), a joint pandemic preparedness exercise, which will involve 27 African and Asian countries and their military representatives.<sup>34</sup>

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<sup>30</sup> PPE kits contain protective suits, goggles, gloves, masks, and other supplies to protect first responders from contracting or spreading influenza viruses.

<sup>31</sup> U.S. Congress, House Committee on Foreign Affairs, Subcommittee on Africa and Global Health, *Global Health Emergencies Hit Home: The "Swine Flu" Outbreak*, Dr. Dennis Carroll, Director, Bureau for Global Health, Avian and Pandemic Influenza Management and Response Unit at USAID, 111<sup>th</sup> Cong., 1<sup>st</sup> sess., May 6, 2009 and USAID, *Global—Influenza A/H1N1*, Fact Sheet # 3, May 18, 2009, p. 2.

<sup>32</sup> For more information on H2P, see <http://www.pandemicpreparedness.org/>. Information about the pandemic preparedness exercise was taken from USAID, "USAID Cooperates in Pandemic Preparedness Initiative," press release, April 29, 2009, <http://www.usaid.gov/press/releases/2009/pr090429.html>.

<sup>33</sup> U.S. Congress, House Committee on Foreign Affairs, Subcommittee on Africa and Global Health, *Global Health Emergencies Hit Home: The "Swine Flu" Outbreak*, Dr. Dennis Carroll, Director, Bureau for Global Health, Avian and Pandemic Influenza Management and Response Unit at USAID, 111<sup>th</sup> Cong., 1<sup>st</sup> sess., May 6, 2009.

<sup>34</sup> Ibid.

## U.S. Assistance for International Pandemic Preparedness Efforts: FY2005-FY2010

In FY2005, Congress provided emergency supplemental funds for U.S. technical assistance efforts related to global pandemic influenza preparedness and response. In each appropriation year since, Congress has funded U.S. efforts to train health workers in foreign countries to prepare for and respond to a pandemic that might occur from any influenza virus, including H5N1 avian flu and H1N1. The U.S. Department of State announced in October 2008 that since FY2005, the United States has pledged about \$949 million for global avian and pandemic influenza efforts, accounting for 30.9% of overall international donor pledges of \$3.07 billion.<sup>35</sup> The United States is the largest single donor to global avian and pandemic preparedness efforts.<sup>36</sup> The funds have been used to support international efforts in more than 100 nations and jurisdictions. The assistance focused on three areas: preparedness and communication, surveillance and detection, and response and containment. The \$949 million was provided for the following efforts:

- \$319 million for bilateral activities;
- \$196 million for support to international organizations, including WHO, the U.N. Food and Agriculture Organization (FAO), the U.N. Development Program (UNDP), the International Federation of the Red Cross and Red Crescent Societies (IFRC), the U.N. System Influenza Coordinator (UNSIC), the World Organization for Animal Health (OIE), and the U.N. Children's Fund (UNICEF);
- \$123 million for regional programs, including disease detection sites;
- \$83 million for a global worldwide contingency, available to address the evolving nature of the threat;
- \$77 million for international technical and humanitarian assistance and international coordination;
- \$71 million for international influenza research (including vaccines and modeling of influenza outbreaks) and wild bird surveillance, including the U.S. launch of the Global Avian Influenza Network for Surveillance (GAINS) for wild birds, with a collection of tens of thousands of samples for H5N1 analysis;<sup>37</sup>
- \$67 million for stockpiles of non-pharmaceutical supplies, including over 1.6 million PPE kits, approximately 250 laboratory specimen collection kits and 15,000 decontamination kits for use in surveillance, outbreak investigation and emergency response and containment efforts; and

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<sup>35</sup> Correspondence with Jeffrey Lutz, Avian Influenza Action Group, U.S. Department of State, April 28, 2009 and U.S. Department of State press release, "U.S. International Avian and Pandemic Influenza Assistance Approaches \$950 Million," October 25, 2008, <http://2001-2009.state.gov/r/pa/prs/ps/2008/oct/111241.htm>. For information on domestic spending on pandemic preparedness, see CRS Report RS22576, *Pandemic Influenza: Appropriations for Public Health Preparedness and Response*, by Sarah A. Lister. For information on domestic spending on H1N1, see CRS Report R40554, *The 2009 Influenza A(H1N1) "Swine Flu" Outbreak: An Overview*, by Sarah A. Lister and C. Stephen Redhead.

<sup>36</sup> U.N. System Influenza Coordinator and World Bank, *Responses to Avian Influenza and State of Pandemic Readiness*, Fourth Global Progress Report, October 2008, p. 83, <http://un-influenza.org/files/081006-Synopsis2008.pdf>.

<sup>37</sup> For more information about GAINS, see <http://www.gains.org/>.

- \$13 million for global communications and outreach.

The cumulative pledge of \$949 million consists of the following contributions by agency:

- USAID: \$542 million.
- HHS, including CDC, the National Institutes of Health (NIH), and the Food and Drug Administration (FDA): \$353 million.
- U.S. Department of Agriculture (USDA): \$37 million.
- Department of Defense (DOD): \$10 million.
- Department of State (DOS): \$7 million.

In addition, President Barack Obama requested that Congress provide \$1.5 billion in FY2009 emergency funds to support U.S. domestic and international responses to H1N1.<sup>38</sup> It was not stated how much of these funds the President intended to spend on international efforts. In a May 7, 2009, markup of the FY2009 Supplemental Appropriations bill, the House Appropriations Committee recommended that \$2 billion be provided for pandemic flu preparedness, including \$200 million for USAID to undertake international initiatives to track and respond to the spread of H1N1.<sup>39</sup> It also reported out \$200 million for CDC to undertake domestic and international H1N1 activities. Should those funds be provided, it is unclear how much would be spent on international efforts. The Senate reported out \$150 million for USAID to implement global H1N1 activities.

## Considerations for the Future

Infectious diseases are estimated to cause more than 25% of all deaths around the world. A number of infectious disease outbreaks over the past decade, such as H5N1 avian influenza and severe acute respiratory syndrome (SARS), have heightened concerns about how infectious diseases might threaten global security. Most recently, the emergence of influenza A H1N1 has demonstrated the threat that infectious diseases pose. It is important to note that about 75% of the diseases that have emerged over the past decades have originated from animals.<sup>40</sup> As a result, effective responses to the growing threat of infectious diseases require a multidisciplinary approach that brings together stakeholders from a variety of sectors, including agricultural and animal health.

Investments that the United States and other international players have made to prepare for a possible influenza pandemic, and to monitor the spread of other infectious diseases, have been

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<sup>38</sup> The White House, "Letter from the President to the Speaker of the House," press release, April 30, 2009, [http://www.whitehouse.gov/the\\_press\\_office/Letter-from-the-President-to-the-Speaker-of-the-House-of-Representatives/](http://www.whitehouse.gov/the_press_office/Letter-from-the-President-to-the-Speaker-of-the-House-of-Representatives/).

<sup>39</sup> House Appropriations Committee, "Summary: 2009 Supplemental Appropriations for Iraq, Afghanistan, Pakistan, and Pandemic Flu," press release, May 7, 2009, <http://appropriations.house.gov/pdf/PressSummary05-07-09.pdf>. For more information on the FY2009 Supplemental, see CRS Report R40531, *FY2009 Spring Supplemental Appropriations for Overseas Contingency Operations*, coordinated by Stephen Daggett and Susan B. Epstein.

<sup>40</sup> CDC homepage for the National Center for Zoonotic, Vector-Borne, and Enteric Diseases (ZVED) at <http://www.cdc.gov/nczved/>.

applied to the most recent global response to H1N1.<sup>41</sup> While health experts have made considerable gains against the disease—including developing strain specific tests that are capable of identifying H1N1, identifying and distributing effective treatments against the disease, and utilizing a global surveillance system—other questions remain.

Some health experts are concerned that some of the poorer countries may not yet have the capacity to sufficiently monitor and respond to H1N1. Others warn that it is too early to become complacent about H1N1, as transmission of influenza viruses tend to accelerate in winter months. Countries in the Southern hemisphere are only beginning to enter their winter season and are beginning to report cases. Questions still remain about whether the virus could change or reassort its genes, particularly should outbreaks in countries simultaneously contending with H5N1 bird flu cases occur (such as Egypt, Vietnam, and Indonesia). The section below raises some questions that health experts are considering about the global spread of H1N1.

## **Pandemic Influenza Phases**

There is some debate about whether the WHO should maintain its pandemic influenza phase system, which reflects the spread of the virus and transmission patterns, not severity. As of May 2009, H1N1 appears to be slightly more virulent and more contagious than seasonal influenza. Some observers would like WHO to develop an alert system that is based on severity. Supporters of this idea assert that the public might not understand that though an influenza virus could have reached the highest pandemic phase level, widespread death may not occur. Critics of the system, including some European leaders, warn that if WHO raises the pandemic threat level to Phase 6, panic might ensue and considerable economic and social disruptions may occur.

Other health experts maintain that recent cases of sustained human-to-human transmission of H1N1 in Japan justifies raising the pandemic threat level to Phase 6. As of May 20, 2009, WHO has set the pandemic threat level of H1N1 at Phase 5, which indicates that a novel influenza virus has caused sustained community-level outbreaks in at least two or more countries in one WHO region. A move to Phase 6 would indicate that in addition to the criteria defined in Phase 5, the same virus has caused sustained community-level outbreaks in at least one other country in another WHO region.

Margaret Chan, Director General of WHO, did not indicate whether she intended to raise the threat level, though she stated that “I have listened very carefully to your comments this morning. As the chief technical officer of this organization, I will follow your instructions carefully, particularly concerning criteria for a move to phase 6, in discharging my duties and responsibilities to Member States.”<sup>42</sup>

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<sup>41</sup> For more information on global pandemic preparedness efforts, see U.N. System Influenza Coordinator and World Bank, *Responses to Avian Influenza and State of Pandemic Readiness*, Fourth Global Progress Report, October 2008, <http://un-influenza.org/files/081006-Synopsis2008.pdf>.

<sup>42</sup> Margaret Chan, *Address to the 62<sup>nd</sup> World Health Assembly*, WHO, Geneva, Switzerland, May 19, 2009, [http://www.who.int/dg/speeches/2009/62nd\\_assembly\\_address\\_20090518/en/index.html](http://www.who.int/dg/speeches/2009/62nd_assembly_address_20090518/en/index.html).

## Capacity to Detect H1N1

U.S. agencies have recognized the threat of infectious diseases, particularly zoonotic ones that have their origins in animals. USAID announced in April 2009 that it would launch a new five-year emerging pandemic threats program in October 2009.<sup>43</sup> The program will be conducted in collaboration with CDC and USDA to support the development of a global early warning system for the threat posed by diseases of animal origin that infect humans, such as SARS, H5N1, and HIV/AIDS. USAID expects that a significant proportion of the funds will be used to invest in establishing a network of laboratories within Africa specifically intended to improve the ability to diagnose, both within animal and human populations, new emergent pathogens.<sup>44</sup> It is unclear how much will be provided for this effort or how extensive it will be.

Some observers are concerned that the lack of confirmed cases of H1N1 human cases to date in any African country is more an indication of the poor condition of laboratory and surveillance systems in Africa rather than a lack of H1N1 transmission. Although there is consensus that laboratory and disease surveillance capacity is weak in most African countries, CDC, USAID, and other international health experts have been working to improve those systems. CDC has sent H1N1 testing kits to 237 laboratories in 107 countries, including 18 in Africa.<sup>45</sup> Countries without the kits send viral samples to one of four WHO collaborating centers in Atlanta, Britain, Japan, and Australia.

## Capacity of Developing Countries to Develop, Procure, and Distribute Antivirals and Vaccines

The ability of poor countries to purchase treatments and vaccines against diseases has been a debatable issue for some time. Arguments about access were raised when HIV/AIDS transmission was at its peak and many countries could not afford patented treatments. Discussions about access resurfaced at the peak of global H5N1 avian flu outbreaks. Indonesia intermittently sent viral samples to WHO, citing concerns that once a vaccine was developed, poorer countries would be unable to afford them or wealthier producing countries would hoard the vaccines. Some have raised similar concerns again with the recent H1N1 outbreaks. The link between access, poverty and health have been well-documented. USAID estimates that about 30% of the world's population lacks regular access to medicines and more than 50% of the poorest areas in Africa and Asia lack access.<sup>46</sup> WHO estimates that more than 90% of the global capacity to develop influenza vaccines is located in Europe and in North America.<sup>47</sup> With the bulk of capacity to

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<sup>43</sup> U.S. Congress, House Committee on Foreign Affairs, Subcommittee on Africa and Global Health, *Global Health Emergencies Hit Home: The "Swine Flu" Outbreak*, Dr. Dennis Carroll, Director, Bureau for Global Health, Avian and Pandemic Influenza Management and Response Unit at USAID, 111<sup>th</sup> Cong., 1<sup>st</sup> sess., May 6, 2009.

<sup>44</sup> Ibid.

<sup>45</sup> The list of African countries to whom CDC has sent H1N1 test kits to was provided by Anstice Brand, CDC Washington Office, May 12, 2009. Those countries are: Cameroon, Central African Republic, Cote D'Ivoire, Democratic Republic of Congo, Gabon, Kenya, Madagascar, Morocco, Nigeria, Republic of Congo, Rwanda, Senegal, South Africa, Sudan, Tanzania, Tunisia, Uganda, and Zambia. The total number of H1N1 test kits was indicated in a *CDC Telebriefing on Investigation of Human Cases of H1N1 Flu*, May 15, 2009, <http://www.cdc.gov/media/transcripts/2009/t090515.htm>.

<sup>46</sup> USAID, *Health-Related Research and Development Activities at USAID: An Update on the Five-Year Strategy, 2006–2010*, Report to Congress, September 2008, p. 45, [http://pdf.usaid.gov/pdf\\_docs/PDACL916.pdf](http://pdf.usaid.gov/pdf_docs/PDACL916.pdf).

<sup>47</sup> WHO, *WHO Consultation on Priority Public Health Interventions Before and During an Influenza Pandemic*, (continued...)

develop and purchase treatments and vaccines concentrated in richer countries, poorer countries rely on the generosity of donor countries. Some are concerned that should a pandemic arise, richer countries will hoard treatments and vaccines for their populations.

In addition to questions of access, others raise concern about the capacity of poorer countries to effectively administer mass vaccination and treatment campaigns. WHO reported that it would not conduct mass H1N1 vaccination campaigns should a vaccine be developed. Instead, the organization expects that national authorities will undertake such efforts. Some argue that countries that are already incapable of administering routine vaccines will be unlikely to successfully undertake such an effort. According to the most recent estimates compiled in 2002, some 1.4 million of deaths among children under five years of age were due to diseases that could have been prevented by routine vaccination. This represents 14% of total global mortality in children under five years of age.<sup>48</sup>

## **Possible Co-occurrence with H5N1 Avian Flu**

WHO asserts that a possible "influenza pandemic is one of the most significant global public health emergencies caused by a naturally occurring pathogen. Given the constantly changing nature of influenza viruses, the occurrence of pandemics defies precise predictions concerning timing, causative strain, and severity of the disease and its international impact. Conditions favoring the emergence of a pandemic virus are, however, well known, and are increasingly being met. It is therefore prudent for all countries, supported by WHO, to undertake or intensify preparedness activities as a matter of urgency."<sup>49</sup>

It is not known which influenza virus might cause a pandemic nor is it known how severe the pandemic might ultimately become. However, health experts—including the WHO—are concerned that other factors could alter the severity of the H1N1 strain currently circulating the globe. One concern raised is the possibility of having strains of H5N1 bird flu and H1N1 circulating in the same area. This could allow the two flu strains to reassort (i.e., intermix their genes) to create yet another strain with the potential to cause human illness. Concerns about the likelihood that H5N1 might cause an influenza pandemic began in January 2004, when Thailand and Viet Nam reported their first human cases of avian influenza. Health experts were particularly concerned about H5N1 outbreaks, because all prerequisites for the start of a pandemic were met except one: efficient human-to-human transmission. The human cases were directly linked to historically unprecedented outbreaks of highly pathogenic H5N1 avian influenza in poultry that began in 2003 and rapidly affected eight Asian nations. By 2006, about 50 countries worldwide had confirmed outbreaks of H5N1 bird flu among its animal and human populations. In 2008 and 2009, seven countries reported human H5N1 cases, though the disease has apparently become endemic in Asia.<sup>50</sup>

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(...continued)

March 2004, p. 37, [http://www.who.int/csr/disease/avian\\_influenza/final.pdf](http://www.who.int/csr/disease/avian_influenza/final.pdf).

<sup>48</sup> WHO Webpage on Vaccine Preventable Diseases, [http://www.who.int/immunization\\_monitoring/diseases/en/](http://www.who.int/immunization_monitoring/diseases/en/).

<sup>49</sup> WHO, *Influenza pandemic preparedness and response*, Report by the Secretariat, January 20, 2005, p. 1, [http://apps.who.int/gb/ebwha/pdf\\_files/EB115/B115\\_44-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/EB115/B115_44-en.pdf).

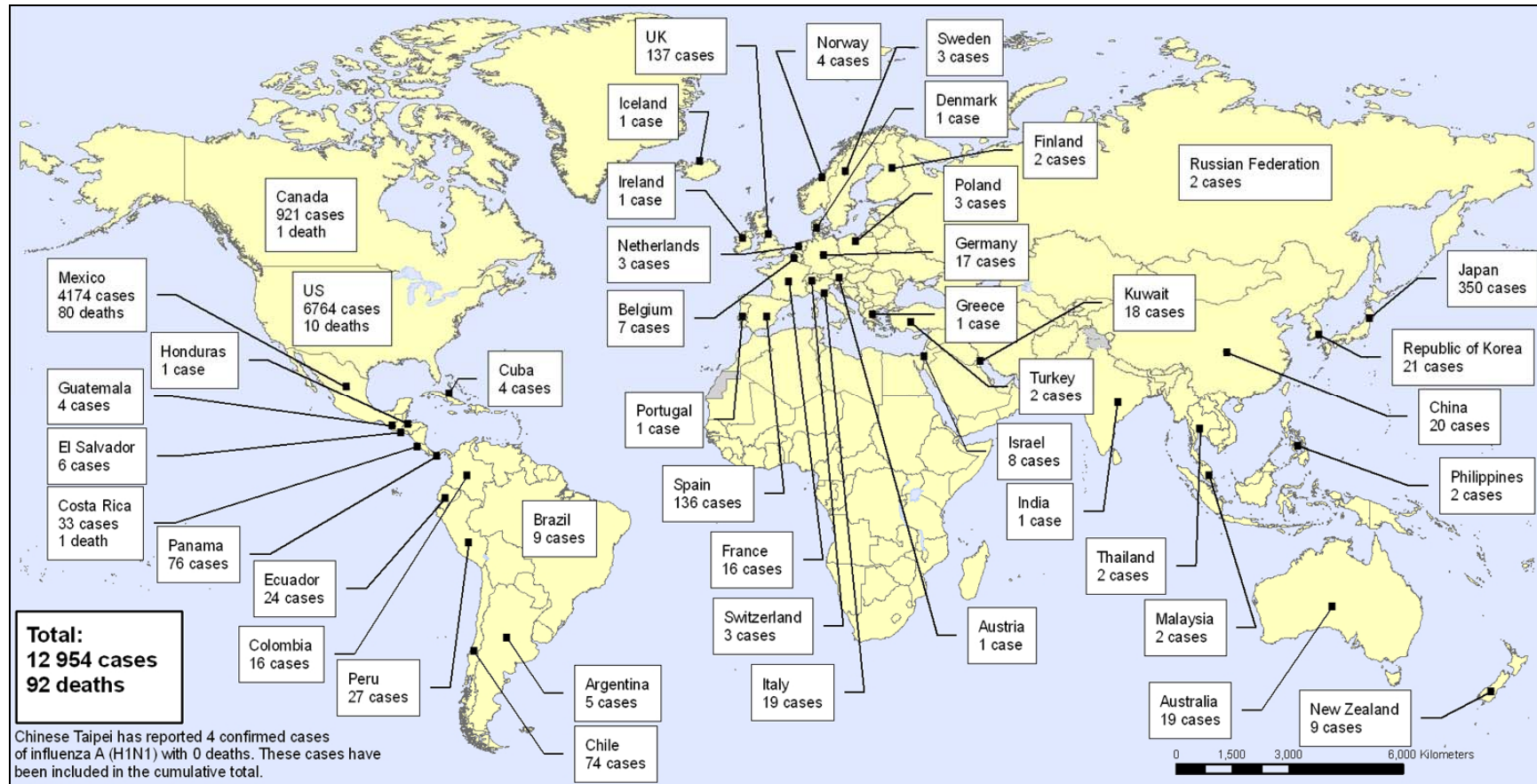
<sup>50</sup> The six countries were Bangladesh, Cambodia, China, Egypt, Indonesia, Pakistan, and Vietnam. For more information on these cases, see WHO's Webpage on avian flu outbreaks at [http://www.who.int/csr/disease/avian\\_influenza/updates/en/index.html](http://www.who.int/csr/disease/avian_influenza/updates/en/index.html).

Health experts are closely watching whether countries contending with ongoing H5N1 cases begin to experience H1N1 cases. Of the seven countries with human H5N1 cases, China is the only one that has also reported H1N1 cases. H5N1 bird flu kills about 60% of humans who contract the virus. While H5N1 is more virulent than H1N1, it is not as easily transmissible. Most human deaths of H5N1 have occurred after direct contact with a sick bird, while animals have not yet been identified as a source of transmission for H1N1.



## Appendix. Human H1N1 Cases as of May 26, 2009

Figure A-1. Map of Global Human H1N1 Cases as of May 26, 2009



Source: World Health Organization, May 26, 2009, at [http://www.who.int/csr/don/GlobalSubnationalMaster\\_20090526\\_0800.jpg](http://www.who.int/csr/don/GlobalSubnationalMaster_20090526_0800.jpg)

**Table A-1. Number of Global H1N1 Cases and Deaths as of May 26, 2009**

WHO Region/Country	Cases	Deaths	WHO Region/Country	Cases	Deaths	WHO Region/Country	Cases	Deaths
<b>Americas</b>			<b>Europe</b>			<b>Southeast Asia</b>		
Argentina	5	0	Austria	1	0	China and Hong Kong	24	0
Brazil	9	0	Belgium	7	0	India	1	0
Canada	921	1	Denmark	1	0	Japan	350	0
Chile	74	0	Finland	2	0	Republic of Korea	21	0
Costa Rica	33	1	France	16	0	Malaysia	2	0
Columbia	16	0	Germany	17	0	Thailand	2	0
Cuba	4	0	Greece	1	0	<b>Southeast Asia Total</b>	<b>400</b>	<b>0</b>
Ecuador	24	0	Iceland	1	0			
El Salvador	6	0	Ireland	1	0			
Guatemala	4	0	Israel	8	0			
Honduras	1	0	Italy	19	0			
Mexico	4,174	80	Netherlands	3	0	<b>Western Hemisphere</b>		
Panama	76	0	Norway	4	0	Australia	19	0
Peru	27	0	Poland	3	0	New Zealand	9	0
United States	6,764	10	Portugal	1	0	<b>Western Hemisphere Total</b>	<b>28</b>	<b>0</b>
<b>Americas Total</b>	<b>12,138</b>	<b>92</b>	Russia	2	0			
			Spain	136	0			
<b>Asia Pacific</b>			Sweden	3	0			
Philippines	2	0	Switzerland	3	0			
<b>Asia Pacific Total</b>	<b>2</b>	<b>0</b>	Turkey	2	0			
			United Kingdom	137	0			
<b>Eastern Mediterranean</b>								
Kuwait	18	0	<b>Europe Total</b>	<b>368</b>	<b>0</b>			
<b>Eastern Mediterranean Total</b>	<b>18</b>	<b>0</b>				<b>World Total</b>	<b>12,954</b>	<b>92</b>

Source: WHO, "Influenza A (H1N1) – Update #39," May 26, 2009.

Notes: H1N1 cases and deaths reflect only those reported to WHO since April 23, 2009.

## **Author Contact Information**

Tiaji Salaam-Blyther  
Specialist in Global Health  
tsalaam@crs.loc.gov, 7-7677