# Pandemic Flu Planning in Africa: Thoughts from a Nigerian Case Study

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# Introduction

Over the past 35 years, dozens of new and frightening diseases have been identified. These include the hepatitis C virus, Ebola and other hemorrhagic viruses, Legionnaires' disease, Nipah encephalitis, H5N1 influenza, SARS, the new arenavirus Lujo, which causes hemorrhagic fever in its victims, and, most pervasively, the human immunodeficiency virus (HIV/AIDS). The emergence of H5N1 avian flu in 1996, coupled with the recent declaration of an H1N1 influenza pandemic, demonstrate the urgent need for countries to have pandemic preparedness plans in place. For nations that are unprepared, a pandemic could result in devastating social, economic, and health consequences, including a high number of fatalities. Nowhere is this more so the case than in countries with underdeveloped health care systems.

The potential impact of a severe pandemic requires that nations throughout the world develop pandemic response plans before the onset of disease. Rapid spread of disease, as is often associated with a pandemic, will not allow countries the time to implement adequate proper health care and disease mitigation procedures. Rapid advancements in international travel and decreases in trade restrictions between neighboring countries only makes it easier for microbes and disease-carrying insects to travel around the world in a short period of time, threatening global health and security.

Maintaining continuity of operations and protecting a nations' greatest asset, its people, during a pandemic requires developing effective plans before a pandemic becomes severe. These plans need to include such key issues as identification of roles and responsibilities, infection control, the identification of health care facilities, maintaining security, providing logistical support for food, medicine, and other commodities, communication procedures, and developing and distributing vaccines and antivirals.

In recognition of the looming threat of an influenza pandemic, the Center for Technology and National Security Policy (CTNSP) developed and administered a program to help build pandemic influenza crisis-response capacities. The first Avian Influenza/Pandemic Influenza Policy Planning workshop occurred in Nigeria in June 2007 with the objective of assisting selected Nigerian officials in evaluating their nation's pandemic response plan. After assessing the viability of the Nigerian National Integrated Avian and Pandemic Influenza Plan, we suggested a number of key action items for various Nigerian ministries that would act to strengthen not only interagency communication and cooperation, but also the pandemic response in the country.

The importance of further pandemic planning in Nigeria and neighboring countries cannot be understated. The current H1N1 outbreak, while at the time of writing has been characterized as only moderately severe, still has the potential to mutate and become much more deadly, necessitating the urgent need for pandemic planning.

The recently established U.S. Africa Command, in partnership with the United Stated Agency for International Development (USAID), Pacific Command, and other

international partners, has developed a Pandemic Response Program aimed at strengthening partner nations' military capacities to plan for, and respond to, pandemics. The development of both military and civilian pandemic response plans in Africa, through the partnership of AFRICOM and other international partners, is vital in preparing for a severe pandemic and mitigating its consequences.

# Epidemics and Pandemics in Human History

"After gasping for several hours they became delirious and … many died struggling to clear their airways of a blood-tinged froth that sometimes gushed from their nose and mouth. It was a dreadful business."
--Isaac Starr, 3rd year medical student, University of Pennsylvania, 1918[1]

There are many crises that one can imagine could lead to chaos—but perhaps none have the potential to affect each member of a society as profoundly as a pandemic.[2] Infectious disease knows no boundary, particularly one that is capable of human-to-human transmission, such as smallpox or influenza. As history has shown, a large outbreak of communicable disease can cause mass morbidity and mortality, resulting in severe social and economic disruption.

In his *History of the Peloponnesian War*, Thucydides wrote about a "plague" that struck the city of Athens in the summer of 430 B.C.E. Occurring early in the Peloponnesian war, the epidemic lasted until 427 B.C.E. and is believed to have killed 25 to 35 percent of the Athenian population.[3] The outbreak of disease caused "a serious breakdown in respect for laws and social norms ….and that may in turn have played a longer-range role in what many scholars have since seen as a collapse of Athenian morality during and after the Peloponnesian War."[4] The "plague" described by Thucydides has never been identified but is believed to have been either smallpox or measles.

The first recorded large-scale outbreak of bubonic plague, known as the Plague of Justinian, occurred in 541, killing thousands of people in Constantinople, Egypt, and elsewhere along the eastern Mediterranean, reaching as far as Italy and Tunisia by 544. J.N. Hays, in *Epidemics and Pandemics: Their Impact on Human History*, describes the tumultuous effects the plague had on society:

> Witnesses agreed that the immediate effect of these plague visitations was catastrophic. Social confusion and economic paralysis resulted. All work ceased. Shops closed for lack of workers and customers. Fields were abandoned, crops remained unharvested, fruits fell rotten to the ground, and flocks and herds wandered untended in fields and pastures. Elite members of society remained unburied when their servants predeceased them.[5]

The second major outbreak of bubonic plague, known then as the Black Death, appeared in 1346. Spread by the bite of infected fleas, it swept rapidly throughout Europe and Asia

[1] Isaac Starr, "Influenza in 1918: Recollections of the Epidemic in Philadelphia," *Annals of Internal Medicine*, 2006;145:13–140, available at <http://www.annals.org/cgi/reprint/145/2/138.pdf>.
[2] Pandemics, an epidemic of infectious disease that spreads across a large population, often globally, are quite rare, generally occurring only 2–3 times a century or less.
[3] J.N. Hays, *Epidemics and Pandemics: Their Impact on Human History* (Santa Barbara, CA: ABC-CLIO, Inc, 2005).
[4] Ibid.
[5] Ibid., 27.

along maritime trade routes, killing between 30 and 40 percent of populations infected (some estimates are as high as 60 percent). Poor sanitation and severe overcrowding in cities further led to the rapid spread of disease. Small outbreaks of bubonic plague continued to reappear in some locations until 1667. According to one author, prior to the outbreak of plague, population levels in Europe were at such a height that the economic and social situation reflected "a world of labor surplus, land shortage, and food shortage—low wages, high rents, and high prices."[6] Perversely, the outbreak of plague in Europe eventually brought higher wages and a better standard of living for the survivors due to the large number of human casualties from the disease.

The single deadliest outbreak of disease in the 20th century, and perhaps all of human history, was the 1918–1919 influenza pandemic. The outbreak of Spanish Flu, as it came to be called, occurred in late winter and early spring of 1918, with mild cases of the flu appearing sporadically around the globe. Beginning in August 1918, near the end of World War I, a second, more virulent, wave of the virus began appearing, spreading rapidly along trade and military troop deployment routes. Efforts to stop the spread of the disease were severely hampered by a lack of medical supplies and a severe shortage of healthcare workers healthy enough to care for those infected with the influenza virus. Hospitals were quickly overfilled with the sick and dying, and morgues were unable to deal with the large influx of corpses.[7] During the epidemic, many cities enforced social distancing restrictions, closing schools and banning large public gatherings in an effort to stem the tide of infection, to no avail.

While the second wave of the influenza outbreak began declining worldwide by the end of December 1918, some countries experienced a third and final wave of the disease in January and February 1919. Within the space of a year the Spanish flu virus killed an estimated 50 million people worldwide (some estimates have placed the number as high as 100 million).[8]

[6] Ibid., 48.
[7] John M. Barry, *The Great Influenza: The Epic Story of the Deadliest Plague in History* (New York: Penguin Books, 2004).
[8] "Influenza research at the human and animal interface," WHO Working Group Report, 21-22 September, 2006, available at <http://www.who.int/csr/resources/publications/influenza/ WHO_CDS _EPR _GIP _2006_3C.pdf>.

**Understanding Influenza Viruses**

Influenza viruses are classified as type A, B, or C, based on their protein composition. Type A viruses are found in many kinds of animals, including ducks, chickens, pigs, and humans. Type A is the most common and typically causes the most serious epidemics and pandemics in humans. Type A viruses are subdivided into groups based on two surface proteins: Hemagglutinin (HA) and Neuraminidase (NA). Scientists have characterized 16 HA subtypes and 9 NA subtypes. Scientists have identified the 1918-1919 pandemic causing virus as an H1N1 type A virus.

Source: Jeffrey K. Taubenberger and David M. Morens, "1918 Influenza: The Mother of all Pandemics," *Emerging Infectious Diseases*, January 2006, available at <http://www.cdc.gov/ncidod/eid/vol12no01/05-0979.htm>.

Two more flu pandemics occurred in the 20th century. The 1957 flu (H2N2 type A influenza), named the Asian flu for where cases were first identified, caused roughly two million deaths worldwide and about 69,800 deaths in the United States.[9] The third pandemic was first detected in Hong Kong in 1968. The Hong Kong influenza (H3N2 type A influenza) resulted in less than one million deaths worldwide, with roughly 34,000 deaths in the United States (this is roughly equal to the number of mortalities that occur in the United States during the annual seasonal flu).

In 1996, epidemiologists discovered an entirely new variety of type A influenza, known as subtype H5N1, when it was first isolated from a farmed goose in Guangdong, China. In 1997, a massive outbreak of H5N1 avian influenza occurred in Hong Kong poultry markets, resulting in 18 cases of bird-to-human transmission of the virus and six deaths. A rapid culling of over 1.5 million birds in just three days is thought to have averted further transmission of the virus.[10]

Since the initial outbreak of avian influenza in poultry and humans in Hong Kong in 1997, there have been hundreds of cases of human infections throughout the world. As of July 1, 2009, the World Health Organization (WHO) reported that there have been 436 human cases of H5N1 reported in 15 countries, 262 of which have been fatal.[11] H5N1 outbreaks have led to mass culling of infected bird populations, increased disease surveillance, including passenger screening at airports, vaccine and antiviral development, and pandemic response planning.

In light of the potential threat of an H5N1 pandemic, the World Health Organization launched an influenza tracking system, is working on the development of new

[9] US Department of Health and Human Services, "Pandemics and Pandemic Scares in the 20th Century," February 12, 2004, available at <http://www.hhs.gov/nvpo/pandemics/flu3.htm>.
[10] World Health Organization, "H5N1 avian influenza: Timeline of major events," March 23, 2009, available at <http://www.who.int/csr/disease/avian_influenza/Timeline_09_03_23.pdf>.
[11] World Health Organization, "Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO," July 1, 2009, available at <http://www.who.int/csr/disease/avian_influenza/country/cases_table_2009_07_01/en/index.html>.

recombinant H5N1 vaccine viruses, and has developed guidance documents on infection control, diagnosis and treatment, disease surveillance, and laboratory procedures for detection of H5N1 virus, to name a few.[12]

In early April 2009, reports began to surface in Mexico of an unusual outbreak of disease. Patients began showing up at hospitals symptomatic with fever, cough, vomiting, and, in some patients, acute respiratory infections and pneumonia. In late April, the U.S. Centers for Disease Control activated its Emergency Operations Center when cases of the disease appeared in California, where scientists identified it as novel A influenza virus, H1N1. On April 26, with cases of H1N1 identified in Canada, Mexico, and the United States, the United States Government declared a public health emergency, which allowed for the rapid shipment of the antivirals Tamiflu and Relenza from the strategic national stockpile.

Cases of H1N1 have been identified in Europe, the Middle East, China, and Africa. By July 16, 2009, the WHO had reported more than 125,000 confirmed cases of H1N1 influenza infections, with over 700 confirmed deaths and also stated that it would no longer issue tables showing the numbers of confirmed cases for all countries due to the rapid spread of the virus.[13] Some estimates place the number of infected individuals in the millions of cases worldwide, but it suspected that many of these cases have been of moderate severity and may not have been reported to medical establishments.

The spread of H1N1 prompted the World Health Organization to declare the outbreak a pandemic on June 11, 2009:

> Globally, we have good reason to believe that this pandemic, at least in its early days, will be of moderate severity. As we know from experience, severity can vary, depending on many factors, from one country to another. On present evidence, the overwhelming majority of patients experience mild symptoms and make a rapid and full recovery, often in the absence of any form of medical treatment.[14]

The WHO ranks pandemics in six levels (the WHO phases refer to the geographic spread of the virus vice the severity of it):

- Phase 1: no viruses circulating among animals have been reported to cause infections in humans.

[12] World Health Organization, "Pandemic (H1N1) 2009 briefing note 3 (revised)," July 16, 2009, available at <http://www.who.int/csr/disease/swineflu/notes/h1n1_surveillance_20090710/en/index.html>.
[13] World Health Organization, "Pandemic (H1N1) 2009 –Update 58,) July 6, 2009, available at <http://www.who.int/csr/don/2009_07_06/en/index.html>.
[14] Margaret Chan, World Health Organization, "World now at start of 2009 influenza pandemic," June 11, 2009, available at <http://www.who.int/mediacentre/news/statements/2009/h1n1_pandemic_phase6_20090611/en/index.html>.

- Phase 2: an animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans, and is therefore considered a potential pandemic threat.

- Phase 3: an animal or human-animal influenza reassortment virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances.

- Phase 4: is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortment 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.

- Phase 6: is the pandemic phase. It is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is under way.[15]

**Pandemic Severity Index**

The U.S. Centers for Disease Control and Prevention has also developed a five-level pandemic severity index (PSI), similar to the system for categorizing hurricanes. The proposed PSI has five different categories of pandemics. Category 1 represents moderate severity and category 5 represents the most severe. The severity of a pandemic is primarily determined by the case fatality rate, or percentage of infected people who die. A category 1 pandemic is as harmful as a severe seasonal influenza season, while a pandemic with the same intensity of the 1918 flu pandemic, or worse, would be classified as category 5.

Source: US Department of Health and Human Services, "HHS Unveils Two New Efforts to Advance Pandemic Flu Preparedness," February 1, 2007, available at <http://www.hhs.gov/news/press/2007pres/ 20070201.html>.

Scientists and health officials will be carefully monitoring the disease as the Southern hemisphere enters its annual influenza season. There is a potential for the virus to mutate

[15] World Health Organization, "Current WHO phase of pandemic alert," available online at <http://www.who.int/csr/disease/avian_influenza/phase/en/>.

during this time and re-emerge during North America's flu season, causing a much more severe form of disease. This is due to processes called antigenic drift and antigenic shift. In antigenic drift, gradual changes occur through point mutations in two main surface proteins, hemagglutinin and neuraminidase. These mutations can cause minor changes to the surface proteins, resulting in new virus strains that may not be recognized by antibodies developed in response to previous influenza strains.[16] Antigenic shift refers to an abrupt, major change that produces a novel influenza A virus that was not previously circulating in humans. This can occur through direct animal-to-human transmission or through mixing of human influenza A and animal influenza A virus genes. In this case, individuals are unlikely to have antibodies from previous influenza strains, making the population more susceptible to infection.[17]

Given pandemic influenza's potential to cause massive loss of life (if, in fact, the virus goes through antigenic shift), it is important that a nation have in place a proper action plan to protect its people and ensure the continuity of operations essential to the maintenance of a viable state. While the importance of U.S. domestic preparedness is obvious, the nature of a pandemic requires that we also consider the implications for our national security of poorly prepared nations abroad. As the former Director General of the WHO, Gro Harlem Brundtland has stated, "in a globalized world, we all swim in a single microbial sea."[18]

[16] Centers for Disease Control and Prevention, "Influenza Viruses," November 18, 2005, available at <http://www.cdc.gov/flu/avian/gen-info/flu-viruses.htm>.
[17] Ibid.
[18] Brundtland, G.H, "Address to the Codex Alimentarius Commission meeting," July 2-7, 2001.

# Health in Africa

Few places on earth demonstrate the devastating effects widespread disease can have on a society as clearly as Africa. Indeed, in sub-Saharan Africa, more than 60 percent of all deaths are due to infectious disease.[19] Outbreaks of cholera and Ebola occur frequently in Africa, and HIV and malaria are endemic throughout the continent. In 2006 alone, malaria was declared endemic in 45 countries in Africa, with over 212 million cases and roughly 800,000 deaths, 91 percent of which were in children under 5 years of age.[20] In urban areas the danger is exacerbated by population density, unsanitary living conditions, and unhygienic water sources. In Zimbabwe, for example, from August 2008 to June 2009, 98,000 cases of cholera and over 4,000 deaths were reported that were attributable to unsanitary living conditions and lack of medical care.[21]

African countries have to deal with many diseases, and widespread poverty mean that they are less able to combat them. At the personal level this means inability to afford such necessities as household cleaning products, soap, and mosquito nets. It can also mean a village farmer refusing to cull protein-rich poultry in an avian influenza outbreak, or a patient unable to afford vaccines, antivirals, or other prophylactics. At the national level, a lack of government funds has meant a reduction in capacity of the health care and education sectors. In the health care sector this has led to fewer clinics with fewer beds, and outdated medical equipment run by underpaid medical staff. For every 10,000 people in the Democratic Republic of Congo (a hotbed for disease due to its tropical climate), only eight hospital beds and one physician are available, compared to 31 beds and 26 physicians in the United States.[22] Due to a lack of funding, few government-subsidized medicines are available and transport and infrastructure weaknesses hamper their distribution to remote areas.

A dearth in the education sector has similar consequences. Fewer schools and a low standard of education have led to entire populations unable to understand what HIV is and how it is transmitted.[23] Locally educated doctors and nurses have learned their trade in educational institutions limited by lack of both equipment and skilled professors, making available treatment basic in nature, and research and development on pharmaceuticals almost non-existent. During the 2008 outbreak of the "Lujo virus" in South Africa, for example, an infected individual in Zambia could not be treated for the disease and had to be airlifted to South Africa for treatment, resulting in four deaths in

[19]The Global Health Council, "The Impact of Infectious Diseases," available at <http://www.globalhealth.org/infectious_diseases/>.
[20] Global Malaria Partnership, "Key malaria facts," 2008, available at <http://www.rollbackmalaria.org/keyfacts.html>.
[21] World Health Organization, "Cholera in Zimbabwe: Update 4," June 9, 2009, available at <http://www.who.int/csr/don/2009_06_09/en/index.html>.
[22] World Health Organization, "World Health Statistics 2009: Health workforce, infrastructure, essential medicines," available at <http://www.who.int/whosis/whostat/EN_WHS09_Table6.pdf>.
[23] In a 2006 rape trial, now-President Jacob Zuma of South Africa admitted having unprotected sex with his HIV-positive accuser, saying he showered afterwards to stop infection. More information available at <http://www.nytimes.com/2006/05/08/world/africa/08cnd-africa.html?scp=6&sq=zuma%20hiv&st=cse>.

both countries. The identification of the virus and all genetic testing was done in the United States as neither African country had the means to do so.[24]

African countries unable to cope with health issues are further burdened by the high prevalence of HIV in their populations. The average life expectancy in many sub-Saharan African countries has plummeted in recent years, leaving even relatively prosperous countries such as South Africa with a life expectancy of just 49 years because of an HIV prevalence of over 18 percent.[25] In 2007, sub-Saharan Africa, which is home to 12 percent of the world's population, accounted for two-thirds of the world's HIV-positive population, an estimated 22 million cases.[26] HIV has caused a contraction in human capital, a shortage of teachers and doctors, and a surge of orphans that governments can not support. It has afflicted African societies from the remotest of villages to the highest echelons of society and has caused a "hollowing out" effect that has weakened essential state infrastructures, priming states for internal collapse and regional conflict.

**Highly Virulent H5N1 Avian Influenza in Africa**

Our early research on pandemic influenza planning took place in Nigeria. Highly pathogenic H5N1 was first detected in chickens in the northern Nigerian state of Kaduna in January 2006. H5N1 quickly spread to 25 of 26 Nigerian states and led to the culling of roughly 368,000 domestic birds.[27]

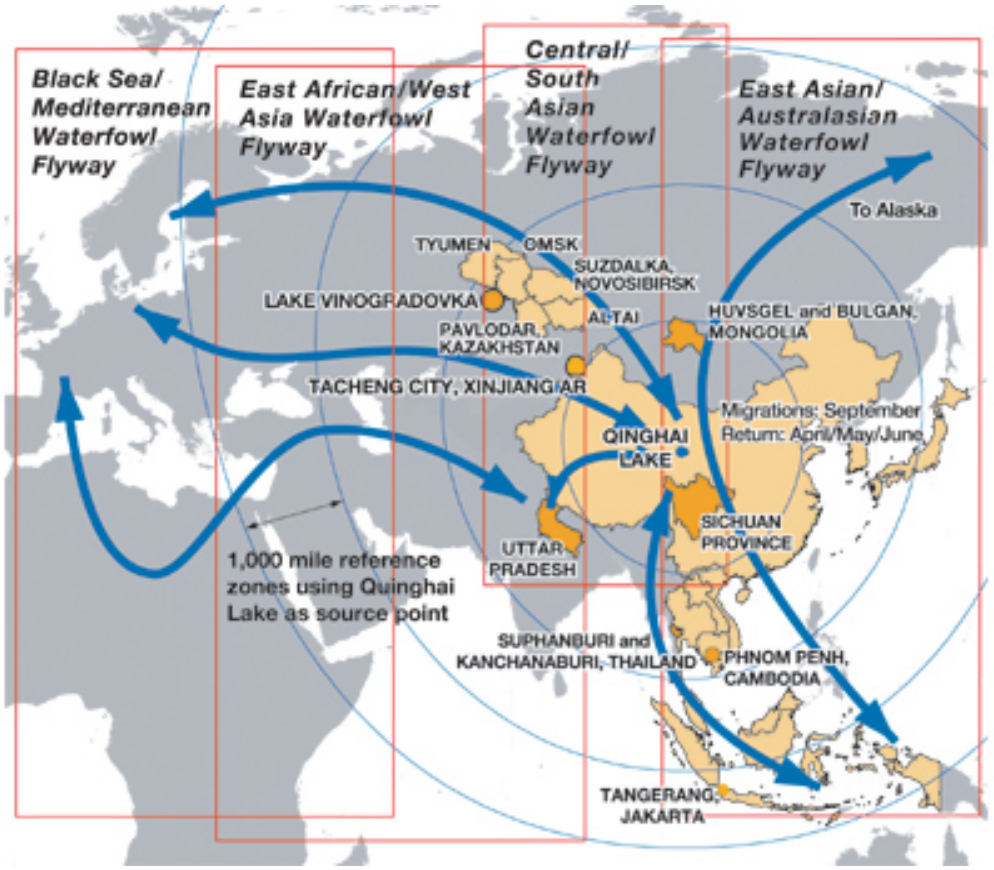
Nigeria acts as the wintering area for the garganey (*Anas querquedula*), the most numerous waterfowl species migrating between Africa and Eurasia.[28] In a study investigating the impact of migration routes for Nigeria, the CDC found that "the wintering area in Nigeria where this duck was caught and remained for 8 weeks before spring migration is located where a large number of outbreaks have occurred repeatedly since February 2006."[29]

Scientists now believe that some migratory waterfowl, carrying the H5N1 virus, have travelled along their traditional migratory routes and introduced H5N1 influenza to various poultry flocks, thus spreading the disease across long distances and introducing it to new populations (see figure 1). In mid-2005, for example, more than 6,000 migratory

[24] Thomas Briese, et al, "Genetic Detection and Characterization of Lujo Virus, a New Hemorrhagic Fever-Associated Arenavirus in Southern Africa," *PLoS Pathogens*, May 2009, available at <http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.1000455>.
[25] Central Intelligence Agency, "World Fact Book: South Africa," available at <https://www.cia.gov/library/publications/the-world-factbook/geos/sf.html>.
[26] UNAIDS, "2008 Report on the Global Aids Epidemic: Annex HIV and AIDS estimates and data, 2007 and 2001," 2008, available online at <http://data.unaids.org/pub/GlobalReport/2008/jc1510_2008_global_report_pp211_234_en.pdf>.
[27] Fusaro A, Joannis T, Monne I, Salviato A, Yakubu B, Meseko C, et al, "Introduction into Nigeria of a distinct genotype of avian influenza virus (H5N1)," *Emerging Infectious Disease*, March 2009, available at <http://www.cdc.gov/EID/content/15/3/445.htm>.
[28] Gaidet N, Newman SH, Hagemeijer W, Dodman T,‡ Cappelle J, Hammoumi S, et al, "Duck migration and past influenza A (H5N1) outbreak areas," *Emerging Infectious Disease*, July 2008, available at <http://www.cdc.gov/EID/14/7/1164.htm>
[29] Ibid.

birds, infected with highly pathogenic H5N1, died at the Qinghai Lake nature reserve in central China. "Scientific studies comparing viruses from different outbreaks in birds have found that viruses from the most recently affected countries, all of which lie along migratory routes, are almost identical to viruses recovered from dead migratory birds at Qinghai Lake."[30] Further, in a recently published study, a group of scientists identified three distinct sublineages of H5N1 circulating across Africa from 2006 to 2008. One of these sublineages can be traced back to the outbreak of H5N1 in migratory waterfowl at China's Qinghai Lake in 2005.[31]

**Figure 1. Waterfowl Flyways**




Many water birds (ducks, geese, swans) migrate between wetlands in the northern breeding areas and southern non-breeding areas, regularly crossing the borders of two or more countries. The birds can cover up to 1,000 miles per day. Source: World Food Program Emergency Preparedness and Response Branch.

[30] World Health Organization, "Avian Influenza (bird flu): The Disease in Birds," February 2006, available at <http://www.who.int/mediacentre/factsheets/avian_influenza/en/#role>.
[31] Giovanni Cattoli, et al, "Highly Pathogenic Avian Influenza Virus Subtype H5N1 in Africa: A Comprehensive Phylogenetic Analysis and Molecular Characterization of Isolates," *PLoS*, March 2009, available at <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0004842>.

Another possible way for the virus to circulate to countries not previously affected with H5N1 is through trade in poultry. Failure to use proper sanitation techniques and conduct inspections of the poultry could lead to the sale and distribution of infected poultry to new locations.

Nigeria is not the only African country affected by outbreaks of highly pathogenic avian H5N1. Since the initial outbreak in Nigeria in 2006, outbreaks have occurred in Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Djibouti, Egypt, Ghana, Niger, Sudan, and Togo.[32] Of the outbreaks of H5N1 in Africa, human cases of infection have occurred in Djibouti, Nigeria, and Egypt. As of July 1, 2009, Egypt had reported 81 confirmed cases, with 27 fatalities. In many of these cases individuals infected with H5N1 had close contact with sick or dead poultry.[33]

Africa has also begun to report its first cases of pandemic H1N1 influenza. Eleven African countries (Algeria, Botswana, Cape Verde, Cote d'Ivoire, Ethiopia, Kenya, Mauritius, Namibia, Seychelles, South Africa, Tanzania, and Uganda) have reported a total of 152 confirmed cases of human infection with pandemic H1N1, with no deaths.[34] Countries that have developed, or begun developing pandemic H5N1 response plans will need to quickly adapt the plans to respond to pandemic H1N1 before the virus spreads further into Africa.

[32] World Organization for Animal Health, "Outbreaks of Avian Influenza (subtype H5N1) in poultry. From the end of 2003 to 11 April 2007, available at <http://www.oie.int/downld/AVIAN%20INFLUENZA/Graph%20HPAI/graphs%20HPAI11_04_2007.pdf>.

[33] World Health Organization, "Avian influenza – situation in Egypt – update 20," July 1, 2009, available at <http://www.who.int/csr/don/2009_07_01/en/index.html>.

[34] World Health Organization, Regional Office for Africa, "Pandemic (H1N1) 2009: Current situation in the AFRO Region," July 15, 2009, available at <http://www.afro.who.int/ddc/influenzaa/index.html>.

# Nigeria: A Pandemic Planning Case Study

In recognition of the threat of an avian influenza pandemic, the Center for Technology and National Security Policy (CTNSP) developed and administered a program to help build pandemic influenza crisis-response capacities in Africa. The first country selected for the pandemic planning course was Nigeria. The strategic goal of CTNSP in providing this course of instruction was to work with the authors of the Nigerian National Integrated Avian and Pandemic Influenza Plan (National Plan) to assist them in defining an appropriate role for the Nigerian military in preserving national security during an influenza pandemic.

To achieve this aim, in June 2007, CTNSP developed a 4½-day Avian Influenza/Pandemic Influenza (AI/PI) Policy Planning workshop, the curriculum for which is outlined in figure 2. The Nigerian participants were lead representatives from the Departments of Agriculture, Health, and Information, as well as members of the Pandemic Influenza Control Center.

The primary focus of the workshop was to assist the attending Nigerian Ministerial officials in exercising and evaluating their nation's pandemic response plan, with the goal of furthering their understanding of potential national security implications pandemic influenza could produce. A secondary goal was to understand the area of responsibility for military preparedness for pandemic influenza and identify the range of detection, response, and containment roles the Nigerian military might be tasked to perform pre-pandemic, intra-pandemic, and post-pandemic.

**Avian Influenza / Pandemic Influenza Policy Planning Course Curriculum**

- Preparing for the Pandemic
  - Understanding the virus (discussion of H5N1 and the methods of transmission)
  - Communicating the risk: development of culturally relevant materials (strategic communication plan) for distribution to the population.
- Planning for the Pandemic
  - Assessing the national infrastructure (ability to maintain food availability and other essential services)
  - Identifying workforce availability and preparation of continuity of operations plans (COOP)
  - Developing medical and non-medical response plans
- Managing the Pandemic
  - All-day table-top exercise drawing on work of the previous three days
- After Action Review
  - Assessment of course objectives completion
  - Provide recommendation for follow on action plan, i.e. advanced Avian Influenza /Pandemic Influenza Senior Leadership Planning Course, Conference on Development of AI/PI National Response Plan

**Figure 2**

## Analyzing the National Integrated Avian and Pandemic Influenza Plan

On June 13, 2007, eight of the workshop participants attended a "Technical Committee" of the Nigerian AI/PI planning group. The purpose of the AI/PI planning group was to discuss the strengths and weaknesses of the National Plan and suggest ways of filling in the gaps. The authors of Nigeria's National Plan, primarily representatives from the Ministries of Health, Agriculture, and Information, initially wanted to keep the working group to a small number by including only those entities who would, in their eyes, "add value to the process." This definition lead to a planning group composed exclusively of representatives from the Ministries of Agriculture, Health, and Information, and members of the Pandemic Influenza Control Center.

As a direct result of the program administered by CTNSP, the AI/PI planning group later identified a number of areas in which significant work was required to develop a full National Plan. Some of the most pressing areas included: the absence of specific roles for the Red Cross, non-governmental organizations (NGOs), and the Nigerian military, a lack of a national security perspective, a weak administrative structure requiring strong agency "support plans," and the absence of decision points for declaring a state of emergency.

According to the seminar participants, planning for the development of the new National Plan is one of the first times there has been extensive inter-ministry coordination. Normally, the ministries work independently of one another, however, the AI/PI issue brought them together. Furthermore, the Nigerian armed forces had been mentioned just once in the 72 pages of the March 22, 2007 draft of the National Plan. The workshop discovered that, until the seminar, the issue of the military's role had not been carefully considered. The three departments (Agriculture, Health, and Information) responsible for drafting the document agreed that the military played an integral part of maintaining order in a peaceful democratic country and needed to be included in any future pandemic planning. When the participants returned in the afternoon to the workshop, they reported that the military and civil defense organizations were from that point forward to be invited into the planning efforts.

While it was recognized that the National Plan is a fluid document, the participants stated that "you have to put your plan into action, even if it is incomplete;" and to "go with the plan you have and continuously revisit it." It was the intention of the workshop participants to implement the current plan as it was and to continue to enhance it with the support of several of the ministries that were not previously part of the initial planning process (i.e., Defense and Civil Defense).

## The Value of the Military in Domestic Preparedness

The military's role in preparing for a pandemic can be defined as defending the nation by filling logistical gaps under the command of civilian authorities. The command structure under civilian authority was emphasized as the basis for success, particularly where communal conflict was occurring or expected.

In many countries, the military is considered the only institution capable of filling certain logistical roles (i.e., providing air transport, 24/7 security, mass distribution of key resources in multiple locations). Their ability to perform these functions is predicated on their being self-contained and self-sustaining. The military is uniquely able to rapidly deploy trained personnel, maintain an independent organized health care structure, and exercise unified command and control. Thus, the military can provide unparalleled resource allocation to civilian agencies through robust personnel, transportation, and communication capabilities, without being an additional burden to the civilian systems.

It is, therefore, imperative that Nigerian military representatives be involved in any future preparedness activities—specifically pandemic influenza exercises, participation in disaster response units, and the conduct of force health protection training. Based on discussions held during the June 2007 workshop in Nigeria, a list of proposed action items for the Ministry of Defense were identified:

- Assist civil response (Borders, Law Enforcement)
- Regulate poultry in barracks (Agriculture)
- Create awareness in barracks (Information)
- Poultry and human monitoring
- Report outbreaks to civilian authority through proper channels
- Request information that may impact military readiness
- Strengthen military health facilities (Health)
- Designate quarantine facilities on military bases

These planning functions were derived from the areas where the military would be involved in the *response* phase. In a severe pandemic event, typical support roles for the military would include operating in a single unified command structure under civilian leadership, providing command, control, and communications infrastructure, affording logistical assistance to first responder NGOs, including the Red Cross, and establishing a joint task force to coordinate efforts from all branches.

The most recent and updated version of the National Plan does a better job of incorporating the military into the planning process, however, their role is mentioned only briefly in the document and we recommend that it continue to be further expanded:

> In the early stages of pandemic emergence, the efforts of Government may be overwhelmed. It is envisaged that the armed forces, security agencies, and paramilitary forces (customs, immigration and prison officers) may be called upon to support pandemic containment activities at their source. They will then be called upon to provide vehicles, aircraft and operators to move personnel, equipment and supplies, as requested by the APIP&CC [Avian and Pandemic Influenza Prevention and Control Centre]; provide logistical support and air/ground transportation of disaster relief supplies, personnel and equipment; provide personnel and equipment for triage and emergency medical care and portable medical aid stations; provide space, as available to serve as resource

staging areas; and provide/and or coordinate traffic control and expedited routing for supply missions or personnel movements.[35]

**Next Steps for Ministries of Health, Agriculture, and Information**

In addition to the drafting of an improved National Plan, every Ministry that was a member of the initial Steering Committee and an author of the original National Plan agreed to draft a Ministry Support Plan that would address the execution of each element of the National Plan from that Ministry's perspective. Utilizing the knowledge gained in the training seminar, each Ministry also agreed to draft their Support Plan with the role of the military in mind. Further, a list of proposed action items for the Ministries of Agriculture, Health, and Information were identified. These action items provide a useful guide for other African countries in the process of developing national pandemic influenza response plans. They show the types of activities that should be included in pandemic planning.

*Ministry of Agriculture:*

- Surveillance in poultry farms and markets
- Strengthen and enforce bio-security measures
- Frequent cleaning of poultry farms
- Strengthen regional laboratories to diagnose influenza subtypes
- Upgrade veterinary quarantine services at borders (equipment, training, etc.)
- Control movement of poultry and poultry products
- Register all poultry farms (locations, operations)
- Program for alternative livelihood (rehabilitation)
- Continue robust compensation program

*Ministry of Health:*

- Mobilize trained medical personnel
- Increase stockpiles of antivirals
- Develop protocols for access to stockpiles
- Standard operating procedures for pharmacological intervention
- Public personal protective measures and education
- Identify isolation facilities
- Active surveillance and contact tracing
- Health risk communication
- Activation of national and international health regulations

*Ministry of Information:*

- Public information campaign and national press conference coordination with Agriculture, Health, and Defense

[35] Government of Nigeria, "Integrated National Avian and Pandemic Influenza Pandemic Influenza Response Plan 2007-2009," available at <http://nigeria.gov.ng/NR/rdonlyres/44FA9DCA-AFEF-4C0E-8076-0C78984A175D/808/NIGERIAINTEGRATEDNATIONALAVIANAND PANDEMICINFLUENZA.pdf>.

- Mobilize states' Ministry of Information for downstream information management
- Provision of public education via mass media coordination with Agriculture, Health, Defense, and Police
- Distribution of Information, Education, and Communication (IEC) materials (military and police support)
- Feedback mechanism coordination with NGOs, Community Based Organizations, (CBOs), and traditional rulers

According to the participants in the workshop, one of the most valuable lessons for them as a group was the newfound understanding of the importance of collaboration and communication between the various ministries. In a demonstration of this new paradigm, the ministries proposed a number of ways their agencies could collaborate. The participants identified opportunities to work cooperatively on issues such as the control of poultry movement and quarantine, ensuring continuity of the food supply, public education campaigns, medical waste management, carcass disposal, poultry culling oversight, capacity building for the military on AI/PI, activation of the command structure (Ministers, Governors), and conducting of simulations with participation from all stakeholders. Each of the above actions requires the involvement of a wide range of ministries, and their collaboration requires practiced interagency communication.

# AFRICOM and Partnering for Public Health

"Improving the health infrastructure in African nations is a 'productive and non-threatening' way to build stability on the continent"
- Dr. (Col) Schuyler Geller, Command Surgeon of U.S. Africa Command

On October 1, 2008, U.S. Africa Command (AFRICOM) was declared a fully unified command. One of six Department of Defense regional military headquarters, AFRICOM's mission is to conduct sustained security engagement with African nations through military-to-military programs, military-sponsored activities, and other military operations as directed, to "create a stable and secure African environment in support of U.S. foreign policy."[36] As part of its strategic objectives, AFRICOM has identified protecting populations from deadly contagions, and in particular, deterring and containing pandemic influenza in Africa, as one of its priority objectives.

AFRICOM has stated that it views health as a "bridge to peace and security," and has developed an impressive number of health initiatives focused on Africa, including the Pandemic Response Program (PRP). In partnership with USAID, U.S. Pacific Command, and other international partners, such as the World Food Program, AFRICOM is spearheading a multi-year pandemic response program aimed at strengthening partner African national military capabilities to respond to pandemic influenza in the context of larger national pandemic preparedness and response plans. The PRP is part of the much broader USAID International Partnership on Avian and Pandemic Influenza (IPAPI) effort aimed at enhancing global pandemic preparedness. To date, USAID has already committed $543 million to international pandemic prevention and readiness issues.[37]

The PRP recognizes that national militaries have a critical role in health crisis response by providing logistical support for the transfer of food and medical supplies to pandemic-affected regions, protecting medical staff, maintaining communications, and maintaining order and security in a time of uncertainty.[38] In an effort to assist African counties in the development of civil-military response plans, partners of the PRP will "train senior and mid-level military leaders in disaster management and humanitarian assistance, with a particular focus on pandemic preparedness; to ensure that militaries in targeted 'pandemic preparedness' countries have developed detailed plans of action directly supporting national plans; and to conduct exercises to test the implementation of these plans and identify gaps or deficiencies."[39]

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[36] AFRICOM, "Fact Sheet: AFRICOM Posture Statement: Ward Updates Congress on U.S. Africa Command," March 12, 2008, available at <http://www.africom.mil/getArticle.asp?art=1799>.
[37] USAID, "Avian and Pandemic Influenza: Preparedness and Response," June 4, 2009, available at <http://www.usaid.gov/our_work/global_health/home/News/news_items/avian_influenza.html>.
[38] AFRICOM, "International Conference Focuses on Civil-Military Influenza Pandemic Response Plans," May 19, 2009, available at <http://www.africom.mil/getArticle.asp?art=3030>.
[39] Ibid.

The PRP comes at a vital time in pandemic influenza planning. With the recent WHO declaration of an H1N1 pandemic, many African nations need immediate assistance in the development of civil and military pandemic response plans. During an influenza pandemic it is estimated that up to 40 percent of an organization's staff may be absent at any time. For a nation that is already hosting a large population of immuno-compromised individuals—such as an African nation with high rates of HIV or AIDS patients—the absenteeism rate will likely skyrocket. As a result, an influenza pandemic may be most devastating in fragile democracies where stability is constantly in jeopardy. These states are significant due to their vulnerability and the consequently greater need for them to develop a strong action plan. To be most effective in preserving a state's human capital, preparations for an influenza pandemic must focus on the readiness issue—particularly in a state with a medical establishment that will assuredly not be able to handle the stresses created by a pandemic.[40] An international presence, such as is being developed by the AFRICOM PRP, may be helpful in preventing an untoward outcome by assisting in the development of a contingency plan and thorough training of military personnel to ensure its execution.[41]

[40] Robert Armstrong et al., "Weathering the Storm: Leading Your Organization Through a Pandemic," Defense and Technology Paper 38 (Washington, DC: Center for Technology and National Security Policy, November 2006), available at <http://www.ndu.edu/CTNSP/Def_Tech/DTP%2038%20Weathering%20The%20Storm.pdf>.

[41] One potential partner outside of African national militaries for the PRP to engage with is the Economic Community of West African States (ECOWAS). Founded in 1975, ECOWAS is a regional group of fifteen West African countries. Among the agencies under ECOWAS is the West African Health Organization (WAHO). Civilian components under the PRP, such as USAID, could potentially engage with WAHO in pandemic preparedness planning for governments in Africa, thus ensuring national governments and militaries have cohesion in their planning.

# Conclusion

In the opinion of the participants from the various Nigerian Ministries and the Nigerian military, the workshop "was a huge success." However, they also recognized that the interdependencies they discovered throughout the workshop need further refinement and assignment of responsibility. In recognition of these lingering deficiencies, many participants requested additional training in their post-workshop comments.

A further concern of the participants in the training workshops was the universal belief that a "pandemic knows no boundaries." The National Integrated Avian and Pandemic Influenza Plan Steering Committee members have addressed, and will continue to refine through their respective agency support plans, the issues of border control in the event of a pandemic incident. However, they were concerned that their neighboring countries have not developed plans or strategies to address a pandemic. To support the integrity of the National Integrated Avian and Pandemic Influenza Plan, it is essential to provide similar training to border countries and the guidance necessary to operationalize each of their national pandemic plans.

The unresolved concerns of the Nigerian participants present an opportunity for AFRICOM and its Pandemic Response Program partners to help selected African partners build their pandemic response capabilities. The recent declaration of an H1N1 pandemic demonstrates the urgent necessity for countries to have pandemic response plans in place and the necessity for continued international aid resources devoted to assisting our partner nations in pandemic response planning and mitigation.