An acclaimed 1980s TV movie “The Day After” graphically depicted the United States after a maximum US/ Soviet nuclear exchange. A lasting memory was the ham radio operator trying to contact other people still alive after these devastating attacks who kept repeating “This is Lawrence, Kansas, is anyone out there”.

Even though the threat of nuclear exchange is much diminished today, we still face threats with the similar potential to kill hundreds of millions of people. Gratefully over the 2005/6 flu season, we have not been reduced by a worldwide bird flu pandemic to a pitiful handful of people calling out in the vastness. We have apparently survived a near-miss in a game of viral and biological Russian roulette. This is an update on the progress and spread of the bird flu as well as local, national and world developments determined to stop that spread.

Through November, 2005 the bird flu (H5N1) had infected 105 humans mostly in Southeast Asia and China, caused 60 deaths, and carried a mortality rate in excess of 55%. By February 2006, only 12 weeks later, the number had grown to 175 infected humans with 95 deaths, and the flu had invaded the wildfowl population of an additional 14 countries. Table1. outlines the incidence of human avian flu cases from early 2003

thru March 2006 and portrays those countries in which human deaths attributed to the avian flu have occurred. Countries with new human cases occurring since January 2006 are Iraq and Turkey.

(March 2006)

Country	2003		2004		2005		2006		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Cambodia	0	0	0	0	4	4	0	0	4	4
China	0	0	0	0	8	5	7	4	15	9
Indonesia	0	0	0	0	17	11	10	9	27	20
Iraq	0	0	0	0	0	0	2	2	2	2
Thailand	0	0	17	12	5	2	0	0	22	14
Turkey	0	0	0	0	0	0	12	4	12	4
Viet Nam	3	3	29	20	61	19	0	0	93	42
Total	3	3	46	32	95	41	31	19	175	95

Europe was not immune to the spread of the bird flu in 2006. In quick sequence, Greece and Italy announced infected swans had been discovered.[28] Bulgaria, Kazakhstan, Ukraine, Kuwait, Romania, Cyprus, Croatia, Austria, Germany, India, and France are now reporting the flu in both domestic and wild bird populations. In France, thousands of turkeys have either died outright from the virus or been culled to stop the possibility of spread. [27, 30]

In Africa, Nigeria confirmed the presence of the avian flu in February 2006, followed within 2 weeks by Egypt and Niger.[27] There are major concerns over the presence of avian flu in Central Africa, including Nigeria and Niger. The population there has suffered decades of malnutrition, warfare, transitory refugee camps, rampant AIDs/HIV, and tuberculosis. Next to China and India, the Central African population becomes the third geographic group with a very strong potential for developing a pandemic "seed" involving human-to-human H5N1 viral transmission.

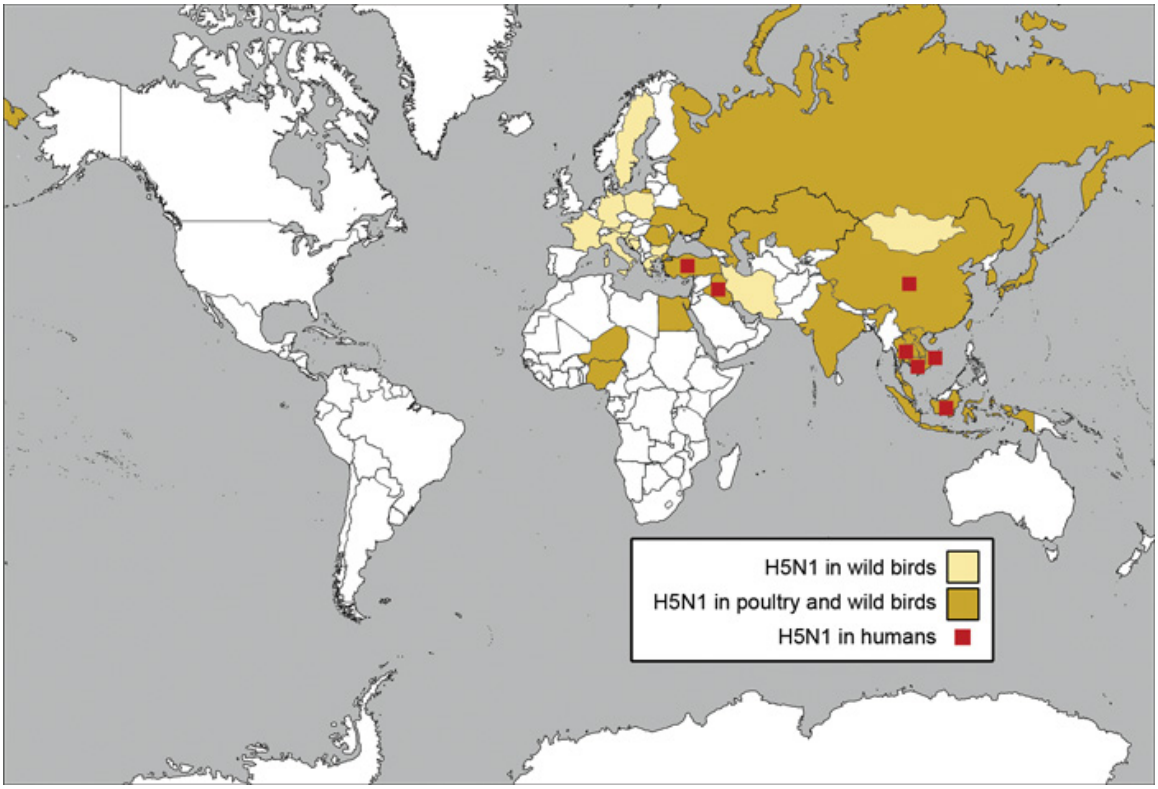
The overwhelming poverty and malnutrition in Central Africa could fuel illegal quarantine exodus of potentially infected birds. The World Health Organization has established determined that concentric quarantine zones of 3 kilometers (about 2 miles) will be imposed around suspected or confirmed sources of avian flu.[30] All bird life ranging from chickens to tweety-bird, are subject to confiscation and destruction in these zones. In the case or Nigeria, the government is paying the equivalent of $1.50 US for each chicken culled from both commercial and personal flocks. The problem is that at market these same chickens demand $7.50 US. There have been unconfirmed reports farmers have transported birds out of quarantine areas to avoid financial ruin. Similar reports of farmers evading quarantine previously occurred in China, Indonesia, and Viet Nam.

Lastly, the North and Central African area has been the winter home of the migratory European bird populations for millions of years. This migratory population includes the

famous chimney storks of Rust, Austria. The possibility of these European populations being infected in Africa, and then retuning to Europe and Asia in the coming spring is a strong possibility. [28]

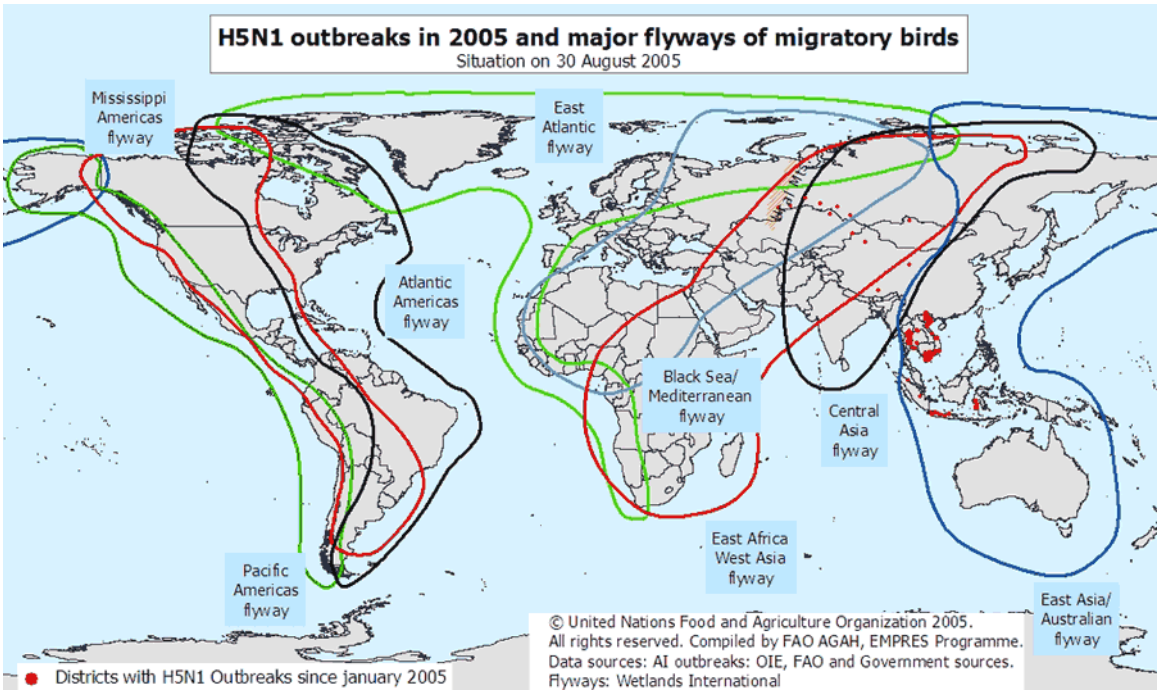
For the first time in decades, Japan suffered an outbreak of bird flu north of Tokyo where authorities destroyed 90,000 chickens to control the spread.[4] Scientists have been unable to definitely link the spread of bird flu to different parts of the World to the migration patterns of ducks, gulls and other wild birds. The scientific community is divided into two camps, those who believe that wild birds and waterfowl traveling along the traditional migratory pathways could be the pathways for the spread of the flu, and those who suggest the spread is a result of shipments of infected domestic poultry.[5, 6, 25,26] There appears to be strong indications for both concepts, creating a methodology that utilizes both migration and transportation of infected birds, both wild and domestic. [26]

Map 1



Map 1 portrays the presence of avian flu in three distinct populations: countries with H5N1 in wild birds, countries with H5N1 in wild birds and poultry, and those countries with H5N1 confirmed in humans.

Map 2



Map 2 delineates H5N1 outbreaks in 2005, and outlines the major flyways of migratory birds. If the two maps are superimposed, the progression of the avian flu appears to fall into one or more of the migratory flyways. In the Far East, the East Asian/Australia flyway seems to cover the initial spread of the flu, with only Australia at the far end of the flyway escaping infection. Coming from middle Asia, the Black Sea / Mediterranean Flyway and the East Atlantic Flyway cover most of the rest of the infected areas. However, a commonality of all the flyways appears to be Siberia and the far north of Asia and Europe where many migratory birds spend time in the summers. The East Asian/Australian Flyway expands over Alaska, and intertwines with two of the three major flyways of the western and central United States, the Pacific American, and the Mississippi American.

Individual human avian flu infections are concerning, but multiple cases in the same location are alarming. In late 2005, a 19-year old Indonesian woman and an 8-year old

boy from her family were diagnosed and confirmed to have died from "bird flu".[4] In early January 2006, Turkey initially reported the presence of the avian flu in its poultry flocks.[7] By mid-January, Turkey was reporting its 15th confirmed human case. 550,000 birds have been culled, a kind term for killing. In one family alone, two brothers and two sisters were confirmed as having the H5N1 infection. All four have subsequently died. The family lived on a poultry farm and all family members were in close contact with the birds. The children were suspected of playing with dead chickens prior to their illness. Despite the apparent clustering, health officials feel the disease was related to direct contact with the dead chickens and not related to human to human transmission.[8, 9]

The appearance of "clustering of infections" in Viet Nam, Indonesia, and Turkey are major causes for concern and the method of transmission to the clustered humans has been carefully evaluated. To date, there have been no cases of human-to-human transmissions confirmed. Clustering is a term for outbreaks of the same pathogen genotype in humans with exposure through direct contact. The clustered cases discussed above have all involved family members.

Countries around the world are combating the spread in different ways. In mid 2005, Great Britain indefinitely stopped all bird imports as a result of what was thought to be an infected parrot from Suriname South America. It was later determined that the viral carriers were Finches from Taiwan that had contaminated other birds in the British import quarantine center.[2] Vietnam has banned poultry raising in Hanoi and Ho Chi Minh City, closely following an edict to destroy all existing poultry within these cities.[3]

China has an estimated 5.2 billion chickens, ducks and other poultry. It has destroyed up to 300 million birds so far, and has embarked on a dramatic poultry vaccination program to eradicate or slow the progress of the disease in its domestic flocks.[1] India has embarked on an immediate a program to destroy 700,000 birds. [30]

In late 2005 and early 2006, detailed plans to combat a potential pandemic began to take shape. The Bush administration announced that front-line healthcare workers, vaccine plant workers, pregnant women, government leaders, and people with high risk medical conditions would be given first priority to vaccination if such an outbreak occurred.[10,12] Travel restrictions would be imposed, forced quarantine of infected cities was discussed, bans on public gatherings, and the use of the military were also discussed. New CDC proposals include requiring a captain of a plane or ship to report any ill passengers at the next airport of port of call directly to the Director of the CDC, bypassing local health officials.[11] Federal officials held "flu summits" discussing federal and state response plans with local officials. Available resources of manpower and stockpiled supplies were outlined. Timing of shipment and receipt of the federal and state responses was also discussed.[13]

It was projected an outbreak in the United States could kill 100- 200,000 people, hospitalize 700,000, and force up to 40 million outpatient visits and 50 million additional illnesses.[14]

In December, the Asian Development Bank projected a bird flu pandemic could cost 300 billion dollars, take 3 million lives, and force a worldwide recession, if not depression. The World Bank put the finishing touches on a $500 million loan to poor countries to help combat the spread of the bird flu. At the same time, the World Bank estimated that the avian flu could cost the World's richest countries like the United States 550 Billion dollars to control an avian pandemic. The G-8 Nations committed to spend between $800 million to 6 Billion dollars to subsidize the purchase of new vaccines against infectious diseases worldwide, which is expected to expand to encompass the various strains of the bird flu. [31]

Beginning in late November 2005, Roche Holding AG began to license other manufacturers and governments like Thailand and the Philippines to produce the anti-viral agent Tamiflu. Roche however maintains that Tamiflu is difficult to produce, takes approximately a year, and requires several processes which can be dangerous.[15, 16] Several cases of resistance to Tamiflu have been reported, possibly related to massive poultry vaccination programs occurring in China, Taiwan, and other Southeast Asian nations. The World Health Organization, seeking to stem possible panic, issued a statement that the reported small numbers of resistance were not cause for alarm and WHO was collecting information to determine the exact cause of the resistance development. [17]

Virgin Airways announced in December 2005 it was purchasing an undisclosed amount of the antiviral agent Tamiflu for its employees in response to the Avian Flu threat. Virgin serves the United States, Britain, China, Malaysia, and Japan. Similar purchases

by non governmental agencies, and the threat of hoarding prompted Roche to announce that it would cease shipments of Tamiflu for a period of time to reassess its normal delivery schedules.[18, 19]

Kentucky Fried Chicken (KFC) announced a plan in November for TV commercials and other materials designed to promote consumer confidence in eating chicken. The US poultry industry is valued at over 50 billion dollars a year. Texas, Oklahoma, Mississippi, and Arkansas are among the leading US producers of poultry.[20, 21] The number 2 American poultry grower, Pilgrim's Pride, saw their shares fall 5% on March 1, 2006 in an apparent shareholder reaction to the French poultry industries woes in dealing with the avian flu.[32] The US poultry industry was quick to issue a statement that, unlike many nations, the majority of US poultry industry utilized roofed and enclosed breeding and raising yards with only limited exposure to outside contamination.

In January, a plan to have 30 volunteers inhale an attenuated and genetically altered bird flu virus in the isolation unit of a Baltimore hospital in an evaluation of a true bird flu virus was announced. It is being billed as FluMist for the Bird Flu. Sanofi-Pasteur also announced progress on it's version of the vaccine. Sanofi-Pasteur said it has also developed a promising added ingredient that would require smaller doses of the vaccine per patient and extend supplies even further.[22, 23]

In a recent phone poll conducted by the Harvard School of Public Health, 60% of the respondents said they are concerned with the bird flu, but only 25% express a concern of contracting the bird flu. 60% felt the bird flu would reach the US in wild birds, 44% felt

if would enter the domestic poultry industry, and 34% felt it would infect fellow Americans within the next year.

Table 2 provides a comparison of the bird flu and the common flu. Differences include a much higher morbidity and mortality. Treatment regimens are also discussed. Mechanical ventilation will be required in an as yet undetermined percent of those infected.

Table 2.

Fact file Comparing bird flu to the common flu

The H5N1 bird flu virus has infected at least 117 people in Asia, killing 60 in the last two years. Here are some facts about bird flu and how it differs from common human flu:

	BIRD FLU	COMMON FLU
SYMPTOMS	Persistent fever, cough, sore throat, muscle aches, shortness of breath and acute respiratory distress. Patients can develop viral pneumonia, multiple organ failure, especially in the lungs and kidneys, and other severe and life-threatening complications in a matter of days. So far the virus is transmitted through direct contact with infected birds.	Fever, cough, running nose, muscle pain.
MORTALITY RATE	Up to 50 percent. 117 have become infected with H5N1; over 60, mostly young people, have died.	Kills up to 2 percent of people it infects, with elderly, young children and people in developing countries more at risk. Mortality rates in developed countries are much lower but in an average year, influenza still kills between 500,000 and

TREATMENT	Prescription antivirals oseltamivir (Tamiflu) and to a lesser extent zanamivir (Relenza) are the only medications that are effective against avian flu. The drugs can prevent infection up to 80 percent and can treat patients who have had symptoms for 2 days or less. However, flu viruses can become resistant to these drugs, so these medications may not always work.	Some vaccines are available to prevent infection. Prescription antivirals oseltamivir (Tamiflu) and zanamivir (Relenza) are approved to treat type A and B influenza, the two types most responsible for flu epidemics. In order to lessen severity of the infection, patients needed to start treatment within two days of the onset of symptoms.

Source: CDC, MSNBC

The US Government has published a pamphlet entitled "Pandemic Flu Planning Check List for Individuals and Families" that is available at http://www.panndemicflu.gov/plagueguide/checklist.html/ The site provides common sense items that would be helpful in the event of a pandemic. Additionally, each state has been asked to develop a Pandemic Preparedness Plan that contains more specific details related to cities and states. Your individual state's websites contain a wealth of information concerning the flu and probably outline your states plan to deal with a pandemic. More global and national information can be found at http://www.pandemicflu.gov

As in many disasters, unscrupulous opportunists are seeking to profit from the fear generated by the avian flu. On January 15th, 2006, the FDA issued a warning against fraudulent therapies for avian flu. There have been numerous internet-based claims for cures and "protective" agents from the bird flu. One such product "Vira 38" claims to inhibit the bird flu. In all, nine companies received "cease and desist" letters from the FDA or face legal action. As a result, one of the agents "Vira 38" is no longer available on the US Market.[24]

This update resulted from over 120 individual articles. I hope it leaves you with a better understanding of the avian flu, and the steps mankind is taking to defeat this and similar biologic threats. The action plans and international cooperation we have developed may or may not be fully needed for this particular virus, but they will prove to be just as applicable for other future viral/biologic agent threats as well. This is a case of a dollar well spent. Lawrence, Kansas, we are still here.

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Table 2. Comparing bird flu to the common cold, CDC, MSNBC http://www.msnbc.msn.com/id/6880869/

Map 1. http://www.pandemicflu.gov./global/

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