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## FACING THE FLU:

# From the Bird Flu to a Possible Pandemic, Why Isn't America Ready?

"WHETHER NATURALLY OCCURRING OR INTENTIONALLY INFLICTED, MICROBIAL AGENTS [INFECTIOUS DISEASES] CAN CAUSE ILLNESS, DISABILITY, AND DEATH IN INDIVIDUALS WHILE DISRUPTING ENTIRE POPULATIONS, ECONOMIES, AND GOVERNMENTS. IN THE HIGHLY INTERCONNECTED AND READILY TRAVERSED 'GLOBAL VILLAGE' OF OUR TIME, ONE NATION'S PROBLEM SOON BECOMES EVERY NATION'S PROBLEM AS GEOGRAPHICAL AND POLITICAL BOUNDARIES OFFER TRIVIAL IMPEDIMENTS TO SUCH THREATS."<sup>1</sup>

— 2003 Institute of Medicine report: *Microbial Threats to Health: Emergence, Detection, Response*

## INTRODUCTION

**B**etween 10 and 20 percent of the U.S. population is estimated to contract influenza annually. Each year, it is responsible for approximately 36,000 deaths in this country.<sup>2</sup> However, the nation lacks a unified and effective flu management strategy.

The recent emergence of avian influenza, commonly referred to as "bird flu," in at least 10 Asian nations, has further complicated the national and international flu response activities this season. It has killed 20 individuals as of February 16, 2004 and disrupted economies worldwide. The genetic makeup of this strain of influenza, specifically its potential to exchange genes with a human flu virus, has public health officials particularly worried about the emergence of a devastating influenza pandemic, a worldwide disease outbreak, capable of causing chaos and casualties in the hundreds of thousands.<sup>3</sup>

A second strain of bird flu, discovered in two flocks of Delaware poultry and four New Jersey live chicken markets in February 2004, has not spread to humans.<sup>4</sup> However, its emergence demonstrates that the impact of avian influenza is not limited to Asia. In addition to flu's potential as a looming health crisis, the recent ban on U.S. poultry imports enacted by numerous nations illustrates the outbreak's impending toll on the nation's economy. As a result, containment efforts and preparedness planning must be afforded the highest national priority.

*It was difficult to say if this year's childhood death toll from the flu was higher than average, because they "don't have detailed, accurate information on the number of children who die every year from influenza specifically because it hasn't been a reportable illness."*<sup>6</sup>

**– Dr. Julie Gerberding**  
Director of the CDC

While the U.S. public health community has reacted quickly by destroying infected flocks in Delaware, quarantining surrounding farms, enacting Asian bird importation bans, dispatching teams of expert epidemiologists to Southeast Asia, and harnessing international media attention to benefit public awareness,<sup>5</sup> the unsettling fact remains: the stateside emergence of a pandemic flu would cripple the resources of a U.S. public health system already stretched too thin. The systematic under-funding and narrow, disease-

by-disease brand of thinking that has characterized the American public health system over recent decades would put the nation's health and safety in a tenuous position.

In the midst of the current flu outbreak and the emergence of avian influenza in Asia, Trust for America's Health (TFAH) examines significant flu-related questions in this issue paper and recommends actions that public health officials should take to better prepare for the threat flu poses to the country every year.

## **I. While this season's flu outbreak seemed to receive more attention than in previous years, why can't health officials determine if more Americans actually contracted the flu than usual?**

Currently, there is no system in place to track and count the number of flu cases in the country, which makes determining its levels of severity a serious challenge. The Centers for Disease Control and Prevention (CDC) does not require states to report influenza cases or even influenza deaths. CDC requests that states and health workers voluntarily report flu cases and particularly deaths.

Without tracking, it is difficult to develop and evaluate containment and prevention strategies because there is no reliable or consistent information available.

On December 19, 2003, during a telebriefing, Dr. Julie Gerberding, Director of the CDC, referred to the nation's flu management as a "complex, multijurisdictional problem."

During a January 8, 2004 telebriefing with reporters, Dr. Gerberding stated:

■ "One of the things that we do routinely is work with our partners in states to help get consistency about reportable conditions. So we already have engaged the individuals in the Council of State and Territorial Epidemiologists -- or CSTE -- who are generally the people in states who are the experts in disease reporting,

and we've asked them to consider officially making influenza deaths among children a reportable condition in the long run...In general, we have a very collaborative agreement with these experts, and we often come to close agreement in a rapid timeframe when something is as important as this."<sup>7</sup>

A strong public health defense begins with effective disease surveillance capabilities. A comprehensive disease tracking system monitors the occurrence of disease and can help inform the rapid identification of outbreaks, corresponding response protocols, amounts and types of vaccines needed, and ongoing prevention strategies.

The emergence of the strain of bird flu demonstrates the heightened need for tracking information to help prepare and contain flu management efforts. Due to the interconnectivity of the contemporary world, it is imperative that nations rapidly disclose any information related to suspected cases of avian influenza and that national boundaries do not trump global concerns. Chinese officials were slow to acknowledge and inform the world of the SARS emergence in the Guangdong province in 2003, needlessly delaying the arrival of expert epidemiologists who even-

tually helped control the virus. Similarly, Thai health officials were slow to disclose the illness and eventual death of several patients due to the avian flu in January 2004. Chinese officials have promised openness in the nation's battle against bird flu, but say "parts of its animal disease prevention system are weak and vulnerable."<sup>8</sup>

In order for critical surveillance systems to live up to the national standard all Americans deserve, CDC needs to be provided the resources to effectively administer and oversee such a network; the current strategy of relying on "surveillance by consensus" of outside committees does not afford sufficient jurisdictional authority.

## II. How is the severity of a flu outbreak determined?

There are a number of variables that determine the severity of an influenza outbreak, most notably, the specific genetic makeup of the influenza strain. Typically, the "flu season" coincides with the winter months in the United States and afflicts 10-20 percent of Americans each year.<sup>9</sup> The current "bird flu" in Asia is particularly pathogenic, as evidenced by the mortality rate within birds and humans.<sup>10</sup>

The ultimate severity of any flu outbreak depends on the genetic form of the predominant virus. True pandemics emerge when different strains of influenza trade genes within a "vessel" organism carrying multiple strains. If the current avian influenza mixed with an existing human influenza strain, the resultant blend would prove a potent virus that humans have no natural immunity against.<sup>11</sup> As a result, the world public health community is treating the avian influenza outbreak with extreme trepidation.

The disclosure that the virus has possibly been discovered in pigs is a dangerous development -- the pig's immune system is similar to humans, making them an "ideal vessel for mixing genes from the bird flu pathogen and the human influenza virus."<sup>12</sup>

The outbreak of pandemic flu that hit the United States in 1918, often referred to as

the Spanish flu, killed 550,000 Americans in ten months and 30 million people worldwide. A similar outbreak today could inflict equal damage -- a toll that even a severe bioterrorism attack is unlikely to reach. Recent findings have discovered that the strain of flu behind the 1918 pandemic was more avian than originally believed; a further indication of the importance of dealing decisively with the present bird flu outbreaks in Asia and the United States.<sup>13</sup>

In the 20th century, two other notable flu pandemics illustrated the devastating potential of influenza in the United States. In 1957 and 1958, an outbreak of influenza spread from China across the globe, killing approximately 70,000 in the U.S. A decade later, 34,000 were killed in the U.S. as a wave of "Hong Kong" flu circulated in 1968 and 1969.<sup>14</sup> Based on historical trends and projections, virologists and epidemiologists speculate a new flu pandemic will emerge three or four times each century.<sup>15</sup>

While medical care is significantly advanced from generations ago, today's high volume of international travel, increased elderly population, and the bird flu's demonstrated capacity to affect children and the infirmed would make the arrival of a pandemic flu a severe test for the nation's public health system.

### III. Why did the vaccines run out and prove ineffective this flu season?

The creation of a vaccine to combat flu season is an annual “best guess” by virologists. The influenza vaccine available each year is carefully engineered to respond to the particular strains of flu most likely to emerge based on projections and prior outbreaks’ genetic makeup. Some years, including

2003-2004, the strains predicted vary slightly from the real-world strains that emerge. The vaccine’s demand has been higher than expected this flu season, due to factors ranging from the season’s demonstrated virulence to increased media attention on emerging epidemics.

“PRODUCTION OF INFLUENZA VACCINES IS A COMPLEX PROCESS THAT REQUIRES MANY STEPS, INCLUDING SELECTION OF SUITABLE VACCINE VIRUSES, GROWTH OF THESE VIRUSES IN EGGS, AND TESTING TO ENSURE SAFETY AND PURITY OF THE VACCINE. RECOMMENDATIONS ABOUT WHICH STRAINS SHOULD GO INTO THE VACCINES FOR THE UNITED STATES ARE BASED ON YEAR-ROUND SURVEILLANCE AND ARE TYPICALLY MADE IN FEBRUARY FOR VACCINE THAT WILL BE USED IN THE FOLLOWING SEASON.”<sup>16</sup>

– CDC, *Questions & Answers: The 2003-2004 Flu Season*

Over the course of the twentieth century and into the twenty-first, vaccines have been developed and systematically administered to eliminate many devastating infectious diseases and drastically reduce the impact of others. Moreover, immunization programs are incredibly cost-effective; every public and private dollar spent on immunization generates exponential return on investment in the form of savings on otherwise necessary direct medical expense, and even greater return when indirect savings are calculated. For example, according to CDC, for every \$1 spent to control diphtheria, tetanus and pertussis, \$27 are saved; for every \$1 spent on measles, mumps and rubella, \$23 are saved.<sup>17</sup>

New technologies have been developed that would allow for much more rapid response, but breakthroughs have not been a public policy priority nor have sufficient incentives to relevant manufacturers been offered for further development and dissemination.

For the long term, the public health system must cope with challenges posed by projected substantial increases in the cost of standardized vaccines, and structural changes in the public and private immunization indus-

tries. Public health organizations must also concentrate upon continuing education about the value of immunization and the horrible impact of the diseases they prevent, particularly where segments of the public are either complacent or ill-educated concerning risks and benefits.

Controlling and treating avian influenza poses a challenge for the public health community more complex than the usual flu season’s impact. Due to the destructive potential of a new pandemic emerging from a cross-strain of avian and human influenza, the control strategy centers on destroying the vector population before it can mix with humans. Additionally, experts are working to develop a human bird flu vaccine to address the current strains of bird flu and prepare for the arrival of a pandemic strain.<sup>18</sup> In testimony before the U.S. House of Representatives, Committee on Government Reform in February 2004, Dr. Gerberding described an effort to “move toward the development of a modern, cell culture influenza vaccine, for which production can be scaled up more rapidly than the traditional egg-based vaccine.”<sup>19</sup>

## IV. What is the bird flu?

There are two known varieties of the influenza virus, Influenza A and Influenza B.<sup>20</sup> All known Type A influenza viruses are further divided into subtype strains based on their surface's composition (categorized by the antigens hemagglutinin (H) and neuraminidase (N)).<sup>21</sup>

The current bird flu spreading through Asia is of the Influenza A (H5N1) virus. Wild birds are the natural hosts of this subtype, which circulates among birds throughout the world.<sup>22</sup> Traditionally, flu seasons featuring type A viruses are more severe to humans, resulting in increased hospitalizations and fatalities.<sup>23</sup>



“WHEN CASES OF AVIAN INFLUENZA IN HUMANS OCCUR, INFORMATION ON THE EXTENT OF INFLUENZA INFECTION IN ANIMALS AS WELL AS HUMANS AND ON CIRCULATING INFLUENZA VIRUSES IS URGENTLY NEEDED TO AID THE ASSESSMENT OF RISKS TO PUBLIC HEALTH AND TO GUIDE THE BEST PROTECTIVE MEASURES. THOROUGH INVESTIGATION OF EACH CASE IS ALSO ESSENTIAL. WHILE WHO AND THE MEMBERS OF ITS GLOBAL INFLUENZA NETWORK, TOGETHER WITH OTHER INTERNATIONAL AGENCIES, CAN ASSIST WITH MANY OF THESE ACTIVITIES, THE SUCCESSFUL CONTAINMENT OF PUBLIC HEALTH RISKS ALSO DEPENDS ON THE EPIDEMIOLOGICAL AND LABORATORY CAPACITY OF AFFECTED COUNTRIES AND THE ADEQUACY OF SURVEILLANCE SYSTEMS ALREADY IN PLACE.”<sup>24</sup>

–“Avian Influenza Frequently Asked Questions,” World Health Organization.

This particular bird flu subtype has generated international attention and began in mid-December 2003 in Korea. Since 1997, H5N1 strains have showed an ability to directly

infect humans. While infected bird carcasses endanger handlers, the most dangerous vector is surviving birds, which spread the virus via excretions for at least 10 days.<sup>25</sup>

## V. Why are public health experts particularly concerned about this strain of the bird flu?

The current avian influenza outbreak has demonstrated itself to be highly pathogenic and a significant public health danger. Within a nation, the disease spreads easily between such places as farms and food markets. Infected wild birds contaminate farm-

land where poultry are kept, which are then widely distributed to food markets. International travelers, poultry exporters, and migrating birds and fowl then spread the virus from region to region and nation to nation.<sup>26</sup>

“THE REAL DANGER IS MORE DISTANT: THE POSSIBILITY THAT SOONER OR LATER SOMEONE WILL BE SIMULTANEOUSLY INFECTED WITH AN AVIAN FLU VIRUS AND A HUMAN FLU VIRUS, ALLOWING THE VIRUSES TO SWAP GENES IN A WAY THAT MAKES THE BIRD VIRUS HIGHLY TRANSMISSIBLE AMONG HUMANS, WHO WOULD HAVE NO NATURAL IMMUNITY.”<sup>27</sup>

– New York Times editorial, January 30, 2004

The current destruction of poultry populations throughout many Asian nations and widespread importation bans illustrate the severity with which officials are regarding this flu strain. Lessons learned from past bird flu outbreaks demonstrate that the most important control measures are rapid destruction of infected or potentially exposed birds, and the quarantining of related farms.<sup>28</sup>

When the first human case of avian influenza virus was diagnosed in Hong Kong in 1997, the rapid destruction of the area's 1.5 million

poultry helped avert a larger-scale public health disaster.<sup>29</sup> This decisive action was in part influenced by the lessons learned five years earlier in Mexico, where a strain of low pathogenic avian influenza was not controlled and evolved into a more virulent and fatal form.<sup>30</sup> While such measures are appropriate due to the virulence of the current health threat, they would become an absolute necessity if a new virus emerged, blending the existing bird flu with a human flu gene partner.

"SINCE MID-DECEMBER 2003, A GROWING NUMBER OF ASIAN COUNTRIES HAVE REPORTED OUTBREAKS OF HIGHLY PATHOGENIC AVIAN INFLUENZA IN CHICKENS AND DUCKS. INFECTIONS IN SEVERAL SPECIES OF WILD BIRDS AND IN PIGS HAVE ALSO BEEN REPORTED. THE RAPID SPREAD OF HIGHLY PATHOGENIC AVIAN INFLUENZA, WITH OUTBREAKS OCCURRING AT THE SAME TIME IN SEVERAL COUNTRIES, IS HISTORICALLY UNPRECEDENTED AND OF GREAT CONCERN FOR HUMAN HEALTH AS WELL AS FOR AGRICULTURE. PARTICULARLY ALARMING, IN TERMS OF RISKS FOR HUMAN HEALTH, IS THE DETECTION OF A HIGHLY PATHOGENIC STRAIN, KNOWN AS "H5N1", AS THE CAUSE OF MOST OF THESE OUTBREAKS. H5N1 HAS JUMPED THE SPECIES BARRIER, CAUSING SEVERE DISEASE IN HUMANS, ON TWO OCCASIONS IN THE RECENT PAST AND IS NOW DOING SO AGAIN."<sup>31</sup>

– "Avian Influenza Frequently Asked Questions," World Health Organization.

If a pandemic flu were to emerge, the U.S. public health system would be stretched well beyond its capacity. Decades of underinvestment and a narrow disease-by-disease response has weakened the entire public health infrastructure. Recent investments in bioterrorism preparedness have improved elements of our overall public health defenses, but recent reports, including a December 2003 state-by-state examination of public health preparedness by TFAH, have illustrated that significant gaps remain, most notably at the state and local level. The U.S. General Accounting Office (GAO) studied local and state bioterrorism preparedness in 2003 and found deficiencies in capacity, communication, and coordination elements essential to preparedness and response.<sup>32</sup>

The Association of State and Territorial Health Officials (ASTHO) has been urging its members to take advantage of "the substantial overlap between public health infrastructure

needed to address a bioterrorism event" and that needed to deal with pandemic flu by completing state-specific pandemic plans. ASTHO refers to the communications, laboratory, disease surveillance, and emergency response capabilities being developed for a possible bioterrorism attack as the "scaffolding" upon which the unique capabilities required to deal with pandemic flu can be built.

In many ways, pandemic flu could be much more demanding on state and local health resources and much more damaging to the general population than a bioterrorism attack. Most experts believe a bioterrorism attack is most likely to involve isolated locations initially. In the event of an attack, aid can be swiftly dispatched both from the federal government and from unaffected states. But pandemic flu would affect most every state simultaneously. People would be forced to rely almost exclusively on their local and state health infrastructure for assistance.

# Conclusions and Recommendations for Better U.S. Flu Preparedness

The initial response to the recent emergence of avian flu underscores the importance of strong public health systems, from the global to the local, as well as integrated and well-functioning systems for health care delivery. Future preparedness also will depend on a well-educated and trained clinical and public health workforce. In addition, the nation needs a sound research agenda addressing near and long-term requirements for new insights into the nature of infectious disease threats, human host responses, and the opportunities to develop new diagnostics, drugs, and vaccines.

The diversity and sheer number of challenges confronting our public health system in recent months, from ricin attacks to emerging epidemics, has demonstrated the necessity for a revitalized 21st century public health defense system. The current “disease du jour” approach to funding and containment is simply not able to deal with the range and volume of health threats we face.

The emergence of the potential flu pandemic coincides with renewed attention being paid to public health. With today’s news stories on emerging epidemics and bioterrorism preparedness activities, most Americans have a better understanding of areas of vulnerability.

Recent outbreaks of animal-borne diseases in the United States, while frightening and attention-getting, resulted in relatively few casualties. However, their emergence provided real-time “trial runs” of our national response and diagnostic capabilities. U.S. efforts in combating SARS, monkeypox, West Nile virus, and Mad Cow disease will prove invaluable in the continuing efforts to prepare against the flu pandemic and have helped illustrate the dangers caused by poor communication and cooperation between

the traditionally separate jurisdictions of animal and public health.

Throughout the United States, animal and public health departments exist as wholly separate entities with different jurisdictions and purviews, separated in both organization and culture. Without better integration and coordination between these two fields, the responses to diseases originating in animals will be at a piecemeal and emergency basis and response and coordination efforts will remain below optimal. The domestic spread of West Nile virus, which was first evident in birds beginning in 1999, illustrates the dangers of poor coordination and cooperation between animal and public health entities. (For additional information on animal-borne diseases, see TFAH’s “Animal-Borne Epidemics Out of Control: Threatening Our Nation’s Health,” which is available at [healthyamericans.org](http://healthyamericans.org))

The threat from biological and chemical terrorism also has provided a much-needed impetus for policymakers and the public to recognize the importance of a strong and well-funded public health system. While federal bioterrorism preparedness funding has exceeded \$2 billion since 9/11, gaps persist,

especially at the state and local level. TFAH recommends shifting focus and funding towards an “all hazards” approach to public health, rather than a siloed approach to bioterrorism readiness. An integrated, “all hazards” protocol would strengthen the fundamentals of our entire system, especially public health workforce recruitment, retention and training, laboratory capacity at the state and local level, and communications and rapid response networks capable of meeting the demands of 21st century health threats.

The current effort to improve the nation’s ability to respond to a public health emergency faces a significant organizational challenge. Whatever the threat, the response is largely dependent on the functioning of a patchwork of state and local public health agencies, whose funding sources, bureaucratic structure, and responsibilities can vary significantly from state to state and even county to county.

It is clear that the U.S. needs a more cohesive, national public health system, though no one is suggesting that state and local agencies be subsumed by a new national body. However, public health officials

should initiate a process that leads to consensus toward common goals and the role of each entity in reaching them.

The President, in consultation with Congress, should convene a White House summit that will develop a concrete vision for the future of the American public health system and the resources needed to make it a reality. The summit would consider how the country can best build a robust, integrated public health infrastructure. TFAH believes that such a summit could craft a blueprint for a public health system that is designed to meet both America’s current and emerging health threats.

The discussion must include how to develop a public health system for the 21st century -- the summit should address all aspects essential to public health, such as biological, chemical and radiological terrorism preparedness, known and emerging infectious diseases, and chronic disease prevention and control. At the same time, it could foster a long-overdue dialogue about the resources required to implement needed changes and guarantee accountability at every level of the public health system.

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