Backgrounder

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Swine Flu: What Every American Should Know

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In June, the World Health Organization (WHO) declared swine flu—officially known as the H1N1 virus—the first influenza pandemic since 1968. The following month, the WHO told countries to stop reporting individual swine flu infections because the number of victims had rapidly exceeded 1 million people and the virus had spread to almost every nation in the world.[1] The flu continues to spread. A WHO scientist estimates that H1N1 could infect 2 billion people in two years. Since emerging in April, it has become one of the fastest spreading contagious diseases on record.

H1N1 will return to the U.S. this fall with the flu season. This year's flu season may be more severe than normal, but the U.S. has the capacity to respond to the extra strains. Federal, state, and local governments should continue to improve their pandemic response and risk communication programs. They still need to do much to improve cross-state planning, continuity of operations, situational awareness and information sharing, and community resiliency.

However, an effective public response will likely be the most important factor in mitigating the effects of the flu season. The public should follow the guidelines of a responsible national vaccination strategy and adopt behaviors, such as washing hands properly, to limit the spread of the disease and minimize its societal impacts.

What Is Swine Flu?

Swine flu, identified as the H1N1 strain, contains a unique genetic makeup that distinguishes it from

Talking Points

- The spread of swine flu around the globe perfectly matched air travel patterns. Indeed, it had gone global before Mexican officials recognized that they had a serious problem. Closing the U.S.–Mexican border would not have stopped or even significantly slowed its spread to the U.S.
- U.S. responses to the initial appearance of H1N1 proved generally adequate. Government did not overreact. Federal, state, and local officials took prudent steps, using the programs and instruments established to deal with pandemics.
- With H1N1 vaccines not becoming generally available until after the U.S. flu season begins, the single greatest contribution that the public can make is to limit opportunities for infection by practicing basic hygiene, beginning with washing hands frequently.
- While national capabilities may still be insufficient to deal with a deadly global pandemic or widespread bioterrorism attack, they should prove sufficient to deal with the swine flu during the approaching flu season.

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other influenza viruses. H1N1 includes gene segments from North American swine, bird, and human flu strains and from Eurasian swine flu—a unique combination that had not been previously reported. New influenza viruses are often created through "molecular reassortment," in which two distinct virus strains invade the same cell and, in the process of using the cell to replicate themselves, mingle their genes creating a hybrid strain.[2]

The Centers for Disease Control and Prevention (CDC) in the U.S. Department of Health and Human Services (HHS) has concluded that many H1N1 symptoms are similar to seasonal flu symptoms: fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills, and fatigue. The CDC anticipates complications similar to seasonal flu. Indeed, the majority of reported cases exhibited symptoms found in influenza-like illness, such as fever and cough. However, some patients reported vomiting and diarrhea, which are unusual for the seasonal flu.[3]

H1N1 transmission modes also match those for seasonal influenza. The CDC has concluded that H1N1 most likely spreads from person to person by "large particle respiratory droplet transmission" (for example, via coughs or sneezes in close range of an uninfected person). Additionally, transmission can occur through contact with a contaminated surface. The virus can live on surfaces and infect individuals for up to eight hours after being deposited.

Therefore, the CDC has warned that "all respiratory secretions and bodily fluids" should be considered potentially infectious. These materials can contain live viruses, which can infect the human body, usually entering through the nose or throat. As with other influenza viruses, infected individuals can begin infecting others before beginning to show symptoms and can still be infectious up to a week after onset of the illness.[4]

Like other forms of "common" influenza, H1N1 has proved resistant to amantadine and rimantadine, older antiviral drugs. Antiviral drugs stop flu from developing by inhibiting the virus from entering cells, thus preventing them from replicating. However, some flu viruses mutate and develop a resistance to antiviral drugs. In 2006, the CDC recommended against using amantadine and rimantadine for seasonal flu after a sample of cases in 26 states showed over a 92 percent resistance rate.[5] The current strain of H1N1 has not yet become resistant to newer antivirals, such as Tamiflu (oseltamivir) and Relenza (zanamivir).[6] Of course, this may change in the future because the virus continues to mutate. Indeed, a seasonal flu strain that appeared in the 2008–2009 flu season proved resistant to Tamiflu.[7]

During the initial H1N1 outbreak, no vaccine was available. Vaccines differ from antivirals in that they can be a prophylactic, preventing an individual from contracting a disease in the first place by stimulating the body's immune system to produce anti-

1. World Health Organization, "Changes in Reporting Requirements for Pandemic (H1N1) 2009 Virus Infection," *Pandemic (H1N1) 2009 Briefing Note* No. 3, revised July 16, 2009, at *http://www.who.int/csr/disease/swineflu/notes/h1n1_surveillance_20090710/en/index.html* (September 2, 2009).
2. Rapid Public Health Policy Response Project, "The H1N1 Influenza A Virus: A Test Case for a Global Response," George Washington University, Homeland Security Policy Institute and School of Public Health and Health Services, May 2009, at *http://www.gwumc.edu/sphhs/about/rapidresponse/download/Rapid_SwineFlu_Final.pdf* (September 2, 2009).
3. Centers for Disease Control and Prevention, "CDC Telebriefing on Investigation of Human Cases of H1N1 Flu," May 19, 2009, at *http://www.cdc.gov/media/transcripts/2009/t090519.htm* (September 2, 2009).
4. Centers for Disease Control and Prevention, "Interim Guidance for Clinicians on Identifying and Caring for Patients with Swine-Origin Influenza A (H1N1) Virus Infection," May 4, 2009, at *http://cdc.gov/h1n1flu/identifyingpatients.htm* (September 2, 2009).
5. Centers for Disease Control and Prevention, "CDC Recommends Against the Use of Amantadine and Rimantadine for the Treatment or Prophylaxis of Influenza in the United States During the 2005–06 Influenza Season," January 14, 2006, at *http://www.cdc.gov/flu/han011406.htm* (September 2, 2009).
6. For reports that H1N1 is already becoming resistant to Tamiflu, see Alexander G. Higgins, "Roche: 13 Cases of Tamiflu-Resistant Swine Flu," Associated Press, at *http://www.google.com/hostednews/ap/article/ALeqM5g39DlePR9XT3KpmAsClUuepPlUwwD9AIGBR04* (September 9, 2009).

bodies that will kill the virus. Vaccines are developed from dead or inactivated virus, but the virus must first be identified before a vaccine can be developed. Furthermore, because flu viruses constantly mutate, the formulation of flu vaccines must be changed almost yearly to remain effective against currently circulating strains. The H1N1 strain had not been identified before the outbreak in April 2009, thus no vaccine was available.

The medical response to H1N1 will probably appear nearly identical to the response to seasonal flu. Individuals will be treated with the same antivirals. Indeed, individuals with flu-like systems are unlikely to be tested for H1N1 because the medical protocols will be so similar. In addition, individuals will be encouraged to receive both seasonal flu and the H1N1 vaccine when it becomes available.

Why Worry?

The principal fear is that the current strain of H1N1 could mutate into a highly lethal strain that causes a pandemic. A pandemic is a disease outbreak that affects a wide geographical area and infects a high proportion of the human population. Dr. Peter Palese, the Chair of Microbiology at Mt. Sinai hospital in New York City and an international expert on infectious influenza, has noted that H1N1 belongs to the same virus group as the 1918 Spanish flu, which killed millions worldwide.

Moreover, the H1N1 strain is transmitted human to human, enabling it to spread easily. H1N1 has also displayed an "unusual robustness" by emerging outside the annual flu season, which occurs during the colder half of the year. Furthermore, the virus has become more virulent and/or deadly through "mutations and/or acquisition of gene derived from other human or influenza viruses."[8] These factors raise serious concerns about the prospects of another deadly global pandemic.

On the other hand, Dr. Palese notes that certain factors mitigate against the likelihood of plague on the scale of 1918. In "1976 there was an outbreak of an H1N1 swine virus in Fort Dix, N.J., which showed human-to-human transmission but did not go on to become a highly virulent strain." While the new strain of H1N1 is more complex, it still may not be more deadly than other seasonal influenzas. Furthermore, the virus lacks "an important molecular signature (the protein PB1-F2) which was present in the 1918 virus.... [H1N1] doesn't have what it takes to become a major killer." Research suggests that without the virulence marker the new strain will not be highly pathogenic.[9]

While H1N1 nightmare scenarios are not inevitable, the disease will certainly become more widespread. H1N1 is more contagious than seasonal influenza. Common influenza has a "secondary attack rate" (the rate of infection following close contact with an infected person) ranging from 5 percent to 15 percent. The WHO has estimated that the new H1N1 strain's secondary attack rate is 22 percent to 33 percent.[10] In fact, the disease has spread so widely and rapidly that the WHO has classified the current H1N1 strain as a global pandemic. In short, many more people could contract the flu during this flu season than normal. More people will miss more days of work and school.

In addition to potentially being more contagious than seasonal flu, H1N1 could cause severe complications. Seasonal flu kills an average of about 36,000 people in the United States each year. Another 200,000 are hospitalized. As of August 21, the CDC reported 522 deaths from H1N1-related illness in the United States and 7,983 hospitaliza-

7. At least one scientific study finds that H1N1 may develop into a strain resistant to Tamiflu and recommends increasing stockpiles of Relenza. Venkataramanan Soundararajan, Kannan Tharakaraman, Rahul Raman, S. Raguram, Zachary Shriver, V. Sasisekharan, and Ram Sasisekharan, "Extrapolating from Sequence—The 2009 H1N1 'Swine' Influenza Virus," *Nature Biotechnology*, Vol. 27, No. 6 (June 2009), pp. 510–513.
8. Peter Palese, "Why Swine Flu Isn't So Scary," *The Wall Street Journal*, May 2, 2009, at *http://online.wsj.com/article/SB124122223484879119.html* (September 2, 2009).
9. *Ibid.*
10. World Health Organization, "Assessing the Severity of an Influenza Pandemic," May 11, 2009, at *http://www.who.int/csr/disease/swineflu/assess/disease_swineflu_assess_20090511/en/index.html* (September 2, 2009).

tions. A White House advisory panel concluded that a second wave of H1N1 cases during the upcoming flu season could cause 90,000 deaths and hospitalize 300,000. Thus, the 2009–2010 flu season could be two or three times more severe than normal. On the other hand, the CDC has concluded that this advisory estimate may be excessive. Indeed, Dr. Peter Gross, chief medical officer at Hackensack University Medical Center, has concluded that "the mortality is no worse than the seasonal flu and, if anything, might be slightly less."[11] If there are more deaths this year than during a normal flu season, it could simply be the result of more people catching the flu rather than the flu being more deadly.

Furthermore, younger people are unusually susceptible to H1N1. For seasonal flu, people 65 and older are usually considered as part of the high-risk group and account for about 90 percent of flu-related deaths and 60 percent of flu-related hospitalizations. Yet H1N1 has affected younger populations at higher rates than is usual for seasonal flu. The CDC has concluded that more deaths have occurred among people under 25 years old. In contrast, an estimated one-third of older adults have some antibodies against H1N1.[12]

Beyond the older and younger groups, the groups most vulnerable to severe and life-threatening complications from influenza infections are the most vulnerable to other types of flu. These include pregnant women and people with medical conditions such as asthma, diabetes, suppressed immune systems, heart or kidney disease, and neurocognitive or neuromuscular disorders. For these reasons, when H1N1 flu vaccine becomes available, priority will probably be given to vaccinating younger individuals and others with particular medical conditions—the most vulnerable populations.

Learning Lessons

While the disease will undoubtedly spread widely, limiting transmission and infection to the maximum extent possible is the most vital component of the strategy to respond to H1N1. The fewer individuals who get sick, the lighter will be the burden placed on medical providers. The fewer high-risk individuals who get sick, the lower is the likelihood for serious medical complications and death. Events surrounding the outbreak of H1N1 this spring hold lessons for the right actions to deal with future outbreaks.

Sickness and Response

Mexico was the epicenter of the spring swine flu outbreak,[13] and the U.S. media chronicled its progress. Mexican Secretary of Health José Ángel Córdova initially told reporters that the virus "constitutes a respiratory epidemic that so far is controllable."[14] However, the actions taken by the Mexican public health department belied that optimistic tone and may have contributed to the subsequent global alarm about the influenza. Mexican officials effectively shut down all cultural life by closing museums and canceling soccer games and religious services. In addition, they requested that citizens avoid cinemas and other large public events and abstain from shaking hands and kissing one another on the cheek. Perhaps most significantly, officials closed down all of Mexico City's schools for the first time since the earthquake of 1985, leaving 7 million students idle.[15] Citizens mostly complied with the govern-

11. Executive Office of the President and President's Council of Advisors on Science and Technology, "Report to the President on U.S. Preparations for 2009 H1N1-Influenza," August 7, 2009, at *http://www.whitehouse.gov/assets/documents/PCAST_H1N1_Report.pdf* (September 2, 2009); Associated Press, "Calm Urged After Flu Death Estimates," *The Washington Post*, August 27, 2009, at *http://www.washingtonpost.com/wp-dyn/content/article/2009/08/26/AR2009082603759.html* (September 2, 2009); and Amanda Gardner, "Study Details Swine Flu Transmission Rates," *U.S. News & World Report*, August 28, 2009, at *http://health.usnews.com/articles/health/healthday/2009/08/28/study-details-swine-flu-transmission-rates.html* (September 2, 2009).
12. *Ibid.*
13. Rapid Public Health Policy Response Project, "The H1N1 Influenza A Virus."
14. Marc Lacey and Donald G. McNeil Jr., "Fighting Deadly Flu, Mexico Shuts Schools," *The New York Times*, April 24, 2009, at *http://www.nytimes.com/2009/04/25/world/americas/25mexico.html* (September 2, 2009).
15. *Ibid.*

ment's requests and avoided public interaction, leading some observers to describe Mexico City as a "ghost town."[16] Restaurants, schools, and other public venues did not reopen until early May.[17]

The sudden outbreak in Mexico, the unexpected deaths among young people with no previous medical complications, and the unsure flow of information from and response by Mexican officials soon garnered significant press attention in the United States and sparked widespread speculation. At least one Member of Congress publicly called for closing the border.[18]

Subsequent research has confirmed that attempting to control land borders cannot significantly control the spread of the new strain of H1N1. A research team lead by Dr. Kamran Khan at St. Michael's Hospital in Toronto has shown that the spread of swine flu around the globe perfectly matched air travel patterns. Between March and April, 2 million people flew out of Mexico. They traveled to 1,000 cities in 164 countries, and where they went, the flu went. Even if closing the land border with Mexico were possible, it would not have stopped the disease from spreading. Four of every five air travelers leaving Mexico landed in the United States. Even if the flu had not directly entered the United States by plane, it would have arrived soon thereafter.[19] Indeed, it had gone global before Mexican officials recognized that they had a serious problem. An infected individual can infect others before he or she feels sick or develops a sniffle. Thus, infected individuals likely crossed U.S. borders by land and air before H1N1 was identified.

Closing the border would not have stopped the disease, but would have created more suffering than the disease itself. For example, in 2003, China implemented a "panic" response to the outbreak of Severe Acute Respiratory Syndrome (SARS). By some estimates, China's overreaction cost the mainland economy 1 percent of its gross domestic product (GDP), some $50 billion. It cost Hong Kong 2.5 percent of its GDP.

Mexico is America's third largest trading partner. In 2008, trade between the two nations totaled $367 billion.[20] "Stopping that trade would be like firing a shotgun blast into the heart of Mexico's economy and the foot of our own,"[21] but do little to mitigate the spread of the disease.

Swine Flu in the Homeland

The first documented cases of swine flu in the United States involved seven people infected from late March to mid-April. Five were in Imperial and San Diego Counties in California. Two were in San Antonio, Texas.[22] Unable to classify the virus, state laboratories sent the specimens to the CDC. Similar

16. Ioan Grillo, "Swine Flu: Mexico City Is 'Like a Ghost Town,'" *The Telegraph*, April 27, 2009, at *http://www.telegraph.co.uk/news/worldnews/centralamericaandthecaribbean/mexico/5226323/Swine-flu-Mexico-City-is-like-a-ghost-town.html* (September 2, 2009). See also Stephen Wade, "Mexico Weekend Soccer Games Will Be Without Fans," Associated Press, April 28, 2009, at *http://bleacherreport.com/articles/163898-mexico-weekend-soccer-games-will-be-without-fans* (September 2, 2009), and Lacey and McNeil, "Fighting Deadly Flu, Mexico Shuts Schools."
17. William Booth and Joshua Partlow, "Mexico City's Restaurants Reopen," *The Washington Post*, May 7, 2009, at *http://www.washingtonpost.com/wp-dyn/content/article/2009/05/06/AR2009050603980.html* (September 2, 2009), and Thomas H. Maugh II, "Some Mexico Schools, Businesses Reopen After H1N1 Virus Outbreak," *Los Angeles Times,* May 8, 2009, at *http://articles.latimes.com/2009/may/08/science/sci-swine-flu8* (September 2, 2009).
18. Press release, "Congressman Eric Massa Calls for Immediate Closure of the Mexican Border Until H1N1 Virus Is Contained," Office of U.S. Representative Eric Massa (D–NY), April 25, 2009, at *http://massa.house.gov/?sectionid=24&sectiontree=23,24&itemid=229* (September 4, 2009).
19. Kamran Kahn, "Spread of a Novel Influenza A (H1N1) Virus via Global Airline Transportation," *New England Journal of Medicine*, Vol. 361, No. 2 (July 9, 2009), pp. 212–214, at *http://content.nejm.org/cgi/content/full/NEJMc0904559* (September 2, 2009).
20. U.S. Census Bureau, "Trade in Goods (Imports Exports, and Trade Balance) with Mexico," August 12, 2009, at *http://www.census.gov/foreign-trade/balance/c2010.html#2008* (September 9, 2009).
21. James Carafano, "Killer Pigs and Politicians," *The Examiner* (Washington, D.C.), July 6, 2009, at *http://www.washingtonexaminer.com/opinion/columns/Killer-pigs-and-politicians-7917624-49730967.html* (September 4, 2009).

to the situation in Mexico, the CDC did not believe these patients had any contact with pigs. Noting that the cases involved a father and a daughter and two 16-year-old schoolmates, the CDC concluded that the virus was transmittable through human contact.[23]

Eschewing the drastic tone adopted by Mexican officials, American officials initially minimized the flu's potential severity. On April 23, Dr. Anne Schuchat, director of respiratory diseases for the CDC, stated that all seven patients had recovered and that "so far this is not looking like very, very, severe influenza." Furthermore, although "we don't yet know the extent of the problem," "[w]e don't think this is a time for major concern."[24] This assessment proved correct.

However, U.S. authorities were not idle. Their response was guided in part by planning and coordination over the past few years in anticipation of a potential Avian flu pandemic. The U.S. response also reflected caution in dealing with a new form of influenza and public unease inflamed by media reporting and widespread speculation.

The first official U.S. response was on April 26, when HHS declared a public health emergency.[25] This decision, which Secretary of Homeland Security Janet Napolitano said "sound[ed] more severe than really it is," was a required first step for the federal government to begin providing special assistance to state, local, and tribal governments.[26] For example, the declaration allowed the CDC to release antiviral medication, personal protective equipment, and respiratory protection devices from its national stockpiles.

The CDC began distributing to state and local emergency responders 12 million courses of antivirals (about 25 percent of the national stockpile), personal protective equipment, gloves, and masks. The DHS prioritized shipment to states with confirmed cases: Arizona, California, Indiana, New York, and Texas. By April 30, the antivirals and other materials had reached New York City, Indiana, Texas, Kansas, Ohio, Illinois, New Jersey, and the District of Columbia. By May 4, all states had received their shares of the stockpile. The government also pre-positioned antivirals for all sectors of the Border Patrol and Coast Guard and provided guidance to federal government employees on antiviral usage. To replenish the stockpile, HHS released funds to purchase 13 million more antiviral doses.[27]

The HHS emergency declaration also gave the federal government the authority to control the movement of people and livestock across U.S. borders, establish quarantines, and close certain public

22. Donald G. McNeil Jr., "Unusual Strain of Swine Flu Is Found in People in 2 States," *The New York Times*, April 24, 2009, at *http://www.nytimes.com/2009/04/24/us/24flu.html* (September 2, 2009).
23. Centers for Disease Control and Prevention, "CDC Briefing on Public Health Investigation of Human Cases of Swine Influenza," April 23, 2009, at *http://www.cdc.gov/media/transcripts/2009/t090423.htm* (September 2, 2009).
24. *Ibid.*
25. Rapid Public Health Response Project, "The H1N1 Influenza A Virus."
26. U.S. Department of Homeland Security, "Press Briefing on Swine Influenza with Department of Homeland Security, Centers for Disease Control and Prevention, and White House," April 26, 2009, at *http://www.dhs.gov/ynews/releases/pr_1240773850207.shtm* (September 2, 2009).
27. Nicole Gaouette, "U.S. Asks Glaxo, Novartis to Start Swine Flu Vaccine," Bloomberg News, May 22, 2009, at *http://www.bloomberg.com/apps/news?pid=20601087&sid=atvxfuUzNvnc* (September 2, 2009); Rapid Public Health Policy Response Project, "The H1N1 Influenza A Virus"; Janet Napolitano, "Remarks by Secretary Napolitano at Today's Media Briefing on the H1N1 Flu Outbreak," U.S. Department of Homeland Security, April 30, 2009, at *http://www.dhs.gov/ynews/releases/pr_1241140344050.shtm* (September 2, 2009); Centers for Disease Control and Prevention, "CDC Briefing on Public Health Investigation of Human Cases of H1N1 Flu (Swine Flu)," May 1, 2009, at *http://www.cdc.gov/media/transcripts/2009/t090501.htm* (September 2, 2009); Centers for Disease Control and Prevention, "CDC Briefing on Public Health Investigation of Human Cases of H1N1 Flu (Swine Flu)," May 4, 2009, at *http://www.cdc.gov/media/transcripts/2009/t090504.htm* (September 2, 2009); and Janet Napolitano, "Remarks by Secretary Napolitano at Media Briefing on H1N1 Flu Outbreak," U.S. Department of Homeland Security, April 27, 2009, at *http://www.dhs.gov/ynews/releases/pr_1240959259336.shtm* (September 2, 2009).

transportation systems. Although the federal government prudently avoided excessive restrictions, Customs and Border Protection and the Transportation Security Administration isolated immigrants and travelers who were believed to be infected with the swine flu. The U.S. Department of Agriculture examined the food supply to confirm that it posed no threat of spreading swine flu.[28]

The CDC explicitly outlined its response strategy on May 12, a few weeks after the outbreak. Noting that the virus had spread to almost every state in the country, the CDC never sought to contain the virus's geographic distribution. Instead, it decided to concentrate on "reducing illness and death and mitigating the impact…as well as focusing our efforts on areas where they can have the most impact." This involved distributing antiviral drugs to those most vulnerable to H1N1, such as individuals with underlying medical conditions and those severely affected by the virus. Again, this proved to be prudent and realistic response. The strategy matched the facts of how the disease spreads with the risks involved, and it exploited the national capabilities that been established over the past several years to manage pandemic response.[29]

The U.S. government also made a significant effort to conduct "risk communications," attempting to implement response measures while dampening panic, despite the exaggerated commentaries and scare stories in the media and on the Internet. Federal health responders consciously sought to meet the recommendation of the national strategy that "trained" and "credible" government spokespersons transmit important information about the disease to the public.[30] DHS officials "conduct[ed] daily conference calls with Homeland Security advisors, state and local elected officials, Fusion Centers, our private sector partners, and congressional representatives."[31]

The CDC also employed new methods to ensure transparency and disseminate public information since the flu outbreak. Almost daily, CDC staff held open telephone briefings.[32] The CDC updated its Web site and increased staffing to manage its information line (1-800-CDC-INFO), reducing both waiting time and dropped calls. Each day the CDC received 4,000 calls, more than 2,000 e-mails, and 6 million to 8 million hits on its Web site.[33] The agency also sought to exploit the latest communication technologies by creating a Twitter site and an RSS feed.[34]

In addition, all 50 states and the District of Columbia had their own pandemic flu plans in place, including plans to receive and distribute emergency vaccines, antidotes, and pharmaceuticals.[35] A February 2009 report from the Government Accountability Office noted federal efforts to collaborate with state and local partners. Federal

28. Donald G. McNeil Jr., "The Next Steps for Swine Flu: Predictions, Protection and Prevention," *The New York Times*, May 21, 2009, at *http://www.nytimes.com/2009/05/22/health/22flu.html* (September 2, 2009), and U.S. Department of Homeland Security, "Press Briefing on Swine Influenza."
29. Centers for Disease Control and Prevention, "CDC Telebriefing on Investigation of Human Cases of H1N1 Flu," May 12, 2009, at *http://www.cdc.gov/media/transcripts/2009/t090512.htm* (September 2, 2009).
30. Homeland Security Council, *National Strategy for Pandemic Influenza: Implementation Plan*, May 2006, at *http://georgewbush-whitehouse.archives.gov/homeland/pandemic-influenza-implementation.html* (September 9, 2009).
31. Janet Napolitano, "Remarks by Secretary Napolitano at the Media Briefing on the H1N1 Flu Outbreak," U.S. Department of Homeland Security, April 28, 2009, at *http://www.dhs.gov/ynews/releases/pr_1240965057737.shtm* (September 2, 2009).
32. See Centers for Disease Control and Prevention, "H1N1 Flu (Swine Flu) Press Updates," Web site, at *http://www.cdc.gov/h1n1flu/press* (September 2, 2009).
33. Centers for Disease Control and Prevention, "CDC Briefing on Public Health Investigation of Human Cases of Swine Influenza," April 23, 2009.
34. Centers for Disease Control and Prevention, CDCemergency on Twitter, at *http://twitter.com/CDCEmergency* (September 4, 2009), and RSS feed, at *http://www2a.cdc.gov/podcasts/rss.asp* (September 4, 2009).
35. Press release, "Trust for America's Health Applauds U.S. Response to Swine Flu," Trust for America's Health, April 27, 2009, at *http://healthyamericans.org/newsroom/releases/?releaseid=168* (September 2, 2009).

officials sponsored pandemic summits with all 50 states. The DHS established coordinating councils to share pandemic information across sectors and levels of government. HHS complemented these efforts by convening influenza pandemic workshops in five influenza pandemic regions. Similarly, the Federal Executive Boards, which operate under the White House's Office of Personnel Management, were tasked with organizing joint activities for federal, state, and local officials. Many boards arranged for influenza pandemic training and exercises for their members.[36]

Federal spokespersons also provided preparedness guidance to the private sector. The DHS communicated with sectors in private industry, providing daily updates and urging them to regularly evaluate their continuity-of-business plans.[37]

Assessment

National responses to the initial appearance of H1N1 proved generally adequate. Government did not overreact. At the federal, state, and local level officials took prudent steps, using the programs and instruments established to deal with pandemics. Nevertheless, substantial doubt remains whether the U.S. has adequate capacity and mechanisms to deal with a deadly global pandemic or widespread bioterrorism attack.

A December 2008 report by the Trust for America's Health assessed the readiness of states in 10 key areas. Although a number of the findings were positive, the report noted significant gaps in effective response. For example, 26 states do not have laws limiting liability for businesses and non-profits that help during an emergency.[38] An HHS assessment also found notable gaps. For example, most states have not considered the impact of a pandemic on workers, provided information to help them plan for such an event, or evaluated which state benefits could be used to help workers during a pandemic.[39] Coordination of national efforts is still a work in progress.

The national response to H1N1 identified additional shortfalls. For example, despite an active communications strategy and tactics during the crisis, some inconsistent CDC guidance caused confusion. Some practitioners found CDC guidance difficult to translate into practical decisions.[40] This was particularly evident in school closures. The CDC initially supported school closures, but on May 5, Acting Director Richard Besser announced that decisions to close schools would henceforth be "local decisions."[41] On May 22, the CDC's online guidance explicitly stated that school closures were "less effective as a control measure."[42]

CDC instructions resulted in inconsistent local decisions causing confusion and panic. For example, in Texas, officials closed the 80,000-student Fort Worth school district after several cases were confirmed in the area. Fearing that the situation was rapidly escalating, the mayor of neighboring Brownsville ordered its 52 schools to close. However, the school district refused to comply and

36. U.S. Government Accountability Office, *Influenza Pandemic: Sustaining Focus on the Nation's Planning and Preparedness*, February 2009, at *http://www.gao.gov/new.items/d09334.pdf* (September 2, 2009).
37. Janet Napolitano and Arne Duncan, "Remarks by Secretary Napolitano and Education Secretary Arne Duncan at Today's Media Briefing on the H1N1 Flu Outbreak," U.S. Department of Homeland Security, May 1, 2009, at *http://www.dhs.gov/ynews/releases/pr_1241217550973.shtm* (September 2, 2009).
38. Laura Landro, "Staff Shortages in Labs May Put Patients at Risk," *The Wall Street Journal*, May 13, 2009, at *http://online.wsj.com/article/SB124217357954413095.html* (September 2, 2009).
39. U.S. Department of Health and Human Services, "Assessment of States' Operating Plans to Combat Pandemic Influenza," January 2009.
40. Trust for America's Health, "Pandemic Flu Preparedness: Lessons from the Frontlines," *Issue Brief*, June 2009, at *http://healthyamericans.org/assets/files/pandemic-flu-lesson.pdf* (September 2, 2009).
41. Centers for Disease Control and Prevention, "CDC Briefing on Public Health Investigation of Human Cases of H1N1 Flu (Swine Flu)," May 5, 2009, at *http://www.cdc.gov/media/transcripts/2009/t090505.htm* (September 2, 2009).
42. Centers for Disease Control and Prevention, "Update on School (K–12) and Child Care Programs: Interim CDC Guidance in Response to Human Infections with the Novel Influenza A (H1N1) Virus," May 22, 2009.

opened schools as normal, a decision that led to much confusion.[43]

Despite such controversies, shortfalls in national capacity, and gaps in integrated national planning and response, nationwide efforts proved adequate to H1N1 response. While national capabilities may still fall short of what is necessary for a deadly global pandemic, they should prove sufficient to deal with the increased levels of flu activity expected this fall.

The Coming Concern

When H1N1 returns this fall, flu sickness will likely be much greater. More people than usual will die, and more severe illness could appear among groups (for example, children and young adults) that normally do not suffer severe complications from the flu. Yet the nation will not face a deadly global pandemic. An effective public response could significantly augment the national response and lessen the burdens on the society as a whole.

Vaccine Strategy. By most estimates, H1N1 vaccines will not become generally available until October, which is after the beginning of the U.S. flu season. One H1N1 vaccine will require two doses given 12 weeks apart. That means full protection will not be available until after February, well after the flu season has peaked. Another vaccine in development requires only one dose and may provide a basic level of immunity within weeks.[44] In either case, however, H1N1 flu vaccine may not be available in quantity to affect the spread of the disease at all this flu season. If stocks are available in time to make a difference, public health officials at all levels of government need to educate Americans on the national vaccination strategy, and Americans will need to listen. The most critical element of the national strategy is not that every individual has to be vaccinated, but vaccinating a sufficient percentage of the population will prevent a recurring pandemic. In addition, as many individuals in high-risk categories as possible should be vaccinated. The national strategy also needs to adjust to the availability of the vaccine.

Under an appropriate strategy:

- **Individuals should receive seasonal flu vaccines.** Even though the seasonal flu vaccine will not prevent H1N1 or even protect individuals against every strain of seasonal flu that might appear this fall, it will reduce the burden on medical providers and productivity losses due to illness.
- **The individuals most likely to spread the disease should be vaccinated first.** A study by scientists Jan Medlock and Alison Galvani concludes that the vaccines should first be used to limit transmission within schools and to the parents of school children, who would then spread the flu to everyone else. This strategy would focus on children (ages five to 19) and adults (ages 30 to 39). This would require an estimated 63 million doses.[45]
- **If more vaccine is available, the most vulnerable groups should be vaccinated next.** Vulnerable groups should be vaccinated according to CDC guidance, including pregnant women, people who care for babies, children and young adults (ages six months to 24 years), people with chronic diseases that make them vulnerable to complications from flu illness, and health care workers.
- **Other individuals should be vaccinated as flu vaccine becomes available.** When sufficient vaccine becomes available, vaccinating 30 percent of the population is necessary to limit the threat of pandemic. Once a responsible level of national vaccination is reached, it would make more sense to ensure that other nations have adequate vaccine supplies rather than seeking to vaccinate the entire population.

43. Stephanie Simon, "Differing Responses to Virus Spark Confusion," *The Wall Street Journal*, May 1, 2009, at *http://online.wsj.com/article/SB124121246599978527.html* (September 2, 2009).
44. Carey Sergant, "Novartis's Swine Flu Vaccine Works in Single Dose," Bloomberg.com, September 3, 2009, at *http://www.bloomberg.com/apps/news?pid=20601124&sid=aVbkaULmJJKQ* (September 9, 2009).
45. Jan Medlock and Alison P. Galvani, "Optimizing Influenza Vaccine Distribution," *Science*, August 20, 2009, at *http://www.sciencemag.org/cgi/content/abstract/1175570* (September 2, 2009).

Prophylactic Strategy. Without vaccines, the single greatest contribution the public can make is to limit opportunities for infection. Public officials have distributed ample guidelines on appropriate preventative measures. These include:

- Washing hands frequently and thoroughly with soap and water and avoiding touching mouth, noses, and eyes with unwashed hands or after touching surfaces;
- Not sharing water bottles and drinking containers;
- Avoiding people who are sick and exposure to coughing and sneezing;
- Coughing or sneezing into one's sleeve;
- Staying at home if one feels sick; and
- Seeking medical attention when appropriate, such as high fever, shortness of breath, chest pain, seizures, persistent vomiting, or inability to retain liquids.

Response Strategies. Individuals, families, businesses, and community groups can help to mitigate the effects of the flu season. Their plans should focus on contingencies if individuals need to stay home from school or work or if key personnel are not available for several days. The best and most effective responses will likely be developed and implemented locally. The greater the scope and severity of the pandemic, the more individuals in communities will need to rely on each other. Many of the resources needed to sustain their communities will also be available locally.

Many consider the efforts of Seattle and King County, Washington, as a model for preparing for pandemic influenza. In response to the SARS outbreak in Asia, county leaders implemented several key actions. Such activities would be appropriate to address any flu outbreak. Specifically, Seattle and King County:

- Established Vulnerable Population Action Teams "to reach individuals who may not or cannot access information from traditional sources that serve the general public," which included using the Community Communication Network to reach vulnerable populations through familiar contacts.
- Conducted a two-day seminar for health care providers on business resiliency issues, such as regional hazards, essential services and critical functions, surge capacity, evacuation, and financial resiliency.
- Created an e-mail alert system that allows individuals to sign up to receive e-mail alerts.
- Translated key documents, such as biohazard and disaster response fact sheets and preparedness check lists, into many languages, including Spanish, Chinese, Vietnamese, Korean, Russian, Somali, and Cambodian.
- Developed and distributed *Speak First: Communicating Effectively in Times of Crisis and Uncertainty*, an advanced training practice kit on public health risk communication, and *Business Not as Usual: Preparing for Pandemic Flu*, a video[46] for businesses, government, and community-based organizations.

The Nation Responds

The U.S. has the capacity to weather the upcoming flu season. Fear and panic are the greatest enemies, but they can be defeated. Federal, state, and local governments need to continue to refine and improve the capacity and efficiency of their pandemic planning and response. Public response will likely be the most significant factor in deciding how the nation fares in the months ahead. The outcome will depend largely on Americans adhering to a responsible vaccination strategy, adopting appropriate behaviors to limit the spread of contagion, and preparing to keep their communities resilient during a flu pandemic.

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46. Seattle and King County, Public Health, *Business Not as Usual: Preparing for Pandemic Flu*, video file, at *http://www.kingcounty.gov/healthServices/health/preparedness/pandemicflu/video.aspx* (September 4, 2009).