

Towards Effective Emerging Infectious Disease Surveillance:

H1N1 in the United States 1976 and Mexico 2009

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Executive Summary

The comparison of Mexico's 2009 A/H1N1 outbreak with the U.S. H1N1 outbreak of 1976 provides notable observations—based on the strengths and weaknesses of each country's response—that can be used as a starting point of discussion for the design of effective Emerging Infectious Diseases (EIDs) surveillance programs in developing and middle-income countries.

Strengths

Mexico's strongest characteristics were its transparency, as well as the cooperation the country exhibited with other nations, particularly the U.S. and Canada. These were the result of Mexico's existing professional relationships with other scientific communities—informal networks, existing without institutional ties, which proved highly beneficial.

Mexico also showed savvy in its effective management of public and media relations. By maintaining transparency and a united political front as it disseminated public health information, Mexico was able to mobilize in this area—something the U.S. handled less effectively in 1976. Uneven economic development was a barrier that prevented full dissemination across more rural regions of Mexico, but on a larger scale, public relations were handled relatively well.

In the U.S., the speed and efficiency of the 1976 U.S. mobilization against H1N1 was laudable. Although the U.S. response to the outbreak is seldom praised, the unity of the scientific and political communities demonstrated the national ability to respond to the situation. In parallel, Mexico also effectively responded to the situation, but in addition it had a preparedness plan for such a pandemic or bio-safety threat, which highlights the necessity of working out such strategies ahead of time.

Mexico's effective pandemic-preparedness plan was comprehensive, but it was also based on simple issues: logistics, administrative structure, and information. The questions it answered included: Is there a national database on the cases of the virus at hand? Is there a network or panel of specialists that the government can pull to their aid? Who is maintaining this network? Are there designated transportation routes and potential central facilities to hold vaccines? Is there a designated individual who reviews the plan?

Weaknesses

In the U.S., the major weakness was turning the response to the outbreak into a single go-or-no-go decision instead of splitting the decision into smaller action tasks or phases of implementation from which decisions could then be made. What made this situation more difficult was the unquestioning support of the Center for Disease Control's (CDC) decision to execute a massive immunization campaign. While then President Ford and CDC Director David Sencer may have acted reasonably considering the circumstances, the move to immunize has since been much criticized, especially owing to the following rise in cases of Guillain-Barré Syndrome and the fact that H1N1 was never identified outside the Fort Dix, New Jersey, army base where it was first detected.

In Mexico, despite the country's overall success in handling A/H1N1, there were myriad political weaknesses that hampered efforts, and these problems persist. Loyalty to political groups is prized above competence. In addition, individuals who are qualified for their position are perennially moved or must leave when there is a change in government, causing the loss of valuable institutional

knowledge and relationships. These issues are hardly unique to Mexico, and will be especially important for countries developing EID surveillance tools to address in the coming years.

An even greater challenge for Mexico was an inflexible workplace culture that did not encourage workers to report abnormalities in patients and therefore delayed the identification of A/H1N1. Inefficiencies can be eliminated if laboratory employees are given the freedom to question situations and are provided with the hardware and tools for executing their duties. Worker compensation, relatively low for an Organization for Economic Cooperation and Development member country, could be an important factor as well.

1. Introduction¹

Emerging infectious diseases (EIDs) pose international security threats because of their potential to inflict harm upon humans, crops, livestock, health infrastructure, and economies. Influenza virus A/H1N1's impact on the Mexican economy in 2009, for example, has been estimated at a loss of almost one percent of Gross Domestic Product.² Despite the scale of this threat, there are inherent limitations in preventing and controlling EIDs, including the scope of current disease surveillance efforts. All of this leads to the following questions: What infrastructure would be necessary to actualize effective zoonotic virus surveillance?³ What would it take to have this infrastructure available in developing countries? Within developing countries, what are the cultural, political, and economic challenges that would be encountered? Finally, are there any generalizations that can be drawn across the board for developed countries?

This paper explores these questions through research on the 1976 U.S. H1N1 influenza virus outbreak, often recalled as the “Swine Flu Affair,” and the recent 2009 influenza virus A/H1N1 outbreak in Mexico. Research on the 1976 outbreak, which actually covers March 1976-78, is based on a seminal study commissioned by then Secretary of the Department of Health, Education, and Welfare Joseph Califano and authored by Richard Neustadt and Harvey Fineberg. Research on the 2009 Mexico outbreak is based on field research and interviews (see Annex B for list) conducted in June 2010 with more than fifteen individuals who were present in Mexico in 2009 during the outbreak and are deeply knowledgeable of the A/H1N1 response. The purpose of this paper is to compare and contrast the strengths and weaknesses of responses to the 1976 and 2009 outbreaks, draw lessons learned, and uncover good practices that could assist other developing countries and inform policymakers to cultivate strategies for EID surveillance and response. A brief summation of the Neustadt and Fineberg report is provided, and five major areas of reflection are highlighted: (1) Building a base for program review; (2) Thinking about doing; (3) Thinking of the media; (4) Maintaining credibility; and (5) Thinking twice about medical knowledge. Essentially, these points review the pros and cons of the execution and decision process behind the U.S. H1N1 program in March 1976-77, with an additional year of reflection until March 1978.

The interviews conducted in Mexico bring to attention three major dimensions that directly affected the outbreak: (1) Political; (2) Economic; and (3) Cultural. More specifically, the discussion includes review of government structure and infrastructure, political loyalties, transparency, uneven development, and the absence of a culture of prevention. The Mexico outbreak turned pandemic, offering good practices because of Mexico's response and the manner in which authorities chose a transparent approach to reporting. This is not to say that challenges were not present; to the

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¹ Motivation for this research is drawn from “Anticipating the Species Jump: Surveillance for Emerging Viral Threats,” Research in Progress, DTRA Advanced Systems and Concepts Office, 4 December 2008.

² As cited in Wenzel, Richard P. “What We Learned From H1N1's First Year,” Op-Ed, *The New York Times*, 13 April, 2010.

³ While this study is technically limited to zoonotic (animal) viruses, the infrastructure is similar regardless of pathogen.

contrary, a number of lessons were learned. Mexico is especially important considering its position as an intermediary between fully developed and developing states. It is a member of the so-called “Rich Man’s Club,”⁴ the Organization for Economic Cooperation and Development (OECD), but frequently finds itself last in OECD rankings.

2. Literature Review

H1N1

Since the outbreak of A/H1N1 in Mexico in May 2009,⁵ the virus has been studied across a broad biological spectrum, from its evolution to the biological mechanisms that aided in its spread.⁶ The origins of the virus have also been heavily studied; as suggested by the name, it is thought that the virus originated in swine and later crossed to humans “several months before recognition of the outbreak,”⁷ according to a *Nature* article published by Gavin J.D. Smith et al. Yet, there were no data on this particular virus strain before the May outbreak, and according to Smith, this highlighted “the need for systematic surveillance of influenza in swine.”⁸ Prior to the 2009 influenza outbreak, “improve[d] communication between human and animal health authorities”⁹ was recommended in a 2001 article entitled, “Lessons from the West Nile Viral Encephalitis Outbreak in New York City, 1999: Implications for Bioterrorism Preparedness,” by Annie Fine and Marcelle Layton. The relationship between animals, viruses, and humans differed greatly in these two cases, but it is clear that animal and human health can be highly interconnected. This underscores Fine’s and Layton’s recommendation for better communication.

It should also be noted that the outbreak and spread of influenza can be highly unpredictable. This is emphasized by Justin Lessler et al. in the 2007 article, “Transmissibility of swine flu at Fort Dix, 1976,”¹⁰ in which the authors used stochastic modeling to estimate the transmissibility of the virus between humans. A 2009 article by José Santos-Preciado et al. also notes that the emergence of a novel influenza is unpredictable.¹¹ With such a level of uncertainty about the next outbreak of influenza, much akin to the uncertainty of a bioterrorist attack—a Black Swan event—the best strategy is to be prepared by developing effective infrastructure and thorough preparedness planning.

⁴ A name the OECD, in its own brochure, admitted it had been called “think tank, a monitoring agency, a rich man’s club and an unacademic university.” As quoted in Arnold, James. “What is the OECD for?” BBC, 30 April 2003, accessed October 19, 2011. Available: <http://news.bbc.co.uk/2/hi/business/2987887.stm>

⁵ Zepeda Hector M. et al. “Identification of influenza A pandemic (H1N1) 2009 variants during the first 2009 influenza outbreak in Mexico City,” *Journal of Clinical Virology*, 2010, 48, 1, 36-39.

⁶ Wang, Ge-Fe; Li, Kang-Sheng, “Origins and Views of the 2009 A/H1N1 Influenza Pandemic,” *Progress in Biochemistry and Biophysics*, 2009, 36, 8, Abstract-945-949.

⁷ Smith, Gavin JD et al. “Origins and evolutionary genomics of the 2009 swine-origin H1N1 influenza A epidemic,” Letter, *Nature* 459, 1122-1125 (25 June 2009) | doi:10.1038/nature08182, accessed October 19, 2011. Available: <http://www.nature.com/nature/journal/v459/n7250/full/nature08182.html>

⁸ Smith et al. (2009:1122).

⁹ Fine, A., and M. Layton, “Lessons from the West Nile viral encephalitis outbreak in New York City, 1999: implications for bioterrorism preparedness,” *Clinical Infectious Diseases*, 2001 Jan 15;32(2):277-82, accessed October 19, 2011. Available: <http://cid.oxfordjournals.org/content/32/2/277.full.pdf+html>

¹⁰ Lessler, Justin, Derek A.T Cummings, Steven Fishman, Amit Vora, and Donald S Burke, “Transmissibility of swine flu at Fort Dix, 1976,” *Journal of the Royal Society Interface*, 2007 August 22; 4(15): 755–762, accessed October 19, 2011. Available: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2373398/pdf/rsif20070228.pdf>

¹¹ Santos-Preciado, José et al. “What have we learned from the novel influenza A (H1N1) pandemic in 2009 for strengthening pandemic influenza preparedness?” *Archives of Medical Research*, 2009, 40, 673-676.

USA 1976

As Richard Neustadt and Harvey Fineberg point out in their book, *The Swine Flu Affair: Decision-Making on a Slippery Disease*, “the swine flu program was once widely seen and now is overwhelmingly recalled as a ‘fiasco,’ a ‘disaster,’ or a ‘tragedy.’”¹² Much of this negative impression can be attributed to the rise in cases of Guillain-Barré Syndrome (GBS)¹³ after a mass vaccination effort and the fact that the H1N1 virus was never identified outside Fort Dix, the New Jersey army base where it was first detected. What, then, were the reasons for what today seems like an overreaction, poor planning, or paranoia?

In a later interview, Fineberg clarifies what appears to be the biggest problem in dealing with the 1976 outbreak—the “decision-making”—stating that “the fundamental strategic flaw was combining all aspects of response into a single ‘go or no-go’ decision.”¹⁴ This rolled-in-one decision ordered enough new vaccine for the entire U.S. population (approximately 200 million at the time) to be produced and administered *en masse*.¹⁵ The plan to mitigate virus spread and mortality was simply to vaccinate the country; its implementation was actually quite successful, with more than 40 million people receiving shots within a span of two-and-a-half months.¹⁶ According to a 2006 article by Timothy Germann et al., in which they performed a stochastic simulation of an influenza pandemic, such a plan would still be the best strategy for the United States. However, the lurking question was and still remains: Why vaccinate so many with an untested vaccine when the targeted virus had not even spread beyond New Jersey?

According to Fineberg and Neustadt, the answer to this question is fairly straightforward: to prevent a deadly H1N1 pandemic. The H1N1 response was conceived by a committee of scientists and policy-makers headed by CDC director David Sencer. H1N1 had been identified at Fort Dix, associated with one death, and documented to have spread from human to human. Those factors, coupled with the assumption that no one under the age of about 50 would have immunity to this virus, convinced some, such as committee scientist Walter Dowdle, that “an epidemic spreading into a pandemic had to be anticipated *as a possibility* [original emphasis].”¹⁷ Finally, with new theories on the cycles of pandemic virus circulation and the heavy memory of prior pandemics like those of

¹² Neustadt and Fineberg (1978:2).

¹³ According to the National Institute of Neurological Disorders and Stroke, “Guillain-Barré syndrome is a disorder in which the body’s immune system attacks part of the peripheral nervous system. The first symptoms of this disorder include varying degrees of weakness or tingling sensations in the legs. In many instances, the weakness and abnormal sensations spread to the arms and upper body. These symptoms can increase in intensity until the muscles cannot be used at all and the patient is almost totally paralyzed. In these cases, the disorder is life-threatening and is considered a medical emergency. The patient is often put on a respirator to assist with breathing. Most patients, however, recover from even the most severe cases of Guillain-Barré syndrome, although some continue to have some degree of weakness. Guillain-Barré syndrome is rare. Usually Guillain-Barré occurs a few days or weeks after the patient has had symptoms of a respiratory or gastrointestinal viral infection. Occasionally, surgery or vaccinations will trigger the syndrome. The disorder can develop over the course of hours or days, or it may take up to 3 to 4 weeks. No one yet knows why Guillain-Barré strikes some people and not others or what sets the disease in motion. What scientists do know is that the body’s immune system begins to attack the body itself, causing what is known as an autoimmune disease. Guillain-Barré is called a syndrome rather than a disease because it is not clear that a specific disease-causing agent is involved. Reflexes such as knee jerks are usually lost. Because the signals traveling along the nerve are slower, a nerve conduction velocity (NCV) test can give a doctor clues to aid the diagnosis.” Accessed October 19, 2011. Available: <http://www.ninds.nih.gov/disorders/gbs/gbs.htm>

¹⁴ Fineberg (2009:414).

¹⁵ Wood (2001).

¹⁶ Neustadt and Fineberg (1978:258).

¹⁷ Neustadt and Fineberg (1978:8).

1918 and 1957, the question of “what if” was the elephant in Sencer’s committee chambers. Most prominent was the worry and anxiety of failure to act in time. With the stage set for some sort of response to H1N1, the rolled-in-one decision took center stage. As elucidated by Fineberg and Neustadt, this was both the beginning and the end of the H1N1 program. Ineffective review processes did not allow proper reconsideration and flexibility, and without evidence of the virus spreading beyond Fort Dix, the H1N1 program descended into a fiasco.

MEXICO 2009

While the 1976 U.S. H1N1 response left much to be desired, the 2009 Mexico response to A/H1N1 may come to be seen as an overall success because Mexico’s transparency and sharing of viral isolates enabled the creation of a vaccine that likely prevented more deaths from occurring. As encouraged by the World Health Organization, many countries, including Mexico, have developed plans for pandemics and/or bioterrorism preparedness.¹⁸ Thus, the first step in responding to an outbreak need not be ad hoc, as happened in 1976, but should be organized and prepared.

After detecting and monitoring the new outbreak, Mexico acted quickly with international cooperation and transparency, as pointed out by Carlos Del Rio et al. in their 2009 article, “Lessons from Previous Pandemics and from the Mexican Response to the Current Pandemic.”¹⁹ Labs shared the new virus strain internationally and vaccine development began. Carlos Franco-Paredes et al. also deemed such international cooperation “on all levels” as “essential” in their August 2009 *Journal of Immune Based Therapies and Vaccines* article.²⁰ In the meantime, the Mexican government launched a media effort to inform the population. The people, in turn, heeded safety precautions, such as social distancing, with a “rapid and complete community response.”²¹ Another key measure was the deployment of antivirals and antibiotics, although these were hampered by ineffective coordination.²² An additional issue that emerged was the high price range of antivirals,²³ which can prove a difficult barrier because of the economic burden for middle-income countries such as Mexico.

As the virus spread to pandemic proportions, more controversial measures were taken in population-dense Mexico City. Schools were closed in the hopes of aiding the social distancing mitigation effort. Though further research is needed, as stated by *The Lancet* and *Emerging Infectious Diseases* articles,²⁴ one *Eurosurveillance* article concluded that school closure would aid in mitigating the spread of flu. The main concerns over school closure dealt with social and economic impacts. When a vaccine became available, more problems emerged in obtaining enough doses and deploying them effectively. An “unequal distribution of vaccine”²⁵ was cited in Del Rio’s and Hernandez-Avila’s article, and Franco-Paredes et al. stated, “vaccine deployment plans are the critical missing link in

¹⁸ Santos-Preciado, José et al. (2009).

¹⁹ Del Rio, Carlos; Hernandez-Avila, Mauricio. “Lessons from Previous Influenza Pandemics and from the Mexican Response to the Current Influenza Pandemic,” *Archives of Medical Research*, 2009, 40, 677-680.

²⁰ Carlos Franco-Paredes, Peter Carrasco and Jose IS Preciado, “The first influenza pandemic in the new millennium: lessons learned hitherto for current control efforts and overall pandemic preparedness,” *Journal of Immune Based Therapies and Vaccines*, 2009, 7:2 doi:10.1186/1476-8518-7-2

²¹ Del Rio, Carlos and Mauricio Hernandez-Avila (2009).

²² Santos-Preciado et al. (2009).

²³ Del Rio and Hernandez-Avila (2009).

²⁴ Echevaría-Zuno, Santiago et al. “Infection and death from influenza A H1N1 virus in Mexico: a retrospective analysis,” *The Lancet*, 2009, Vol 374 Dec 19/26 and Bell, David M. et al. “Pandemic Influenza as 21st Century Urban Public Health Crisis,” *Emerging Infectious Diseases*, 12 Dec., 2009, Vol. 15, No. 12.

²⁵ Del Rio and Hernandez-Avila (2009:679).

pandemic preparedness response.”²⁶

While significant improvements have been made since 1976, and Mexico should be commended for its actions throughout 2009, there are still significant issues in responding to future pandemics, natural or man-made. An average of three to four major pandemics strike per century.²⁷ A qualitative comparison of the 1976 U.S. outbreak and the 2009 Mexican pandemic can provide a foundation for future strategies.

3. Methodology

In order to effectively draw out lessons learned from the outbreaks, this study used a qualitative analysis comparing the findings of Neustadt’s and Fineberg’s 1978 study of the H1N1 outbreak in the United States (*The Swine Flu Affair*) with June 2010 interviews and data from several groups who were present in Mexico in 2009 during the A/H1N1 outbreak. *The Swine Flu Affair* is an important document for understanding the U.S. response to an outbreak of H1N1 and is the definitive policy study reflecting upon that experience. The authors emphasize several important ideas throughout their recounting of the affair and offer a few suggestions for how future outbreaks can be handled more effectively. This report summarizes these findings and updates them with reflections that one surviving author, Harvey Fineberg, made in 2009. The literature review also draws on studies that compare the U.S. and Mexican experiences.

The response to the A/H1N1 outbreak in Mexico in 2009 involved a multitude of actors. Semi-structured interviews of more than fifteen individuals deeply engaged in the response were conducted by the author with the help of a Mexican research assistant (when on one occasion the interview was in Spanish). The interviews were conducted between 5-13 June, 2010, in Mexico City with several groups and individuals to gain an understanding of how the response was led, what worked, what didn’t, and why. Officials in the U.S., Indonesian, and Canadian embassies were interviewed in Mexico City. Indonesia was included because of its experience with highly pathogenic avian influenza (H5N1), the reaction of the authorities there to virus sharing, namely viral sovereignty, and the decision to end a long-standing relationship with the U.S. Naval Area Medical Research Unit 2 examined in Ear (forthcoming).²⁸ A short discussion of the centralization of Mexico versus decentralization of Indonesia and geography of both countries and Canada is offered in Annex A. These officials provided insights into how their countries interacted and learned from Mexico. They also provided valuable outside opinions on how the Mexican government and public health officials responded to the outbreak. In addition to the embassies, representatives from the U.S. Department of Agriculture and the U.S. Agency for International Development (USAID) were interviewed. USAID is important because it is active in Mexico and undertakes programs in public health. On the Mexican side, INdRE (*Instituto de Diagnóstico y Referencia Epidemiológicos* or Institute of Epidemiological Diagnosis and Reference), the Ministry of Health, and the Animal Health department of the Mexican Ministry of Agriculture (SAGARPA) were interviewed, among others. The Ministry of Health and SAGARPA were the primary Mexican agencies in charge of responding to the outbreak, and they provide powerful insight into EID surveillance and the response to

²⁶ Carlos Franco-Paredes, Peter Carrasco and Jose IS Preciado (2009).

²⁷ Spika JS, Butler-Jones D., “Pandemic influenza (H1N1): our Canadian response,” *Can J Public Health*, 2009 Sep-Oct; 100(5):337-9.

²⁸ See Ear, S. “Towards Effective Emerging Infectious Disease Surveillance: Cambodia, Indonesia, and NAMRU-2,” forthcoming.

A/H1N1. Finally the United States-Mexico Foundation for Science, funded by both countries, also provided valuable context. The extreme funding problems in Cambodia, and to a lesser extent in Indonesia, are not so serious in Mexico.

Once these two cases have been sufficiently expanded, the lessons highlighted from each are compared and contrasted to identify similarities and differences, and to draw lessons learned and good practices that should be the subject for future research and policy review in the field of EID surveillance.

4. Findings

USA 1976

At the request of former Health, Education, and Welfare (HEW) Secretary Joseph Califano, Richard Neustadt and Harvey Fineberg compiled a report on the 1976 H1N1 outbreak in the United States. The report provides a comprehensive overview of the entire outbreak from the view of policymakers but is mainly crafted, as Secretary Califano states, “in search of lessons for the future, not of fault in the past.”²⁹ Ultimately, the report finds five major areas for reflection: (1) Building a base for program review; (2) Thinking about doing; (3) Thinking of the media; (4) Maintaining Credibility; and (5) Thinking twice about medical knowledge. A brief summation of these five areas provides a good basis from which to look at the 2009 outbreak in Mexico. With this foundation, we can distill lessons learned and good practices. Additionally, studying these cases sheds light on policymaking for future EID surveillance.

Building a Base for Program Review

A major theme presented by Neustadt and Fineberg is the relationship between deadlines and decisions. The knowledge surrounding the H1N1 outbreak originating in Fort Dix, New Jersey, in 1976 was opaque at best, with potential of an outbreak possible but the probability unknown.³⁰ While Neustadt and Fineberg recognize this dilemma, they suggest that officials could have prevented an H1N1 outbreak without committing to the controversial decision of mass immunizations.

Sencer’s action-memorandum of March 1976,³¹ with its two-week go-or-no-go, actually obscured, not clarified, relationships between deadlines and individual decisions. Arguably, the decision to begin manufacturing (prepare recombinants and purchase eggs) was under such timing. But the decision to institute a mass immunization program was not.³²

The decision to move forward with rapid vaccine cultivation followed by a national immunization campaign is one of the most aggressive options in the prevention of a potential pandemic.

²⁹ Neustadt and Fineberg (1978:iv).

³⁰ Neustadt and Fineberg (1978:73).

³¹ Dr. David Sencer, former director for the Center for Disease Control, prepared an “action-memorandum” for his boss, assistant secretary of HEW Theodore Cooper, and ultimately for the president. The memorandum suggests the fourth of four choices, advocating a combined approach of vaccine creation and nationwide immunization (Neustadt and Fineberg (1978:127).

³² Neustadt and Fineberg (1978:72).

Policymakers were primarily concerned with the risk of another outbreak on par with that of 1918.³³ But with the advantage of hindsight, Neustadt and Fineberg challenge the decision to package the development of the vaccine with implementation of nationwide inoculation. If the government focused resources on developing the vaccine but refrained from instituting a nationwide vaccination campaigns, it is possible that cases of GBS could have been averted. Without a nationwide inoculation, however, the government ran the risk of insufficient coverage to contain potential spread.

But why, then, did Sencer and others decide to advocate for the nationwide distribution of the vaccine? One factor suggested by Neustadt and Fineberg is the ambiguity of the H1N1 virus due to the lack of scientific data relating to it.

A serious stake in the outcome ought to concentrate the mind on breaking down the issue and scrounging for anything that might inform judgment. If one has ‘scientific’ evidence from laboratory tests, one need not scrounge, but swine flu decisions are not like that. Expertise counts for a lot, but only by way of informing subjective judgment.³⁴

Due to the lack of hard data and the great fear of a new pandemic, contradictions emerged: scientists were uncomfortable expressing subjective estimates—which are less than scientific by their nature—and resented having to qualify their judgments, which would reveal their uncertainty. The solution to this problem suggested in *The Swine Flu Affair* was for policymakers to develop a series of questions and procedures to dictate a response to a newly emerging infectious disease. In Appendix E of *The Swine Flu Affair*, Neustadt and Fineberg propose a series of questions that they developed in response to the lessons they derived from this experience. The first question, focused on the threat to the United States, was “1. How likely is the new influenza strain to spread in the United States? What do you consider the likelihood of no outbreak, of sporadic outbreaks only, of an epidemic? Within what time[frame]?”

Thinking About Doing

In order to shed some light on how Sencer and others decided to endorse a rapid action plan bundling vaccine production and inoculation, Neustadt and Fineberg suggest an overall lack of “implementation analysis” that led to thinking “before-hand, allowing one to weigh, in the decision, estimates of some sort about difficulties, likelihoods and costs of going wrong.”³⁵

This overall lack of implementation analysis seems to be explained by the hierarchy of policymakers beginning with the CDC, graduating into the HEW, and on into the White House. Sencer and his boss, Assistant Secretary for Health Theodore Cooper, were both medical doctors. As doctors, they would have believed in preventive medicine. With this in mind, they moved to strongly endorse a plan for total protection from the possible pandemic with only some regard for possible negative consequences.³⁶ This left all the critical thinking to the policymakers in the offices of then HEW Secretary David Mathews and the White House. It was ultimately at these two levels where a

³³ The 1918 influenza pandemic claimed roughly 50 million lives worldwide.

³⁴ Neustadt and Fineberg (1978:73).

³⁵ Neustadt and Fineberg (1978:78).

³⁶ Neustadt and Fineberg (1978:78).

decision to heed the advice of the medical community, and to implement a policy of nationwide inoculation, was made. By recommending a combined approach, Sencer was advocating a plan that would most effectively protect against the main concern: pandemic H1N1. This was Sencer's primary concern as a doctor and head of the CDC (subsequently renamed the "Centers for Disease Control and Prevention" on October 27, 1992), but through focusing on the potential spread of H1N1, Sencer may not have considered all possible side effects. Neustadt and Fineberg explain this behavior:

Thinking about doing does not happen in a vacuum. It occurs in people's heads and is unlikely to illuminate save as it intersects something already there... But more attention to the do-able would almost certainly have altered emphasis and scope. So at least the hopeful light of hindsight makes it seem. Moreover, what could not be changed could surely have been watched.

Had Sencer, or Cooper for that matter, not focused so acutely on the fear of previous epidemics and pandemics, they might have been able to broaden their view on the issue to address other factors, including reevaluating their recommendations for policy to the HEW and White House by preparing for the worst but refraining from action until comprehensive information was collected regarding the outbreak and H1N1 virus itself. Of course, refraining from action bears its own risk. What if, indeed, the H1N1 outbreak had spread to pandemic levels? Neustadt and Fineberg emphasized the importance of this idea, arguing actions should not have been so hastily taken.

In our view, a version of Sencer's 'minimum' response—with stress upon an idea like 'we can't do more until we know more'—would have served the country well even if another swine flu outbreak had occurred.³⁷

But as department administrators and doctors, as opposed to public health and epidemiologists, Sencer and his team may not have possessed all the necessary tools to make informed decisions. Neustadt and Fineberg ultimately suggest that in order to strengthen the policymaking process, the HEW could have created a network of informed specialists that would aid the federal government in decision-making in the event of a public health crisis.

This leads us to the view that HEW could use an advisory group of political administrators from which panels could be drawn to help Assistant Secretaries and their agency heads think about prospective public interventions...we suggest a reservoir of talent, selected for practical knowledge not representation, from which panels are drawn when wanted.³⁸

Certainly, the conditions present in the mid-to-late 1970s have changed, but the lessons remain. As will be seen in the case of Mexico, this networked mattered in that country's successful handling of A/H1N1.

Thinking of the Media

³⁷ Neustadt and Fineberg (1978:76).

³⁸ Neustadt and Fineberg (1978:78-79).

A serious concern that emerged in 1976 during the H1N1 scare was the role the media played. During this time, information was presented by the media before the government was ready for it to be public and the differing viewpoints presented by the media created great frustration in the CDC, HEW, and White House. Officials were confused, even offended to a degree, that the news organizations were broadcasting information about the possible outbreak to the public. As Neustadt and Fineberg suggest, “Their need is to stop thinking about ‘shoulds’ (TV should convey our message as we conceive it) and to start thinking about what can reasonably be expected from the medium in given cases.”³⁹ But the HEW and CDC did not have any perspective on how the media would treat the event, as there were few, if any, staffers with any experience in media relations. “There was a glaring lack of institutional connections between medical professionals of every stripe and anybody knowing much of anything about the news profession...The Information Officer in PHS [Public Health Service, a major corps division of HEW] is said to have been street-wise; he was not consulted.”⁴⁰ Neustadt and Fineberg go on to describe the nature of the HEW press operations as being “decentralized,”⁴¹ which created a problem in dealing with the media on an unprecedented, national public health issue.

The 1976 H1N1 scare provided the HEW, and the U.S. government as a whole, with an important lesson in the growing role of the media, especially televised media. While policymakers were aware of the power of the media (following the 1972-74 Watergate scandal that led to the resignation of President Nixon), public health officials and doctors were ill-suited to address the issue of media relations. This became very clear when dealing with a possible pandemic where public knowledge and reactions were important to control. Recognizing the various failures and frustrations, Neustadt and Fineberg ultimately suggest that the HEW and CDC harness “thoughtful politicians or reporters once removed from daily news”⁴² to increase the proficiency of media relations.

Maintaining Credibility

The U.S. 1976 experience suggests that the decision-making process that occurred around the H1N1 outbreak raised the importance of maintaining credibility. Neustadt and Fineberg interviewed a TV network spokesperson in 1978, who commented:

CDC was almost the last Federal agency widely regarded by reporters and producers as a *good thing*, responsible, respectable, scientific above suspicion. This gave Sencer [and the CDC] terrific clout.... Even a hint that any one of them was blocking Sencer’s urgent memo would have been a big story...good guys (the best) against bad.⁴³

This observation sheds light on media relations and helps explain why the Ford administration so hastily accepted Sencer’s suggestion and put the vaccination plan into effect. Not only was the CDC considered to be the foremost authority on the issue, but the possibility of a backlash from the public after media questions of the CDC arose was a potential issue of its own. In the end, it may have been this unwavering faith in the CDC that ultimately proved problematic.

³⁹ Neustadt and Fineberg (1978:80).

⁴⁰ Neustadt and Fineberg (1978:79).

⁴¹ Neustadt and Fineberg (1978:81).

⁴² Neustadt and Fineberg (1978:80).

⁴³ Neustadt and Fineberg (1978:81).

However, it appears that Sencer and the CDC did not foresee the long-term issue of maintaining credibility. They were focused on the immediate responsibility of a potential pandemic. “Had they thought equally hard about the likely case in the longer ride—side-effects and suits but no pandemic—the issue of diminished credibility for CDC would have loomed large, hard to ignore.”⁴⁴ Sencer had, in essence, become a salesman. And the administration “wanted to be sold.”⁴⁵ As the argument climbed the ladder to the White House, it appeared everyone was endorsing Sencer’s initial assessment. Ultimately, Neustadt and Fineberg make a retrospective suggestion for Sencer to have maintained credibility and averted the failures in policy:

Sencer was not President. Yet as he did his work this may be a distinction without a difference. For he evidently thought it was his task to make his constitutional superiors do right no matter what they thought (and so he did). He also made them do it with but little time to think.

Legitimation by election, the embodiment of popular sovereignty, is a far cry from legitimation by professional training and consultation. The first is a political value, the second a scientific one. Not even *pro forma* is there any means to reconcile the two. Unlike the military, medical professionals do not have in their value system a ready rationale like “commander-in-chief.” Sencer pushed his bosses without stint. They were his constitutional superiors but that gave him no pause. Cooper aside, they were laymen. Sencer evidently held the not uncommon premise that the boobs could not be trusted to decide right on their own.

This we believe is what made him a salesman. On that premise he could not afford to take the opportunity we say he missed, could not allow himself to dawdle over either of the questions we propose—neither what’s the likely case over a longer time, nor what’s the risk to CDC’s reputation. Had he pursued them, either one, he soon would have been led to the more open stance of a technician serving up to his superiors the data for *their* judgment. We think this stance both prudent for his agency and proper in his role. Plainly he did not think so.

As a prerequisite to playing the technician’s role, a man in Sencer’s shoes has to accept the notion that the politicians may be boobs but it is they who were elected.⁴⁶ [original emphasis]

Taking this into consideration might not only have boosted the credibility of the CDC; it might have ultimately led to better planning and policy implementation toward the influenza outbreak, saving both money and lives. As Churchill once implored, science “should be on tap, but not on top.” By this he meant that scientists should advise, while policymakers should decide.

Thinking Twice About Medical Knowledge

⁴⁴ Neustadt and Fineberg (1978:82).

⁴⁵ Neustadt and Fineberg (1978:82).

⁴⁶ Neustadt and Fineberg (1978:82-83).

The last major area of reflection discussed in *The Swine Flu Affair* is the lack of understanding relating to the H1N1 influenza virus. Referring to it as a “slippery disease,” Neustadt and Fineberg discuss several troubling areas with regard to H1N1 monitoring.

1. [T]he changing character of the influenza virus, with spread and timing mortgaged to the processes of antigenic change about which there are painfully few documented observations ...
2. [T]he effectiveness of influenza vaccine is relatively short-lived ...
3. [I]nfluenza symptoms are widely misunderstood ...
4. [A]lthough [influenza] resides in the respiratory tract, it is by no means the only virus likely to be lurking there and may not be the major source of flu-like aches and fever ...
5. [T]he multitude of causes of flu-like illness makes it difficult to estimate the year-to-year impact of the influenza virus on public health.⁴⁷

In effect, in the mid-to-late 1970s, we did not know enough about influenza to confidently explain how it spreads nor were we able to identify, as is true of every virus, its symptoms accurately enough to single out the specific viral strain. We were not able to create an effective vaccine that is proven to provide adequate protection and minimal collateral harm to the human body. Why, then, did policymakers decide to move forward with such an aggressive campaign against a virus they knew so little about?

Comparing influenza to other federal immunization targets reveals just how “slippery” H1N1 was. Polio, smallpox, and measles were all well-understood diseases with well-researched vaccines when inoculation began.⁴⁸ But applying the same methodology of inoculation to influenza, and providing only a two-week period to decide how to do so, was the Ford administration’s major mistake. By presuming the worst of an influenza outbreak, they thought they were making a move to protect the public, but in reality may have overreacted and inadvertently caused casualties in the form of GBS. It is estimated that the increased risk of GBS from 1976 was one additional case per 100,000 vaccinated.⁴⁹ Forty million people received vaccines resulting in an estimated additional 400 cases of GBS.

While it would have been advisable to distinguish between vaccine creation and nationwide immunization by having the vaccine ready but stored in warehouses (not people), Neustadt and Fineberg suggest that once committed to a vaccine campaign, it would have been prudent for authorities to differentiate between those who were at greater risk and those who were not.

Workers who are not at risk of death may be greatly inconvenienced by the same vaccine. At this stage of medical knowledge, they and their physicians and employers are the ones we think should judge whether benefits of vaccination outweigh disadvantages.⁵⁰

⁴⁷ Neustadt and Fineberg (1978:83).

⁴⁸ Neustadt and Fineberg (1978:84).

⁴⁹ Questions & Answers: Guillain-Barré Syndrome (GBS) August 17, 2011, accessed October 3, 2011. Available: <http://www.cdc.gov/flu/protect/vaccine/guillainbarre.htm>

⁵⁰ Neustadt and Fineberg (1978:85).

Thus, retrospectively, targeting especially vulnerable populations could have been more prudent than to begin with a mass vaccination campaign.

MEXICO 2009

Political Aspects

Well-known flaws of the Mexican political system were evident during the A/H1N1 outbreak. Informality and lack of teamwork between government and international agencies, and inside of Mexican agencies, hampered the response to the outbreak. Low pay (in the \$1,000 range), often a cause of corruption, interfered with the productivity of civil service actors. Political agendas and party politics took precedence over the needs of the country. The findings below draw out lessons learned and good practices in the political realm that had a direct effect on the response to the A/H1N1 outbreak in Mexico in 2009. Briefly, lessons learned were that loyalty to political groups can trump bureaucracy (a rational-legal approach) and that informality and patronage rule in Mexico. This is a problem common in developing and middle-income countries where that trilateral cooperation and transparency were among the good practices identified.

Loyalty to Political Groups Trumps Bureaucracy, Informality, and Patronage Rule

Loyalty to certain political groups influenced Mexican politics because party interests superseded national interest. A rational and legal approach to policymaking was difficult to attain, and this stood in the way of a cohesive government response during the influenza outbreak.

The former director of epidemiology Mexican Government Official 8 [who was technically capable] had problems with the new administration and he had to leave, but during the outbreak he was asked to be an advisor. (Local Embassy Staff 4)

The post of director of epidemiology would be considered technocratic elsewhere, but in Mexico it became political. In other words, the civil service is politicized and appointments are made not on the basis of technical competence but on loyalty to the party.

The problem in Mexico is that there are groups and the new group is the group of 'PANistas' [*Partido Acción Nacional*] that was not really prepared. Health is a very technical issue, where you need to have very technical people. In other countries the people with technical knowledge stay, even when the heads change. (Local Embassy Staff 4)

This issue could be less of a problem in more technocratic ministries such as the Ministry of Health, which tends to suffer lower turnover than other Ministries. As was observed in the case of the director of epidemiology, however, the Ministry of Health is not immune, and there is still a need to professionalize the public service more generally. Even though personal relationships helped during the influenza outbreak (some of the key actors happened to know each other because of interaction over the course of several years), the fact that cooperation among the United States, Canada, and Mexico hinged on personal relationships might be a problem in the future, especially because of the lack of a professional public service in Mexico:

What happens when these people leave? Well, this poses an issue that is intrinsic to Mexican politics, which is that when you have a change of government you know that you'll have almost a wholesale change even if it's the same political party that wins ... This is a challenge that we have to face and we spend a year figuring out who is doing what. (Senior Embassy Staff 1)

Despite the aforementioned issues regarding party politics and loyalty, some interviewees believed the problem was not the political parties themselves, but in-fighting among the ministries. There was no coordination between the Ministry of Health, SAGARPA, Protección Civil, and the Ministry of Defense (Junior Embassy Staff 3). Loyalty to political parties was detrimental to the effectiveness of the A/H1N1 response in Mexico, and therefore is an obstacle in overall EID monitoring and response. As has been discussed thus far, civil service turnover following new administrations (every six years, since the President cannot be reelected) and failure to coordinate are common problems under the rubric of loyalty to political parties. It is a problem when a public health issue such as A/H1N1 becomes politicized, whether among politicians, ministries, or between the government and academics (discussed below). But the gravity of the A/H1N1 situation encouraged a public semblance of unity both among ministries and between the *Partido Revolucionario Institucional* (PRI) or Institutional Revolutionary Party and the *Partido Acción Nacional* (PAN) or National Action Party.

There were press conferences and you could see the government on TV every day ... It was clear that this was not only a health issue. Even the Federal District [which encompasses Mexico City], which is governed by a rival party and doesn't want the other party to look good showed a united face. (Donor Staff 11)

Relations between U.S. and Mexican institutions were important during the A/H1N1 outbreak, but personal connections such as that between Mexican Government Official 7 and Health Expert 12 proved invaluable. As Junior Embassy Staff 3 explains, "There wasn't really an institutional response. It was all personal connections, and Mexican Government Official 7 was behind everything."

Personal networks helped to get the correct person to bend U.S. Customs rules and allow the carrying of viral samples across the border from Mexico to the U.S., but the drawback was a reliance on arbitrary staff (someone who spoke English or knew somebody well in the U.S. or Canada). Institutionalization would likely prevent future problems, but in Mexico the idea is that there is "No need to institutionalize or trust organizations as long as you know who to call" (Junior Embassy Staff 3). In fact, patronage and personal connections were the sole route by which samples got to Canada first, as Junior Embassy Staff 3 explained: "It was easier for Mexico to contact the right people in Canada to make an exception than to locate the right person in the U.S. to get a sample through." Indeed, "Canada is less bureaucratic and the Embassy was minimally involved (in getting the samples to Canada), because the Mexican Ministry of Health has pretty good connections in Canada." (Senior Embassy Staff 1)

If the outbreak had started in the U.S., Mexican authorities would have probably been more flexible to receive the samples than vice-versa (Junior Embassy Staff 3). But as the first cases arose in Mexico, it was not long before these informal networks yielded help in the form of supplies and equipment from the U.S. The problem was that these informal networks, however effective at communicating and sharing across borders, did not operate within the normal confines of Mexican policy and procedure.

There were problems importing supplies and equipment to Mexico even though the President had issued an emergency decree. You cannot import things to Mexico without prior approval, and people at the border didn't know what the order covered. (Donor Staff 11)

Even though there was a decree, people at the border were afraid to let critical lab equipment enter without the right person calling to confirm that such equipment was indeed permitted and covered under the decree.

Personal connections did play a role. In order to let things in, people had to get hold of somebody you knew so they could figure out who they should call. [...] It didn't work the way it was supposed to work. (Donor Staff 11)

According to Mexican Government Official 7, in fact, the connections between INdRE and the Ministry of Health and their Canadian and American counterparts were completely institutionalized. Personal ties developed later, and their presence helped solve problems faster.

Relations are completely institutionalized and personal. Mexico has had these collaborations for the longest time. Every time a new director of INdRE comes along, they are going to be exposed to and will interact with the director of CDC. However, this is the first time in years that we have all these people collaborating in more personal ways, because it's not the same [...] if I don't know the person. Collaboration wouldn't be that easy and trust is important. (Mexican Government Official 7)

Trilateral Cooperation and Transparency

The influenza crisis underscored the importance of cooperation as another good practice, but there were also some lessons learned about sharing samples and vaccines. Mexico's government reacted by sharing all the information it had, even though there were issues with statistics at the outset. An April 30, 2009 graphic editorial (shown below) in the popular magazine, *Milenio*, shows the Minister of Health on television saying, "Of the 159 dead, 26 are infected by the virus and seven are confirmed" while a viewer notes "It seems that the virus first atrophies the capacity to do mathematical operations."



Source: *Milenio*, April 30, 2009.

International cooperation was not without its glitches. Canada helped with analyzing samples and responded quickly, giving doses of the vaccine when the U.S. was not able to share any of its stock with Mexico after the latter requested a few thousand doses for its health-care workers.

The U.S. helped with lab capacity, equipment, and technical people, but Canada was the easier country to which to send samples. A Mexican military plane delivered the samples after a phone call to health authorities there who could make arrangements on the Canadian side. In a baffling incident the day before, a sample had been sent to the U.S. but got stuck at the border while Customs officials on the U.S. side stopped the entry of an unknown “disease agent” (as required in Customs Declaration CBP Form 6059B under 19 CFR 122.27, 148.13, 148.110, 148.111, 1498; 31 CFR 5316 of OMB No. 1651-0009).

Mexico might not have been ready, but it had the elements to reach out to its neighbors in very little time. The director of INdRE has Health Expert 16 from Canada on speed-dial. They are great friends, and this doesn’t come from one meeting. These people know each other, they talk and plan together. That didn’t only work for INdRE, it worked for the Ministry of Health, too. We had an entire team of people that we had already worked with before ... International coordination went well right away, because we understood that this had to be done, so we went to our partners to see if they had more information. (Mexican Government Official 7)

Of course, this begs the question of what if the director of INdRE had not been great friends with Health Expert 16? Would the outcome have been different? One would hope not. From the US

perspective, the relationships were intensified in the aftermath of NAFTA: “Canada and the U.S. have a long history of working bilaterally in regulatory and protocol issues. A lot of these contacts with Mexico are recent... NAFTA created the opening and as issues arise, where people realize that cooperation is needed, that is when this particular area starts getting attention.” (Senior Embassy Staff 1) Among the most dangerous aspects of not just viral but all outbreaks are their spread and the challenge of tracking and quarantining posed to public health officials and government leaders. Knowing that a disease such as A/H1N1 does not stop at borders, cooperation among North American countries became important not only for goodwill toward Mexico, but also to ensure the successful isolation and treatment of the virus to prevent its proliferation.

The influenza outbreak was a good example of how transparency helped mitigate its destructiveness. Consequences could have been worse if Mexico had decided to remain silent about the outbreak and refused to reveal the extent of the outbreak or share viral isolates. It is even said that the President was given two choices early on in the outbreak: Mexico could be like China or Canada. China had gained notoriety for its unwillingness to be transparent in the face of outbreaks of SARS and H5N1. Canada, especially during a domestic SARS outbreak, had been a model of transparency. The President chose the Canadian approach.

There is a need to raise awareness that we are living in a new world. And sometimes there's more value in being transparent and being honest than there is in knowing all the facts and knowing all the truths [before being able to share them with the public or other nations]. (Mexican Government Official 7)

Arguably, the crisis also helped promote transparency in Mexico, since the highest political spheres (i.e. the President and the Minister of Health) decided to share considerable information accumulated with respect to the A/H1N1 outbreak.

Globalization in Mexico was not very popular, but globalization is not something that you choose, it's something that happens. In the political and diplomatic point of view, politicians were very willing to share information and very willing to admit that they didn't know what was going on at the beginning, but they were willing to say, “I don't know what's going on, but I'm trying to find out.” (Mexican Government Official 7)

In hindsight, it is clear that the efforts of local, national, and international actors to contain the A/H1N1 outbreak in Mexico were transparent, and this very likely aided the international effort to contain the outbreak and mitigate its destructiveness. This good practice presented a contrast to the view of a foreign diplomat (Senior Embassy Staff 2), whose country also suffered outbreaks of an emerging infectious disease and who, while praising Mexico's brave and transparent approach to reporting, said his own country could not take the same path.

Economic Aspects

Economic inefficiency was a factor in dealing with the A/H1N1 outbreak in Mexico in 2009. At the time of the outbreak there were insufficient labs for analysis, and those that were present were ill-equipped, limiting the quality and diversity of information they could gather. Planning was also a weak area. Public health and government officials were unprepared to make rapid decisions in response to the growing viral outbreak. In addition to a lack of planning and procedure, the sparsely populated and poor areas of the country that experienced the disease were hard to identify and treat

in a timely manner. The lack of economic resources undermined the effectiveness of an A/H1N1 response in Mexico and should be taken into consideration in the future. As a middle-income country, one would expect to find sufficient lab equipment to gather, study, and disseminate information pertaining to viral outbreaks. In reality, at the time of the A/H1N1 outbreak in 2009, Mexican authorities had access to only one advanced lab capable of performing sufficient research towards preventing the spread of the virus. As Junior Embassy Staff 3 noted, “Mexico is a middle-income country, but development is really uneven. Investment in science is lagging behind.” In contrast, Senior Embassy Staff 1 disagreed, “It is not a matter of lack of resources. Mexico is a wealthy country and when it wants to focus resources on something, it certainly can.” Indeed, both might be right.

Health is a priority of the Mexican Government, but almost all resources go to medical care, and very few resources are used for surveillance or early warning systems. (Mexican Government Official 7)

Development is uneven, as some fields are very advanced while others lack the proper funding and equipment, according to Scientific Expert 13. Government labs exemplify this inequality, as they exist with a severe deficit in income and distribution of knowledge.

Mexico was not prepared for a threat like influenza, but it is unfair to judge that, because no country expects something like that to happen, especially because influenza is not a common disease in Mexico. Some countries are more prone to the flu than others. SARS in Canada, for example, was the genesis to create the Public Health Agency of Canada. (Senior Embassy Staff 1)

There were labs in Mexico that could have analyzed the samples, but the procedure at the influenza lab was to use immunofluorescence first to detect the type of virus, and Polymerase Chain Reaction (PCR) later, since the latter was more expensive. To clarify, the PCR technique uses a device to amplify copies of genes so researchers can easily compare a sample taken from a sick person to the genetic material of a known virus, whereas immunofluorescence is a technique allowing the visualization of a specific protein or antigen in cells or tissue sections. The government has 31 labs, many of which are capable of PCR. But only the one advanced lab was utilized to use immunofluorescence (Mexican Government Staff 10).

Some PCR tests were done, some journals and World Health Organization reports said that we didn't really have the test, but that is absolutely not true. The machine was set up in INdRE. However, it was not the first technique of choice, because it is very expensive. (Mexican Government Official 7)

INdRE used to receive around 2,000 influenza samples to test every year. During the outbreak, they received 1,000 samples a day.

What we didn't have was the capacity to test a thousand samples a day ... Our preparedness plan had been published in 2006 and then it was revised, but it had not really come into place and we were thrown into phase 5 of the pandemic just right away and we had to adjust during that time ... It was useful to have the preparedness plan and it was also useful to already have the contacts and to be able to call people.

Of course there were things in the coordination that didn't go so well because people had changed and roles had changed. (Mexican Government Official 7)

Mexico's failures and frustrations in dealing with the A/H1N1 outbreak appear to be due to a lack of adequate coordination of resources.⁵¹ With an already sizable budget directed at public health, it seems that more money would have only had a marginal impact. Better planning and coordination would have made the biggest difference on Mexican lab capabilities.

Lack of Confidence in Mexican Capacity: Real or Imagined?

The Mexican Academy of Science argued that the government did not trust them enough to ask for their help during the outbreak. On the other hand, during a crisis, decisions with huge political and social ramifications must be made very quickly. From the position of a foreign embassy, the decision makers did not have the luxury of time to reach out broadly at a domestic level, so they went for the easiest and most trusted options, sending samples for analysis to the U.S. and Canada. This mentality manifests itself in what Senior Embassy Staff 1 refers to as an "inferiority complex," explaining the lack of trust between the government and academia:

There is a sense that if you want the best you go to the U.S. or Europe. We don't have it here. It is a reflex a lot of people have ... Now that the crisis has settled down, they have the opportunity to look around, take a breath, and do a bit of analysis and make an effort to reach out domestically. (Senior Embassy Staff 1)

Mexico was not really prepared for the outbreak. Mexico did not trust the scientists with what was going on. Mexico relied on international commitments and connections to get the U.S. and Canadian cooperation. How can you act without having the scientific support of the national Academia? ... The Mexican Academy of Science complained about the lack of confidence in our science, because there are scientists who could do the job yet the government just sent the samples abroad. (Local Embassy Staff 4)

INdRE didn't expect any participation from the universities. Maybe they should have. The coordination was there from the lab part, but it was really competitive, and in a crisis like that you become hesitant to be as open and inclusive. The question is how to include them, but that has to change in the future. Academic institutions need to be included. (Mexican Government Official 7)

When the government found out about the outbreak of A/H1N1, there was a lot of confusion about the various cases, and it was hard to organize the information.

There was information coming in from doctors about cases, but there wasn't a very good system for the data to go up to the decision makers. There was also a lack of capacity to analyze the information. (Donor Staff 11)

⁵¹ The extreme funding problems in Cambodia, and to a lesser extent in Indonesia, discussed in Ear (forthcoming) are not so serious in Mexico.

The first days were a mass of confusion and a transition phase, until the right people were found to deal with the crisis and these people managed to organize things (Mexican Government Officials 7 and 8). Mexican Government Official 7 believed that the confusion during the first days was due to too many advisors who came to Mexico and got into the Ministry of Health claiming to be top influenza experts. The experts were not very helpful, but people had to deal with them, because they were very close to the President. While it would have been ideal to utilize the local scientific network, the confidence in the Mexican scientific community was not present. As a result, dealing with a potential pandemic forced Mexican policy-makers to seek scientific advice from trusted sources.

Surveillance and Resources: Human vs. Animal

During the A/H1N1 outbreak, Mexico possessed defective or non-existent surveillance for monitoring mechanisms for infectious diseases. Despite having an action plan to fight against external health threats, the Mexican government was caught off guard by the A/H1N1 outbreak. As Local Embassy Staff 4 described it, “In order to build an early warning system to detect disease outbreaks, there’s not only a need for money. It is also a matter of commitment and international collaboration.”

There was likely no intention to implement the established guidelines or enforce such a plan, as no real risk of such an incident was perceived.

The surveillance for influenza was never given much importance until SARS. Surveillance began after the outbreaks of Avian Influenza. Then, Mexico started to do what all the other countries around us were doing, especially the U.S. Right now there is not an agency fully dedicated to emergency preparedness. We are working towards building that, and we are thinking that eventually it will happen, but at this point there is no emergency preparedness agency. (Mexican Government Official 7)

Moreover, the assumption had been that any outbreak would very unlikely originate from North America, much less Mexico, as Asia had been the epicenter of SARS and H5N1. The imagined scenario was that pandemic preparedness would involve controlling the spread of a disease originating from Asia (or elsewhere) for which a diagnosis would already have been made weeks or days in advance by labs in places other than Mexico (likely North America or Europe), and that this knowledge would be shared with Mexico. Mexico, in other words, would not be where patient zero would originate. This was turned on its head with A/H1N1.

Before A/H1N1, the surveillance of certain diseases was not a priority for the country. After several outbreaks had an impact on the Mexican economy, however, the surveillance of animal diseases became important. Some of the most important outbreaks were:

- Foot and Mouth Disease between 1948 and 1954, when over one million head of cattle had to be quarantined and killed
- Highly Pathogenic Avian Influenza (H5N2) in Puebla and Queretaro, where over 18 million birds were culled in 1994 and 1995 respectively.⁵²

⁵² Villareal, C. “Avian influenza in Mexico,” *Rev. sci. tech. Off. int. Epiz.*, 2009, 28 (1), 261-265, accessed October 3, 2011. Available: <http://www.oie.int/doc/ged/D6192.PDF>

- Screw-worm outbreaks in Chiapas in 2001 and 2003

These outbreaks led the government to invest in lab capacity and in different measures to monitor animal diseases. SAGARPA, under the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food, has over 16 labs countrywide and two more BSL level 3 labs are under construction. With over 50 years of experience in the surveillance and early detection of animal diseases, SAGARPA is in constant collaboration with other ministries, including the Ministry of Health and the Ministry of Environment. Since SAGARPA has had more experience in the prevention and surveillance of diseases—driven in large part by Mexico’s export of livestock to the United States—it has established cooperation agreements with universities all over the country. Veterinary Experts 14 and 15, who do not work for SAGARPA, agreed that animal health in some ways is actually better than human health because of exports.

But despite the leadership shown by SAGARPA towards EID research and prevention, funding has not always been adequate. Public health has always been a priority for the government, but this has taken the form of investing in hospitals and health care with little funding allocated for EID research and surveillance. When the 2009 influenza outbreak appeared, Mexico was not prepared to deal with human diseases as emergency plans presupposed that the disease would come from outside, which would give the country at least two weeks to organize and implement an emergency preparedness plan. Mexican Government Official 7 said as much: “Once the pandemic hits we will have two weeks to get everything working. What Mexico was not prepared to do was to jump from phase 1 to phase 5.”

SAGARPA has a very good early surveillance system, and regulations on bio-safety are very strict. There are 187 private laboratories that are a part of or are associated with different farms, which can detect diseases. There are also public labs that supervise the farms. SAGARPA works with different universities to train biologists, zoologists, and veterinarians on how to react during an outbreak. Other strategies of SAGARPA include:

- Verification routes through the different regions of the country
- Risk evaluation campaigns
- Timely detection of diseases
- Research collaboration with different institutes
- Bio-safety assessment programs in farms

The policies of SAGARPA have worked, and big farms in Mexico comply with the norms. Backyard farms, on the other hand, do not, and they are common in rural and poor areas. These farms are a big risk and can be the source of many diseases, but poverty and inequality are a fact in Mexico. As stated by Senior Mexican Official 6: “In some farms, pigs live better than people.”

Cultural Aspects

Mexico has an array of cultural characteristics that had a direct effect on the outcome of the 2009 A/H1N1 outbreak. Because of a culture of self-medication, there were problems tracking and treating those infected early on. This tendency of Mexican citizens to treat themselves without pursuing professional medical assistance is very common and helps explain high mortality rates. Senior Embassy Staff 1 underscored this problem, expressing concern about people infected with

A/H1N1 coming too late into emergency rooms for care. Seeking assistance early on greatly increases the effectiveness of treatment. “The first cases of flu were not taken seriously enough, because of the self-medication culture. People only went to the hospital when the disease was in a late stage and was already deadly. That’s also probably one of the reasons why poor people died the most.” (Junior Embassy Staff 3) Additionally, technical collaboration between Mexican and U.S. and Canadian authorities is sometimes difficult due to language barriers. “The INdRE received a guidance document from the CDC, but it wasn’t useful because it was in English. Also the manuals are in English ... It was an advantage that Mexican Government Official 7 spoke English.” (Local Embassy Staff 4) Embassy Staff 5 had to translate technical manuals and help the Mexican technicians understand what they were supposed to do with PCR equipment sent from America. But cultural factors for disease prevention run deeper in Mexico than just a lack of English or unwillingness to seek medical assistance. A culture of informality in the workplace, a lack of professionalism, and an absence of prevention as a practice all had direct roles in the 2009 A/H1N1 outbreak.

Planning and Understanding

Influenza had never been a priority for the Ministry of Health because there were more prevalent diseases in Mexico affecting the population. At the time of the outbreak, INdRE dealt with two other outbreaks and did not think the influenza outbreak was an issue that deserved more attention. Junior Embassy Staff 3 noted, “They plan for things that are common like earthquakes, hurricanes [...], but they don’t have a lot of pre-planning in comparison from what we have in [our country].” This was further exacerbated by a lack of understanding of early warning as a concept.

Mexican technicians are not familiar with the concept of early warning. They think that the surveillance of certain diseases is an early warning mechanism and that they should only report strange findings to their superiors once they have fully figured out what they are dealing with. (Mexican Government Official 7)

While the timing of the response from the Mexican government was adequate, they were caught off guard and were forced to react instead of being proactive. As Junior Embassy Staff 3 noted, “they never expected having to do all the research themselves.” Preparations and response structures were guided by U.S. strategy, but there’s no Emergency Preparedness Agency at the Ministry of Health. The Ministry of Health did have a plan, but surveillance of the outbreak was weak and there were few definite answers. “Our surveillance was not that strong at the moment. We guided ourselves from other experiences, and our plan was built on that.” (Mexican Government Official 7)

The Mexican health authorities exchanged thoughts with some international partners. For example, Mexican health officials took advantage of prevailing technology to conduct a videoconference with international partners to discuss the increase of influenza-like cases. It should be noted that the U.S. was not alarmed at this time.

Our surveillance system is not a real-time system. At the beginning of February and more towards March 2009, we started getting more reports on outbreaks of respiratory diseases. That was a little bit puzzling to us. What we did in the first place was to open that situation for comments and none of the southern countries answered. The U.S. mentioned some outbreaks, but they were not worried about it. (Mexican Government Official 7)

The surveillance system started to show that there were pneumonia-like cases in hospitals, but there were no notifications sent through formal channels. Instead, information spread much more quickly through informal networks of doctors and other health-care professionals. Mexican government Official 9 received no formal notification of the rise in pneumonia cases but instead heard from friends who worked in different hospitals. At that time, other cases in the Imperial Valley of California, and the Mexican cities of Calexico and Mexicali were confirmed, and after the case of the social worker in Oaxaca, the authorities started to suspect that they were dealing with SARS.

A social worker developed pneumonia very rapidly and then died. And when that happened the state health department said it was a case of SARS. They tested for the virus, but didn't find SARS. Then when we looked into the evidence we tested again and had the same thing, but we still didn't understand why she died so fast ... At that point our political leaders were telling people that we were seeing an intensification in respiratory diseases, but until now, all that we've ever found is influenza. (Mexican Government Official 7)

Workplace Culture

The workplace culture present in Mexico had a direct effect on those trying to learn about and combat the outbreak of A/H1N1. The Mexican government is hierarchical and involves very strict vertical lines where people are expected to obey the orders and opinions of their supervisors without question. When CDC employees were sent to Mexico to help, they were surprised that it was not customary for underlings to ask questions of their supervisors.

They were here to provide technical expertise on how to use the results to know which cases were flu and which were not flu at all. [...] What I found was that the trainees were talking among themselves, but were not asking the people who knew. My sense is that gender and culture have something to do with it. It was not only the language ... We need to promote a culture where people can question the manager and ask questions instead of just having to follow instructions ... They (the technicians at the lab) are very qualified, dedicated professionals, but they are stuck in a system that doesn't respond to them. (Embassy Staff 5)

As Embassy Staff 5 noted, lab chiefs "were more political people than technical people," yet they did not lobby for the interests of the labs in the political sphere. As a result, there are trained and prepared technicians in poorly equipped laboratories. High-level politicians are not receiving information or input from lower level officials or are not listening to them. On the other hand, people with technical knowledge cannot deal with political issues above their pay grade, making it difficult to get the resources needed to improve the lab equipment.

It is also necessary to foster a new working culture where people know they don't have to be 100% sure that something strange is going on to report it. Not knowing the answer before posing the question is OK:

It is OK not to know what is going on at the beginning. You have to be sure of what you are reporting to the system. If you don't know what's going on, don't bother reporting it. You need to make sense out of it, instead of just alerting. That leaves out

the opportunity to detect that something new or different is going on. Epidemiological intelligence needs to come from all sources. Epidemiologists in Mexico are not trained to think that way, they follow and survey certain diseases and think that's early warning. (Mexican Government Official 7)

A lesson learned is that laboratories could have reported that the immunofluorescence procedure was not working on the virus, and after seeing that this was happening in many laboratories, they might have concluded earlier that they were dealing with a new virus.

5. Conclusion

The comparison of Mexico's experience with A/H1N1 in 2009 and the U.S. experience with H1N1 in 1976 provides notable strengths and weaknesses that can be used as a starting point of discussion when considering other developing and middle-income countries as they work toward effective emerging infectious diseases surveillance.

Strengths

For Mexico, the greatest achievement was effective cooperation with other nations, particularly the U.S. and Canada, and a practice of transparency. These were an organic product of the professional relationships of the scientific communities in Mexico and other countries. Informal networks present, absent institutional ties, saved the day.

An additional success for Mexico—something the U.S. faltered on in 1976—was effective management of public and media relations. By maintaining transparency, and a united political front, Mexico was able to mobilize the public and effectively disseminate public health information. Uneven economic development was a barrier that prevented full dissemination to the more rural areas of the nation, but on a larger scale, public safety and public relations were handled relatively well.

On the 1976 U.S. front, the speed and efficiency of the mobilization against the virus was laudable. Although the program as a whole was seldom praised, the unity of the science and political communities demonstrated the national ability to respond to the situation. In parallel, Mexico also effectively responded to the situation, but Mexico notably had a preparedness plan for such pandemic/bio-safety threat, which highlights the importance and necessity of planning in advance.

The preparedness plan needs to be comprehensive, but is based on simple issues: logistics, administrative structure, and information. Questions to address in developing the plan can include: Is there a national database on the virus at hand? Is there a network/panel of specialists that the government can pull to their aid? Who is maintaining this network? Are there designated transportation routes and potential central facilities to hold vaccines? Is there a designated individual who reviews the plan? These are basic questions that should form the foundation of any pandemic preparedness plan, and which were components in Mexico's effective overall strategy.

Weaknesses

In the U.S. case, the major weakness was the culmination of the program into a single go-or-no-go

decision instead of splitting the decision into smaller action tasks or phases of implementation from which decisions could then be made. What made this situation more difficult was the unquestioning support of the CDC decision to execute a massive immunization campaign. Political actors rarely have such unity of effort or single operating picture, so while science “should be on tap but not on top,” as Churchill famously said, the situation in which then President Ford and CDC Director David Sencer acted under was reasonable considering the circumstances.

An important element that will be especially important to countries developing EID surveillance tools is the issue of politics. Mexico, despite its overall success in handling A/H1N1, had myriad political weaknesses that hampered efforts against the disease. One element was that loyalty to political groups was prized above competence. With this, individuals qualified for their positions are perennially moved or must leave when there is a change in government, causing the loss of valuable institutional knowledge and relationships. The transition process of a new administration also invariably takes up significant time.

And, most challenging of all, is culture. Addressing cultural issues in the workplace will prove especially vital in improving national lab capacity. The workplace culture in Mexico did not provide for a sufficiently flexible system for noting abnormalities in patients and prevented the identification of A/H1N1 as problem early on. Additionally, inefficiencies can be eliminated if lab employees are given the freedom to question situations and are provided with the hardware and tools for executing their duties. Needless to say, they are underpaid for an OECD member country, but receive far more than they would in a country like Cambodia and to a lesser extent Indonesia.

Annex A: Centralization, Decentralization, and Geography: Mexico, Indonesia, and Canada

At the central level, the government had the expertise to analyze the virus. If the Health sector had been decentralized, as happened in Indonesia following President Suharto's downfall (see Ear, forthcoming), it would have likely taken longer to identify the problem. Therefore, in this case centralization was an advantage:

Centralization in this case was a good thing because the president was able to have all the governmental infrastructure available for the pandemics ... During the outbreak it was an advantage, because the secretary of health and president Calderon were able to order and to ask for the health facilities from Pemex [aka Petróleos Mexicanos, the Mexican state-owned petroleum company], from the states, from the Defense and from the Navy, to open their health facilities in case that was necessary and also to order all the ministries to support that outbreak. It was a special order to allocate resources in case they were necessary. (Local Embassy Staff 4)

Some states have their own health departments and some work better than others ... Decentralization can lead to disorganization. The states don't count the stocks or anticipate what they will need. Some states are better than others in tracking what they'll need and it's the same with the surveillance. (Donor Staff 11).

Centralization has weakened since the PRI lost the presidency of Mexico after more than 70 years of rule, but it is surprising how well people accepted the measures adopted by the government during the outbreak, especially in urban areas. However, the farther away one went from urban areas, the less people complied with these measures. Interviews suggest that a centralized government is advantageous for addressing EIDs through increased communication, knowledge sharing, and a unification of efforts.

Some of the patients that needed medical attention were unable to receive it, not because it was not available, but because geographical elements prevented medical professionals from locating and traveling to assist them. This experience was mirrored by Canada's encounter with SARS and Indonesia's experience with H5N1 where patients were spread widely over sparsely populated and mountainous areas (and islands in Indonesia's case).

There were other kinds of plans that included hospitals that could be built in hours. In the past five years, there was actually a very intensive effort to build support and capacity in medical facilities. However, the human elements don't match up. We don't have enough people to distribute them around the country to overcome geographic distance. (Mexican Government Official 7).

Mexico sent medical professionals to very remote communities to take care of people, but there were simply not enough skilled people to overcome the problem. When they realized that the response had to be fully embraced in every state, the national government received a diverse and comprehensive response from healthcare providers. There was political will and no resources were spared, but there were not enough medical professionals to send to all the needed remote areas.

Annex B: Generic Title⁵³ and Unique Identifier

| Position and Code |
|-------------------------------|
| Senior Embassy Staff 1 |
| Senior Embassy Staff 2 |
| Junior Embassy Staff 3 |
| Local Embassy Staff 4 |
| Embassy Staff 5 |
| Senior Mexican Official 6 |
| Mexican Government Official 7 |
| Mexican Government Official 8 |
| Mexican Government Official 9 |
| Mexican Government Staff 10 |
| Donor Staff 11 |
| Health Expert 12 |
| Scientific Expert 13 |
| Veterinary Expert 14 |
| Veterinary Expert 15 |
| Health Expert 16 |

⁵³ To protect personally identifiable information.