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Immunization Newsletter

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Current Situation of Influenza A(H1N1)

This special edition of the *Immunization Newsletter* aims to provide readers with a single reference document in which the current status and knowledge of the new influenza A(H1N1) can be found. Since the data are constantly changing, this issue also provides resources and references for readers to obtain updates.

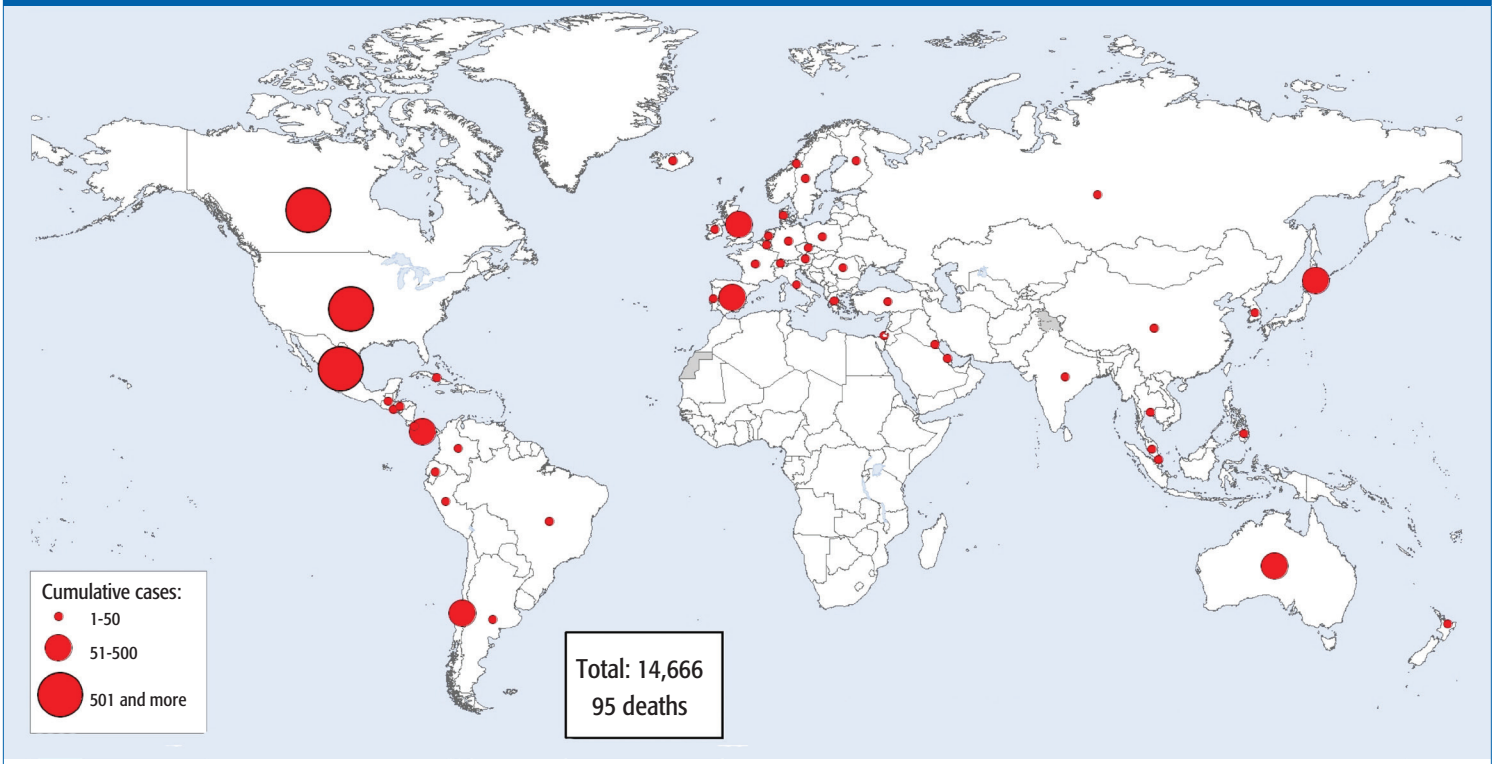
Although suspect cases occurred in Mexico as early as February 2009, influenza A(H1N1) was first confirmed in the United States on 21 April and Mexico on 23 April. On 25 April 2009, the World Health Organization (WHO) declared there was an emergency of public health concern.

As of 27 May, 14,666 cases were confirmed from 50 countries (Argentina, Australia, Austria, Bahrain, Belgium, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cuba, Czech Republic, Denmark, Ecuador, El Salvador, Finland, France, Germany, Greece, Guatemala, Honduras, India, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Malaysia, Mexico, Netherlands, New Zealand, Norway, Panama, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Russia, Spain, Singapore, Sweden, Switzerland, Thailand, Turkey, United Kingdom, USA) and 95 deaths (1 in Canada, 1 in Costa Rica, 83 in Mexico, 10 in USA). Updated data are available at http://www.who.int/en/.

On 27 April, WHO's Director-General declared Phase 4 on the WHO pandemic ranking scale. The level was raised to Phase 5 on 29 April. Phase 5 is characterized by sustained human-to-human community spread of the virus into at least two countries in one WHO Region. As defined by WHO, the phases are related to the spread of the disease rather than its severity (see page 2 for a full description of pandemic alert phases).

Vaccination remains one of the best tools to prevent an epidemic or pandemic. At this time, there is no vaccine for influenza A(H1N1), although one is expected to be developed within a 5-to-6 month period. It is also important to note that the seasonal flu vaccine does not offer substantial protection against influenza A(H1N1). ■

Figure 1. New Influenza A(H1N1): Number of Laboratory-confirmed Cases as Reported to WHO



Source: World Health Organization (data as of 27 May 2009).

WHO Pandemic Alert Phases

The Global Influenza Preparedness Plan of the Wold Health Organization (WHO) defines the use of a six-phased approach to facilitate incorporation of new recommendations into existing national preparedness and response plans. The WHO has revised the grouping and description of pandemic phases to try to make them easier to understand, more precise, and based upon observable phenomena.

The classification of pandemic alert phases is based on geographic spread of the disease. It is not based on the severity of the disease. Each phase will require a different set of actions to be implemented.

In nature, influenza viruses circulate continuously among animals, especially birds. Even though such viruses might theoretically develop into pandemic viruses, in **Phase 1** no viruses circulating among animals have been reported to cause infections in humans.

In **Phase 2** an animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans.

In **Phase 3**, an animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver. For phases 1-3, there has been predominantly animal infection and few human infection.

Phase 4 is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause "community-level outbreaks." The ability to cause sustained disease outbreaks in a community marks a significant increase in the risk for a pandemic. Any country that suspects or has verified such an event should urgently consult with WHO so that the situation can be jointly assessed and a decision made if a rapid pandemic containment operation is warranted. Phase 4 indicates a significant increase in risk of a pandemic but does not necessarily mean that a pandemic is a forgone conclusion.

Phase 5 is characterized by human-to-human spread of the virus into at least two countries in one WHO Region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.

Phase 6, the pandemic phase, in addition to the criteria defined in Phase 5, is characterized by community level outbreaks in at least one other country in a different WHO Region. Designation of this phase will indicate that a global pandemic is under way.

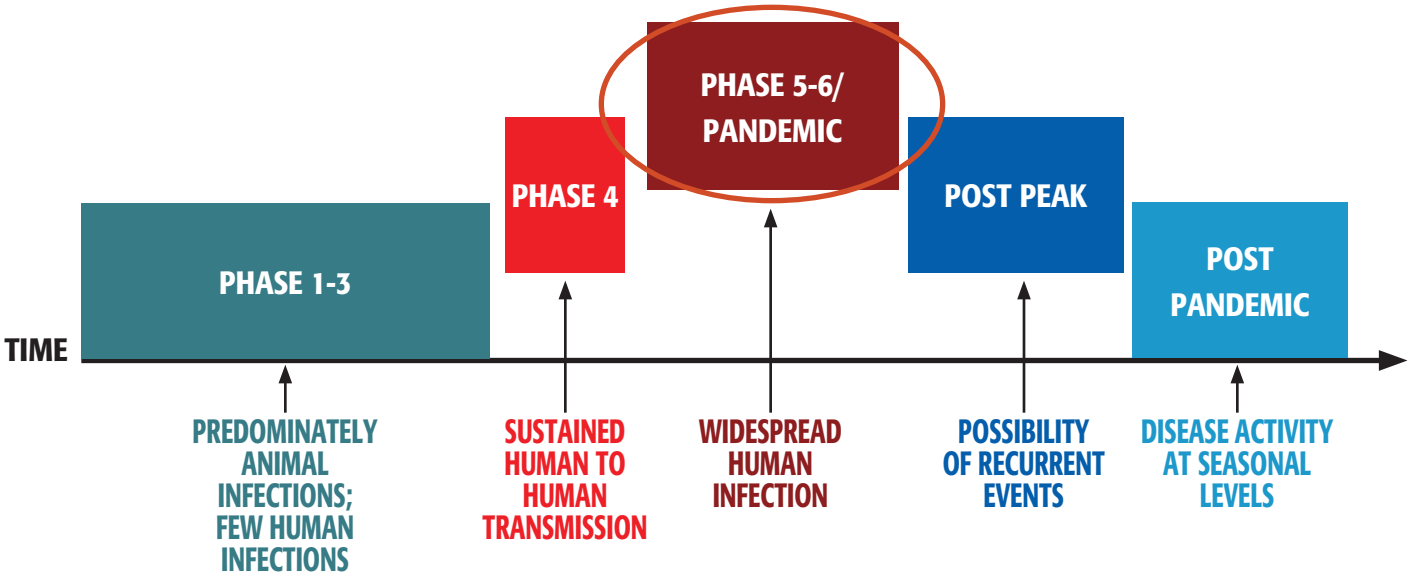
During the **post-peak period**, pandemic disease levels in most countries with adequate surveillance will have dropped below peak observed levels. The post-peak period signifies that pandemic activity appears to be decreasing; however, it is uncertain if additional waves will occur and countries will need to be prepared for a second wave.

Previous pandemics have been characterized by waves of activity spread over months. Once the level of disease activity drops, a critical communications task will be to balance this information with the possibility of another wave. Pandemic waves can be separated by months and an immediate "at-ease" signal may be premature.

In the **post-pandemic period**, influenza disease activity will have returned to levels normally seen for seasonal influenza. It is expected that the pandemic virus will behave as a seasonal influenza A virus. At this stage, it is important to maintain surveillance and update pandemic preparedness and response plans accordingly. An intensive phase of recovery and evaluation may be required. ■

Adapted from *Current WHO phase of pandemic alert* available at http://www.who.int/csr/disease/avian_influenza/phase/en/)

Figure 1. Pandemic Influenza Phases



Source: World Health Organization (http://www.who.int/csr/disease/avian_influenza/phase/en/).

Glossary	
Endemic:	A term to describe levels of infection which do not exhibit wide fluctuations through time in a defined place.
Epidemic:	A rapid increase in the levels of an infection. Typical of acute infection (with long lasting immunity and short generation times), an epidemic is usually heralded by an exponential rise in the number of cases in time and a subsequent decline as susceptible numbers are exhausted. Epidemics may arise from the introduction of a novel pathogen (or strain) to a previously unexposed (naive) population or as a result of the increased number of susceptible individuals some time after a previous epidemic due to the same infectious agent.
Pandemic:	An epidemic widely distributed in space.
Flu:	A contagious respiratory illness caused by influenza viruses that infect humans and various animals, including dogs, birds, and pigs. The flu can cause mild to severe illness, and at times can lead to death. There are three main types of influenza (flu) virus: types A, B, and C.
Antigenic drift:	The result of continuous random mutations of the genome over time.
Antigenic shift:	It most commonly occurs when relatively large segments of the genome of different viruses undergo recombination.
Swine Flu:	A strain of the flu that causes illness in pigs.

World Health Organization Influenza A(H1N1) Case Definitions*	
Clinical Case Description:	Acute febrile respiratory illness (fever >38°C.) with the spectrum of disease from influenza-like illness to pneumonia.
Probable Case of Influenza A(H1N1) Virus Infection:	An individual with an influenza test that is positive for influenza A, but is unsubtypable by reagents used to detect seasonal influenza virus infection OR an individual with a clinically compatible illness or who died of an unexplained acute respiratory illness who is considered to be epidemiologically linked to a probable or confirmed case.
Confirmed Case of Influenza A(H1N1) Virus Infection:	An individual with laboratory-confirmed influenza A(H1N1) virus infection by one or more of the following tests: real-time RT-PCR, viral culture, four-fold rise in influenza A(H1N1) virus-specific neutralizing antibodies. The test(s) should be performed according to the most currently available guidance on testing.

* Interim WHO guidance for the surveillance of human infection with swine influenza A(H1N1) virus. 27 April 2009. Epidemic and Pandemic Alert and Response: Influenza A(H1N1) guidance documents. Available at: http://www.who.int/csr/resources/publications/swineflu/en/index.html.

Pandemics and Pandemic Threats Since 1900

History suggests that influenza pandemics have probably occurred during at least the last four centuries. Since 1900, three pandemics and several pandemic threats have occurred.

1918 (Spanish Flu): The Spanish influenza pandemic is the catastrophe against which all modern pandemics are measured. It is estimated that approximately 20 to 40% of the world population became ill and that over 50 million people died. One of the most unusual aspects of the Spanish flu was its ability to kill young adults.

1957 (Asian Flu): In February 1957, the Asian influenza pandemic was first identified in the Far East. Unlike the virus that caused the 1918 pandemic, the 1957 pandemic virus was quickly identified, due to advances in scientific technology. Vaccine was available in limited supply by August 1957. By December 1957, the worst seemed to be over. However, during January and February 1958, there was another wave of illness among the elderly. Although the Asian flu pandemic was not as devastating as the Spanish flu, 1 to 4 million people died worldwide.

1968-1969 (Hong Kong Flu): In early 1968, the Hong Kong influenza pandemic was first detected in Hong Kong and killed an estimated 1 million people worldwide.

1976 (Swine Flu Threat): When a novel virus was first identified at Fort Dix, New Jersey (USA), it was labeled the "killer flu." Research on the virus later showed that if it had spread, it would probably have been much less deadly than the Spanish flu.

1977 (Russian Flu Threat): In May 1977, influenza A(H1N1) viruses isolated in northern China spread rapidly and caused epidemic disease in children and young adults (<23 years) worldwide. Because illness occurred primarily in children, this event was not considered a true pandemic.

1997 and 1999 (Avian Flu Threat): The most recent pandemic threats occurred in 1997 and 1999. In 1997, at least a few hundred people became infected with the avian A (H5N1) flu virus in Hong Kong and 18 people were hospitalized. Six of the hospitalized persons died. In 1999, another novel avian flu virus, A(H9N2), was found that caused illnesses in two children in Hong Kong. Although both of these viruses have not gone on to start pandemics, their continued presence in birds, their ability to infect humans, and the ability of influenza viruses to change and become more transmissible among people is an ongoing concern. ■

Adapted from Pandemics and Pandemic Threats since 1900. Available at: http://www.pandemicflu.gov/general/historicaloverview.html

Facts About Influenza Infection, Vaccination, and Treatment

The Disease

Influenza A(H1N1) is a respiratory disease of pigs caused by type A influenza viruses. Outbreaks of swine flu happen regularly in pigs. People do not normally get influenza A(H1N1), but human infections can and do happen. Most commonly, human cases of the disease happen in people who are around pigs, but it is also possible for swine flu viruses to spread from person to person.

The symptoms of influenza A(H1N1) in people are similar to the symptoms of regular human flu and include fever, cough, sore throat, body aches, headache, chills, and fatigue. Some people have reported diarrhea and vomiting associated with H1N1 flu. In the past, severe illness (pneumonia and respiratory failure) and deaths have been reported with H1N1 flu infection in people. Like seasonal flu, H1N1 flu may cause a worsening of underlying chronic medical conditions.

The Virus

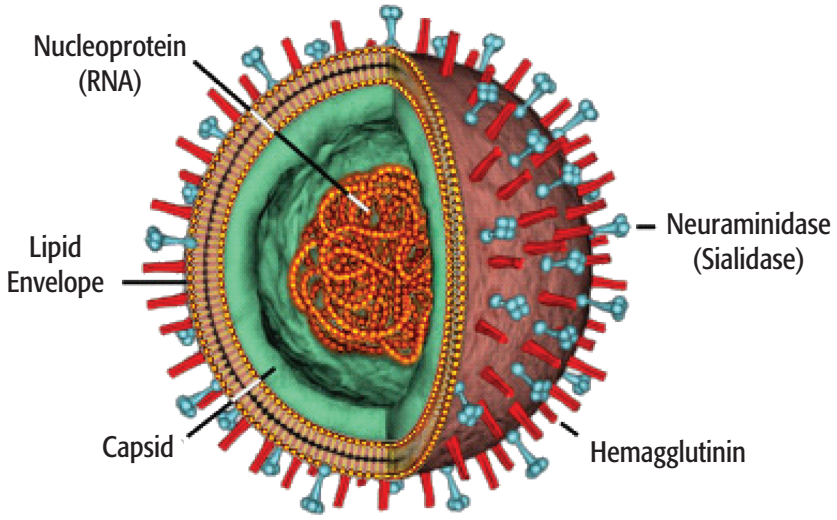
There are three types of influenza viruses: A, B and C. Influenza type C infections cause a mild respiratory illness and are not thought to cause epidemics.

Influenza A and B viruses are responsible for seasonal flu epidemics each year. Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus: the hemagglutinin (H) and the neuraminidase (N) (Figure 1.) The current subtypes of influenza A viruses found in people are A(H1N1) and A(H3N2). Over the course of a flu season, influenza type A and B and subtypes of influenza A viruses can circulate and cause illness.

Influenza viruses are constantly changing. They do so in two different ways. One is called antigenic drift. Antigenic drift is the result of continuous random mutations of the genome over time. It produces new virus strains that may not be recognized by the body's immune system. This process works as follows: a person infected with a particular flu virus strain develops antibody against that virus. As newer virus strains appear, the antibodies against the older strains no longer recognize the "newer" virus, and reinfection can occur.

The other type of change is called antigenic shift. Antigenic shift most commonly occurs when relatively large segments of the genome of different viruses undergo recombination. Shift results in a new influenza A subtype. When shift happens, most people have little or no protection against the new virus. While influenza viruses are changing by antigenic drift all the time, antigenic shift happens only occasionally. Type A viruses undergo both kinds of changes; influenza type B viruses change only by the more gradual process of antigenic drift.

Figure 1. Influenza Virus Anatomy



Source: Molecular Expressions™. Reproduced with permission of the copyright owners (Michael W. Davidson & The Florida State University Research Foundation).

Influenza A viruses are found in many different animals, including ducks, chickens, pigs, whales, horses and seals. Influenza B viruses circulate widely only among humans.

Pigs can be infected with both human and avian influenza viruses in addition to swine influenza viruses. Infected pigs get symptoms similar to humans, such as cough, fever, and runny nose. Because pigs are susceptible to avian, human, and swine influenza viruses, they potentially may be infected with influenza viruses from different species (e.g., ducks and humans) at the same time. If this happens, it is possible for the genes of these viruses to mix and create a new virus through the process of genetic recombination.

The Influenza Vaccine

The seasonal influenza vaccine is composed of two influenza type A viruses and one type B virus. Due to the constant risk of antigenic drift, vaccines are reconfigured annually for both the Northern and Southern Hemispheres.

Two forms of vaccine are currently available in the market: trivalent inactivated influenza vaccine (TIV) and live, attenuated influenza vaccine (LAIV). TIV first became available in the 1940s and today is the most widely used presentation globally. TIV can be administered to any individual aged >6 months, including population groups considered to be at highest risk. LAIV represents a small percentage of the global vaccine market and is currently only licensed for use in healthy, non-pregnant individuals aged 2-49 years. Decisions regarding annual vaccine composition are made by the World Health Organization (WHO) based on viral surveillance data from WHO's Global Influenza Surveillance Network (FluNet).

Vaccine protection is influenced by recipients' age and immunocompetence. Among healthy populations <65 years, inactivated seasonal influenza vaccine has been shown to be 70-90% effective at preventing disease; in populations >65 years, efficacy decreases to approximately 30-40%. However, in this older age group, the vaccine has been shown to be 50-60% effective at preventing hospitalizations and 80% effective at preventing death.

Pandemic Influenza Vaccine

The pandemic vaccine will be developed with an antigenic composition designed to match the strain isolated from the virus with pandemic potential. Persons vaccinated may need a booster dose to be fully protected. The production of a

vaccine starts when the pandemic virus is isolated. At least four to six months will be necessary to produce the first doses of vaccine.

Pandemic vaccine should prevent significant morbidity and mortality that would otherwise be seen during a pandemic. However, until a vaccine becomes available, the Pan American Health Organization calls upon all individuals to avoid close contact with people who show influenza-like symptoms by trying to maintain a distance of about 1 meter if possible, and by taking the following measures:

- Avoid touching your mouth and nose;
- Clean hands thoroughly and frequently with soap and water; you can also use an alcohol-based hand rub on a regular basis;
- Reduce the time spent in crowded setting if possible;
- Improve airflow in your living space by opening windows;
- Practice good health habits, including adequate sleep, eating nutritious food, and keeping physically active. A comprehensive approach to pandemic control includes a combination of public health interventions, personal care, and the use of antiviral drugs and vaccines.

Antivirals

Antiviral drugs are medicines (pills, liquid, or an inhaler) with activity against influenza viruses, including swine influenza A(H1N1) viruses. Antiviral drugs can be used to treat this type of influenza or to prevent infection with flu viruses. Influenza antiviral drugs only work against influenza viruses and will not prevent or treat symptoms caused by infection from other viruses.

Influenza viruses A(H1N1) isolated from patients have been tested for resistance to antiviral medications. As of the end of April 2009, all tested viruses were resistant to amantadine and rimantadine and susceptible to neuraminidase inhibitors, i.e., oseltamivir (Tamiflu®) and zanamivir (Relenza®). The purpose of antiviral resistance testing is to aid in making recommendations for treatment and prophylaxis for influenza A(H1N1) infection and to monitor antiviral-resistance overtime.

Antiviral drugs can be used to treat persons who are sick in order to make the illness milder and prevent serious influenza complications. Influenza antiviral drugs work best when started within two days after illness onset, but treatment with antiviral drugs should still be considered after 48 hours of symptom onset, particularly for hospitalized patients or people at high risk for influenza-related complications.

Influenza antiviral drugs can also be used to prevent influenza when they are given to a person who has been in contact with a person with influenza. Antiviral drugs are about 70% to 90% effective.

Oseltamivir (Tamiflu®) is for oral use and can be used to both treat and prevent influenza A and B virus infection in people one year of age and older. Zanamivir (Relenza®) needs to be inhaled and it can be used to treat influenza A and B virus infection in people aged 7 years and older and to prevent influenza A and B virus infection in people aged 5 years and older.

The World Health Organization started a global stockpile of the drug Tamiflu® in 2005 after the drug manufacturer donated five million units. Currently, the stockpile is being deployed to countries in need at WHO's discretion. ■

References:

1. Centers for Disease Control and Prevention. Antiviral Drugs and H1N1 Flu (Swine Flu). Available at: http://www.cdc.gov/h1n1flu/antiviral.htm
2. Centers for Disease Control and Prevention. Update: Drug Susceptibility of Swine-Origin Influenza A(H1N1) Viruses, April 2009. MMWR. April, 2009/58 (Dispatch) 1-3.

Questions and Answers Related to Vaccines for the New Influenza A(H1N1)

Q: Is an effective vaccine already available against the new influenza A(H1N1) virus?

A: No, but work is already underway to develop such a vaccine. Influenza vaccines generally contain a dead or weakened form of a circulating virus. The vaccine prepares the body's immune system to defend against a true infection. For the vaccine to protect as well as possible, the virus in it should match the circulating "wild-type" virus relatively closely. Since this H1N1 virus is new, there is no vaccine currently available made with this particular virus. Making a completely new influenza vaccine can take five to six months.

Q: What implications does the declaration of a pandemic have on influenza vaccine production?

A: Declaration by WHO of phase 6 of pandemic alert does not by itself automatically translate into a request for vaccine manufacturers to immediately stop production of seasonal influenza vaccine and to start production of a pandemic vaccine. Since seasonal influenza can also cause severe disease, WHO will take several important considerations such as the epidemiology and the severity of the disease when deciding when to formally make recommendations on this matter. In the meantime, WHO will continue to interact very closely with regulatory and other agencies and influenza vaccine manufacturers.

Q: How important will influenza A(H1N1) vaccines be for reducing pandemic disease?

A: Vaccines are one of the most valuable ways to protect people during influenza epidemics and pandemics. Other measures include anti-viral drugs, social distancing, and personal hygiene.

Q: Will currently available seasonal vaccine confer protection against influenza A(H1N1)?

A: The best scientific evidence available today is incomplete but suggests that seasonal vaccines will confer little or no protection against influenza A(H1N1).

Q: What is WHO doing to facilitate production of influenza A(H1N1) vaccines?

A: As soon as the first human cases of new influenza A(H1N1) infection became known to WHO, the WHO Collaborating Center in Atlanta (Centers for Disease Control and Prevention [CDC] in the United States of America) took immediate action and began the work to develop candidate vaccine viruses. WHO also initiated consultations with vaccine manufacturers worldwide to facilitate the availability of all necessary material to start production of influenza A(H1N1) vaccine. In parallel, WHO is working with national regulatory authorities to ensure that the new influenza A(H1N1) vaccine will meet all safety criteria and be made available as soon as possible.

Q: Why is WHO not asking vaccine manufacturers to switch production from seasonal vaccine to a influenza A(H1N1) vaccine yet?

A: WHO has not recommended stopping production of seasonal influenza vaccine because this seasonal influenza causes 3 million to 5 million cases of severe illness each year, and kills from 250,000 to 500,000 people. Continued immunization against seasonal influenza is therefore important. Moreover, stopping seasonal vaccine production immediately would not allow a pandemic vaccine to be made quicker.

Q: What is the process for developing a pandem-

ic vaccine? Has a vaccine strain been identified, and if so by whom?

A: A vaccine for the influenza A(H1N1) virus will be produced using licensed influenza vaccine processes in which the vaccine viruses are grown either in eggs or cells. Candidate vaccine strains have been identified and prepared by the WHO Collaborating Center in Atlanta (Centers for Disease Control and Prevention [CDC] in the United States of America). These strains have now been received by the other WHO Collaborating Centers[1] which have also started preparation of vaccine candidate viruses. Once developed, these strains will be distributed to all interested manufacturers on request. Availability is anticipated by mid-May.

Q: What is the global manufacturing capacity for a potential influenza A(H1N1) pandemic vaccine?

A: While this cannot be assessed precisely since there is much uncertainty regarding the appropriate formulation for an effective and protective vaccine, a conservative estimate of global capacity is approximately 1 billion doses per year.

Q: Will influenza A(H1N1) vaccines be effective in all population groups?

A: There are not data on this but there also is no reason to expect that they would not, given current information.

Q: Will the influenza A(H1N1) vaccine be safe?

A: Licensed vaccines are held to a very high standard of safety. All possible precautions will be taken to ensure safety and new influenza A(H1N1) vaccines.

Q: How can a repeat of the 1976 swine flu vaccine complications (Guillain-Barré syndrome) experienced in the United States of America be avoided?

A: Guillain-Barré syndrome is an acute disorder of the nervous system. It is observed following a variety of infections, including influenza. Studies suggest that regular seasonal influenza vaccines could be associated with an increased risk of Guillain-Barré syndrome on the order of one to two cases per million vaccinated persons. During the 1976 influenza vaccination campaign, this risk increased to around 10 cases per million vaccinated persons which led to the withdrawal of the vaccine.

Pandemic vaccines will be manufactured according to established standards. However, they are new products so there is an inherent risk that they will cause slightly differently reactions in humans. Close monitoring and investigation of all serious adverse events following administration of vaccine is essential. The systems for monitoring safety are an integral part of the strategies for the implementation of the new pandemic influenza vaccines. Quality control for the production of influenza vaccines has improved substantially since the 1970s.

Q: Will it be possible to deliver new influenza A(H1N1) vaccine simultaneously with other vaccines?

A: Inactivated influenza vaccine can be given at the same time as other injectable vaccines, but the vaccines should be administered at different injection sites.

Q: If the virus causes a mild pandemic in the warmer months and changes into something much more severe in, say, 6 months, will vaccines being developed now be effective?

A: It is too early to be able to predict changes in the influenza A(H1N1) virus as it continues to circulate in humans or how similar a mutated virus might be to the current virus. Careful surveillance for changes in the influenza A(H1N1) virus is ongoing. This close and constant monitoring will support a quick response should important changes in the virus be detected.

Q: Will there be enough influenza A(H1N1) vaccine for everyone?

A: The estimated time to make enough vaccine to vaccinate the world's population against pandemic influenza will not be known until vaccine manufacturers will have been able to determine how much active ingredient (antigen) is needed to make one dose of effective influenza A(H1N1) vaccine.

In the past two years, influenza vaccine production capacity has increased sharply due to expansion of production facilities as well as advances in research, including the discovery and use of adjuvants. Adjuvants are substances added to a vaccine to make it more effective, thus conserving the active ingredient (antigen).

Q: What is WHO's perspective on fairness and equity for vaccine availability?

A: The WHO Director-General has called for international solidarity in the response to the current situation. WHO regards the goal of ensuring fair and equitable access by all countries to response measures to be among the highest priorities. WHO is working very closely with partners including the vaccine manufacturing industry on this.

Q: Who is likely to receive priority for vaccination with a future pandemic vaccine?

A: This decision is made by national authorities. As guidance, WHO will be tracking the evolution of the pandemic in real-time and making its findings public. As information becomes available, it may be possible to better define high-risk groups and to target vaccination for those groups, thus ensuring that limited supplies are used to greatest effect.

Q: Will WHO be conducting mass influenza A(H1N1) vaccination campaigns?

A: No. National authorities will implement vaccination campaigns according to their national pandemic preparedness plans. WHO is exploring whether the vaccine can be packaged, for example, in multi-dose vials, to facilitate the rapid and efficient vaccination of large numbers of people.

Developing countries are very experienced in administering population-wide vaccination campaigns during public health emergencies caused by infectious diseases, including diseases like epidemic meningitis and yellow fever, as well as for polio eradication and measles control programs.

Q: How feasible will it be to immunize large numbers of people in developing countries against a pandemic virus?

A: Developing countries have considerable strategic and practical experience in delivering vaccines in mass campaigns. The main issue is not feasibility, but how to ensure timely access to adequate quantities of vaccine.

Q: What is the estimated global number of doses of seasonal vaccine used annually?

A: The current annual demand is for less than 500 million doses per year.

Q: Will seasonal influenza vaccine continue to be available?

A: At this time there is no recommendation to stop production of seasonal influenza vaccine. ■

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1 National Institute for Biological Standards and Control (UK), Food and Drug Administration/Center for Biologics Evaluation and Research (USA), New York Medical College (USA), Victorian Infectious Diseases Research Laboratory (Australia).

Adapted from Vaccines for the new influenza A(H1N1), 2 May 2009. World Health Organization. For a full version, see at http://www.who.int/csr/disease/swineflu/frequently_asked_questions/vaccine_preparedness/en/index.html.

Influenza A(H1N1): Sources of Information

General Information

The Pan American Health Organization (PAHO): www.paho.org	The Center for Disease Control and Prevention (CDC, USA): www.cdc.gov
The World Health Organization (WHO): www.who.int	Pandemicflu.gov (U.S. Department of Health and Human Services): www.pandemicflu.gov
Global Influenza Surveillance Network (FluNet): http://www.who.int/csr/disease/influenza/surveillance/en/index.html	Public Health Agency of Canada: www.phac-aspc.gc.ca/index-eng.php
	Ministry of Health of Mexico: http://portal.salud.gob.mx/

Useful Documents

Influenza A(H1N1) guidance documents. Epidemic and Pandemic Alert and Response (EPR)/WHO.	http://www.who.int/csr/resources/publications/swineflu/en/index.html
H1N1 Flu (Swine Flu): General Information. CDC.	http://www.cdc.gov/h1n1flu/general_info.htm
Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care. WHO Interim Guidelines. Epidemic and Pandemic Alert and Response (EPR)/WHO (WHO/CDS/EPR/2007.6).	http://www.who.int/csr/resources/publications/WHO_CDS_EPR_2007_6c.pdf
Infection prevention and control in health care in providing care for confirmed or suspected A(H1N1) swine influenza patients. Interim Guidance. Epidemic and Pandemic Alert and Response (EPR)/WHO.	http://www.who.int/csr/resources/publications/infection_control/en/index.html
Epidemic-prone & pandemic-prone acute respiratory diseases. Infection prevention & control in health-care facilities. Summary Guidance. Epidemic and Pandemic Alert and Response (EPR)/WHO (WHO/CDS/EPR/2007.8).	http://www.who.int/csr/resources/publications/WHO_CDS_EPR_2007_8/en/
Standard precautions in health care. Aide-memoire. Epidemic and Pandemic Alert and Response (EPR)/WHO.	http://www.who.int/csr/resources/publications/standardprecautions/en/
Early recognition, reporting and management of infection control of acute respiratory diseases of potential international concern. Aide-memoire. Epidemic and Pandemic Alert and Response (EPR)/WHO.	http://www.who.int/csr/disease/avian_influenza/guidelines/AMinfectioncontrolearlyrecognition/en/
Advice on the use of masks in the community setting in influenza A(H1N1) outbreaks. Interim Guidance. Epidemic and Pandemic Alert and Response (EPR)/WHO.	http://www.who.int/csr/resources/publications/swineflu/masks_community/en/index.html
Influenza vaccines. WHO position paper. Weekly Epidemiological Report. No. 33, 2005, 80, 277–288 (19 August 2005). WHO.	http://www.who.int/immunization/wer8033influenza_August2005_position_paper.pdf
Andrus JK and de Quadros CA, ed. Preparing for the Pandemic. In: *Recent Advances in Immunization*, 2nd ed. Washington, D.C.: Pan American Health Organization; 2006: 99-113.	http://www.paho.org/English/AD/FCH/IM/RAI_PandemicPrep_e.pdf

Country	Ministry of Health Website	PAHO Country Office Website
Argentina	http://www.msal.gov.ar	http://new.paho.org/arg/
Bahamas	http://www.bahamas.gov.bs/health	N/A
Barbados	http://www.barbados.gov.bb/portfoli_health.htm	N/A
Belize	http://www.health.gov.bz/moh/	http://new.paho.org/blz/
Bolivia	http://www.sns.gov.bo/	http://www.ops.org.bo/
Brazil	http://portal.saude.gov.br/saude/	http://www.opas.org.br/
CAREC	N/A	http://www.carec.org/
Canada	http://www.hc-sc.gc.ca/index-eng.php	N/A
Chile	http://www.minsal.cl/	http://new.paho.org/chi/
Colombia	http://www.minproteccionsocial.gov.co/VBeContent/home.asp	http://www.col.ops-oms.org/
Costa Rica	http://www.ministeriodesalud.go.cr/	http://www.cor.ops-oms.org/
Cuba	http://www.sld.cu/sistema_de_salud/ssalud.html	http://new.paho.org/cub/
Dominican Rep.	http://www.sespas.gov.do/	http://new.paho.org/dor/
Ecuador	http://www.msp.gov.ec/	http://www.opsecu.org/
El Salvador	http://www.mspas.gob.sv/	http://www.ops.org.sv/

Country	Ministry of Health Website	PAHO Country Office Website
Guatemala	http://portal.mspas.gob.gt/	http://new.paho.org/gut/
Guyana	http://www.health.gov.gy/	http://www.guy.paho.org/
Haiti	http://mspp.ht/	N/A
Honduras	http://www.salud.gob.hn/	http://new.paho.org/hon/
Jamaica	http://www.mohe.gov.jm/index.php	N/A
Mexico	http://www.salud.gob.mx/	http://www.mex.ops-oms.org/
Nicaragua	http://www.minsa.gob.ni/	http://www.ops.org.ni/
Panama	http://www.minsa.gob.pa/minsa2008/final_newpage/links_other.htm	http://new.paho.org/pan/
Paraguay	http://www.mspbs.gov.py/	N/A
Peru	http://www.minsa.gob.pe/portada/	http://new.paho.org/per/
Suriname	http://www.volksgezondheid.gov.sr/	N/A
United States	http://www.hhs.gov/	N/A
Uruguay	http://www.msp.gub.uy/index_1.html	http://www.ops-oms.org.uy/
Trinidad and Tobago	http://www.health.gov.tt/	N/A
Venezuela	http://www.mpps.gob.ve/ms/	http://devserver.paho.org/ven

Influenza A(H1N1): Advice for Individuals

What can individuals do?

To protect yourself and prevent infection, practice general preventive measures:

- Practice good health habits including adequate sleep, eating nutritious food, and keeping physically active;
- Avoid close contact with people who appear unwell and have fever and cough by trying to maintain a distance of about 1 meter if possible;
- Avoid touching your mouth and nose;
- Wash your hands with soap and water thoroughly and often; you can also use an alcohol-based hand rub on a regular basis;
- Reduce the time spent in crowded setting if possible;
- Improve airflow in your living space by opening windows;
- If you are feeling ill, visit a medical practitioner;
- If you are sick, stay at home and avoid contact with people;
- Do not cough in people's faces, cough on your tissue or sleeve;
- Face masks: If you are not sick you do not have to wear a mask. If you are caring for a sick person you should wear a mask. All home-made masks should be cleansed regularly.

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