



# International Disease Surveillance Mechanism for 2009 Pandemic Influenza A (H1N1) in Taiwan

Shiang-Yun Huang<sup>1</sup>, Cheng-Yi Lee<sup>1,2</sup>, Yu-Lun Liu<sup>1</sup>  
Shiang-Lin Yang<sup>1</sup>, Hsiu-Yun Lo<sup>1,3</sup>, Jen-Hsiang Chuang<sup>1,4</sup>

1. Epidemic Intelligence Center, Centers for Disease Control, Taiwan
2. Institute of Health Policy and Management, College of Public Health, National Taiwan University, Taipei, Taiwan
3. Institute of Public Health, Community Medicine Research Center, National Yang-Ming University, Taipei, Taiwan
4. Institute of Biomedical Informatics, National Yang-Ming University, Taipei, Taiwan

## Abstract

After the novel influenza A (H1N1) virus was reported from North American countries in April 2009, Taiwan is also encountering the global impact of 2009 pandemic influenza A (H1N1). In order to keep track of first hand information, Taiwan Centers for Disease Control (Taiwan CDC) gathers the most updated news from official health authority websites as well as international organizations regarding H1N1 flu, and then publishes on CDC website.

This article focused on 2009 pandemic influenza A (H1N1) surveillance mechanisms adopted by Taiwan CDC, and to diagram the major ideas of

- Received : September 7, 2009.
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- Correspondence : Jen-Hsiang Chuang
- Address : No.6, Linsen S. Rd., Taipei 10050, Taiwan (R.O.C.)
- e-mail : jhchuang@cdc.gov.tw

“Multiple-Entry, Single-Exit”. The review also provides readers to understand communication between different departments in government to achieve message consistency.

**Keywords:** 2009 pandemic influenza A (H1N1), communicable disease surveillance, IHR (International Health Regulations), surveillance mechanism, lateral communication

## **Introduction**

On April 21, 2009, US Centers for Disease Control (US-CDC) announced two children with febrile respiratory illness who resided in adjacent counties in southern California were caused by a swine influenza A (H1N1) virus. Neither child had contact with pigs; the source of the infection was unknown [1].

On April 24, WHO confirmed that swine flu A (H1N1) outbreaks were reported in Mexico and United States, which caused at least 62 deaths in Mexico. The virus appeared to be a recombinant of four viruses from three continents, with a human segment, an avian segment and pig segments, and the virus was resistant to two antiviral drugs, Amantadine and Rimantadine.

The origin of 2009 pandemic influenza A (H1N1) global outbreak was posted on Disease Outbreak News in WHO website. On April 24, the website revealed that the United States Government had reported seven confirmed human cases of Swine Influenza A (H1N1) in the USA (five in California and two in Texas). All seven confirmed cases had mild Influenza-Like Illness (ILI), with only one requiring brief hospitalization. No deaths occurred. The Government of Mexico reported three separate events. In the Federal District of Mexico, surveillance began picking up



cases of ILI starting 18 March. The number of cases had risen steadily through April and as of 23 April there were more than 854 pneumonia cases from the capital. Of those, 59 had died [2].

In addition to Mexico and US, Canada's government said that 12 of 18 laboratory confirmed Swine Influenza A (H1N1) cases are genetically identical to the Swine Influenza A (H1N1) viruses from California. WHO also warned that the characteristic of this virus was different from seasonal flu strains which attack mostly elders as well as children. Those briefing reports were a prelude to this 2009 pandemic influenza A (H1N1).

### **Response Mechanisms Adopted by Taiwan CDC**

#### **Response mechanism 1: Publish when information is confirmed, and keep updated with news and sources.**

Taiwan CDC collects information and website messages from international organizations such as WHO as well as official health departments and publishes daily on International Travel Information (Travelers' Health) on CDC website. People could make use of "Travelers' Health", and simply click world map, regions, country names, diseases, time period to query latest information about international communicable diseases. The public could gather infectious disease information through the website, and take precautions prior to travel.

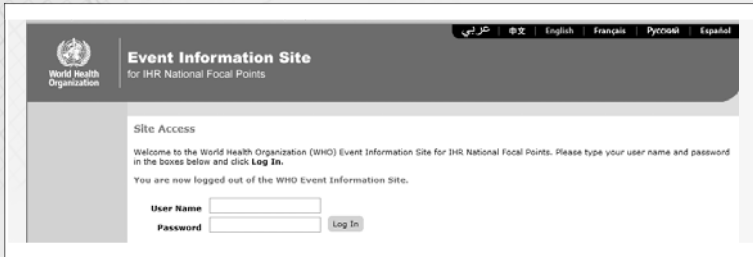
April 22 (Taiwan time), Taiwan CDC received US-CDC Morbidity and Mortality Weekly Report which indicated in the United States, two children were infected with swine influenza A (H1N1) virus, and neither child had contact with pigs; the source of the infection was unknown. Taiwan CDC published this immediate notice on official Traveler's Health

website. Then on April 25, WHO reported 2 separate news regarding swine influenza A (H1N1) virus outbreaks, and we published those news on website as well.

**Response mechanism 2: Through IHR Focal Point, early informed WHO will raise alert level of pandemic influenza phase.**

April 27, Taiwan CDC launched a 24-hour 2009 pandemic influenza A (H1N1) disease surveillance mechanism, which includes monitoring major news media and latest international organization news. Through this mechanism, Taiwan CDC gathered WHO Expert Advisory Committee news as well as response measures in different countries. Am. 0400, April 28, through IHR (International Health Regulations) National Focal Point and WHO EIS (Event Information Site), Taiwan CDC realized that WHO will soon raise pandemic influenza phases from phase 3 to 4, which was prior to WHO press release, and major news media from United States, UK and Japan. CDC staff immediate reported to supervisors through standard operation procedure. On same day, in light of continuously wide-spreading of 2009 pandemic Influenza A (H1N1), Taiwan established “Central Epidemic Command Center” (CECC) in accordance with Article 17, Communicable Disease Control Act. The CECC was Inter-ministry, and commander was then Health Minister, Dr. Ching-Chuan Yeh.

Since the beginning of 2009 pandemic influenza A (H1N1), CDC has not only done the disease surveillance, but also exchanged information with WHO, United States, Japan, and partners in international society through WHO IHR Event Information Site (Figure 1.) as well as national focal points.



**Figure 1. WHO Event Information Site for IHR National Focal Points**

Due to frequent international exchanges, novel influenza A (H1N1) transmitted quickly through the international traffic and tourisms. The information indicated tourists who had Mexico or US travel history rapidly spread to other countries, and transmission routes were from North America to Europe, New Zealand, Australia, Central and South America, Asia, Oceania, and Africa. With the increase in the number of cases, on April 29, WHO raised the pandemic alert to Phase 5. Taiwan CDC received updated news, case number, WHO published documents and policy recommendation through IHR National Focal Point.

**Response mechanism 3: After Phase 5, published “Update on Novel Influenza A (H1N1) Infection in Humans” every day.**

With the global spread of the epidemic, WHO Director-General Dr. Margaret Chan mentioned that based on the epidemiological data as well as scientific committee’s decision, WHO decided to raise the pandemic alert level from Phase 4 to Phase 5. WHO emphasized that the decision was also based on having human to human transmission in community in one region (at least two countries). WHO also emphasized the public not be panic, as long as taking more attention to the individual's health, and urged to seek medical assistance immediately if had flu symptoms.

Since Apr 30, the Taiwan CECC published daily “Update on Novel

Influenza A (H1N1) Infection in Humans” to enable all levels of government and the public have the latest first-hand information on 2009 pandemic influenza A (H1N1), which included not only the Chinese version but also English edition for the international society. The document updated on the daily noon, and in line with the CECC major announcements and press releases at 14:00 daily. In addition, Taiwan CDC keeps most updated news regarding international 2009 pandemic influenza A (H1N1) outbreaks on Travelers' Health on official website. On May 20, Taiwan had its first confirmed novel influenza A (H1N1), and soon reported to WHO. On May 23, daily updated WHO novel influenza A (H1N1) map appeared “Chinese Taipei has reported its first confirmed case of 2009 pandemic influenza A (H1N1) with 0 deaths” [5], which was also name of Chinese Taipei officially appeared on WHO 2009 pandemic influenza A (H1N1) website. (Figure 2)

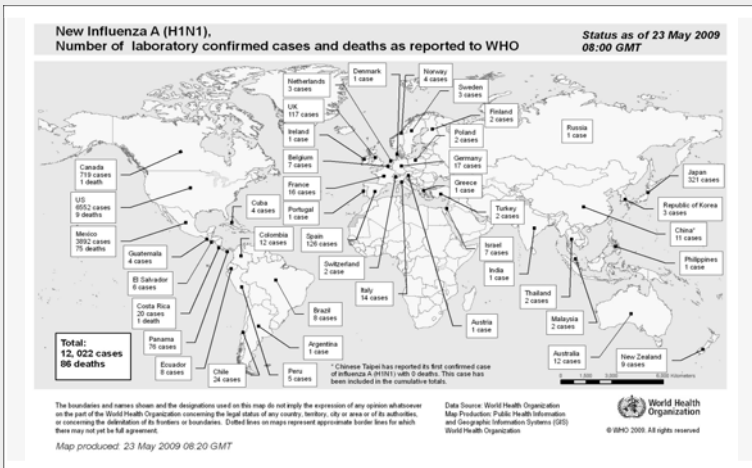
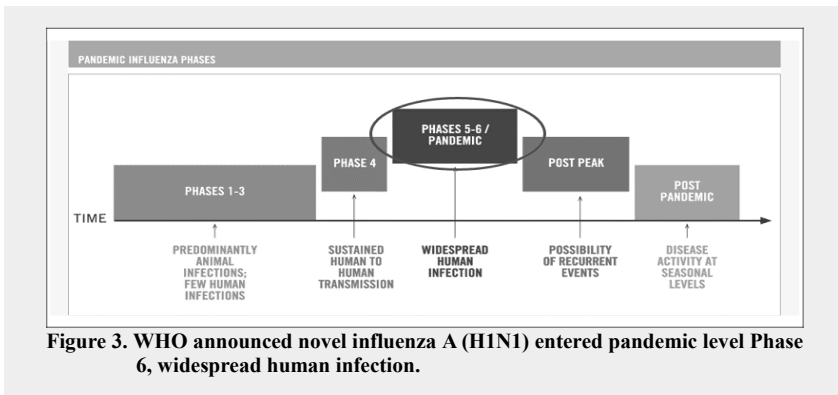


Figure 2. WHO world map of number of laboratory confirmed cases and deaths. On May 23, 2009, WHO officially revealed Chinese Taipei’s confirmed case on novel influenza A (H1N1).

**Response mechanism 4: In accordance with “Four Major Strategies, and Five Lines of Defense”, intensive monitor international epidemic and responses**

According to “Influenza Pandemic Strategic Plan”, Taiwan has four major strategies and five lines of defense to fight the pandemic influenza. Four Major Strategies included that Strategy I- Early Detection, Strategy II- Interruption of Transmission, Strategy III- Antivirals and Strategy IV- Influenza Vaccine. Five Lines of Defense included that First Line of Defense-Containment Abroad, Second Line of Defense–Border Control, Third Line of Defense- Community Epidemic Control, Fourth Line of Defense - Maintaining Medical System Functions, and Fifth Line of Defense - Individual and Family Protection. In addition to aforementioned plans, Taiwan CDC strengthens cooperation with international society.

In June, almost every country in the world was influenced by novel influenza A (H1N1), and apparently in Oceanic (Australia) and Europe (United Kingdom) had sustained human to human transmission in communities. On June 11, WHO raised the global pandemic influenza alert from Phase 5 to Phase 6 [6]. (Figure 3)



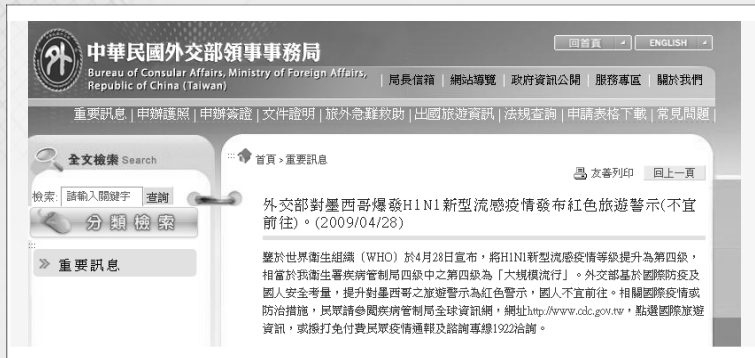
**Figure 3. WHO announced novel influenza A (H1N1) entered pandemic level Phase 6, widespread human infection.**

In other words, novel influenza A (H1N1) has caused a global pandemic. Last time, WHO declared flu pandemic, during 1968 and 1969. WHO declared again in 41 years in 2009 after a new outbreak of 2009 pandemic influenza A (H1N1). In the mean time, the novel influenza A (H1N1) from the first appearance in North America region since April, had spread to at least 74 countries worldwide, WHO had received a total of approximately 28000 novel influenza A (H1N1) confirmed cases, which had caused at least 141 deaths. According to WHO statement, pandemic alert Phase 6 means that sustained community outbreaks have occurred in over two WHO regions. WHO had urged that to fight against novel influenza, countries should strengthen cooperation to share disease surveillance information as well as prevention measures and policies should be made.

**Response mechanism 5: By implementing principle “Multiple-Entry, Single-Exit”, strengthen communication between different departments in government to achieve message consistency.**

To maintain Government Information open, consistent, fair and objective, Taiwan CDC implemented principle of “Multiple-Entry, Single-Exit”, which meant that whether the information from the WHO, IHR Focal Point, international organizations or government official website information, after confirmation, Taiwan CDC would actively notify Ministry of Foreign Affairs and the Mainland Affairs Council through single exit (designated officers). This practice strengthened the communication between different departments in government to achieve message consistency. As long as the relevant ministries received the latest news, then notice of travel warning or self protection measures will be published [7]. (Figure 4)





**Figure 4. The Ministry of Foreign Affairs issued a red travel alert to Mexico on Apr 28, 2009, after confirmation of novel influenza A (H1N1) epidemic information with Taiwan CDC.**

In late April, after WHO raised pandemic alert level from Phase 4 to Phase 5, the international press and public experts expected that WHO would shortly raise to Phase 6 which meant global pandemic. In response to ever changing pandemic information, Taiwan CDC actively monitored major news media, official health authority websites, international organizations, and WHO (including WHO Event Information Site for National Focal Points).

In May, with the increasing number of confirmation, deaths, and sustained community outbreaks in different countries, on May 20, Taiwan had its first imported H1N1 novel influenza confirmed case who was a foreign male, from USA and transferred from Hong Kong to Taiwan. He was detected at airport by fever screening, after medical officers took samples for exam and then CDC laboratory confirmed as first novel influenza A (H1N1) case. Prior to press release, Taiwan notified relative countries and WHO through IHR focal points.

Before WHO announced pandemic Phase 6, Taiwan CDC had monitored international epidemic news 24-hour a day, officers who were

in charge of international disease surveillance and WHO Event Information Site affairs shifted to CECC international disease surveillance team. As long as receiving up to date important messages, the team would notify CECC directors and disease prevention officers either via mobile phone texting, email or fax, whether on holidays or late at night.

## **International Disease Surveillance and Press Release Process**

### **1. Information sources and press release process**

Due to novel influenza A (H1N1) information was ever changing and also came from multiple channel sources, discrepancy among international news agencies, press media, international health organizations, and official health authority websites might occur. Taiwan CDC had SOP (Standard Operation Procedure) for publishing international epidemic news. Epidemic revealed by any of the following sources, Taiwan CDC would publish the news. (Detailed info on Figure 5)

- (1) **International health organizations:** World Health Organization, European Centre for Disease Prevention and Control, ECDC [8], WHO Pan American Health Organization, PAHO [9]. The ECDC and PAHO websites were good reference for confirmed cases and deaths of relative countries, and its publication data comparing to official health authority websites had merely 0 to 2 days gap. As for WHO website data, since notification to regional offices and then organize may take time, the reports of WHO official website might have 2 to 14 days delay from official health authority websites of countries.
- (2) **Health authority official websites:** Those included first hand laboratory information, and were most accurate and prompt information. In the

beginning of the epidemic, health authority webs were one of most important sources. However, text with local languages (not English) and large number of different sites, which might be challenges for interpretation, and would need more human resources to translate. (Sites could be found in Recommended webs, International Travel Health, Taiwan CDC.)

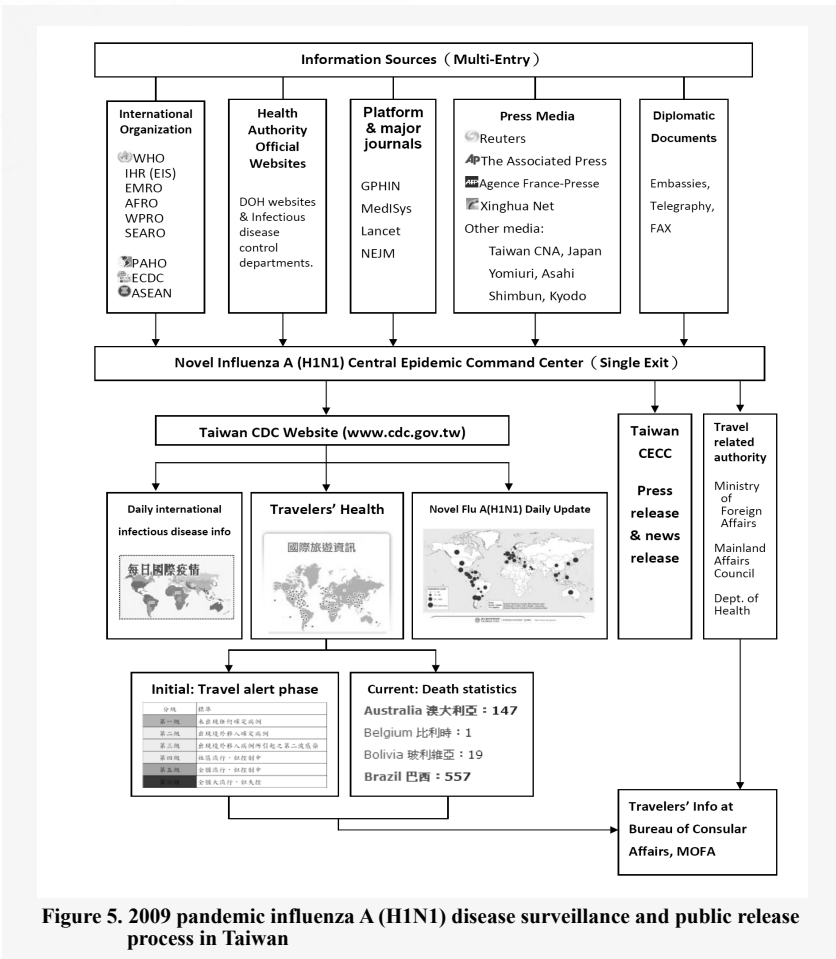


Figure 5. 2009 pandemic influenza A (H1N1) disease surveillance and public release process in Taiwan

- (3) **Press media:** First priority: Four major international news agencies: Reuters, [10], AP, The Associated Press [11], AFP, Agence France-Presse [12], Xinghua Net [13]. Second Priority: Taiwan CNA, Central News Agency, Japan Yomiuri Online, Japan Asahi Shimbun and Kyodo News and etc.
- (4) **Diplomatic documents:** Official communication documents with Ministry of Foreign Affairs, Telegraphy and facsimile regarding to communicable disease surveillance from Embassies. Some outbreak news was not as prompt as major international press media, however, through diplomatic cooperation, which still remained reference values especially in the beginning phase of outbreaks.
- (5) **Other resources:** Global Public Health Intelligence Network (GPHIN) [14] which was provided and developed by the Public Health Agency of Canada. GPHIN is an Internet-based "early warning" system that gathers preliminary reports of public health significance, on a 24 hours a day, seven days a week basis. GPHIN is an adaptable system with multilingual capacity in Arabic, English, French, Russian, Simplified and Traditional Chinese, and Spanish, which also automatically monitor approximately 1000 media. Based on pre-set key terms, on a frequent of at least every 15 minutes, search on press release and major media, then gather and organize on GPHIN and sends important messages by Email. In addition, Taiwan CDC adopted news from MedISys [15] which coworked with European Unions Commissions. MedISys (Medical Information System) is a real-time news alert system for medical and health-related topics and operates 24 hours per day, 365 days per year.

## **2. Actions taken**

- (1) Since Apr 22, confirmed novel influenza A (H1N1) case number in



- each country, preliminary case report, travel history, and related information was published daily on International Travel Information (Travelers' Health) on Taiwan CDC website.
- (2) Since Apr 28, in accordance with novel influenza A (H1N1) Central Epidemic Command Center (CECC), international disease surveillance officers adopted a 24-hour-shift rotating, and each shift worked for 12 hours. Officers monitored Global Outbreak News and kept most updated message on Taiwan CDC website.
  - (3) From Apr 30 to June 19, Taiwan CDC published "Update on Novel Influenza A (H1N1) Infection in Humans" daily (Chinese and English version). The report included WHO highlights, current Taiwan situation, border control, global case geographic distribution, report criteria, prevention measures, and precautions. The document updated on the daily noon, and in line with the CECC major announcements and press releases at 14:00 daily.
  - (4) From May 1 to 7, in accordance with WHO's updates - 2009 pandemic influenza A (H1N1) twice a day as well as ever changing outbreaks worldwide, Taiwan CDC kept most updated news.
  - (5) From May 4 to June 16, travel alerts classification system was implemented (Figure 6). In the initial stage of H1N1 outbreak, in accordance with WHO guidelines as well as capacity of disease control in country, Taiwan CECC classified pandemic alert into 6 phases. Phase 1: Green light (no confirmed cases), Phase 2 to 4: Yellow light, Phase 5: Orange light, and Phase 6: Red light. On CECC 4<sup>th</sup> committee, for the lifting of travel contracts and the refund issue derived from Government's policy, CECC decided to integrated CECC's alert phase with travel alert

system adopted by Bureau of Consular Affairs (BOCA), Ministry of Foreign Affairs. If classified to Phase 6: Red light, applied to Article 28, Foreign Travel Standard Contract Templates; Phase 5: Orange light, applied to Article 28-1, Phase 4: Yello light, case reviewed by BOCA, and Phase 2-3: Yellow light, applied to Article 28-1.

**Applying Taiwan’s Pandemic Alert Phase to other Countries in 2009 pandemic influenza A (H1N1)**

2009/6/17 update		
Phase	Criteria	Countries
1	Absence of confirmed cases or no confirmed cases within seven days	Kuwait, United Arab Emirates, Bahrain, Puerto Rico, Russia, Cyprus, Finland, Portugal, Luxembourg, Bermuda, Slovakia, French, Polynesia, Bahamas, Bulgaria, etc.
2	Presence of imported confirmed cases	Taiwan, Turkey, Jamaica, Saudi Arabia, Cayman Islands, Ukraine, Malaysia, Rep. of Korea, Trinidad and Tobago, Czech Republic, Cuba, Dominica, Martinique, Belgium, Palestine, Estonia, Greece, Lebanon, Bolivia, Ireland, Morocco, British Virgin Islands, Austria.
3	Presence of secondary spread from imported confirmed cases	United Kingdom, Spain, Panama, Costa Rica, Japan, Chile, Germany, Ecuador, Peru, Australia, Guatemala, Argentina, Philippines, China, El Salvador, Romania, Uruguay, Brazil, Israel, France, Dominican Republic, Honduras, Barbados, Denmark, Thailand, Italy, Singapore, Nicaragua, Colombia, India, Vietnam, New Zealand, Netherlands, Switzerland, Venezuela, Egypt, Hong Kong, Paraguay, Poland, Norway, Sweden, Hungary, Iceland.
4	Community outbreaks but under control	USA, Canada, Mexico.
5	Nationwide outbreaks but under control	-
6	Nationwide epidemics but out of control	-

**Note:**

1. Community outbreaks indicate presence of tertiary or more than tertiary spread of infection.
2. The countries listed here are those with confirmed cases announced by their national health authorities or international public health organizations. Therefore, the information provided here is more updated than that provided by WHO.
3. Travel health notice and Taiwan’s pandemic alert phase may change as more reports are received.

**Considerations of quarantine measures on international travelers arriving in Taiwan:**

1. The phase of 2009 pandemic influenza A (H1N1) epidemic of the traveler’s country of origin.
2. Transparency of epidemic information of the traveler’s country of origin.
3. Capabilities of epidemic control of the traveler’s country of origin.

**Figure 6. Taiwan’s pandemic alert phase description and country list (Last updated: 2009/6/17)**



※**Upgrade to Phase 2:** Yellow light if imported confirmed case was reported, and turn to Phase 3: if indigenous confirmed case was reported. When any of the international organizations, health authorities, or four major news agencies revealed of the epidemic, Taiwan CDC would publish the news and upgrade alert phase right away.

※**Downward to Phase 2 or Phase 1:** According to the information from official health authority or WHO website, no new confirmed cases in 7 days: Phase 1 (Green light); no new indigenous confirmed cases in 7 days: Phase 2 (Yellow light). Alert phase would be announced by Taiwan CECC every noon.

For changes of Phase 4 to 6, it was needed to be discussed and decided by Taiwan CECC committee.

- (6) Since June 17, with the growing number of confirmed cases in countries, and indigenous cases are becoming more usual, Taiwan CECC changed to release the number of cases and deaths instead.
- (7) Since August 10, with WHO's suggestion that surveillance should focus on severe case and deaths. Taiwan CECC changed to just published death number and major developments in countries.

### **3. Key events for surveillance of 2009 pandemic influenza A (H1N1)**

- 3/5 In La Gloria, Veracruz, Mexico, during Mar 5 to Apr 10, over 400 persons had symptoms of influenza like illness and Pneumonia.
- 4/6 United States company issued a warning that outbreak with unusual acute respiratory infections was reported in La Gloria.
- 4/21 US Centers for Disease Control announced that two cases of febrile respiratory illness occurring in children were caused by infection with a swine influenza A (H1N1) virus. Neither child

- had contact with pigs.
- 4/23 United States and Mexico government reported swine flu cases to WHO and on its official website had public announcements regarding to unknown sources of infection.
- 4/24 WHO launched Headquarter of Strategic Health Operations Center (HQ SHOC) in Geneva, Switzerland.
- 4/26 WHO announced that the swine flu event was Public Health Emergency.
- 4/27 WHO raised global pandemic alert level to Phase 4 (Taipei time: 4/28).
- 4/28 Taiwan constructed “Central Epidemic Command Center”, and monitor disease 24 hours a day.
- 4/29 WHO raised global pandemic alert level to Phase 5.
- 4/30 Taiwan CDC published” Update on Novel Influenza A (H1N1) Infection in Humans” (Chinese and English version) daily.
- 5/1 Hong Kong had its first Mexico imported confirmed novel influenza A (H1N1) male case.
- 5/2 Rep. of Korea had its first imported confirmed novel influenza A (H1N1) female case.
- 5/4 Cooperated with Ministry of Foreign Affairs, Taiwan CECC implemented travel alerts classification system.
- 5/9 Japan had its first imported confirmed novel influenza A (H1N1) cases, 3 teacher and students with USA travel history
- 5/11 China had its first imported confirmed novel influenza A (H1N1) case, who was a Chinese student studies in the USA.
- 5/20 Taiwan had its first imported confirmed novel influenza A





- (H1N1) case, a USA citizen, male, traveled from USA and transferred in Hong Kong. Report to WHO right after confirmation.
- 6/11 WHO raised global pandemic alert level to Phase 6 out a six-point scale, which was a moderate pandemic so far.
- 7/16 WHO revised the reporting criteria, and suspended publishing world situation update on a daily basis.
- 8/10 Taiwan CECC started to publish world situation update merely on death number since the major countries reported deaths only.
- (Current model on international disease surveillance)

## Conclusions

### 1. Current strategic direction for 2009 pandemic influenza A (H1N1)

In the initial stage of 2009 pandemic influenza A (H1N1), containment policies were widely adopted by many countries to minimize the domestic impact, and also to publish daily updated situation on confirmed cases and deaths; however, with the spread of the epidemic, WHO indicated that a global outbreak is imminent. WHO suggested mitigation instead of containment, and the Director General Dr. Margaret Chan recommended: not to close borders, not to restrict international travel, and not to immobilization of persons, goods and services. WHO would push the pharmaceutical industry to develop and produce sufficient 2009 pandemic influenza A (H1N1) vaccine. WHO would recommend the national health authorities to focus on surveillance of severe cases and on medical resource allocation.

Currently, the major pandemic virus type was 2009 pandemic influenza A (H1N1), and WHO indicated that 2009 pandemic influenza A (H1N1)

virus would directly affect the lung and cause respiratory failure. In some cities at South Hemisphere, 15% hospitalized patients would need critical care and stay in Intensive Care Unit. Patients who are pregnant, have respiratory disease history (especially asthma), cardiovascular diseases, diabetes, or use immune suppressing medications would be the high risk groups. The 2009 pandemic influenza A (H1N1) virus mostly attacked younger persons comparing to seasonal influenza, and until now, most of severe cases and deaths were among adults aged less than 50 years old. However, approximately 90% of the severe cases and deaths in seasonal influenza were aged over 65 years old.

## **2. Direction for Taiwan international disease surveillance**

- (1) Global strategic guidelines: Implement current international disease surveillance mechanisms to follow WHO's recommended response strategy and control measures taken in major countries.
- (2) Influenza-like illness (ILI) surveillance: Monitor ILI trends, high risk groups, consultation rates, event report and related reference publications in major countries and WHO websites.
- (3) Server case and death surveillance: Monitor cases in hospitalization, cases in Intensive Care Unit, severe complications, case fatality rare, mortality rate and medical resource allocation in countries.
- (4) Strain surveillance: Monitor epidemic strain and cross infection cases in countries.
- (5) Vaccine and antiviral drugs: Monitor vaccination coverage with morbidity and mortality, and efficacy and safety of antiviral drugs in countries.



## References

1. Swine influenza A (H1N1) infection in two children - Southern California, March-April 2009. *MMWR* 2009; 58:400-2.
2. WHO Global Alert and Response (GAR). Influenza-like illness in the United States and Mexico. Available at: [http://www.who.int/entity/csr/don/2009\\_04\\_24/en/index.html](http://www.who.int/entity/csr/don/2009_04_24/en/index.html).
3. Taiwan CDC. Health information for international travel. Available at: <http://www.cdc.gov.tw/sp.asp?xdurl=travel/travel00.asp&mp=1&ctNode=1553>.
4. Taiwan CDC. Novel influenza A (H1N1) news update. Available at: <http://www.cdc.gov.tw/ct.asp?xItem=22790&ctNode=1942&mp=1>.
5. WHO. Influenza A (H1N1) - update 37, laboratory-confirmed cases of new influenza A (H1N1) as officially reported to WHO by States Parties to the International Health Regulations (2005). Available at: [http://www.who.int/csr/don/2009\\_05\\_23/en/index.html](http://www.who.int/csr/don/2009_05_23/en/index.html).
6. WHO. Current phase of alert in the WHO global influenza preparedness plan, pandemic preparedness. Available at: [http://www.who.int/csr/disease/avian\\_influenza/phase/en/index.html](http://www.who.int/csr/disease/avian_influenza/phase/en/index.html).
7. Bureau of Consular Affairs, Ministry of Foreign Affairs, ROC (Taiwan). Travelers' information. Available at: [http://www.boca.gov.tw/lp.asp?CtNode=226&CtUnit=1&BaseDSD=7&mp=1&xq\\_xCat=4](http://www.boca.gov.tw/lp.asp?CtNode=226&CtUnit=1&BaseDSD=7&mp=1&xq_xCat=4).
8. WHO. Pandemic (H1N1) 2009, World Health Organization disease outbreak news. Available at: <http://www.who.int/csr/don/en>.
9. Pan American Health Organization. Pandemic (H1N1) 2009. Available at: <http://new.paho.org/hq/index.php?lang=en>.
10. Reuters. Swine flu. Available at: <http://www.reuters.com/news/globalcoverage/swineflu>.
11. The Associated Press. Health topic news. Available at: <http://www.aparchive.com/Default.aspx>.
12. L'Agence France-Presse. International news. Available at: <http://www.afp.com/afpcom/en/taglibrary/thematic/actuality>.
13. Xinhuanet. Health world. Available at: <http://www.chinaview.cn/health/world.htm>.
14. Public Health Agency of Canada. Global Public Health Intelligence Network (GPHIN). Available at: [http://www.phac-aspc.gc.ca/media/nr-rp/2004/2004\\_gphin-rmispbk-eng.php](http://www.phac-aspc.gc.ca/media/nr-rp/2004/2004_gphin-rmispbk-eng.php).
15. European Union Commission. Medical Information System (MedISys). Available at: <http://medusa.jrc.it/medisys/homeedition/all/home.html>.