

Influenza Pandemic Preparedness In Taiwan

1. Introduction

Influenza is a highly contagious disease caused by viruses that are constantly undergoing antigenic drift. Given that influenza antibodies persist for few months only in the human body after an infection, annual influenza epidemics of various scales are commonplace in many countries. During the past century, three influenza pandemics occurred in 1918, 1957 and 1968. As recent developments abroad suggest the imminence of another pandemic, this planning document was developed to outline key pandemic preparedness measures.

Influenza pandemic is defined by the emergence of a novel influenza virus that causes outbreaks and substantial deaths in many countries. In recent years, there have been cases of human infection with avian influenza viruses H5N1, H7N7, H9N2, etc. Although it remains unclear whether and how the highly pathogenic H5N1 virus transmits between humans, many experts and WHO officials are concerned that this virus currently ravaging poultry populations in Asia would set off a human pandemic in a few years time. As a result, influenza is currently regarded as the disease with the greatest pandemic potential, and flu pandemic preparedness has become a global priority and is considered an obligation upon national governments. Under threat from an imminent flu pandemic, countries around the world – such as Britain, America, Canada, Japan, Australia and South Africa – have begun working on national preparedness plans since 1997. Given that Taiwan is not a member state of WHO, there is uncertainty as to whether it would receive a share of the global rapid response resources should a pandemic occur. Furthermore, Taiwan boasts a huge amount of cross-border activity and traffic, especially with China and Southeast Asian countries where a pandemic virus is deemed most likely to emerge. Therefore, it is vital for Taiwan to have a pandemic preparedness plan in place to ensure the health of its citizens and to avoid substantial economic loss.

2. References

Communicable Disease Control Act, policy instructions from Executive Yuan and WHO recommendations.

3. Timeframe

The Influenza Pandemic Preparedness Plan is a five-year project that runs from June 1, 2005 to May 31, 2010. The plan consists of two branch plans:

1. The branch plan of stockpiles.
2. The branch plan of mobilization.

This plan has been regularly revised and is open to public suggestions. During the pre-pandemic phase, priority is given to resource procurement and management to ensure a sufficient stockpile of disease prevention and control supplies in Taiwan, and this priority is reflected in the allocation of government funding. However, once a pandemic is declared, the government will immediately launch the branch plan of mobilization and assign an emergency funding appropriate to the magnitude of the crisis.

4. Objectives

This plan provides a comprehensive picture of the systematic mobilization of medical institutions, administrative agencies and research organizations in Taiwan during a pandemic, so that all concerned parties would gain a prior understanding of their roles and become well equipped to minimize the morbidity, mortality and socio-economic loss of a pandemic.

The objectives of this plan are informed by four overarching principles – pandemic prevention, infection control, damage mitigation and effective recovery. The main objectives in each section of the plan are as follows:

4.1 The branch plan of stockpiles

- a) Efficient supply and appropriate use of flu vaccine.
- b) Sufficient supply and proper use of antiviral agents.
- c) Adequate and appropriate stockpile of safety and protective equipment.

4.2 The branch plan of mobilization

- a) Cross-departmental coordination that harnesses different viewpoints.
- b) Integration of surveillance data and information.
- c) Development of more sophisticated and widely-applicable laboratory techniques.
- d) Enhancement in the quality of clinical medical services.
- e) Community mobilization for disease prevention and control.
- f) Improved media relations and psychological counseling for the public.

- g) Better knowledge management and integration (including international cooperation and training of professionals).

5. Implementation Strategies –The Branch Plan of Stockpiles

5.1 Efficient supply and appropriate use of flu vaccine

- a) Adequate supply of seasonal flu vaccines

Vaccination is the most effective measure for preventing influenza. However, due to resource limitations, the government has devised a priority list for vaccination based on the relative risk for influenza-related complications of different population groups. This enables limited resources to achieve maximum results in preventing influenza. The government is committed to maintaining a sufficient stockpile of flu vaccines to protect high-risk groups against seasonal influenza, which would in turn help minimize the number of complications and deaths from seasonal influenza and reduce the spread of flu viruses and the impact of epidemics. Furthermore, the government would increase its purchase of flu vaccines and broaden its definition of “high-risk groups” if warranted by global or domestic epidemic situations.

- b) Devise a novel influenza vaccine immunization plan and mapped out well and give priority to certain groups

Given that seasonal flu vaccine cannot prevent infection by novel influenza viruses and that novel influenza is likely to cause a pandemic with serious global consequences, much international effort has gone into the research and development of novel influenza vaccine. However, according to expert assessments, it will take at least 6 months for an effective vaccine to be developed and mass produced for the market against a novel influenza virus. When vaccine does become available, manufacturers might not be able to meet an explosive global demand. Therefore, once a pandemic is declared, the government must promptly identify high-risk groups and formulate a priority list for vaccination while actively seeking funding to purchase vaccine from all possible channels. Vaccination coverage will depend on the volume of vaccine acquired and the priority list developed to achieve maximum results.

5.2 Sufficient supply and proper use of antiviral agents

During the early phase of a novel influenza epidemic, when vaccine is presumably not yet available, anti-viral agents constitute the most effective measure of protection for

the public. They can effectively prevent severe complications or even death from novel influenza, thus lowering the morbidity and mortality rates of the epidemic. In 2003, Taiwan began putting into practice its policy on influenza antivirals and adopted a multi-stage approach in stockpiling antiviral agents to tackle the threat of possible epidemics. In addition to treatment, antiviral agents can also be used for prophylaxis to protect the health of frontline medical personnel and close contacts of influenza cases. Furthermore, given the likely shortage of antiviral agents in the international market during pandemic time, Taiwan will assist domestic pharmaceutical companies to research and develop the raw materials and technology necessary for manufacturing influenza antiviral agents.

5.3 Adequate and appropriate stockpile of personal protective equipment

The government is obligated to protect the safety of frontline disease control personnel. In addition to giving them proper training on self-protection before assigning them to a job, it is crucial to brief them on the use of personal protective equipment. The government must stock sufficient PPE and specify the authorities responsible for storing and managing of PPE, including N95 masks, surgical masks, P100 semi-facemasks with filters, powered air-purifying respirators (PAPR), protective clothes, etc. The government must consult with experts to determine the types of equipment needed according to the degree of danger posed by a pathogen and the procedures for operating different equipment.

6. Structure

6.1 Command Center

Once Taiwan enters phase B pandemic period, a Central Epidemics Command Center (see Figure 1) will be launched. For less severe pandemic situations of phase A1 or A2, a phase A1/A2 Pandemic Flu Prevention and Control Command Center will be set up. The government, however, must plan ahead and implement relevant preparedness measures while the pandemic situation is still at phase 0.

The Central Epidemics Command Center will be set up according to the Enforcement Regulations Governing the Central Epidemics Command Center. On the other hand, the Center for Disease Control (CDC) under the Department of Health (DOH) is responsible for planning, launching and managing the Level A1/A2 Pandemic Flu Prevention and Control Command Center and for coordinating relevant cross-departmental efforts. The center will be headed by a Commander and three Deputy-Commanders. In principle, the Commander post will be filled by CDC Director during level A1 pandemic phase. However, once the pandemic situation deteriorates to

level A2, DOH Minister becomes the Commander with CDC Director now serving as the Executive Officer.

Local authorities are responsible for local implementation of strategies specified in this document and for devising local action plans based on the overarching principles set forth in this document.

6.2 Division of Responsibilities among Government Authorities

At phase 0 pandemic situation, the Council of Agriculture serves as the primary disease control authority since there is no domestic case of human infection despite the detection of avian influenza viruses in the poultry population. During this phase, disease control efforts focus on virological surveillance and quarantine of animals, culling of infected animals, disinfection of culling sites, etc.

However, once a phase A pandemic situation is declared, the Department of Health will take over as the chief disease control authority. Phase A1 situation will be declared once human-to-human transmission of novel influenza has been confirmed overseas. Phase A2 situation will be declared if there are domestic cases of suspected animal-to-human transmission or laboratory infection of novel influenza. At phase A pandemic situations, the government must continue disease surveillance, containment and disinfection efforts in animals while activate and strengthen on a full scale the mechanisms for human epidemic control, in the realms of disease surveillance, clinical treatment, public health defense, environmental safety, public education, etc.

If the situation deteriorates further to pandemic phase B, where human-to-human transmission has been confirmed domestically, the government must respond with advanced disease control measures. A focus will be on the control of community activity, and the competent authorities must supervise the implementation of support measures at public gathering places such as schools, offices, community meeting facilities, etc. To prevent a domestic outbreak from turning into a pandemic, the government must utilize its cross-departmental command mechanism and the Central Epidemics Command Center to facilitate effective communication among agencies in their common fight against the influenza virus.

If the outbreak turns disastrous and the situation deteriorates to pandemic phase C, government agencies at all levels, including central and local authorities, must engage in more intense vertical and horizontal communication and give priority to providing proper treatment to patients and ensuring the safety of health care personnel. The major responsibilities of each authority are as follows:

- 1) Council of Agriculture (COA):
 - (a) Strengthen animal surveillance
 - (b) Determine infected areas and quarantine zones for subsequent

- implementation of disease control measures to halt disease spread
 - (c) Manage the movement of people in affected areas; conduct culling of infected animals and ensure the safety of personnel involved; carry out disinfection at culling sites and properly dispose of the carcasses
 - (d) Strengthen animal quarantine and management of smuggled animals or animal products at airports and seaports; ensure the safety of quarantine personnel involved
 - (e) Enhance quarantine of bird and poultry imports
 - (f) Assist poultry farms in building self-defense mechanisms and conduct public education campaigns on animal quarantine and preventing smuggling
 - (g) Strengthen disinfection of wholesale poultry markets, slaughtering houses and vehicles for transporting bird carcasses, and carry out associated public education campaigns
 - (h) Provide emergency relief loans to business owners affected by the pandemic
- 2) Environmental Protection Authority (EPA)
- (a) Regulate the disposal of bird carcasses after culling and provide necessary assistance
 - (b) Manage environmental contamination in areas surrounding the sites where an outbreak took place or bird carcasses were handled
 - (c) Investigate arbitrary disposal of dead poultry and birds
 - (d) Assist in the disposal of hazardous waste generated by a surge in hospital visits and admissions
- 3) Ministry of Transportation and Communications (MOTC)
- (a) Notify travel agencies of any travel warning issued by the Ministry of Foreign Affairs and ask them to act accordingly
 - (b) Supervise and coordinate disease control efforts in the public transportation sector
- 4) Coast Guard Administration (CGA)
- (a) Locate and seize smuggled animals and animal products
 - (b) Locate and capture people attempting to enter Taiwan illegally
- 5) Ministry of Education (MOE)
- (a) Supervise and help implement disease control measures in school
 - (b) Conduct school-based health education campaigns
 - (c) Coordinate the operation of university hospitals
- 6) Ministry of the Interior (MOI)
- (a) Provide police support

- (b) Regulate mass rallies, community activities, etc
 - (c) Manage matters pertaining to immigration control and people smuggling
 - (d) Perform duties pertaining to first aid and emergency relief
 - (e) Decontaminate medical and other hazardous waste
 - (f) Handle the corpses of those who died from novel influenza
- 7) Ministry of Economic Affairs (MOEA)
- (a) Supervise the provision of relief loans
 - (b) Help ensure an adequate supply of disease control materials when necessary
- 8) Ministry of Finance (MOF)
- (a) Strengthen quarantine inspection on baggage and imported goods from epidemic areas
 - (b) Priority customs clearance for essential medical equipment and drugs
- 9) Financial Supervisory Commission
- (a) Assist financial institutions in the provision of relief loans
- 10) Directorate General of Budget, Accounting and Statistics (DGBAS)
- (a) Determine the funding necessary for emergency response
- 11) Ministry of Foreign Affairs (MOFA)
- (a) Regulate entry of travelers from epidemic areas (in matters pertaining to visa application)
 - (b) Assist in the provision of health education and vaccination to people traveling to affected areas
 - (c) Notify World Health Organization of domestic developments and arrange with WHO and its collaborating centers to dispatch experts to Taiwan to help control and halt the epidemic when necessary.
 - (d) Step up efforts to gather information on epidemic situations and response measures from affected countries and regions; issue travel alerts when necessary to ensure the health and safety of Taiwanese travelers
 - (e) Strengthen communication with relevant agencies abroad to build cross-national platforms for exchanging information and resources to prevent and treat novel influenza
 - (f) Implement disease control measures in and around the Ministry, the embassy district in Taiwan and Taiwanese representative offices overseas
- 12) Government Information Office (GIO)
- (a) Assist in public health education

- (b) Communicate with overseas bureaus of Taiwanese news organizations as well as foreign correspondents based in Taiwan

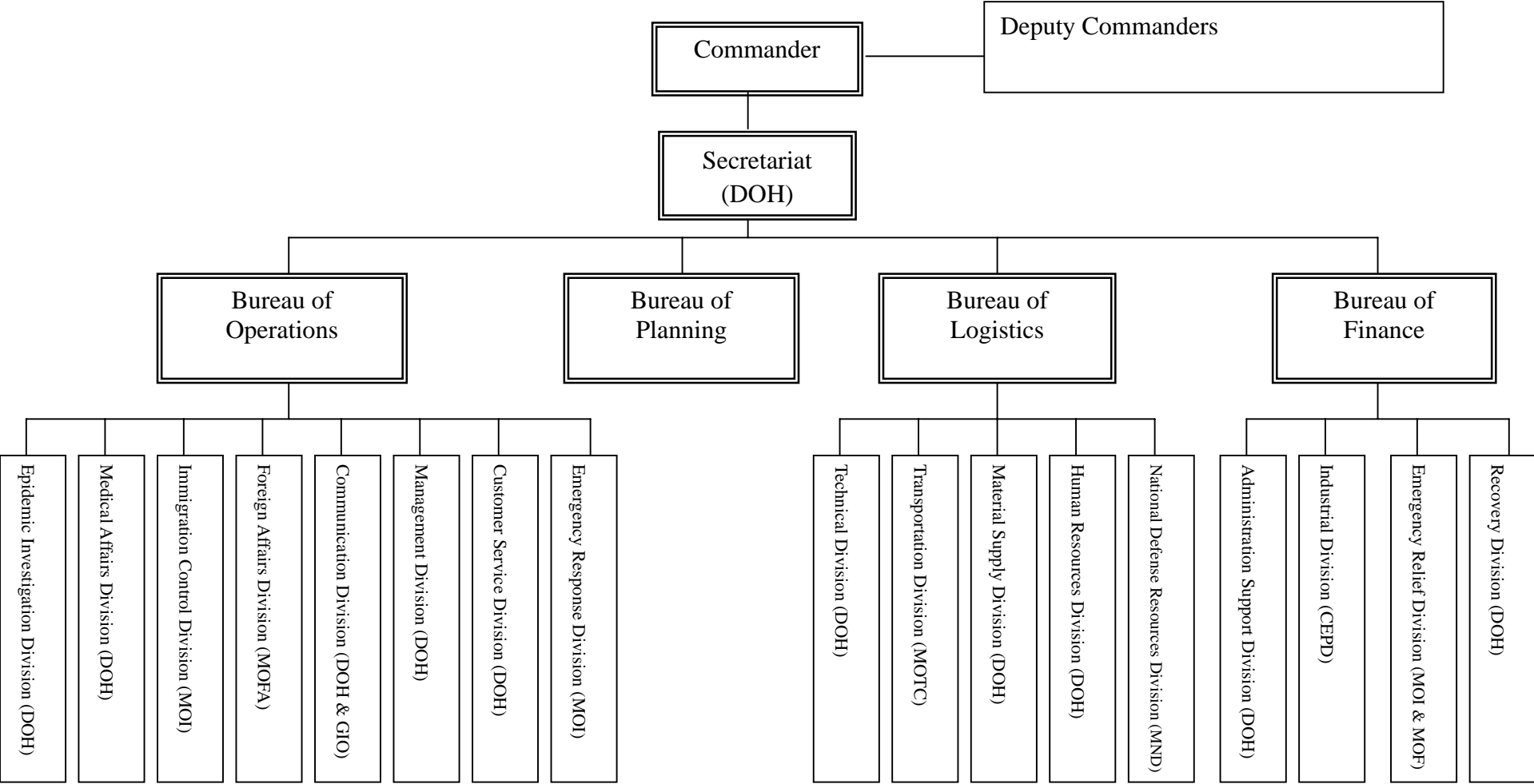
13) Ministry of National Defense (MND)

- (a) Provide manpower support for medical and disease control activities
- (b) Monitor and control disease outbreaks in the military
- (c) Coordinate the operation of military hospitals
- (d) Deploy other national defense resources to assist in epidemic control

14) Mainland Affairs Council (MAC)

- (a) Coordinate with relevant authorities in Mainland China, Hong Kong and Macau on policy matters pertaining to cross-strait exchange

Figure 1: Organization Chart of Central Epidemics Command Center



7. Projected Effects

1. **Influenza vaccination:** Vaccination can reduce the chance of developing severe complications from influenza by 50% to 60% and lower the risk of death by 80%. Even though novel influenza vaccine is not yet available, vaccination against seasonal influenza can contribute to the prevention of pandemic flu by effectively preventing simultaneous infection with avian and human flu viruses and thus possible gene swaps between the viruses. As the circulating strains of influenza virus vary from year to year, protection from flu vaccine lasts for one year only and people need to receive a shot annually.
2. **Antiviral agents:** Although vaccination is widely recognized as the most effective measure for preventing influenza, as many as half of the members of certain high risk groups, such as people over 65 years of age and nursing home residents, will fail to produce sufficient antibodies from vaccination due to a weak immune system and may still develop severe complications from influenza. For these people, antiviral agents offer another line of protection. For example, the antiviral agent Tamiflu is effective for treating influenza A and B, even with mutations in the hemagglutinin gene. In other words, it helps to fill the gap left by flu vaccine when the circulating strains are not identical with the vaccine strains or when a novel influenza virus emerges. On average, Tamiflu can reduce the duration and severity of illness by 30% and 40% respectively, at the same time lowering the possibility of severe complications from influenza by 50%. In addition, clinical data illustrate that influenza treatment with Tamiflu is economically efficient as it can save the use of antibiotics by 30%. As a result, developed nations such as the US and Japan have extended the coverage of their public insurance schemes to antiviral drugs against influenza.
3. An influenza pandemic becomes inevitable when the H5N1 avian flu virus, against which the human population has no immunity, acquires the ability to be transmitted effectively between humans. Given that influenza viruses are transmitted by droplets in the air, the avian flu virus is likely to spread rapidly once it becomes capable of human-to-human transmission. This will lead to massive demand for medical resources, and the associated financial and social costs will be impossible to estimate. US research predicts that the next flu pandemic will cause 89,000 to 207,000 deaths, 310,000 to 730,000 hospitalizations and 18 to 42 million outpatient visits in the US, and the

economic impact is estimated to be between US\$1.3 and \$170 billion.

The mortality rate from the 1997 bird flu outbreak in Hong Kong stands at 30%, much higher than the mortality rates from seasonal influenza with an average of less than 3%. The current wave of avian influenza outbreaks beginning at the end of 2003 has an even higher death rate of 70%. Based on these statistics, over 3 million people would require medical assistance and the number of deaths would be substantial should pandemic flu strike Taiwan. Given that the estimated mortality rate from pandemic flu is 3 to 7 times of the P&I death rates during the inter-pandemic period, the government is obligated to do everything in its power to save precious lives and to protect the citizens.

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