Preparedness and Contingency Planning in Response to COVID-19 Epidemic

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Ministry of Health and Welfare

Taiwan CDC

February 28th, 2020

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I. Preface

The COVID-19 epidemic which first started in Wuhan, the capital of Hubei province, China, has received immense international attention. In order to ensure adequate security measures regarding disease prevention and stay on constant vigilance against this epidemic, Taiwan CDC has formulated this plan based on experience from past international epidemics including H7N9, Ebola, MERS and Zika outbreaks. The proposal consists of two phases, "Preparedness" and "Contingency Planning" depending on global epidemic situations. "Contingency Planning" is further stratified into four levels according to the risk and extent of the outbreak. Each level would correspondingly activate different epidemic command systems as well as preventive measures. The aim of this plan is to prevent disease outbreak in Taiwan and to safeguard the health and well-being of Taiwanese citizens.

II. Legal Basis

A. Articles 5 & 6 of the Communicable Disease Control Act
B. Enforcement Regulations Governing the Central Epidemics Command Center

III. Aim

A. To establish activation protocols for preparation and contingency planning in response to the COVID-19 epidemic.
B. To strengthen Taiwan’s preparation strategies and actions taken against the COVID-19 epidemic.
C. To effectively prevent domestic COVID-19 outbreaks to ensure the health and well-being of Taiwanese citizens.

IV. Activation Protocol for Preparedness and Contingency Planning

Prevention strategies consist of two phases, "Preparedness" and "Contingency Planning" depending on global epidemic situations.

The first phase "Preparedness" is activated when suspected cases of COVID-19 have been reported in neighboring countries but without ongoing community transmission. All preparedness strategies will be carried out.

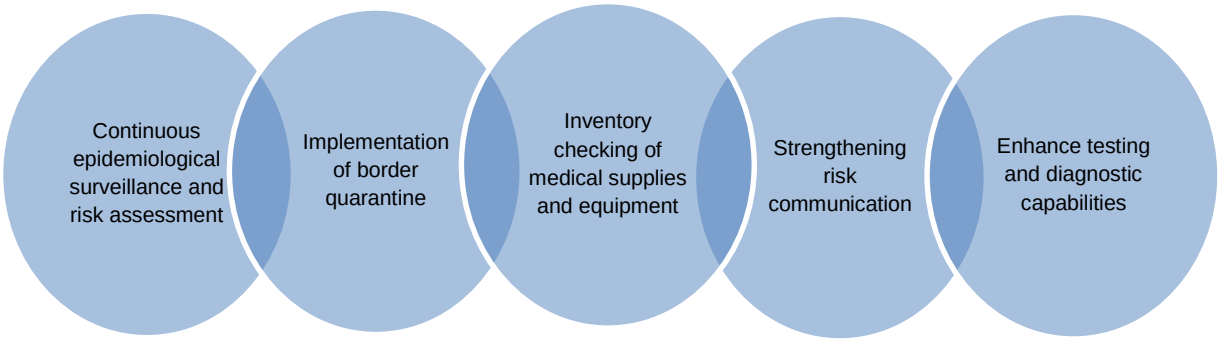
The second phase "Contingency Planning" is activated during an ongoing, spreading epidemic, after the first phase “Preparedness”. It is further stratified into four levels according to the risk and extent of the outbreak. Each level would correspondingly

activate different epidemic command systems as well as preventive measures, please refer to Table 1 for details.

V. Preparedness Planning in Taiwan: Strategies

When suspected cases of COVID-19 have been reported in neighboring countries but without ongoing community transmission, the first phase "Preparedness" shall be activated. Major measures aimed at effectively blocking the epidemic include the following, as illustrated in Figure 1: continuous epidemiological surveillance and risk assessment, implementation of border quarantine, strengthening risk communication, and inventory checking of medical supplies and equipment.

Fig. 1 Preparedness Planning Strategies in Taiwan



A. Continuous epidemiological surveillance and risk assessment

1. Actively gather and organize information on the COVID-19 epidemic via various sources. Carry out domestic risk assessment based on risks of imported cases, community outbreaks, and social as well as healthcare impact.
2. Update international travel suggestions according to the extent of the epidemic if necessary. Initiate inter-ministerial integration and mobilization, hold joint meetings and discussion sessions, and activate epidemic command systems whenever necessary.
3. Complete review of the surveillance system to ensure monitoring efficiency and that each suspected case is closely followed up.

B. Implementation of border quarantine

1. Enforce fever screening for inbound passengers and crew members, and provide health assessment at all international ports of entry.
2. Strengthen border quarantine at all airports and harbors. Activate on-board quarantine for aircrafts and vessels as well as on-the-spot compulsory transfer to hospital (medical evacuation) when necessary. Run virtual or live drills.

C. Inventory checking of medical supplies and equipment

1. Inventory checking of personal protective equipment (PPE), ensure enough supply to meet healthcare facilities' and citizens' demand during an outbreak.
2. Run drills on distributing medical supplies and equipment, aimed at expediting provision of urgent demands in times of need.
3. Collect and organize information worldwide regarding COVID-19 treatment strategies and relevant pharmacological data.

D. Strengthening risk communication

1. Update the latest information through multiple channels.
2. Release news reports or hold press conferences depending on the extent of the epidemic to notify the public of the current situation and tackling strategies.
3. Track public opinion continuously and proactively respond or clarify when necessary. This is to ensure distribution of correct information and to timely respond to public reactions and viewpoints.

E. Enhance testing and diagnostic capabilities

1. Inventory checking of reagents, consumables, as well as laboratory equipment required for specimen collection, handling, and diagnostic testing of the pathogen (SARS-CoV-2) to ensure smooth diagnostic workflow in times of epidemic.
2. Establish standard COVID-19 testing workflow and relevant protocols, closely monitor testing quality so as to ensure accuracy and efficiency.
3. Proactively monitor the ongoing international epidemic. Identify key pathogen features and improvise testing techniques accordingly.
4. Assemble and coordinate a nationwide network of testing facilities. Prepare for immediate expansion of testing capabilities under emergent situations.

Table 1 : Four levels of command unit activation protocols corresponding to different extent of outbreak and risk assessment

Level	Extent of outbreak and risk assessment	Command unit activation protocol
IV	COVID-19 epidemic confirmed in Wuhan, China	Organize contingency team
III	Evident ongoing community spreading of COVID-19 in Wuhan, China	Establish Central Epidemics Command Center (CECC), appoint Taiwan CDC Director as Chief Commander
II	Confirmed imported cases of COVID-19 in communities in Taiwan	Establish Central Epidemics Command Center (CECC), appoint Minister of Health and Welfare as Chief Commander
I	Community spreading of COVID-19 in Taiwan	Establish Central Epidemics Command Center (CECC), appoint Premier as Chief Commander

VI. Contingency Planning in Taiwan: Strategies

During an ongoing, spreading epidemic, the second phase "Contingency Planning" shall be activated after the “Preparedness” phase. Several strategies, based on the risk and extent of the outbreak, should be applied to effectively prevent further spreading and local transmission, as illustrated in Figure 2: continuous epidemiological surveillance and risk assessment, tightening border quarantine, perfecting the healthcare system, allocation and management of medical supplies and equipment, enhance testing and diagnostic capabilities, constant risk communication, community-based epidemic prevention, epidemiological investigation, and developing international collaboration.
All strategies should be constantly modified and reviewed based on current status.

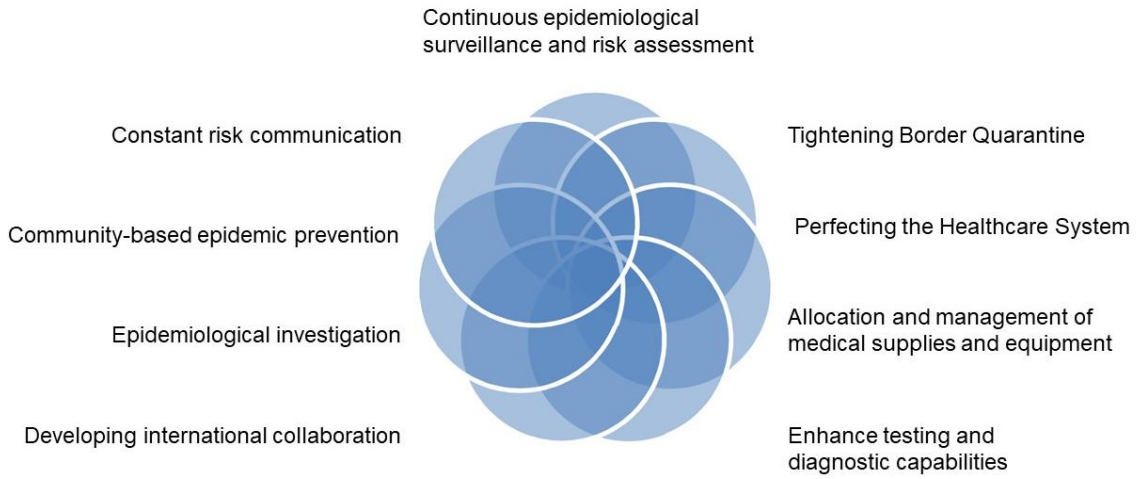


Fig. 2 Contingency Planning in Taiwan: Strategies

A. Continuous epidemiological surveillance and risk assessment

1 Strengthen disease surveillance systems
Gathering the latest international and domestic epidemiological data can aid in early detection of Public Health Emergency of International Concern (PHEIC) and update Taiwan CDC Travel Health Notices accordingly. Integrating various surveillance systems regarding notifiable communicable diseases, Taiwan CDC-contracted laboratories, patient symptoms, mortality cases associated with pneumonia or influenza, as well as border quarantine would likewise offer valuable information.

2 Establish mechanisms for domestic risk assessment
Rapid risk assessment is conducted in a stepwise manner through collecting case information, reviewing past literature, evaluating current domestic COVID-19 infection, and organizing the aforementioned evidence-based data. The risks of imported cases, community spreading, and overall impact can subsequently be graded as Level 1 (low), 2 (middle), and 3 (high) according to risk probability and severity. Such risk stratification constitutes a comprehensive evaluation of the current epidemic and would help guide further recommendations. Contingency measures, resource allocation, and risk communication strategies targeting different populations would also be adjusted accordingly, so as to minimize damages caused by the epidemic.

1. Define reporting requirements for COVID-19 in closely monitored cases (person under investigation, PUI)
Collect and organize the latest epidemiological data and information worldwide regarding COVID-19, both clinical and epidemiological. In

combination with experts' opinion and consensus, establish and constantly update the reporting requirements of COVID-19 in closely monitored cases (person under investigation, PUI) to better detect positive patients.

3 Activate surveillance system for newly reported cases
   (1). When a case meets the reporting requirements for COVID-19, it is mandatory that doctors report it within 24 hours. The report should be submitted online or in written form. If necessary, the report can be handed in after informing the district public health bureau through phone call, e-mail, or fax first.
   (2).Doctors can report online via the "Mandatory Communicable Disease Reporting System" - "Version for Clinics" (https://ida4.cdc.gov.tw/hospital/). Reporting through a written form ("Notifiable Disease Report Form"), phone call, e-mail, or fax to the district public health bureau is also acceptable.
   (3).The district public health bureau is responsible for reporting cases to the Taiwan CDC, either by reviewing information submitted online by doctors, or report the case via the "Mandatory Communicable Disease Reporting System" - "Version for PHB" (https://ida4.cdc.gov.tw/phb/) if the initial report was done by phone call, e-mail, or fax. Specimens including nasopharyngeal swab, sputum, and serum should be collected and sent to the Taiwan CDC Center for Research, Diagnostics, and Vaccine Development, while the entire process should meet standards for sample collection, handling, and transfer. Please refer to Taiwan CDC "Recommendations for COVID-19: Case Definition, Specimen Collection, and Diagnostic Tests" for more details.

B. Tightening Border Quarantine

1. Collecting and updating the latest quarantine strategies of other countries as reference for adjustment of current quarantine measures. High-risk flights between Taiwan and epidemic regions should also be routinely evaluated.
2. Promoting disease awareness among inbound/outbound travelers at ports of entry
   (1.) Employ multimedia devices (posters, electrical signage, electronic scroll, internet... etc.) to promote disease awareness at fever screening stations, airport and harbour terminals, as well as pre-travel clinics.
   (2.) Offer the latest information on epidemic and disease awareness to CIQS (Customs, Immigration, Quarantine, Security) personnel at ports of entry and to those working in the travel or transportation industries. This can be channeled through Safety and Health Units at ports of entry or Taiwan CDC Travel Health Quicknews. Broadcast or leaflets on aircrafts may also be employed if necessary.
3. Implementing and upgrading border quarantine measures when necessary

(1.)Enhance fever screening and health evaluation for inbound travelers from epidemic regions. On-board quarantine is required for direct flights from these regions.

(2.)Travelers meeting the criteria of on-the-spot compulsory transfer to hospital (medical evacuation) will be transferred to contracted hospital for further evaluation. For travelers who do not meet the criteria, they should still seek medical advice within 24 hours, and would be followed up by public health authorities on their health status.

(3.)Per the “Communicable Disease Control Act” and the “Regulations Governing Quarantine at Ports”, as epidemic risks continue to increase, cruise ship or ferry doctors are requested to promote disease awareness among passengers on board and to truthfully report any abnormal health conditions on board.

C. Perfecting the Healthcare System

1. Improve Infection Prevention and Control (IPC) measures

(1.)Based on relevant international guidelines, the “Infection Prevention and Control (IPC) Guidelines in Response to COVID-19” formulated by Taiwan CDC has been published online. Healthcare facilities are advised to post relevant information at noticeable locations to facilitate understanding of the epidemic among the general public.

(2.)Offer checklists, guidelines, and other advisory documents to healthcare facilities in response to the COVID-19 epidemic

- “Checklist for Hospital Preparedness Planning in Response to COVID-19 Epidemic”:
  Provide hospitals with instructions to self-assess preparedness and contingency planning, which includes reviewing epidemic prevention measures. District public health bureaus and professional societies should supervise and assist hospitals in the process. Random inspections can be conducted if necessary.
- “Self Assessment Form for Healthcare Personnel Preparedness in Response to COVID-19 Epidemic” :
  Encourage healthcare personnel to self-assess their preparedness. Supervisors from district public health bureaus as well as relevant professional societies should be involved in the effort.
- Encourage healthcare facilities to organize education and training sessions for correctly donning and removing personal protective equipment (PPE). Available teaching materials include “Standard Operating Procedure for PPE donning”, “Standard Operating Procedure for PPE removing”, and “Recommendation for PPE use”.

(3.)Hospitals and clinics are required to formulate plans for contingency planning in response to the COVID-19 epidemic, and to conduct virtual or live drills. Clinics should establish standard workflow on transferring suspected cases to hospitals, while random inspections would be conducted by district public health bureaus.

(4.)Hospitals and clinics are advised to establish measures for diverting patients in emergency rooms and outpatient clinics, and may refer to Taiwan CDC "Infection Prevention and Control (IPC) Guidelines for Healthcare Facilities in Response to COVID-19" for further details.

2. Contingency measures of the Communicable Disease Control Medical Network

(1) Designated commanders and co-commanders

Currently, six regions of the Communicable Disease Control Medical Network are established nationwide, essentially forming a tight zone defense network. In addition, the Ministry of Health and Welfare has designated a commander and co-commander for each region. The commander and co-commander are responsible for dispatching medical resources and leading efforts in response to epidemics.

(2) Designated hospitals for quarantine/emergency response/assistance

The quarantine hospitals of each city (county), emergency response hospitals of each medical network, city (county), and offshore islands, as well as the assisting hospitals are designated through joint evaluation by central and local health authorities based on the characteristics of each administrative area, distribution of healthcare facilities, available manpower and equipment at each hospital, and the inpatient and outpatient capacities of each hospital.

Each designated hospital isolates and treats patients according to its role and function within the medical network, so as to effectively concentrate medical resources in order to optimize treatment for confirmed COVID-19 cases.

3. Integrating all available medical resources

Continue to proactively integrate healthcare facilities of the six regions of the Communicable Disease Control Medical Network with existing emergency medical service networks and regional divisions of the National Health Insurance Administration. Based on an all hazards prevention and protection

strategy, healthcare services for severe cases of COVID-19 are provided by the emergency medical service networks to unify command and to standardize allocation of critical care resources, including ICU beds and ventilators.

4. Establish clinical expert advisory council

The clinical consultation group, or expert advisory council, can offer treatment advice for clinical doctors caring for COVID-19 patients when necessary. When necessary, clinical case conferences may be held to facilitate discussion of treatment experiences in order to minimize mortality and morbidity.

D、Allocation and management of medical supplies and equipment

1. Personal protective equipment (PPE) reserve

(1) Health authorities and healthcare facilities at all levels should maintain at least a 30-day reserve of personal protective equipment (PPE). The equipment should be properly stored, while education and training sessions regarding PPE use should be held in accordance with relevant IPC guidelines.
(2) Local health authorities are responsible for supervising the management and storage of PPE at healthcare facilities within the same administrative area. Drills focusing on distribution and allocation of medical supplies should be held based on domestic epidemic situations, so as to timely fulfill the needs of local healthcare facilities and communities in the event of an ongoing outbreak.
(3) Central health authorities should maintain a safety reserve of PPE as well as keeping communication channels and logistics open for medical supply chains. Make emergency purchases or distribute emergency medical supplies and equipment if necessary, so as to ensure no PPE shortage or difficulties in resource allocation arises during an epidemic.

2. Other protective equipment and capacities reserve

Based on past experiences on epidemic prevention, begin preparations for other relevant measures in advance. (e.g., routine maintenance of spray trucks, evaluation of the capacity and protective measures required for large-scale corpse disposal, as well as the ability to provide palliative or supportive care).

3. Therapeutic drugs reserve

Collect and organize information worldwide regarding COVID-19 treatment strategies and relevant pharmacological data. Make emergency purchases or distribute emergency therapeutic drugs when necessary. Legally expropriate the pharmaceutical manufacturers when necessary.

E、 Enhance testing and diagnostic capabilities

1. Expanding laboratory testing capacities

Preparedness planning for reagents, consumables, as well as laboratory equipment required for specimen collection, handling, and diagnostic testing of the pathogen (SARS-CoV-2), make emergent purchases to expand testing capacities if necessary. Establish standard protocols for the aforementioned procedures.

2. Defining standard diagnostic tests and workflows

The Taiwan CDC Center for Research, Diagnostics, and Vaccine Development has established standard diagnostic tests and workflows under different testing scenarios based on genome sequences of the pathogen (SARS-CoV-2). These protocols will be constantly reviewed and updated.

3. Activating nationwide network of designated testing facilities to further expand laboratory testing capacities

The Taiwan CDC (Centers for Disease Control) can handle approximately 100 specimens per day. According to law, currently laboratories of 8 medical centers in Taiwan are eligible to become designated testing facilities, and could further handle around 300 specimens per day, adding to the existing diagnostic capacity. The National Laboratory of Taiwan CDC will also initiate shift works on holidays if necessary.

4. Strengthening laboratory staff training

The National Laboratory of Taiwan CDC is responsible for conducting educational training and competence evaluation of all laboratory staff nationwide to ensure consistent test quality across all designated testing facilities. All testing must follow standard protocols published by the Taiwan CDC.

F、Constant risk communication

1. Promote disease awareness through various approaches aimed at targeting different populations. Encourage the general public to adopt IPC measures (e.g., regular hand washing, cough etiquette, and respiratory hygiene) into daily lives.

2. Make use of various approaches (e.g., the Official Website of Taiwan CDC, Taiwan CDC Travel Health Quicknews, toll-free Infection Control Hotline 1922, fever screening stations, policy announcement at ports of entry, circular letters to healthcare communities, latest information releases through Facebook, Line, and Instagram) for risk communication. Organize awareness campaigns, industrial cooperation events, or online live streaming if necessary.

3. Strengthen communication with the media. Regularly issue press releases and hold press conferences to explain current epidemic situations and corresponding measures. In addition, track public opinion continuously and proactively respond or clarify when necessary to avoid any misunderstanding or panic among the general public, and to effectively preserve community capacities.

4. Promote business continuity planning for all institutions and industries so as to facilitate their understanding of possible effects by the ongoing epidemic, as well as their social responsibilities during this time.

G、Community-based epidemic prevention

1. In-coming travelers

Travelers with symptoms of COVID-19 arriving on direct flights from Wuhan or with travel history to Wuhan must be evaluated. Those meeting the criteria of on-the-spot compulsory transfer to hospital (medical evacuation) will be transferred to contracted hospital for further evaluation. For travelers who do not meet the criteria, they should still seek medical advice within 24 hours, and would be followed up by public health authorities on their health status.

2. Community cases

Community cases meeting one or more of the epidemiological criteria (please refer to Taiwan CDC “Recommendations for COVID-19: Case Definition,

Specimen Collection, and Diagnostic Tests" for details) and has developed clinical symptoms of acute respiratory infection should put on surgical masks and dial the 1922 Hotline. Seek medical advice under the assistance of local health unit staff, and inform the doctor of detailed travel and residency history.

3. Follow up and management of suspect cases and contacts

For inbound travelers and suspected community cases or contacts, establish various supporting measures and relevant documents including "Recommendations for COVID-19: Case Definition, Specimen Collection, and Diagnostic Test", "Workflow for Management of Suspected COVID-19 Cases", "Person Under Investigation (PUI) Case Report Form for COVID-19", "Notice on the Self-Management of Health of COVID-19". Thorough notification, follow-up, quarantine, and self-health management measures of the suspected cases are aimed at effectively preventing the COVID-19 epidemic from spreading.

H、Epidemiological investigation

1. Standardizing documents pertaining to epidemiological investigation

Establish and revise the relevant epidemiological investigation documents based on the latest available epidemiologic information, literature and information offered by Field Epidemiology Training Program (FETP) personnel from neighboring countries. The content of the "Person Under Investigation (PUI) Case Report Form for COVID-19" should include clinical symptoms, potential exposure sources, and contact tracing. Through standardization of documents, our goal is to accurately obtain key epidemiological data to expedite further identification of cases, as well as diagnosis and treatment.

2. Improve epidemiological investigation quality

During the early stages of the epidemic, epidemiological investigation should be carried out by doctors appointed by the Taiwan CDC or by professionals who have completed the Field Epidemiology Training Program (FETP), so as to strengthen the completeness and correctness of collected information.

I、Developing international collaboration

1. Participate in major international conferences/activities

Participate in related major international conferences and activities through various channels, visit foreign national health institutions, and dispatch

medical teams for health diplomacy. In addition, actively collaborate with neighboring countries to establish communication channels.

2. Staff training

Organize staff training programs based on the epidemic situation in order to improve disease surveillance, risk assessment, quarantine, laboratory testing, as well as preparedness and contingency planning. Our goal is to keep pace with the international community and establish channels for international collaboration, which is essential in the fight against COVID-19.

VII、 Assignment of responsibilities

1. Activation protocols of the contingency command system, corresponding strategies, and responsibilities of Taiwan CDC

Please refer to Table 1 for details.

2. Grading of epidemic severity and corresponding contingency measures taken by relevant governmental ministries and agencies

To strengthen Taiwan’s contingency planning in response to COVID-19 and to integrate all available resources for disease prevention and control, please refer to Table 2 for contingency measures taken by relevant governmental ministries and agencies based on grading of epidemic severity.