

### Preparedness and Contingency Responses of Healthcare System to COVID-19 in Taiwan, 2020

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#### Abstract

The outbreak of pneumonia caused by novel coronavirus in Wuhan, China began at the end of 2019. World Health Organization named the virus as coronavirus disease 2019 (COVID-19). Afterwards, the pandemic of COVID-19 hit countries worldwide and outbreaks of healthcare-associated infection occurred. The pandemic of COVID-19 is a rigorous challenge to public health and healthcare system in Taiwan. To strengthen the preparedness and response capacity of healthcare system, Taiwan developed 10 contingency strategies for healthcare facilities, long-term care facilities, and laboratories, to reach three major goals: “mitigation of the transmission”, “maintenance of the healthcare system operation”, and “reduction of severe and death cases”. The 10 contingency strategies included: (1) strengthening infection control and biosafety; (2) conducting un-notified on-site inspections and drills on medical responses; (3) tracing and identifying persons at-risk via National Health Insurance database; (4) implementing patient triage and decentralizing in-patients; (5) preparing response hospitals and designated wards; (6) constructing national testing networks; (7) monitoring capacity of healthcare system; (8) expanding capacity of quarantine places; (9) managing visitors to hospitals; and (10) monitoring health status of healthcare workers.

**Keywords:** Coronavirus disease 2019, healthcare facilities, long-term care facilities, contingency responses, infection control

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# Covid-19: Global Progress in Developing Vaccines and Mechanisms for Equitable Distribution

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## Abstract

The serious unique infectious pneumonia (COVID-19), caused by the new coronavirus (SARS-coV-2) in Wuhan, China in late 2019, has rapidly spread and become a global pandemic. It resulted in crises menacing people's health, lives, international engagement and economic systems. Thus, a vaccine holds most potential for a rapid means of resolving the pandemic before the end of 2021. There are 23 different candidate vaccines worldwide that have entered into clinical trials. Among them, the two that have progressed the fastest are Sinovac Biotech's inactivated vaccine and the recombinant vaccine (ChAdOx1-S) developed by Oxford University, which are already in the third phase of clinical trials. In late April 2020, WHO, EU and the Bill and Melinda Gates Foundation launched the ACT Accelerator Plan to acquire more COVID-19 tools. Also, GAVI, CEPI and WHO are jointly promoting the COVAX Facility, responsible for coordinating and integrating resources among worldwide vaccine developers and manufacturers. In addition to assuming risks of vaccine development, they also provide early investment in candidate vaccine products. These efforts increase chances of successful vaccine development as they expedite safe, efficient development and mass manufacturing of COVID-19 vaccines. This will result in the common goal of equitable distribution of vaccines for every nation.

**Keywords:** COVID-19, vaccine, ACT Accelerator

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# The Development of Pharmacological Treatment for COVID-19

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## Abstract

Facing the pandemic of emerging infectious diseases, in addition to non-pharmaceutical interventions, an effective drug can slow the spread of the epidemic and reduce the impact, which is an important weapon before the vaccine coming to fruition. Initially, the research of COVID-19 drug treatment was mainly based on the experience and development of the treatment for other coronavirus infections (SARS, MERS), for example, remdesivir, hydroxychloroquine/chloroquine, lopinavir/ritonavir and interferon. According to the result of the latest large randomized clinical trial, Taiwan Food and Drug Administration had conditionally approved remdesivir on May 30, 2020, for the treatment of severe SARS-CoV-2 infection. Although the virus was cleared in the initial small-scale studies of hydroxychloroquine/chloroquine treatment, a larger retrospective study found that hydroxychloroquine did not reduce the risk of death or intubation in patients with SARS-CoV-2 infections, furthermore, might cause side effects. Low-dose steroids (dexamethasone) was found to reduce the risk of mortality among patients with severe SARS-CoV-2 infections, which was currently the treatment option with the strongest scientific evidence. Before the best treatment evidence appears, medical personnel should avoid being affected by rumors or exaggerated messages, and should provide experimental treatments with the best available evidence, ethical approval and patient's informed consent. The government and scientific societies should also systematically collect patients' treatment information and effectively analyze these valuable treatment experiences.

**Keywords:** SARS-CoV-2, emerging infectious diseases, treatment, clinical trial, pandemic

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week 31–32(Jul.26–Aug.8, 2020)

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Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

| Case diagnosis year                   |   | Week 31★ |      | Week 1–31    |                |              |                |
|---------------------------------------|---|----------|------|--------------|----------------|--------------|----------------|
| Classification                        | Disease Diagnosed                                 | 2020     | 2019 | 2020         |                | 2019         |                |
|                                       |   |          |      | Total cases★ | Imported cases | Total cases★ | Imported cases |
| Category I                            | Plague  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Rabies  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | SARS  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Smallpox  | 0        | 0    | 0            | 0              | 0            | 0              |
| Category II                           | Acute Flaccid Paralysis                           | 0        | 2    | 18           | 0              | 39           | 0              |
|                                       | Acute Viral Hepatitis type A                      | 2        | 1    | 51           | 7              | 54           | 15             |
|                                       | Amoebiasis  | 4        | 4    | 146          | 79             | 202          | 109            |
|                                       | Anthrax   | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Chikungunya Fever                                 | 0        | 6    | 3            | 3              | 25           | 24             |
|                                       | Cholera   | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Dengue Fever                                      | 12       | 30   | 76           | 62             | 358          | 294            |
|                                       | Diphtheria  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Enterohemorrhagic E. coli Infection               | 0        | 0    | 0            | 0              | 1            | 0              |
|                                       | Epidemic Typhus Fever                             | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Hantavirus Pulmonary Syndrome                     | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Hemorrhagic Fever with Renal Syndrome             | 0        | 0    | 8            | 0              | 0            | 0              |
|                                       | Malaria   | 0        | 0    | 1            | 1              | 2            | 2              |
|                                       | Measles   | 0        | 4    | 2            | 2              | 112          | 45             |
|                                       | Meningococcal Meningitis                          | 0        | 0    | 5            | 0              | 2            | 0              |
|                                       | Paratyphoid Fever                                 | 0        | 2    | 0            | 0              | 5            | 4              |
|                                       | Poliomyelitis                                     | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Rubella   | 0        | 0    | 0            | 0              | 19           | 15             |
| Shigellosis                           | 0   | 4        | 94   | 21           | 89             | 32           |                |
| Typhoid fever                         | 0   | 1        | 5    | 3            | 18             | 14           |                |
| West Nile Fever                       | 0   | 0        | 0    | 0            | 0              | 0            |                |
| Zika virus infection                  | 0   | 1        | 2    | 2            | 2              | 2            |                |
| Category III                          | Acute Viral Hepatitis type B                      | 2        | 6    | 55           | 2              | 65           | 3              |
|                                       | Acute Viral Hepatitis type C                      | 16       | 11   | 381          | 3              | 362          | 2              |
|                                       | Acute Viral Hepatitis type D                      | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Acute Viral Hepatitis type E                      | 0        | 0    | 7            | 0              | 7            | 3              |
|                                       | Congenital Syphilis                               | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Congenital Rubella Syndrome                       | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Enteroviruses Infection with Severe Complications | 0        | 1    | 7            | 0              | 25           | 1              |
|                                       | Haemophilus Influenza type b Infection            | 0        | 1    | 3            | 0              | 1            | 0              |
|                                       | Japanese Encephalitis                             | 3        | 2    | 19           | 0              | 19           | 2              |
|                                       | Legionnaires' Disease                             | 5        | 6    | 156          | 8              | 165          | 12             |
|                                       | Mumps   | 10       | 11   | 286          | 6              | 360          | 4              |
|                                       | Neonatal Tetanus                                  | 0        | 0    | 0            | 0              | 0            | 0              |
| Pertussis                             | 0   | 0        | 8    | 0            | 22             | 0            |                |
| Tetanus                               | 0   | 0        | 6    | 0            | 1              | 0            |                |
| Category IV                           | Botulism  | 0        | 0    | 1            | 0              | 0            | 0              |
|                                       | Brucellosis                                       | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Complicated Varicella                             | 0        | 4    | 30           | 0              | 40           | 1              |
|                                       | Endemic Typhus Fever                              | 1        | 1    | 11           | 0              | 13           | 1              |
|                                       | Herpesvirus B Infection                           | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Influenza Case with Severe Complications          | 0        | 56   | 548          | 6              | 1301         | 6              |
|                                       | Invasive Pneumococcal Disease                     | 0        | 7    | 160          | 0              | 267          | 2              |
|                                       | Leptospirosis                                     | 2        | 6    | 29           | 0              | 46           | 0              |
|                                       | Listeriosis                                       | 0        | 1    | 85           | 0              | 116          | 1              |
|                                       | Lyme Disease                                      | 0        | 0    | 0            | 0              | 1            | 1              |
|                                       | Melioidosis                                       | 1        | 5    | 9            | 1              | 12           | 0              |
|                                       | Q Fever   | 1        | 0    | 11           | 0              | 14           | 2              |
|                                       | Scrub Typhus                                      | 11       | 13   | 216          | 1              | 266          | 3              |
| Toxoplasmosis                         | 3   | 0        | 5    | 0            | 8              | 0            |                |
| Tularemia                             | 0   | 0        | 0    | 0            | 0              | 0            |                |
| Category V                            | Ebola Virus Disease                               | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Lassa Fever                                       | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Marburg Hemorrhagic Fever                         | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Middle East Respiratory Syndrome                  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Coronavirus Infections                            | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Novel Influenza A Virus Infections                | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Rift Valley Fever                                 | 0        | 0    | 0            | 0              | 0            | 0              |
| Severe Pneumonia with Novel Pathogens | 16  | -        | 474  | 419          | -              | -            |                |
| Yellow Fever                          | 0   | 0        | 0    | 0            | 0              | 0            |                |

- ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
- MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
- Numbers of mumps and tetanus cases are summed up by the week of report.
- Since 2020/1/15, "Severe Pneumonia with Novel Pathogens" was listed as a Notifiable Infectious Disease.

## Suspected Clusters

- Ten clusters related to diarrhea (7), tuberculosis (2), and upper respiratory tract infection (1) were reported during week 31.

## Imported Infectious Diseases

- There were 17 imported cases from 7 countries/areas during week 31.

| Diseases \ Countries/Areas            | Philippines | South Africa | Indonesia | USA | Lesotho | Guatemala | Hong Kong | Total |
|---------------------------------------|-------------|--------------|-----------|-----|---------|-----------|-----------|-------|
| Severe Pneumonia with Novel Pathogens | 9           | 2            |           | 1   | 1       | 1         | 1         | 15    |
| Dengue Fever                          |             |              | 1         |     |         |           |           | 1     |
| Amoebiasis                            |             |              | 1         |     |         |           |           | 1     |
| Total                                 | 9           | 2            | 2         | 1   | 1       | 1         | 1         | 17    |

- As of week 31, there were 620 imported cases from 49 different countries. The top 3 countries are Indonesia (120), USA (94), UK (72).
- The three notifiable diseases with the highest number of imported cases are Severe Pneumonia with Novel Pathogens (419), Amoebiasis (79), Dengue Fever (62).

## Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens** : Due to the severe international epidemic status, the imported cases increase. The risk of acquiring SARS-CoV-2 infection in Taiwan is expected to raise.
- **Dengue Fever** : There has been one indigenous cluster in northern Taiwan, the risk of dengue fever is expected to raise.
- **Japanese Encephalitis** : Taiwan is in the midst of Japanese Encephalitis season. Every county in Taiwan is at risk of infection.
- **Scrub Typhus** : Taiwan is in the midst of Scrub Typhus season, both eastern Taiwan and outlying islands are high risk area.

### Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

| Case diagnosis year                   |   | Week 32★ |      | Week 1–32    |                |              |                |
|---------------------------------------|---|----------|------|--------------|----------------|--------------|----------------|
| Classification                        | Disease Diagnosed                                 | 2020     | 2019 | 2020         |                | 2019         |                |
|                                       |   |          |      | Total cases★ | Imported cases | Total cases★ | Imported cases |
| Category I                            | Plague  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Rabies  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | SARS  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Smallpox  | 0        | 0    | 0            | 0              | 0            | 0              |
| Category II                           | Acute Flaccid Paralysis                           | 0        | 0    | 18           | 0              | 39           | 0              |
|                                       | Acute Viral Hepatitis type A                      | 2        | 3    | 52           | 7              | 57           | 16             |
|                                       | Amoebiasis  | 4        | 4    | 150          | 81             | 206          | 110            |
|                                       | Anthrax   | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Chikungunya Fever                                 | 0        | 3    | 3            | 3              | 28           | 27             |
|                                       | Cholera   | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Dengue Fever                                      | 0        | 16   | 76           | 62             | 374          | 306            |
|                                       | Diphtheria  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Enterohemorrhagic E. coli Infection               | 0        | 0    | 0            | 0              | 1            | 0              |
|                                       | Epidemic Typhus Fever                             | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Hantavirus Pulmonary Syndrome                     | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Hemorrhagic Fever with Renal Syndrome             | 0        | 0    | 8            | 0              | 0            | 0              |
|                                       | Malaria   | 0        | 0    | 1            | 1              | 2            | 2              |
|                                       | Measles   | 0        | 1    | 2            | 2              | 113          | 46             |
|                                       | Meningococcal Meningitis                          | 0        | 0    | 5            | 0              | 2            | 0              |
|                                       | Paratyphoid Fever                                 | 0        | 0    | 0            | 0              | 5            | 4              |
|                                       | Poliomyelitis                                     | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Rubella   | 0        | 1    | 0            | 0              | 20           | 16             |
|                                       | Shigellosis                                       | 2        | 0    | 96           | 21             | 89           | 32             |
| Typhoid fever                         | 0   | 0        | 5    | 3            | 18             | 14           |                |
| West Nile Fever                       | 0   | 0        | 0    | 0            | 0              | 0            |                |
| Zika virus infection                  | 0   | 0        | 2    | 2            | 2              | 2            |                |
| Category III                          | Acute Viral Hepatitis type B                      | 4        | 2    | 59           | 2              | 67           | 3              |
|                                       | Acute Viral Hepatitis type C                      | 10       | 9    | 391          | 3              | 371          | 2              |
|                                       | Acute Viral Hepatitis type D                      | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Acute Viral Hepatitis type E                      | 0        | 0    | 7            | 0              | 7            | 3              |
|                                       | Congenital Syphilis                               | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Congenital Rubella Syndrome                       | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Enteroviruses Infection with Severe Complications | 0        | 0    | 7            | 0              | 25           | 1              |
|                                       | Haemophilus Influenza type b Infection            | 0        | 0    | 3            | 0              | 1            | 0              |
|                                       | Japanese Encephalitis                             | 1        | 1    | 20           | 0              | 20           | 2              |
|                                       | Legionnaires' Disease                             | 8        | 5    | 164          | 8              | 170          | 12             |
|                                       | Mumps   | 9        | 11   | 295          | 6              | 371          | 5              |
|                                       | Neonatal Tetanus                                  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Pertussis   | 0        | 1    | 8            | 0              | 23           | 0              |
| Tetanus                               | 1   | 0        | 7    | 0            | 1              | 0            |                |
| Category IV                           | Botulism  | 0        | 0    | 1            | 0              | 0            | 0              |
|                                       | Brucellosis                                       | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Complicated Varicella                             | 0        | 0    | 30           | 0              | 40           | 1              |
|                                       | Endemic Typhus Fever                              | 1        | 1    | 12           | 0              | 14           | 1              |
|                                       | Herpesvirus B Infection                           | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Influenza Case with Severe Complications          | 0        | 49   | 548          | 6              | 1350         | 6              |
|                                       | Invasive Pneumococcal Disease                     | 5        | 10   | 165          | 0              | 277          | 2              |
|                                       | Leptospirosis                                     | 3        | 3    | 32           | 0              | 49           | 0              |
|                                       | Listeriosis                                       | 5        | 5    | 90           | 0              | 121          | 1              |
|                                       | Lyme Disease                                      | 0        | 0    | 0            | 0              | 1            | 1              |
|                                       | Melioidosis                                       | 0        | 2    | 9            | 1              | 14           | 0              |
|                                       | Q Fever   | 1        | 0    | 12           | 0              | 14           | 2              |
|                                       | Scrub Typhus                                      | 14       | 8    | 230          | 1              | 274          | 3              |
| Toxoplasmosis                         | 0   | 1        | 5    | 0            | 9              | 1            |                |
| Tularemia                             | 0   | 0        | 0    | 0            | 0              | 0            |                |
| Category V                            | Ebola Virus Disease                               | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Lassa Fever                                       | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Marburg Hemorrhagic Fever                         | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Middle East Respiratory Syndrome                  | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Coronavirus Infections                            | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Novel Influenza A Virus Infections                | 0        | 0    | 0            | 0              | 0            | 0              |
|                                       | Rift Valley Fever                                 | 0        | 0    | 0            | 0              | 0            | 0              |
| Severe Pneumonia with Novel Pathogens | 5   | -        | 479  | 424          | -              | -            |                |
| Yellow Fever                          | 0   | 0        | 0    | 0            | 0              | 0            |                |

1. ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.  
2. MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.  
3. Numbers of mumps and tetanus cases are summed up by the week of report.  
4. Since 2020/1/15, "Severe Pneumonia with Novel Pathogens" was listed as a Notifiable Infectious Disease.

## Suspected Clusters

- Twenty-three clusters related to tuberculosis (13), diarrhea (9) and upper respiratory tract infection (1) were reported during week 32.

## Imported Infectious Diseases

- There were 7 imported cases from 3 countries during week 32.

| Diseases                              | Countries   |           |              | Total |
|---------------------------------------|-------------|-----------|--------------|-------|
|                                       | Philippines | Indonesia | South Africa |       |
| Severe Pneumonia with Novel Pathogens | 4           |           | 1            | 5     |
| Amoebiasis                            |             | 2         |              | 2     |
| Total                                 | 4           | 2         | 1            | 7     |

- As of week 32, there were 627 imported cases from 49 different countries. The top 3 countries are Indonesia (122), USA (94), UK (72).
- The three notifiable diseases with the highest number of imported cases are Severe Pneumonia with Novel Pathogens (424), Amoebiasis (81), Dengue Fever (62).

## Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens** : Due to the severe international epidemic status, the imported cases increase. The risk of acquiring SARS-CoV-2 infection in Taiwan is expected to raise.
- **Dengue Fever** : Accumulation of water containers after the rainfall increase vector breeding. Therefore, the risk of dengue fever is expected to raise.
- **Japanese Encephalitis** : Taiwan is in the midst of Japanese Encephalitis season. Every county in Taiwan is at risk of infection.
- **Scrub Typhus** : Taiwan is in the midst of Scrub Typhus season, both eastern Taiwan and outlying islands are high risk area.

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