



Taiwan Centers for Disease Control

2022 CDC Annual Report

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Message from the Director-General

The COVID-19 pandemic continued to spread in 2021. Peak infections bounced back numerous times in Southeast Asia, the Americas, and Europe. In Taiwan, the number of imported cases continued to increase, resulting in sporadic community infections. Starting in mid-May, the Alpha and Delta variants spread to the country, leading to local outbreaks. As the outbreaks were contained by the end of July, Taiwan returned to its previous stage of sporadic community infections.

In 2021, Taiwan continued to implement border control measures and encouraged non-medical preventive interventions, such as mask wearing, frequent hand washing, and social distancing. The restrictions on large-scale events where people gather were also imposed based on local control needs. Our public health officials conducted epidemiological investigations into places with cluster infections, performed screening tests of close contacts,



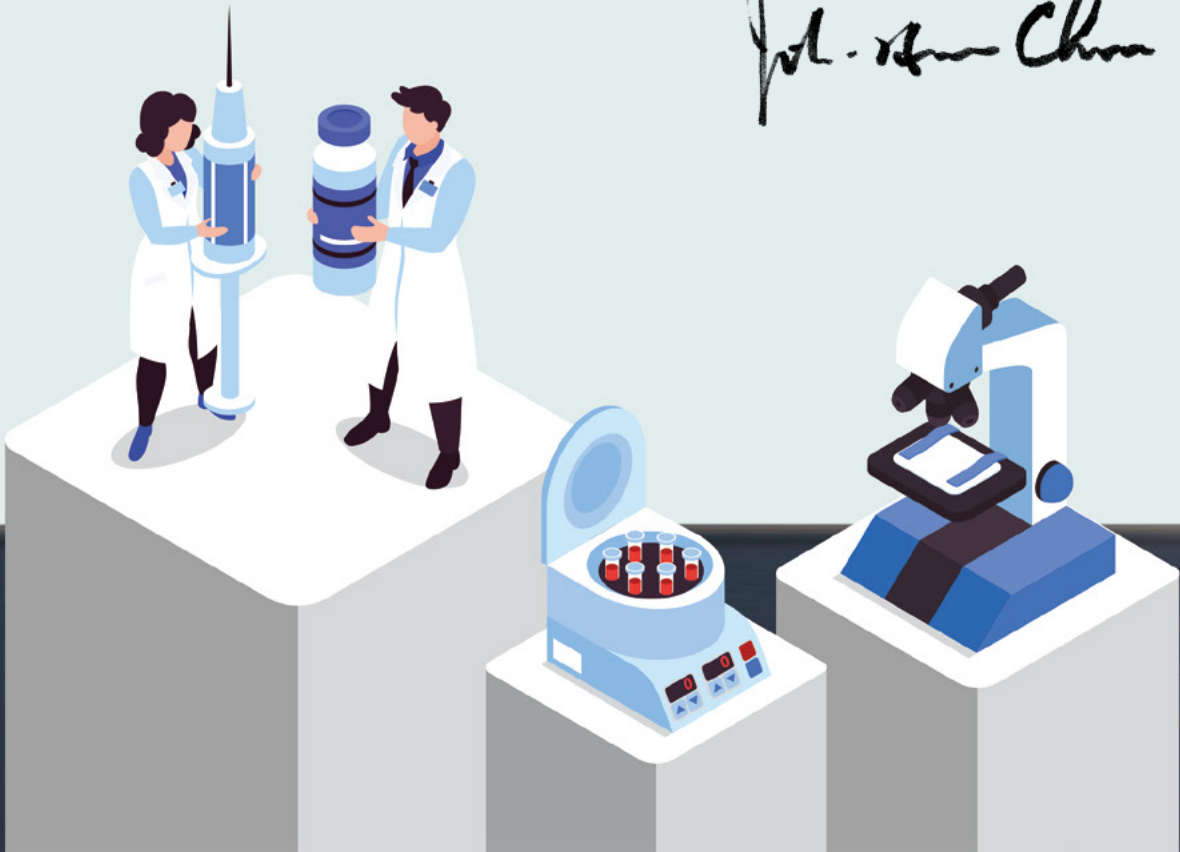
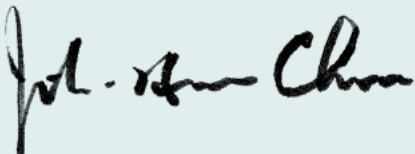
and placed them under isolation. Following these precise epidemic control protocols, we successfully contained multiple outbreaks. The Focus section of this annual report details our efforts that brought the outbreaks under control.

In March 2021, we launched a national COVID-19 vaccination program to begin vaccinating the priority groups, starting with front-line healthcare workers and people at high risk of developing severe disease. When the program was first launched, the vaccination rate was not high since there wasn't community spread in Taiwan. However, as local COVID-19 cases surged in May, the domestic demand for COVID-19 vaccines abruptly soared, leading to vaccine supply shortages throughout the program. To address the domestic vaccine shortage, not only did Taiwan's private and public sectors cooperate to quickly import vaccines, the United States, Japan, Lithuania, the Czech Republic, Poland, and Slovakia also provided support by donating a total of more than 9 million vaccine doses. Within a short period of time, Taiwan's vaccination coverage rate rose significantly, which helped keep local cases low for a prolonged period of time.

The COVID-19 pandemic is ongoing with new variants constantly emerging and posing a threat to human health. In the face of the ever-changing challenges, we remain dedicated to decisively implementing disease prevention measures to reduce the impact of the pandemic on people's health, while doing everything we can to help people maintain a normal life, so that disease prevention efforts can be sustainable.

We thank all the countries that helped us secure vaccines and hope that Taiwan's experiences can contribute to the global pandemic response.

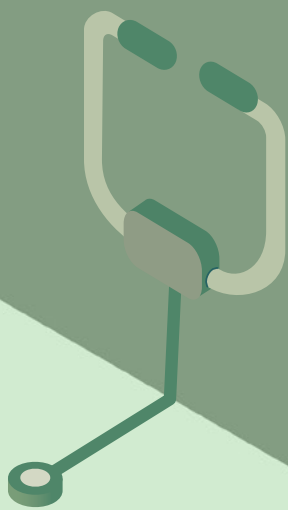
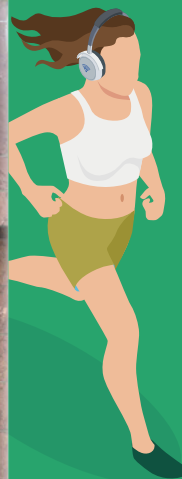
Jih-Haw Chou, D.D.S., M.P.H. Director-General,
Taiwan Centers for Disease Control



01

About Taiwan CDC

衛生福利部疾病管制署
Taiwan Centers for Disease Control



About Taiwan CDC

Owing to the reorganization of the Executive Yuan and its subordinate agencies, the Taiwan Centers for Disease Control (Taiwan CDC) was organizationally restructured in 2013. Taiwan CDC is the agency in charge of communicable disease control in Taiwan and shall implement the following matters:

1. Planning and execution of policies and relevant regulations concerning the prevention and control of communicable diseases.
2. Prevention, control, investigation, research, and laboratory testing of various communicable diseases.
3. Reporting and surveillance of diseases within the country; collection and exchange of international disease information.
4. Preparedness, response, and emergency management of disease outbreaks.
5. Provision of pharmaceuticals for disease control, government-funded vaccines, biologics, and immunization against notifiable disease.
6. Quarantine and sanitary control of international airports and ports; health management of migrant workers.
7. Formulation of laboratory testing standards of various diseases; verification of laboratory testing; biosafety management.
8. Training of disease control and quarantine professionals.
9. International cooperation and exchanges on disease control.

Organizational Structure

Taiwan CDC is under the command of the director-general, who is assisted by two deputy directors and a chief secretary. Since government restructuring in July 2013, Taiwan CDC has comprised six divisions, five offices, two centers, six regional centers, and two task forces (Figure 2-1), as follows:

1. Six Divisions: Division of Planning and Coordination; Division of Acute Infectious Diseases; Division of Chronic Infectious Diseases; Division of Preparedness and Emerging Infectious Diseases; Division of Infection Control and Biosafety; Division of Quarantine
2. Two Centers: Epidemic Intelligence Center; Center for Diagnostics and Vaccine Development
3. Five Offices: Information Management Office; Secretariat; Personnel Office; Accounting and Statistics Office; Civil Service Ethics Office

4. Six Regional Centers: Taipei Regional Center; Northern Regional Center; Central Regional Center; Southern Regional Center; Kaohsiung-Pingtung Regional Center; Eastern Regional Center
5. Two Task Forces: Public Relations Office; Office of Preventive Medicine

Distribution of Employees by Gender, Age, and Education: At the end of December 2021, there were 769 Taiwan CDC employees, with a male to female ratio of 1:3. Average age was 42.9 with 68.9% under 49 years old (Table 2-1). About 44% graduated from university or college while 55% completed a graduate school degree (Table2-2).

Figure 2-1 Organization



Table 2-1 Age Distribution of Taiwan CDC Employees

Under 29 years	30-39 years	40-49 years	50-59 years	60-65 years
10%	29.1%	29.8%	26.8%	4.3%

Table 2-2 Education Level of Taiwan CDC Employees

Graduate School	University	College	High School or Under
54.8%	39.6%	4.8%	0.8%

Core Values of Taiwan CDC



1. Expertise Cultivation

Putting science and new knowledge into action to strengthen Taiwan's capacity for preventing and confronting emerging infectious diseases.



2. Pragmatic Actions

Working relentlessly around the clock to implement disease prevention measures and ensure the health and wellbeing of the people in Taiwan.



3. Concerted Efforts

Cooperating with central and local governments, experts, and NGOs in epidemic control; strengthening international cooperation to keep abreast of the latest knowledge and technology.



4. Securing Public Trust

Enhancing communications to ensure public access to real-time information and win the public's trust and praise.



02

2022 Focus -
COVID-19 Contact Tracing

Introduction

As the COVID-19 pandemic entered a second year in 2021, Taiwan also experienced a number of outbreaks. Through investigation and control measures, we were able to contain outbreaks to prevent further transmission, as shown by the following outbreak investigation examples.

COVID-19 Investigation Objectives and Methods

Before the community has widespread COVID-19 transmission in Taiwan, health authorities would conduct case investigation, source finding, and contact tracing. Through investigation, health authorities could contain further transmission and prevent health, social, and economic burdens that might have resulted from large-scale community outbreaks. Finding the source of infection requires defining the date when the patient became ill and calculating the incubation period to identify a possible source of infection. For close contacts during the patient's infectious period, public health workers evaluated the place, type, distance, and duration of contact, and what personal protective equipment was used. Public health workers assessed the risk of infection and then determined whether quarantine or testing of contacts were needed. Additional control measures included ventilation improvement, environmental cleaning and disinfection.

Outbreak in Taipei Wholesale Markets

In June 2021, the Taiwan Centers for Disease Control (Taiwan CDC) received several reports of COVID-19 cases among employees in northern Taiwan wholesale markets. Taiwan CDC conducted investigations along with the local health bureau and the company officials. Outbreaks occurred in three different markets. In total, there were 247 cases detected in Markets A, B, and C, where Markets A and B were operated by the same company. The cases were reported between May 15 and July 15, 2021, and confirmed between May 20 and July 23, 2021. The first patient in Market A had symptoms on May 14, 2021, and was confirmed on May 20. The first patient in Market B had symptoms on May 25, 2021, and was confirmed on May 27.



Incident command post with multidisciplinary teams at Markets A, B, and C.



A COVID-19 testing station at Market B.

The investigation of the Central Epidemic Command Center (CECC) found that vendors in Markets A and B had no cross interaction since May 15, 2021. Public health officials determined that the cases in Markets A and B were two different clusters. By July 23, 2021, there were 129 outbreak-related cases including market vendors (105 in Market A and 24 in Market B). Among these, 73 were from New Taipei City, 53 from Taipei City, two from Keelung City, and one from Taoyuan City. Based on the concept of a nine-square block diagram, vendors located around a confirmed case were required to quarantine at home and undergo testing. Market workers who were not close contacts were asked to undergo self-health management. Vendor booths affected by the outbreak were closed for three days to undergo cleaning and disinfection. A total of 161 workplace contacts and 336 household contacts or other close contacts were ordered into quarantine. From June 24, 2021, people were required to show proof of a negative COVID-19 test within three days before entering the markets. By June 27, 2021, a total of 5,124 people were tested. Other disease control measures implemented by CECC, Taiwan CDC, Taipei City Government, and market operators included environmental cleaning and disinfection, COVID-19 screening for employees and vendors, health monitoring and management, entry control, split operations, setup of disease prevention standards for workers, and vaccination.

In Market C, the first patient developed symptoms on May 15, 2021, was reported on June 2, and confirmed on June 3. Through July 20, Market C had a total of 118 outbreak-associated cases, including 97 market workers and 21 contacts who had been to the market; among them, 63 were from New Taipei City, 54 from Taipei City, and one from Taoyuan City. A total of 220 workplace contacts were quarantined, as were another 389 household or other close contacts. Similar control measures implemented in Markets A and B were also implemented in Market C.



Incident command post officials conducted on-site evaluation and communication at Market C

To facilitate the implementation of these control measures in the three markets and prevent further spread of the disease, CECC and Taipei City Government established an incident command post on July 2, 2021, to enhance multidisciplinary and cross-sectoral collaborations on entry control, split operations, disease surveillance, and screening for wholesale market staff. Efficient implementation of control measures by the incident command post contributed to ending the outbreak, and the incident command post was disbanded on July 10.

Miaoli Electronics Factories Outbreak

On May 30, 2021, CECC received a report from an electronics factory that two migrant workers living in the company's dormitory tested positive for COVID-19. Following an increase in confirmed COVID-19 cases at the factory, CECC established an incident command post on June 4, 2021, and investigated the factory's employee composition, work patterns, work facilities, and living quarters. As the outbreak spread to other factories, CECC conducted investigation in seven factories and provided recommendations for COVID-19 business continuity plan. In accordance with COVID-19 outbreak investigation and contact tracing guidelines, CECC quarantined and tested contacts based on infection risks. These efforts contributed to identifying the chain of disease transmission and prevented further disease spread.

By June 21, there were 471 confirmed cases, consisting of 71 (15%) Taiwanese and 400 (85%) foreign nationals. A total of 26,250 COVID-19 tests were conducted. Eighteen days after establishment of the incident command post, the outbreak was under control and eventually eliminated. Prevention measures taken to control this cluster included the following:



COVID-19 testing in the Miaoli electronics factory

1. Assess Risk Level and Implement Quarantine Measures

High-risk individuals had to enter group quarantine facilities, mid-risk individuals were quarantined in their dormitories, and low-risk individuals continued to work with enhanced health management measures.

2. Repeated testing to Gradually Eliminate the Disease

Repeated testing conducted on high-, mid-, and low-risk individuals identified 176 confirmed cases, prevented them from entering factories and stopped transmission in the dormitories.

3. Split Operation, Reduced Capacity, and Enhanced Control Measures

The factories did not stop operating but reduced their capacity. Dormitories were subjected to enhanced social distancing measures, people were split into work teams to prevent further spread, and health monitoring measures were implemented.

After this outbreak, related agencies continued to improve management of migrant workers, implement business continuity plans, conduct regular employee screenings, build health reporting systems, and encourage employees to receive COVID-19 vaccination, to prevent occurrence of similar outbreaks.

Pingtung Delta Cluster

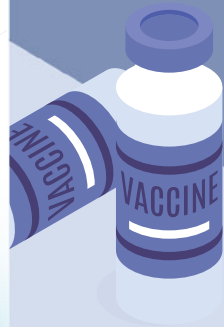
On June 22, 2021, Taiwan CDC received a report of a confirmed locally-acquired COVID-19 case. The patient was a taxi driver from a township of approximately 5,000 people in Pingtung County. Investigation of close contacts found that the source of infection was a

taxi passenger. Further investigation identified a family member of the passenger was an imported case of COVID-19, and was regarded as the source case.

Public health officials later found 17 confirmed cases, including two imported cases and 15 locally-acquired cases. Of the 15 specimens successfully sequenced, all were found to be Delta variants of SARS-CoV-2. Because the Delta variant is highly transmissible, CECC and local governments collaborated to take the following actions:

1. Thoroughly identified potential contacts and arranged for close contacts to be managed at group quarantine facilities or isolation rooms.
2. Quickly established an incident command post to identify cases, disinfect places visited by confirmed cases, broadcast messages for residents in the town to follow COVID-19 restrictions and wear masks whenever possible, and provide social care services.
3. Operated large testing centers near where confirmed cases lived to enhance community screening; more than 17,000 people were screened in total.
4. Opened vaccination clinics to increase vaccination coverage. The clinics vaccinated more than 1,000 residents within three days.
5. Enhanced hospital screening and implemented infection control measures. Emergency prevention measures at health facilities visited by confirmed cases were implemented, including temporarily suspending emergency and clinical services, strengthening environmental cleaning and disinfection, and performing PCR tests for contacts. In addition, COVID-19 vaccinations and health monitoring were provided to residents of long-term care facilities and dialysis institutions.
6. Raised the alert level of primary care physicians and strengthened reporting and infection control among health centers near where cases emerged. Doctors were instructed to transfer suspected COVID-19 patients to testing facilities to be reported and tested, in accordance with the COVID-19 community testing network and referral guidelines.

COVID-19 monitoring continued until July 10 without any more related cases emerging, showing that the outbreak was controlled and the Delta variant was stopped from spreading further. This was the first community outbreak caused by the Delta variant in Taiwan. Success in stopping transmission underscored the need for public health officials to conduct meticulous investigations of COVID-19 cases and to quarantine their contacts. It also highlighted the importance of partnership between central and local governments, and the need for multi-departmental collaboration at the county government level (police, civil administration, health administration, and health care institutions). Cooperation from the general public was also recognized as being crucial to success.



03

Domestic Epidemic Prevention and Control



Current Immunization Program & Vaccine Injury Compensation Program in Taiwan

National Immunization Programs

Current Status

The Taiwan government provides free immunizations to children up to 6 years of age, including BCG, 5-in-1 (diphtheria and tetanus toxoid with acellular pertussis, Haemophilus influenza type b, and inactivated polio, DTaP-Hib-IPV), hepatitis B, pneumococcal conjugate vaccine (PCV), varicella, measles, mumps, rubella (MMR), hepatitis A, Japanese encephalitis, tetanus, diphtheria toxoids, acellular pertussis and inactivated polio vaccine (DTaP-IPV) and influenza. The current immunization schedule is shown in Table 3-1. Parents of newborns are given a children's health handbook with a recommended immunization schedule. Children can receive vaccinations at 347 health stations and more than 1,500 contracted hospitals and clinics across Taiwan.

Health stations regularly carry out health promotion programs for improving coverage rate. The programs include mailing reminder postcards, making notification phone calls,

Table 3-1 Current Immunization Schedule in Taiwan

Vaccine	Age	<24hr	1 month	2 months	4 months	5 months	6 months	12 months	15 months	18 months	21 months	27 months	5 years	1-6 th grade Primary school students
Hepatitis B		HepB1	HepB2				HepB3							
BCG						BCG								
Diphtheria, Tetanus, Pertussis, Hib, Polio				DTaP-Hib-IPV 1	DTaP-Hib-IPV 2		DTaP-Hib-IPV 3			DTaP-Hib-IPV 4			DTap-IPV	
Pneumococcal conjugate vaccine ^{note1}				PCV13 1	PCV13 2			PCV13 3						
Varicella								Var						
Measles, Mumps, Rubella								MMR1					MMR2	
Japanese Encephalitis ^{note2}									JE1			JE2	JE3 ^{note3}	
Hepatitis A ^{note4}								HepA1		HepA2				
Influenza														Influenza (yearly)

note1: 2 primary doses at least 8 weeks apart

note2: The mouse brain-derived vaccine was replaced by the Vero cell-derived Japanese encephalitis vaccine in May 2017.

note3: JE3 (live attenuated cell-based vaccine) was provided for 5-yr children who have received 2 doses of inactivated JE vaccine.

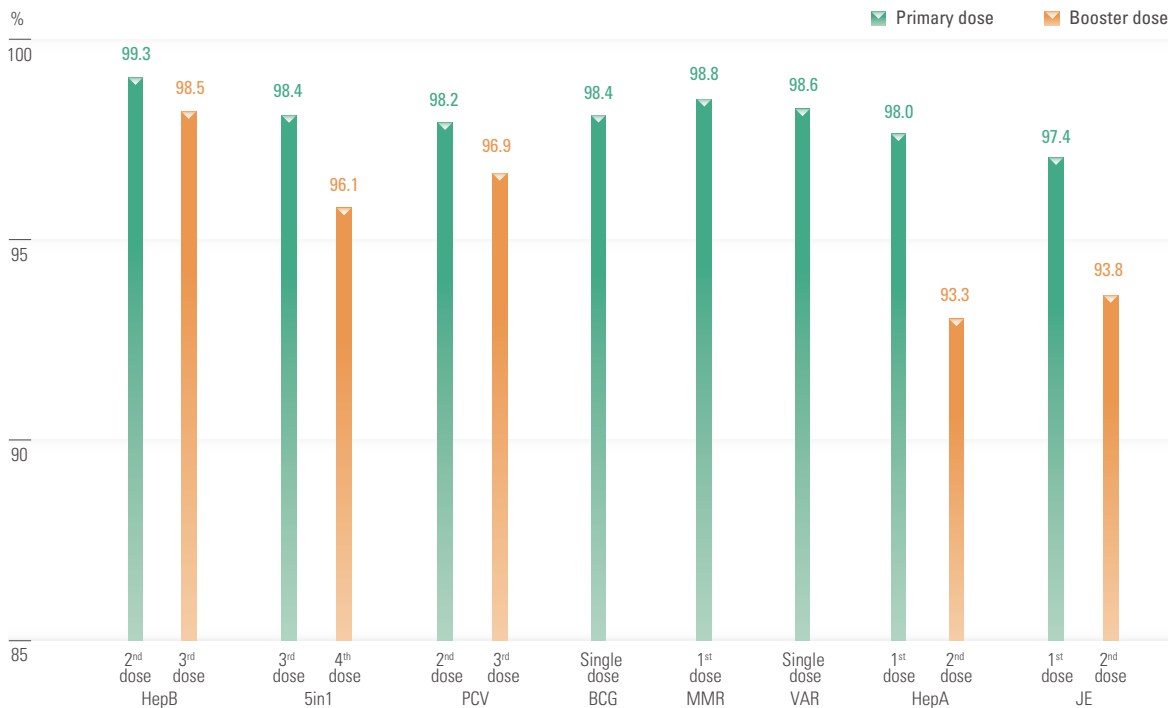
note4: In January 2018, hepatitis A vaccine was introduced into routine immunization program for children born after January 2017. The original hepatitis A vaccine program for children registered in selected aboriginal areas are implemented continuously.

scheduling home visits, and providing media announcements. Moreover, public health nurses at the health stations where children are registered regularly monitor immunization records and follow up on children who have not received up-to-date immunization to ensure those children complete the vaccination series. The immunization coverage rate of primary doses was as high as above 96%. (Figure 3-1)

Accomplishments

1. The world's first universal hepatitis B vaccination program has been implemented in Taiwan since July 1986 that demonstrated great impacts of such vaccination program by reducing the rates of both HBV infection and hepatocellular carcinoma.

Figure 3-1 National Immunization Coverage



Source: The values were calculated in December 2021 by compiling retrospectively the immunization data of the National Immunization Information System

Footnote:

- HepB: Hepatitis B vaccine
- 5in1: DTaP-Hib-IPV
- PCV: Pneumococcal 13-valent conjugate vaccine
- BCG: Bacillus Calmette-Guérin vaccine
- MMR: Measles, mumps and rubella combination vaccine
- VAR: Varicella vaccine
- HepA: Hepatitis A vaccine
- JE: Japanese encephalitis vaccine

2. With the promotion of vaccination policies, many major infectious diseases that have threatened national health such as poliomyelitis, diphtheria, and measles have been effectively controlled, eliminated, or even eradicated.
3. The National Vaccine Fund was launched in 2010 based on Article 27 of the Communicable Disease Control Act. Due to the establishment of the National Vaccine Fund, it is possible to expand national immunization program to protect children's health, including:
 - (1) Replaced DTwP and OPV with DTaP-IPV-Hib in 2010.
 - (2) Replaced Tdap and OPV given to new primary school enrollees with Tdap-IPV in 2011. In order to improve the effectiveness of the booster dose, Tdap-IPV was replaced with DTaP-IPV in 2017.
 - (3) Gradually expanded pneumococcal conjugate vaccine (PCV) vaccination target from 2009 to 2014. In 2015, 13-valent PCV (PCV13) was introduced into routine immunization for children.
 - (4) Replaced the mouse brain-derived Japanese encephalitis (JE) vaccine with the live attenuated cell-based JE vaccine in 2017, which has fewer side effects, high efficacy, and the manufacturing process is also in line with the humanitarian use of animal models and international standards.
 - (5) Expanded the target individuals for hepatitis B immunoglobulin (HBIG) from infants born to HBeAg-positive mothers to infants born to HBsAg-positive mothers in 2019 to prevent more mother-to-infant transmission of hepatitis B.
4. In order to improve the quality of vaccination services and encourage the hospitals and clinics continuously providing convenient and high-quality vaccination services, the subsidized vaccination treatment fee has to be expanded from 2018. Children and the elderly should not pay diagnostic fees for the public funded vaccines.
5. In January 2018, Taiwan introduced hepatitis A vaccine into children's routine immunization program for children born after January 2017, and hepatitis A vaccine provided under the program was donated by Paujar Charity Foundation.
6. In order to strengthen the immune protection of the elderly, the 23-valent pneumococcal polysaccharide vaccine was extended to the elderly over 71 years of age in March 2022.

Future Prospects

With a stable source of support from the National Vaccine Fund, Taiwan CDC will gradually add new vaccines to the routine immunization schedule based on cost-effectiveness and recommendations of the Advisory Committee on Immunization Practices. In the future, Taiwan CDC will continue to provide pneumococcal vaccine for the elderly over 71 years of age and plan to gradually expand the targets to high-risk groups and elderly over 65 years of age.

National Immunization Information System

Current Status

In 2004, Taiwan CDC established the National Immunization Information System (NIIS) to consolidate immunization data scattered among various health stations into one database. NIIS, together with household registration authorities and medical institutions, has improved the management of immunization operations and the efficiency of storage and retrieval of immunization information. Household data are obtained from the Department of Household Registration, Ministry of the Interior. The information is updated daily and transmitted to NIIS. Through NIIS, authorities can remind parents via text and e-mail of their children's immunization schedule, thereby improving immunization coverage rates.

Accomplishments

1. Enhanced the functions and efficiency of the central database to handle yearly increases in data quantities and improve management efficiency.
2. Adopted multiple strategies to trace and urge the unvaccinated to get vaccinated, thereby reducing delays and raising the coverage rate.
3. For children entering the country, entry information from the National Immigration Agency, Ministry of the Interior is compared with NIIS data to find children who have not received the MMR vaccine. Local health agencies will then arrange vaccination.
4. The revision of NIIS was launched in 2018, upgrading system capabilities and effectiveness.

Future Prospects

1. Promote the use of application programming interface (API) to upload and query immunization information at contract hospitals/clinics, enhance the accuracy, completeness and timeliness of immunization data, and improve the quality of vaccination services.
2. Strengthen management of atypical cases, such as foreign spouses of citizens, children who follow their parents working abroad and children who fail to complete their immunizations due to family factors.
3. Integrate various databases and systems (foreign spouses, reporting of communicable diseases, National Immigration Agency, Ministry of the Interior) and diversify NIIS immunization reminders to improve the coverage rate.

Polio, Measles, Congenital Rubella Syndrome, and Neonatal Tetanus Eradication Programs

Current Status

Taiwan launched polio, measles, congenital rubella syndrome (CRS), and neonatal tetanus (NT) eradication programs in 1991. Since achieving its goal of polio eradication on October 29, 2000, Taiwan has maintained the eradication situation of polio by maintaining a high polio-related vaccine coverage rate and improving surveillance systems.



Measles and Rubella became the primary elimination target after polio. In 2021, there were no confirmed measles cases and rubella cases. No confirmed NT case has been reported since 1996 apart from a child born to a foreign mother in 2001. From 1994 to 2008, five cases of CRS were confirmed, four of which were in patients born to foreign mothers. No confirmed CRS case has been reported from 2009 to 2016. In 2017, one CRS case born to a foreign mother was confirmed through CRS active surveillance. From 2018 to 2021, there were no confirmed CRS cases.

Accomplishments

1. In 2021, 28 AFP (acute flaccid paralysis) cases under the age of 15 were reported and investigated. None of the cases were polio or polio compatible.
2. Since January 1, 2009, all foreigners applying for residence or settlement must submit either a report showing they are antibody positive for measles/rubella report or an immunization certificate. This requirement is also included in the physical check for foreign laborers before entry.
3. Encourage the institutions contacting foreign traveler frequently to provide one dose of MMR vaccination for their personnel who were born after 1981.
4. Encourage flight attendants and ground crews to receive one dose of MMR vaccine.

Future Prospects

1. Prevent the importation of polio to maintain eradication of the disease.
2. Complete measles and rubella elimination certification in accordance with the WHO.

Hepatitis Immunization Program

Current Status

Since 1982, Taiwan CDC has proposed a series of five-year programs. Priorities include: improving the surveillance system for acute cases, improving the immunization coverage rate of hepatitis B vaccine, severing hepatitis A infection paths, enhancing health education related to liver disease control, improving blood transfusion management, and raising hepatitis examination quality. Since 2018, Taiwan introduced the Hepatitis A vaccine into children's routine immunization program for children born after January 2017.

Accomplishments

Hepatitis A

1. Confirmed cases of acute viral hepatitis A in Taiwan were reduced from 633 in 1995 to 74 in 2021; the incidence rate was lowered from 2.96 out of 100,000 people in 1995 to 0.32 out of 100,000 people in 2021. In aboriginal regions, confirmed cases were reduced from 183 in 1995 to 0 in 2021 and the incidence rate was lowered from 90.7 out of 100,000 people in 1995 to 0 in 2021.
2. The coverage rate of the first dose of HepA for babies born in 2019 was 98.2%.

Hepatitis B

1. The carrier rate of children at age 6 declined significantly and steadily from 10.5% in 1989 to 0.8% in 2007.
2. The coverage rates of the second and third doses of HepB for babies born in 2019 were 99.4% and 98.7%, respectively.

Future Prospects

Infants born to a mother who is e antigen positive face a 10% chance of becoming chronic carriers of hepatitis B even after receiving hepatitis B immunoglobulin (HBIG) and three doses of immunoprophylaxis. Taiwan CDC has offered free hepatitis B screenings for these children at age 1 since September 2010. It will continue to raise screening coverage and study effectiveness of the vaccination.

Vaccine Injury Compensation Program (VICP)

In response to a case in which a child received oral poliomyelitis vaccination and subsequently developed polio in 1986, the Ministry of Health and Welfare established a Vaccine Injury Compensation Fund in June 1988. The fund enables individuals to claim

compensations from their local health bureau in the event of death, disabilities, serious illnesses, or adverse reaction resulting from vaccination. Review of claims by the Vaccine Injury Compensation Working Group ensures the causal relationship between the vaccine and the adverse events to eliminate vaccination worries.

For effective use of vaccine injury compensation resources and to strengthen protection of compensation rights and guarantees, the Regulations Governing Collection and Review of Relief Fund for Victims of Immunization was amended in recent years. Highlights were as follows:

Table 3-2 Types of Compensation, Vaccine Injury Compensation Program

Type of Compensation	Criteria		Amount of Compensation (US\$ 1,000)
	Definition/Degree of Disability	Causality Conclusion	
Compensation for Death			Vaccine associated 17.9~214.3
			Indeterminate 10.7~125
Compensation for Disability	Determined by the types and degrees of disability set forth in regulations for the protection of physically and mentally disabled people	4-extremely severe	Vaccine associated 17.9~214.3
			Indeterminate 10.7~125
		3-severe	Vaccine associated 10.7~178.6
			Indeterminate 7.1~107.1
		2-moderate	Vaccine associated 7.1~142.9
			Indeterminate 3.6~89.3
		1-mild	Vaccine associated 3.6~89.3
			Indeterminate 1.8~71.4
Compensation for Severe Illnesses	Illnesses determined by the Catastrophic Illness List from the National Health Insurance or based on severe adverse reactions of medicament as defined in the Regulations for Reporting Severe Adverse Reactions of Medicaments, which do not reach the definition of disability		Vaccine associated 0.4~107.1
			Indeterminate 0.4~42.9
Compensation for Other Adverse Reactions	Other adverse reactions not meeting the definition of severe illnesses. However, commonly seen, mild and expected adverse reactions of vaccination will not be compensated		Associated/ Indeterminate 0~7.1

1. We revised the cap of the fund in response to the future trend of increased manufacturing and imports of vaccines.
2. We amended the procedure for filing claims for vaccine injury compensation in order to conform to the current schedule of the local competent authority for filing claims.
3. To realize the spirit of the Convention on the Elimination of All Forms of Discrimination against Women and fulfill the obligations of State parties, members of either gender shall comprise not less than one third of the review committee.
4. As no sufficient medical evidence was present to link many vaccine adverse events to vaccination, we added medical principles as one of the bases for determination of causality between vaccination and the alleged injury.
5. To protect the interests and rights of victims of vaccine injury, we amended the criteria for severe illness and the amount of compensation.

Figure 3-2 Flowchart for Vaccine Injury Compensation Claims Evaluation Process

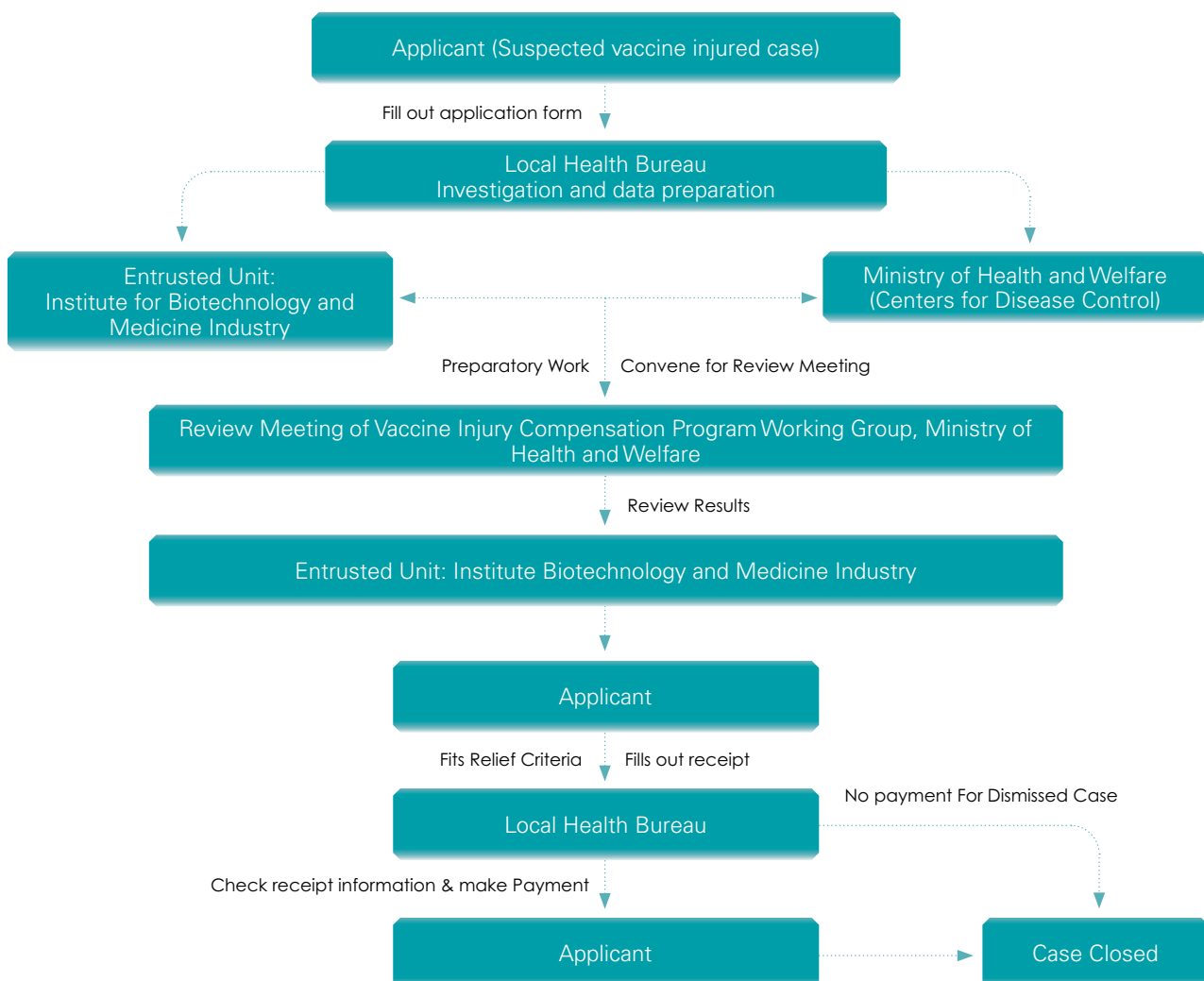
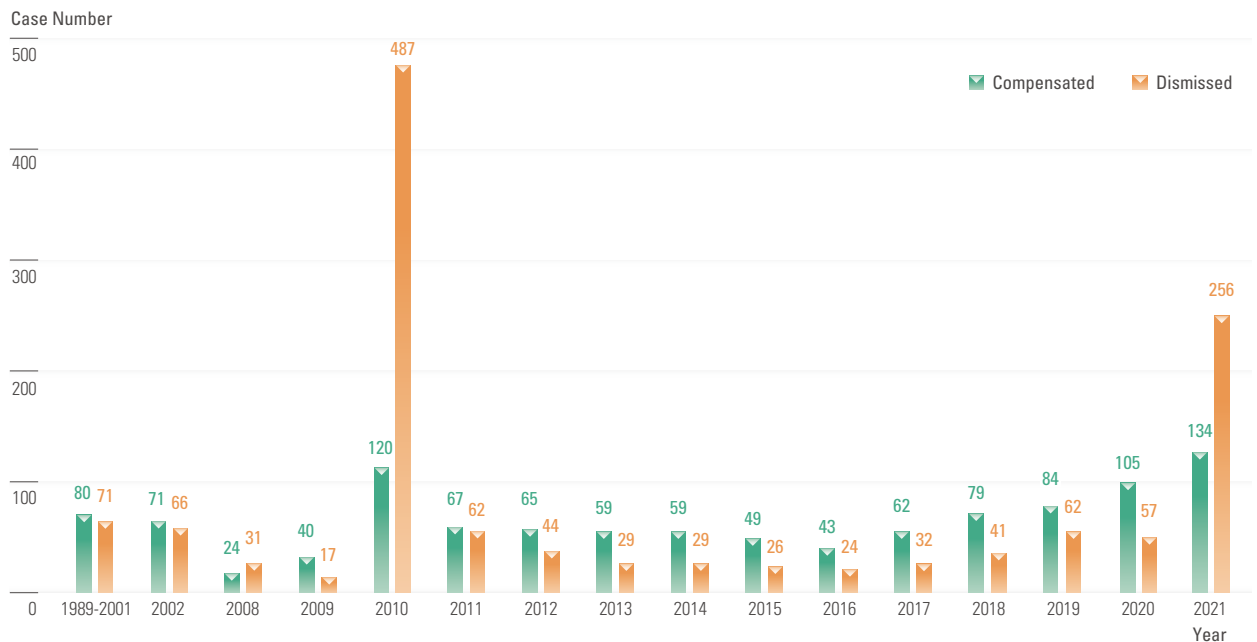


Figure 3-3 Total Number of Cases Settled Per Year from Program Inception in 1989 to 2021



Following the claim evaluation process (Figure 3-2), in 2021, 390 cases were settled, a total of 2,485 claims had been reviewed since program inception (Figure 3-3), and compensation disbursement had reached US\$ 5 million.

With the implementation of the national COVID-19 vaccination program, a greater number of claims were filed for vaccine injury compensation in 2021 than the years before. Injuries experienced following the administration of a COVID-19 vaccine are covered under the current vaccine injury compensation scheme. As of 2021, a total of 158 claims were reviewed, and compensation awarded reached US\$ 0.32 million.

Communicable Disease Surveillance System

Current Status

Following the reorganization of Taiwan CDC in July 1999, infectious disease surveillance shifted to the National Communicable Disease Surveillance and Response Systems. The systems began with surveillance of notifiable diseases and sentinel surveillance to detect epidemics. Later on, several systems were built to facilitate the collection of timely, complete, and precise information on infectious diseases. Taiwan CDC envisions these systems to monitor national health status and rapidly detect outbreaks by integrating various infectious disease surveillance networks.

The progress includes: (1) Constructing diversified disease surveillance systems; (2) Collecting and monitoring data for disease trend analysis, predictions and alerts; and (3) Providing regular analysis and assessments of global and indigenous infectious diseases.

Accomplishments

Notifiable Disease Surveillance System (NDSS)

If a doctor treats a patient suspected of having a notifiable infectious disease (Table 3-3), the doctor must report the case within a limited time. Taiwan CDC established the Notifiable Disease Surveillance System to give medical personnel across the country a platform for reporting diseases and grasping information related to communicable disease occurrences immediately (Figure 3-4).

By using the system, public health personnel can make early and informed decisions on assigning manpower and resources to carry out disease prevention and thereby keep diseases from spreading.

The first stage of constructing the Notifiable Disease Surveillance System, finished in July 2001, involved establishing a web-based version that enabled easier and more detailed dissemination of reported information. The second stage, completed in September 2004,

Figure 3-4 Notifiable Disease Surveillance System Data Flow



Table 3-3 List of Notifiable Diseases in Taiwan

Category	Disease	
I	Smallpox	Plague
	SARS	Rabies
II	Anthrax	Typhoid Fever
	Diphtheria	Dengue Fever
	Paratyphoid Fever	Acute Flaccid Paralysis and Poliomyelitis
	Meningococcal Meningitis	Amoebiasis
	Shigellosis	Measles
	Malaria	Enterohemorrhagic E. coli Infection
	Acute Hepatitis A	Cholera
	Hantavirus Syndrome	Multi-drug Resistant Tuberculosis
	Rubella	West Nile Fever
	Chikungunya Fever	Epidemic Typhus Fever
	Zika Virus Infection	
III	Pertussis	Tetanus
	Neonatal Tetanus	Japanese Encephalitis
	Tuberculosis	Hansen's Disease
	Congenital Rubella Syndrome	Acute Hepatitis B
	Acute Hepatitis C	Acute Hepatitis D
	Acute Hepatitis E	Legionnaires' Disease
	Mumps	Syphilis
	Invasive Haemophilus Influenzae Type B Infection	Congenital Syphilis
	Gonorrhea	Enteroviruses Infection with Severe Complications
	HIV Infection and AIDS	Acute Viral Hepatitis Unspecified
IV	Herpesvirus B Infection	Leptospirosis
	Melioidosis	Botulism
	Invasive Pneumococcal Disease	Q Fever
	Endemic Typhus Fever	Lyme Disease
	Tularemia	Scrub Typhus
	Complicated Varicella	Toxoplasmosis
	Brucellosis	Influenza Case With Severe Complications
	Creutzfeldt-Jakob Disease	Listeriosis
	Severe Fever with Thrombocytopenia Syndrome	
V	Rift Valley Fever	Marburg Hemorrhagic Fever
	Yellow Fever	Ebola Virus Disease
	Lassa Fever	Novel Influenza A Virus Infections
	Middle East Respiratory Syndrome Coronavirus infections	Severe Pneumonia with Novel Pathogens

strengthened the surveillance system, while the third stage, completed in September 2006, integrated this system. The fourth stage, finished in June 2008, involved building a single reporting gateway and increasing user-friendliness. In order to increase the communicable disease reporting timeliness, Taiwan CDC has developed several new ways of reporting notifiable diseases since 2014. By creating dedicated disease reporting modules within the hospital electronic medical record systems, infection control staffs from over 65 regional hospitals or medical centers have substantial workload reduction. Furthermore, Taiwan CDC allowed healthcare workers to login to the Notifiable Disease Surveillance System without registering for an account by having their RSA cards issued by the Healthcare Certification Authority (HCA) verified inside the Virtual Private Network (VPN) of the National Health Insurance Administration. An Application Programming Interface (API) was developed for connecting the Healthcare Information System (HIS) of 53 clinics in Tainan and Kaohsiung to the Notifiable Disease Surveillance System. This allows primary medical institutes a convenient way to report the majority of notifiable infectious diseases.

School-Based Surveillance System

Taiwan CDC has implemented the School-Based Surveillance System since 2001, in order to monitor epidemic trends, detect possible outbreaks and contain the spread of communicable diseases in elementary schools. Taiwan CDC collects information about school children who exhibit symptoms such as influenza-like illness, hand-foot-and-mouth disease or herpangina, diarrhea, fevers, acute hemorrhagic conjunctivitis, and varicella (chickenpox) on a weekly basis. These data are used to analyze and estimate the scope and magnitude of diseases at the school and regional levels, followed by the dissemination of weekly reports to participating schools as well as educational and public health authorities to stimulate public health action.

As of 2021, a total of 773 elementary schools enrolling students from kindergarten to 6th grade participated in the systems, representing 29% and 99.4% of all the elementary schools and administrative areas in Taiwan, respectively.

Symptom Surveillance System

To effectively control the clusters incidents of infectious diseases at an early stage and launch prompt disease prevention mechanisms, Taiwan CDC established the Symptom Surveillance System since 2003. When the local health departments find the following suspected clusters, they should report them to the system. Disease categories under surveillance include fevers of unknown etiology, diarrhea, upper respiratory tract infections, varicella, and enterovirus clusters.

Surveillance System for Populous Institutions

The Surveillance System for Populous Institutions is aimed at early cluster detection of infectious diseases among institution inhabitants or workers. It applies to elderly

homes, long-term care facilities, apartments for the elderly, facilities for the disabled, juvenile protectories, veterans' homes, prisons, nursing homes, outpatient centers for mental rehabilitation, and infant care centers. If an individual or a cluster of cases with symptoms of respiratory, gastrointestinal disease or fever of unknown origin are found, the facility must file online reports within 24 hours; in addition, the facility must report the number of people under its care weekly. As of 2021, a total of 3,111 populous institutions participated in the system.

Real-time Outbreak and Disease Surveillance (RODS)

The ICD-9-CM/ICD-10-CM diagnosis codes from over 180 emergency rooms nationwide are forwarded daily to enable early and immediate analysis of aberrations for various syndromes. RODS also enables routine monitoring of specific disease trends such as influenza-like illness, enterovirus infection, diarrhea, and conjunctivitis.

Syndromic Surveillance Using National Health Insurance Data

Daily aggregated outpatient, hospitalization and emergency room data of specific diseases gathered by the National Health Insurance Administration from IC cards have been used to monitor trends of influenza-like illness, enterovirus infections and diarrhea since April 2009. In 2011 and 2014, scarlet fever and varicella were added to the disease watch list respectively.

Pneumonia and Influenza Mortality Surveillance

Daily updated death certification reports from the Department of Statistics, Ministry of Health and Welfare were used to identify pneumonia and influenza associated deaths, and monitor trends of pneumonia and influenza mortality. This information provides a reference for influenza prevention and control.

Laboratory Automated Reporting System

To immediately monitor disease outbreaks and establish epidemic curves caused by important pathogens, Taiwan CDC has developed the Laboratory Automated Reporting System (LARS) to collect the laboratory data with positive test result caused by any of the 21 pathogens via automated submitting of reports from hospital Laboratory Information System (LIS) to the LARS since 2014. LOINC (Logical Observation Identifiers Names and Codes), a universal code system for reporting laboratory and clinical observations, is used as the standardized format for the electronic exchange of laboratory data. The use of LOINC to identify laboratory observations could improve the quality of public health surveillance by reducing data transcription errors and facilitate data sharing of laboratory test results between hospitals and countries.

As of 2021, a total of 67 hospitals participated in the LARS. Recently, more than 15,000 pieces of data are collected weekly and used in monitoring pathogen activity.

Establishing Support Systems for Disease Management and Data Analysis

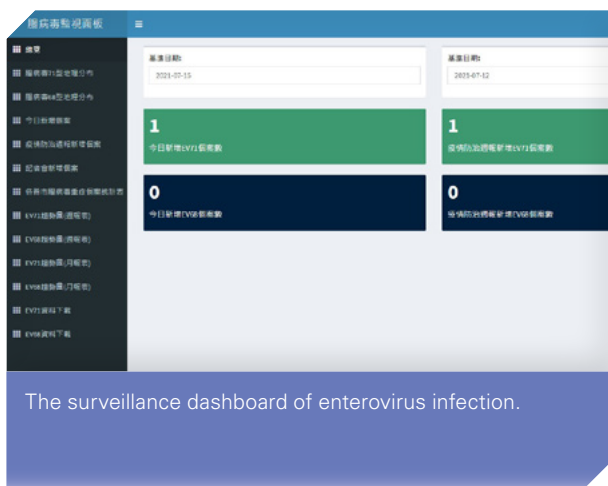
1. Taiwan CDC utilized the capabilities of the Notifiable Diseases Surveillance System, the Geographical Information System (GIS) and other surveillance systems to present and analyze data, and developed a GIS-based prediction model for estimating the distribution of infectious diseases.
2. Taiwan CDC installed multifaceted surveillance systems for data acquisition and analysis.

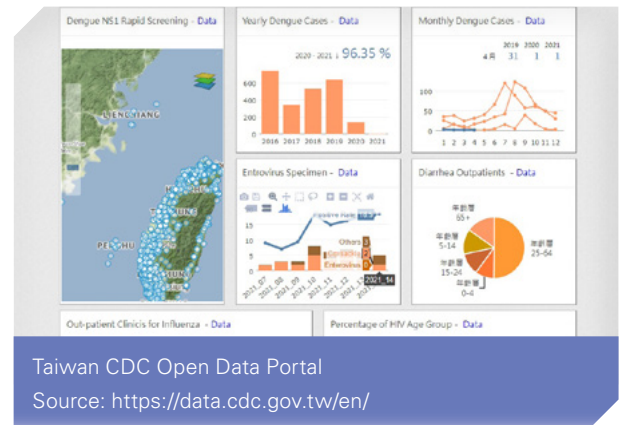
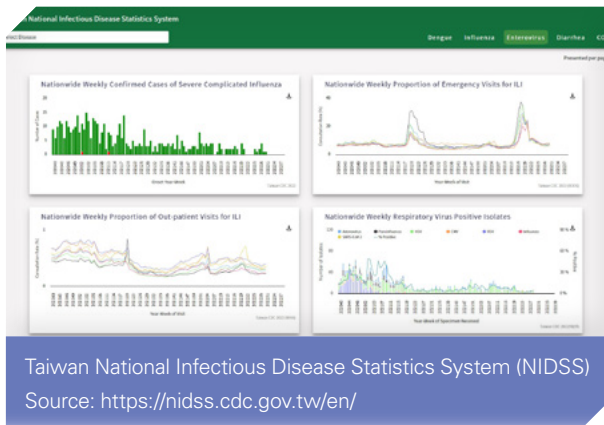
Reporting via the Internet

To effectively detect and monitor infectious diseases, all the Taiwan CDC reporting systems are electronic-based for users to upload information.

Systems Integration

To enhance presentation and application of surveillance systems, Taiwan CDC combined and analyzed Web information to improve the integration of web surveillance systems, including the Notifiable Disease Surveillance System, the Symptom Surveillance System and the Syndrome Surveillance System. This task was completed in September 2006. In 2018, the R system for epidemic statistical analysis was established to use R





programming language to integrate and monitor system data. Visualized data for monitoring communicable diseases are automatically generated every day for public health professionals to promptly obtain information on epidemiological situations across Taiwan.

Information Sharing

Taiwan CDC generates the School-based Surveillance Weekly Report, the Influenza Express, the Weekly Report of Enterovirus Infection and other statistical reports of designated communicable diseases which are available online. Daily reports on international epidemics are forwarded to related authorities, while regular collaboration with academics assists with evaluation or development of surveillance systems. Key tasks include collection, evaluation and dissemination of information to the public, local health departments and governmental authorities.

In addition, the website “Taiwan National Infectious Disease Statistics System” (NIDSS) was launched in 2008, which aims at providing the general public, academic researchers, health care providers and public health authorities with an intuitive interface to obtain the latest information on the notifiable and other infectious diseases or conditions in Taiwan. “The Taiwan CDC open data portal” provides more than 300 datasets including numbers of all notifiable disease cases and emergency department visits of selected syndromes, and information on quarantine practices, vaccines, nosocomial infections, etc.

Datasets related to numbers of cases of all notifiable diseases and emergency department visits are updated automatically and daily. Taiwan CDC will keep providing new datasets to make government data available to all.

Training and Education

Taiwan CDC offers training workshops on surveillance systems to keep users informed about updated information. In addition, trainings on R, Python and database management basics and applications were carried out from 2017 to 2021 to improve staff’s capabilities of managing, analyzing, and creating visualized statistical data.

Reducing Key Infections

Tuberculosis

Tuberculosis (TB) has been one of the most severe communicable diseases in Taiwan for decades. Nearly 7,100 TB cases and 440 TB deaths are reported in Taiwan annually. Half-century of hard work by health workers has reduced prevalence of the disease, but when compared with other advanced countries, Taiwan leaves much room for improvement.

Tuberculosis control in Taiwan faces several challenges such as high population density, population aging, comorbidities, frequent international travel, foreign spouses and laborers from high TB prevalence countries. All of these factors could make TB control in Taiwan more challenging. To protect the health of the general public, Taiwan has adopted more active and aggressive methods when facing with new challenges for TB control.

Current Status

1. Incidence

There were 16,472 and 7,062 TB cases in 2005 and 2021, respectively. The incidence rate went from 72.5 to 30.1 persons per 100,000 populations over this time period, declining at an average rate of 5.3% per year. The cumulative reduction between 2005 and 2021 was 58.5% (Table 3-4).

Table 3-4 Taiwan TB Incidence and Mortality Rate, 2005 - 2021

Year	Cases	Incidence	Death	Mortality
2005	16,472	72.5	970	4.3
2006	15,378	67.4	832	3.6
2007	14,480	63.2	783	3.4
2008	14,265	62.0	762	3.3
2009	13,336	57.8	748	3.2
2010	13,237	57.2	645	2.8
2011	12,634	54.5	638	2.8
2012	12,338	53.0	626	2.7
2013	11,528	49.4	609	2.6
2014	11,326	48.4	591	2.5
2015	10,711	45.7	571	2.4
2016	10,328	43.9	547	2.3
2017	9,759	41.4	511	2.2
2018	9,179	38.9	506	2.1
2019	8,732	37.0	546	2.3
2020	7,823	33.2	460	2.0
2021	7,062	30.1	442	1.9

Since 2019, Ministry of Health and Welfare (MOHW) switches to Iris automatic system for coding multiple causes of death and for the selection of the underlying cause of death. Due to the above change, TB mortality rate in 2005-2018 requires adjustment before direct comparing with statistics post 2019.

Taiwan became an aging society in 2018 as the proportion of Taiwanese people aged over 65 years surpassed 14% of the country's total population. Of the new TB cases, the elderly over 65 year-old accounted for more than 50% of total since 2005, and the proportion amounted to 61% in 2021.

The number of Multi-Drug Resistant TB (MDR-TB) cases was 82 in 2021. The proportion of new TB cases with MDR-TB was 1.2%.

2. Mortality Rate

TB claimed 442 lives in Taiwan in 2021, with a mortality rate of 1.9 per 100,000 populations. The cumulative reduction between 2005 and 2021 was 55.8% (Table 3-4).

Accomplishments

1. Improving Surveillance and Monitoring

National TB Reporting and Management System

- (1) Nationwide real-time surveillance on TB laboratory system and TB drug prescription
- (2) Strengthen monitoring among high-risk groups
- (3) Enhance TB outbreak monitoring by adopting novel strategy of geospatial surveillance

2. Establishing a High Quality and Rapid TB Diagnosis Network

- (1) Monitor quality of contracted and authorized laboratories
- (2) Train staff members
- (3) Develop new TB diagnosis techniques

3. DOTS Program

- (1) DOTS coverage rate surpassed 98%.
- (2) Treatment success rate for bacteriological positive TB cases was about 72% in 2019 cohort. It has not increased significantly due to population aging.

4. Establishing the Drug-Resistant TB (DR-TB) Medical Care System

"DR-TB Medical Care System" (established in May 2007)

- (1) Taiwan CDC contributes resources and designated teams to offer patient-centered care according to WHO DR-TB guidelines.
- (2) DR-TB teams actively treat each patient for 9 months to 2 years, and designated health workers provide incentive, allowance and personal care via the DOTS Plus program.
- (3) 99% MDR-TB cases were managed in the DR-TB system through the end of December 2021, leading to a favorable outcome. About 69% of patients in 2019 cohort were cured or completed after 24-month treatment.

5. LTBI Treatment Program

(1) Initiated “The LTBI Treatment for All Contacts Program” in April 2016

- Provide LTBI screening service and treatment for TB contacts of infectious index cases, such as those with MTBC-positive pulmonary TB. LTBI treatment coverage reached 84% in 2021.
- Provide short course treatment regimens for LTBI, including 3-month isoniazid and rifapentine (3HP), 3-month isoniazid and rifampin (3HR) and 4-month rifampin (4R), as an alternative to the 9-month isoniazid (9H) for LTBI contacts.

(2) Expand the target population of LTBI high-risk groups, including the following: residence of mountainous areas, inmate of the long-term care facilities and correctional institutions, patients receiving dialysis, people living with HIV, illicit drug users, and poorly-controlled diabetic patients.

(3) In 2021, up to 10,882 TB contacts and people with high risk of TB received LTBI treatment. The DOPT rate reached 98%.

Future Prospects

Taiwan has a moderate-burden of TB, with incidence rate of 30.1 cases per 100,000 populations in 2021. The National Tuberculosis Program (NTP) sets out ambitious targets to reduce TB incidence to less than 10 new cases per 100,000 population by 2035. Although the average annual decline rate in Taiwan was more than 2-fold compared with the global average during 2005 to 2021, there are substantial challenges that need to be overcome. To realize the targets, Taiwan CDC will focus on introducing WHO-recommended new diagnostic tools for TB and strengthening active case finding in TB high risk populations including those in mountainous areas, the elderly in long-term care facilities and new immigrants, and etc. And to further reduce the risk of TB infection progressing to active TB disease in these key populations, Taiwan CDC is putting efforts to increase access to TB preventive therapy.



Campaign against TB on World TB Day, March 23, 2021



Taiwan-Vietnam Virtual Conference on Tuberculosis Prevention and Control, December 7, 2021

HIV/AIDS

Current Status

The first HIV case in Taiwan was reported in 1984. By 2021, 42,260 cases were reported (20,343 of whom had developed full-blown AIDS with 7,616 deaths). Infections surged in 2005 due to skyrocketing conditions among injection drug users. Faced with this dire situation, Taiwan CDC cooperated with other departments in dedicating a tremendous amount of effort and resources to harm reduction programs. Total reported cases dropped in 2006, marking the first trend reversal since 1984. In 2008, the epidemic took another turn, with new infections mainly occurring among men who have sex with men (MSM). The program enables people with HIV receive highly active antiretroviral therapy right after diagnosis since 2016. Mass campaign of screening and services. Pre-exposure Prophylaxis (PrEP) integrated screening services have been one of the prevention strategies since 2016. The epidemic decreased since 2018.

In 2021, there were 1,246 new infections diagnosed. In terms of age, people in the 25 to 34 age group accounted for 568, or 46%, of new infections diagnosed in 2021, more than any other group. The second-largest group was the 35 to 44 age group, numbering 286, or 23%, of all cases. An analysis of risk factors showed that the highest proportion of HIV infections was a result of unsafe sexual contact among MSM, accounting for

Figure 3-5 HIV Infection Risk Factors in Taiwan, 1984-2021

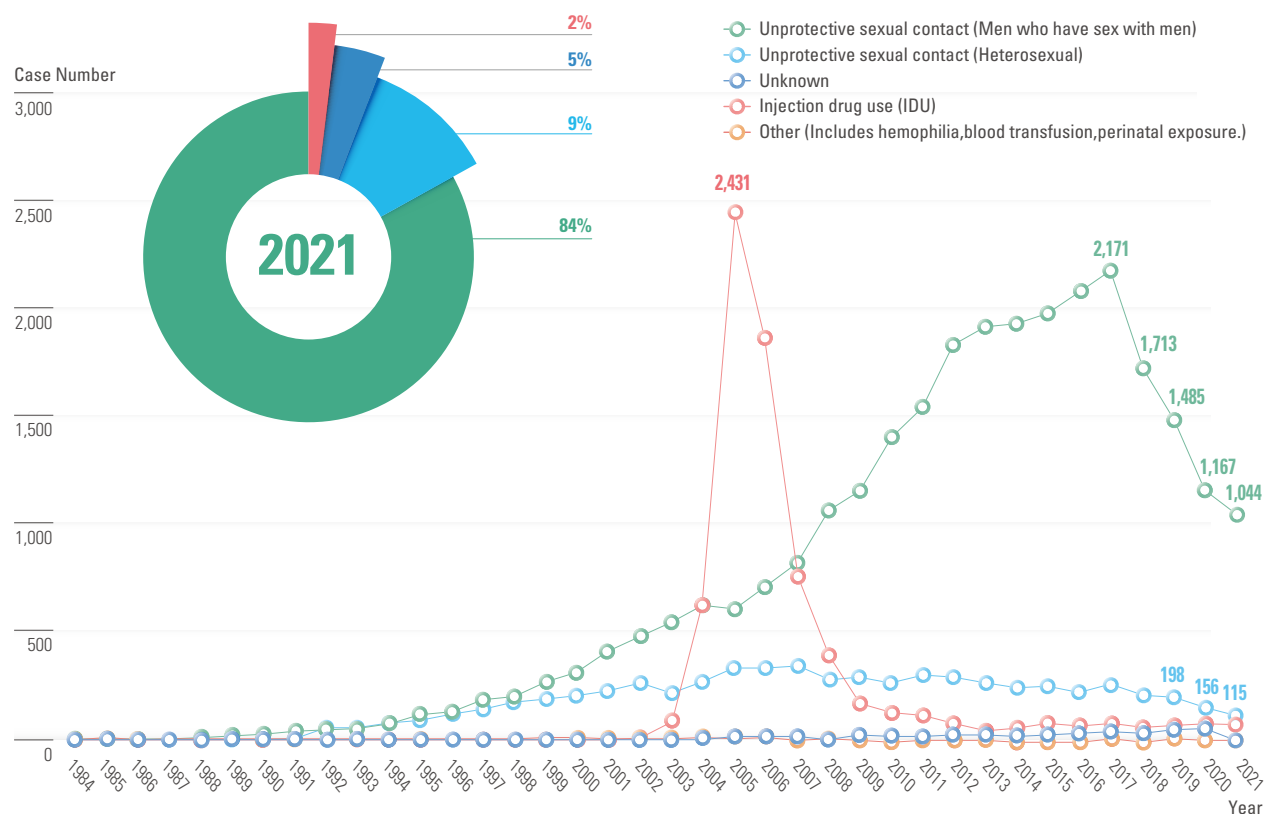
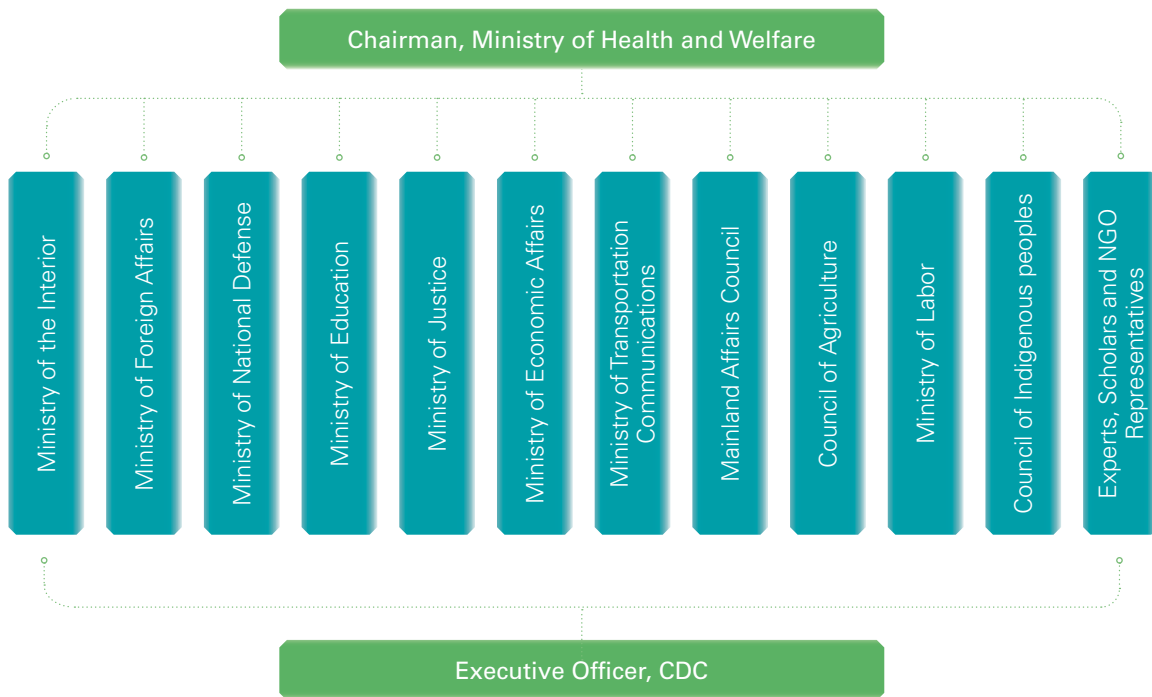


Figure 3-6 Committee for HIV Infection Control and Patient Rights Protection, Ministry of Health and Welfare, Executive Yuan



84% of all cases. The second-largest proportion of infections was heterosexual contact, accounting for 9% of cases (see Figure 3-5). Of Taiwanese nationals diagnosed with HIV in 2021, 1,208 people, or 97%, were males and 38 people, or 3%, were females. The sex ratio of new diagnoses was 32:1.

Accomplishments

1. The Committee for HIV Infection Control and Patient Rights Protection (Figure 3-6) held several cross-ministerial meetings in 2021.
2. To ensure the dignity and rights of people living with HIV/AIDS (PLWHA), the HIV Infection Control and Patient Rights Protection Act was amended in 2015. This amendment canceled all restrictions on the entry, stay, and residency of HIV-infected non-nationals. For the need of organ transplantations for the HIV infected, the HIV Infection Control and Patient Rights Protection Act was amended on May 18, 2018, for the HIV infected who are in good health status to donate organs to another HIV infected. Related regulations were amended and announced. The Criteria of Unsafe Sexual Behavior was amended on July 2, 2021, including the medical assessment of a significant risk of infection and causing HIV infection into the legal judgment to meet the best available scientific and medical evidence.
3. The harm reduction program has made significant progress. The reported number of HIV infections among IDUs dropped in 2006. Taiwan saw an effective reduction in the number of HIV infections, with the largest decline among IDUs. The percentage of all newly reported cases attributable to IDUs fell from a high of 72% in 2005 to only 1.7% in 2021.

4. Taiwan CDC promotes diversified prevention programs to confront the epidemic among MSM. Initiatives include (1) Establishment of MSM Community Health Centers that provide lesbian, gay, bisexual, and transgender (LGBT) friendly health services. (2) Implementation of health education and intervention services, such as online opinion leaders and HIV testing advertisement on mobile dating apps. (3) Providing voluntary HIV counseling and testing outreach services at saunas and pubs. (4) Installation of condom vending machines in venues frequented by the gay population. (5) Establishment of a free hotline for MSM to provide immediate and accurate health information and counseling on HIV-related matters.



Taiwan CDC held a press conference with the Olympic boxing player, Hsiao-Wen Huang to disseminate 4 key ways to prevent HIV, and to promote the slogan "Fight HIV/AIDS, share Love" via Facebook profile picture and Instagram story on November 30, 2021.



Taiwan CDC published a video of the Olympic boxing player, Hsiao-Wen Huang fighting against the myth of HIV/AIDS and emphasizing the importance of doing HIV tests on November 30, 2021.

5. To prevent mother-to-child transmission, HIV screening has been incorporated into standard prenatal checkups since 2005. All pregnant women in Taiwan are offered HIV screening during the first prenatal screening in the first trimester. The Taiwan government provide pregnant women found to be HIV-infected with antiretroviral therapy. The exposed infants are provided with free perinatal prophylaxis during intrapartum and first 4-6 weeks of life. They are also supplied with breast-milk substitutes during the first 4 months of life.

6. To enhance disease surveillance, Taiwan began to screen blood donors in 1988, drafttees in 1989, and prison inmates in 1990. Seventy hospitals provided anonymous HIV screening services in 2021 and 13 of them offered one-stop HIV screening services shortening the turnaround time from screening to confirmation of diagnosis within 1 hour. They screened 31,083 people, with 343, or 1.1% of people, found to be HIV positive.

7. Moreover, to decrease the barriers for people to know their own HIV sero-status, from December 2018, Taiwan CDC launched a program to distribute HIV self-test kits at NGOs or health stations, and through pay-at-pickup services provided by the chained convenient store, and through vending machines at LGBT health centers, health stations, and gay saunas. Users paid 6 US dollars to get the kits, and could get a free coupon for their next HIV self-test kits after logging their test results online.

In 2021, 51,119 kits were sold: 8,780, or 17.2%, through vending machines, 7,756, or 15.2%, distributed by LGBT health centers and health stations, 34,583, or 67.7%, distributed through pay-at-pickup services provided by the chained convenience stores. 0.5% of respondents reported being newly tested HIV-positive.



8. To expedite the diagnosis of HIV, Taiwan CDC has actively introduced and promoted the use of rapid HIV testing, including Ag/Ab combination testing, Immunochromatographic testing (ICT), and Nucleic Acid Testing (NAT), while amending the HIV testing procedure. Moreover, Taiwan CDC has made adjustments to HIV testing covered by National Health Insurance (NHI) program which took effect on November 1, 2021.
9. Taiwan CDC held a pilot project of PrEP which provided subsidies for drugs, HIV & STI testing since 2016, then had scaled up nationally for those who were serodiscordant couples/partners of PLWH and prioritized population aged below 30 y/o since 2018. In 2021, this project expanded to those aged below 35 y/o. The total amount of participants enrolled in the project in 2021 was 1,542 people of which 1,278 people were aged below 35 y/o (83%) and 264 people were serodiscordant couples/partners of PLWH (17%).
10. The Taiwan government has provided HIV/AIDS patients with free medical treatment since 1988 and free highly active antiretroviral therapy (HAART) since 1997. At the end of 2021, 83 designated hospitals, 1 clinic and 63 pharmacies provided HIV/AIDS patients medical services, and over 94% of people living with HIV received HAART and 95% of all people receiving HAART had viral suppression in 2021. In addition, TCDC has implemented the "Quality Improvement Project for Designated Medical Institutions" In 2021, 80 designated hospitals, 1 clinic and 54 pharmacies participated in the project. The participated institutions are subsidized for the case management provided to the patients according to their performances. Furthermore, to serve the need of long-term care for HIV/AIDS patients, the government designated 24 nursing homes, and subsidized 30 hospitals to sign agreements with 52 long-term care institutes.

Prospects

Taiwan continues to promote various HIV prevention and treatment strategies with three major aspects: prevention, screening, and treatment. The efforts of health units and non-governmental organizations led to remarkable results in HIV. The number of HIV-infected new cases has declined for four consecutive years. We hope that through the participation of relevant units and the implementation of multiple strategies, Taiwan can reach the UNAIDS 95-95-95 target by 2030 and end the HIV/AIDS in the near future.

Preparing for Influenza Pandemics

Current Status

Taiwan began to prepare for potential pandemics since the avian influenza epidemic emerged at the end of 2003. From the experience of SARS in 2003, government agencies were highly supportive and willing to allocate necessary funding for preparations.

In May 2005, the first National Influenza Pandemic Preparedness Plan (hereafter referred to as the 'Preparedness Plan') was approved by the Executive Yuan. In May 2015, the Executive Yuan approved the Phase III plan as a continuation of the Phase II plan, to engage with all the preparation work.

The influenza pandemic strategic plan in Taiwan is composed of four major strategies and five lines of defense. The four major strategies are as follows: (1) Surveillance and assessment, (2) Interruption of transmission, (3) Antivirals, and (4) Influenza vaccines; and the five lines of defense are defined as follows: (1) Containment abroad, (2) Border control, (3) Community epidemic control, (4) Maintenance of medical system functions, and (5) Individual and family protection. Together, these measures minimize the morbidity and mortality rate, economic losses, and impact of novel influenza viruses.

Accomplishments

The content of the Preparedness Plan is outlined as follows:

1. Vaccine Stockpile and Use

(1) Seasonal Influenza Vaccines

The 2021 government-funded seasonal influenza vaccination program was launched in two stages. Except for adults aged 50-64 without high-risk chronic diseases who started to be vaccinated in the second stage on November 15, 2021, other individuals began to receive their vaccination on October 1, 2021. The seasonal influenza vaccination program targeted nine groups of people: 1. Persons aged 50 years and above; 2. Children and adolescents aged 6 months through 18 years; 3. People with catastrophic illnesses; 4. Residents and staff in nursing homes and long-term care facilities; 5. Healthcare workers and public health personnel; 6. Poultry and livestock farmers and animal health inspectors; 7. People who had underlying medical conditions; 8. Pregnant women and parents of infants less than 6 months of age; 9. Kindergarten caretakers, and child-care professionals. The program subsidizes a policy of not charging diagnostic fees for all vaccination groups to lower barriers and increase the willingness of influenza vaccination. Influenza vaccines were given to school-aged students at campus and to other groups at clinics or hospitals.

(2) Pandemic Influenza Vaccines

In recent years, the emergence of the H5N1, H1N1pdm and more recently, the H7N9 virus has continued to cause more and more human infections, indicating the urgent need for influenza pandemic preparedness. Taiwan CDC now continues to act in accordance with the phase III Pandemic Preparedness plan to ensure that the vaccines are available and sufficient during a pandemic.

2. Stockpiling and Use of Antiviral Drugs

In accordance with the WHO recommendation to maintain a diverse stockpile of influenza antivirals in preparation for a pandemic, Taiwan CDC has established national stockpiles of Tamiflu, Relenza, Eraflu, Rapiacta, and Avigan. These stockpiled antivirals are sufficient to supply at least 10% of the population. In response to seasonal influenza control, as well as the proper use of stockpiled drugs, it followed recommendations from the Advisory Committee on Influenza Control and Prevention to supply antivirals to those reported as severe complicated influenza, and who were at increased risks for influenza-related complications such as infants, elderly, and patients with chronic diseases. In addition, during the peak of flu season, usually from December 1 to March 31, Taiwan CDC expands the target population for antiviral drug use and adjusts the duration based on actual conditions. There were more than 4,200 contracted hospitals and clinics to administer government-funded antivirals.



Stockpiling of influenza Antiviral Drugs and Active Pharmaceutical Ingredient(API)

3. Stockpiling and Management of Personal Protective Equipment (PPE)

Taiwan CDC established a 3-tier stockpiling framework of PPE. Taiwan CDC, local health authorities, and medical institutions should maintain a minimum stock of PPE (including surgical masks, N95 respirators and coveralls) and ensure a sufficient supply for personnel engaged in epidemic control and health care services during the early phase of an epidemic.

In 2011, Taiwan CDC initiated a stockpile replacement model in order to optimize the PPE stockpiling efficiency. This stockpile replacement model employs a first-in-first-out principle in which the oldest stock in the central government stockpile is regularly replaced and replenished with the same amount of new and qualified products, ensuring the availability and the maintenance of the minimum stockpiles.

PPE has been used to reduce infection, during the COVID-19 outbreak, in order to reach a rational distribution of PPE and ensure enough PPE for medical workers working on the front

lines to protect themselves, the Ministry of Health and Welfare purchased or requisitioned medical face masks, surgical masks, N95 respirators, isolation gowns and coveralls produced by domestic manufacturers of Taiwan for professional use in healthcare settings or for public health. Moreover, to ensure universal access to face masks and to increase fairness and transparency in resource allocation for healthy individuals, a name-based rationing system was implemented.



Stockpiling of Personal Protective Equipment(PPE)

Information such as purchases, stocking, inventory, collection and re-stocking at all levels of inventory units can be monitored in real time by using the Epidemic Prevention Supplies Management Information System. Furthermore, they can be delivered to local health bureaus and hospitals in a regular cycle, based on the inventory conditions at the local health bureau and hospitals. CDC also inviting hospitals to re-assessment actual needs of PPE, and increasing their PPE stockpiles.

4. Communicable Disease Control Medical Network Preparedness

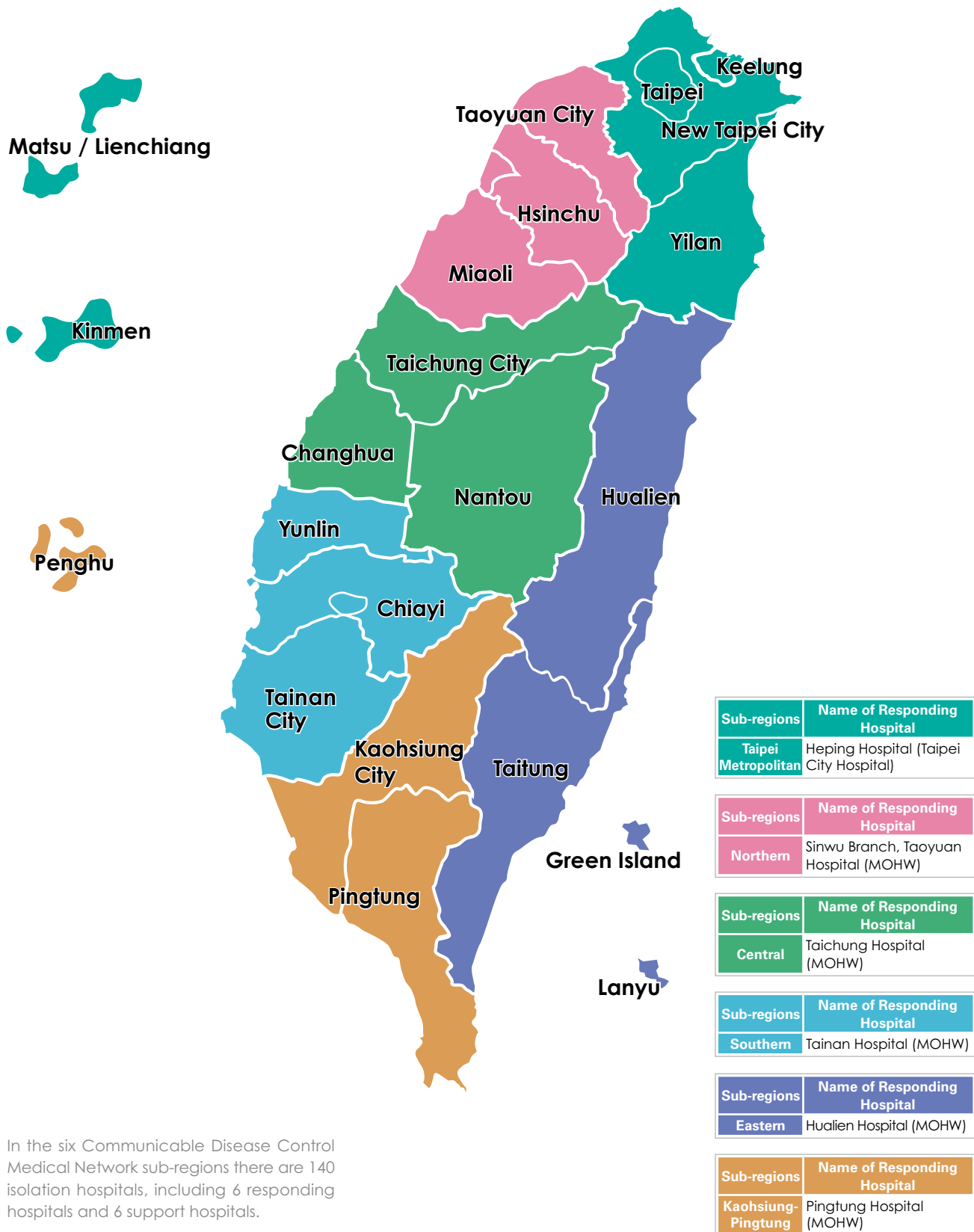
The Communicable Disease Control Medical Network (CDCMN) was set up in 2003 after SARS. It has brought together the medical and public health systems to provide safer, more effective treatments for communicable disease patients, and strengthen Taiwan's capacity to handle contingencies in the prevention and control of communicable diseases. In 2021, the CDCMN with its 6 sub-regions organized 140 designated isolation hospitals for treating communicable disease patients (Figure 3-7).

There are 6 response hospitals for treating patients suspected of having contracted category 1 or category 5 notifiable diseases or emerging infectious diseases. Additionally, 6 designated support hospitals provided medical treatment advice, and local health authorities offered manpower support to response hospitals. To improve staff capabilities, there were 256 communicable disease response training courses and 15 practice drills for response staff in 2021. Each sub-region of the CDCMN had a commander and a deputy commander who assisted with area epidemic control and preparedness of response hospitals.

Future Prospects

Mutation of influenza viruses is still ongoing. We need to continue to prepare for possible pandemics. Therefore, it is important to maximize the use of limited resources in accordance with the Pandemic Influenza Risk Management, which is a guidance released by the WHO in May 2017. Taiwan CDC will put effort in developing and strengthening existing pandemic strategies as well as consolidating a sustainable stockpile of antivirals, vaccines and PPEs. We expect the above actions to pave the way for appropriate responses to possible pandemics in order to ensure people's health.

Figure 3-7 Communicable Disease Control Medical Network



In the six Communicable Disease Control Medical Network sub-regions there are 140 isolation hospitals, including 6 responding hospitals and 6 support hospitals.

Dengue Fever

Current Status

During the first half of the 20th century, there were three island-wide dengue outbreaks in Taiwan (1915, 1931 and 1942). After almost 40 years of dormancy, a DEN-2 outbreak occurred in Liuchiu Township, Pingtung County in 1981, and another DEN-1 outbreak occurred in the Kaohsiung area (1987-1988). Thereafter, dengue outbreaks became more common. Epidemics mainly have occurred in Kaohsiung, Tainan and Pingtung, with several instances in the north. The past ten years have seen an increase in cases of dengue fever and severity level. There were more than 1,000 cases in Taiwan in 2007, 2010, 2011, and 2012. Though the number of cases did not reach 1,000 in 2006, 2009, and 2013, there were still more than 500 cases each year. 2014 and 2015 saw unprecedented outbreaks with more than 10,000 cases. Some 97% of the indigenous cases in 2014 were concentrated in Kaohsiung while indigenous cases were concentrated in Kaohsiung (45%) and Tainan (52%) in 2015.

After suffering the serious dengue outbreaks, Taiwan CDC developed and implemented new approaches. There were few indigenous cases in Taiwan from 2016 to 2021. In 2021, the number of indigenous cases in Taiwan was zero. (Figure 3-8) Severe dengue epidemics in Southeast Asia in recent years have led to an increase in imported cases in Taiwan, reaching 363 in 2016, 350 in 2018, and 540 in 2019. In response to the COVID-19 pandemic in 2020 and 2021, border controls have been strengthened. In 2021, the number of imported cases was 12, the lowest over the previous 10 years. (Figure 3-9)

Figure 3-8 Indigenous Dengue Cases in Taiwan, 1988 - 2021

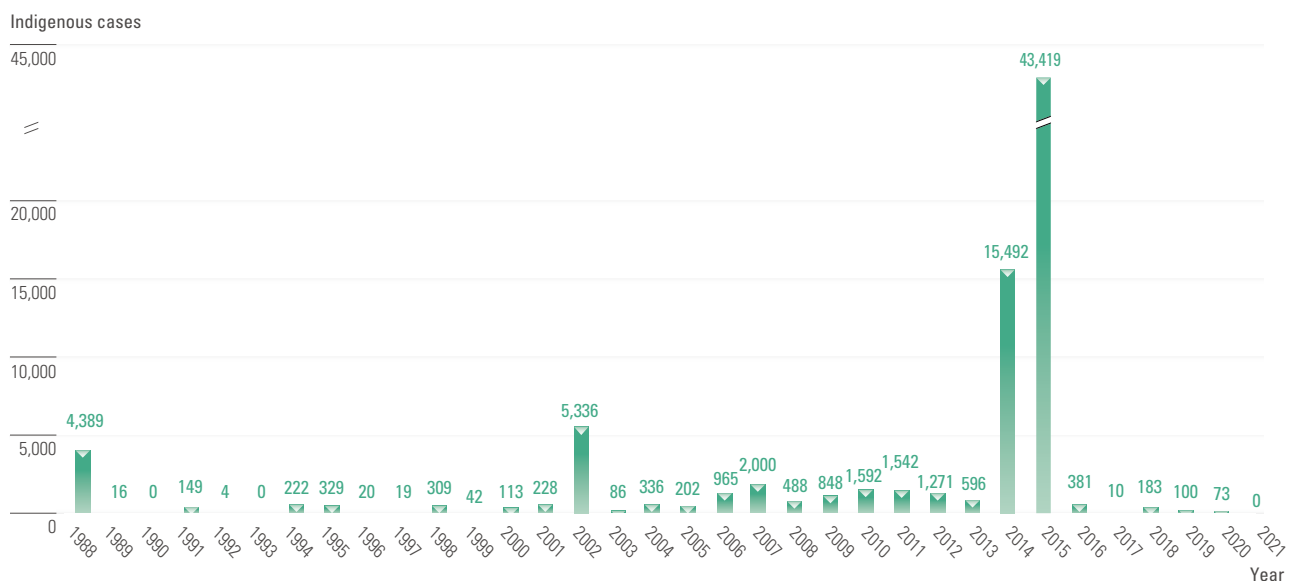
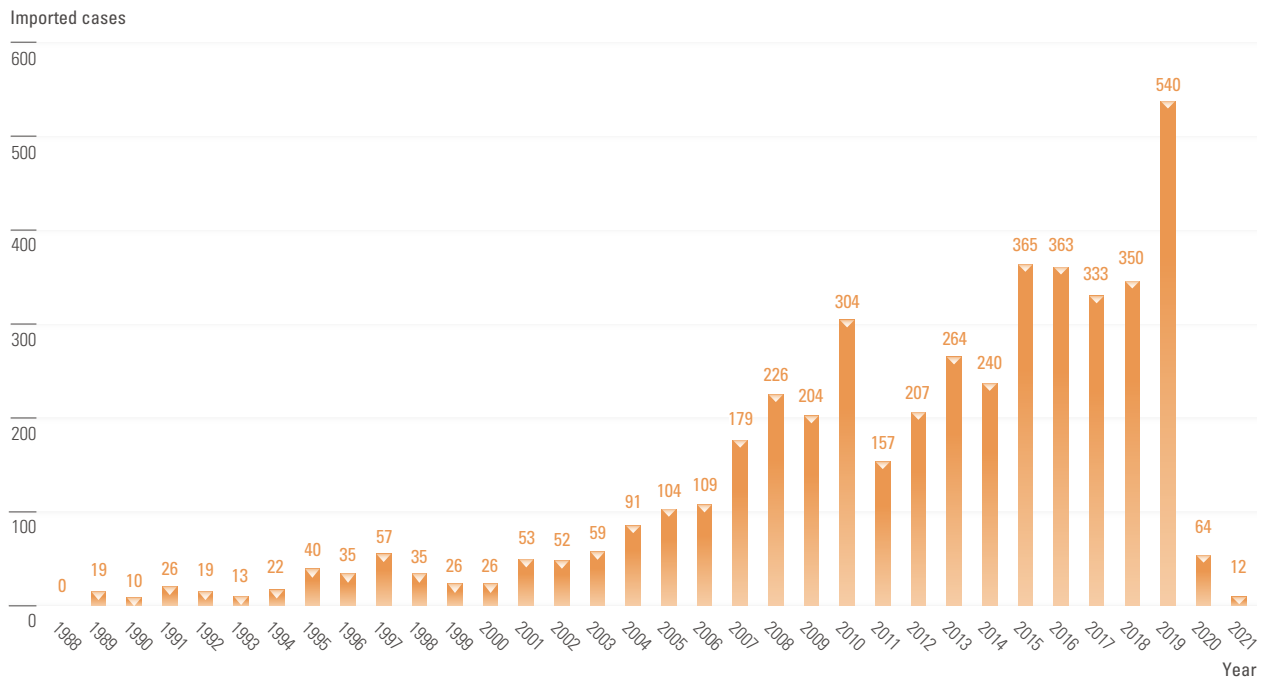


Figure 3-9 Imported Dengue Cases in Taiwan, 1988 - 2021



Goals & Strategies

The main strategies to control dengue in Taiwan are eliminating vector (mosquito) breeding sources and lowering vector density.

Taiwan CDC has devised a three-stage prevention strategy for controlling the dengue epidemic. Primary prevention measures include source reduction and control of the vector population. Secondary measures cover disease surveillance and emergency/contingency mechanisms. Tertiary prevention involves controlling the mortality rate.

Primary Prevention

1. Implementing health education through diverse communication channels to promote dengue fever and severe dengue awareness.
2. Involving the community in improving environmental and household sanitation along with reducing vector sources through volunteer training.
3. Encouraging regular inspection and eliminating vector breeding sources by cleaning empty houses, vacant lots, and other potential vector breeding sources, and keeping records for future inspections.
4. Strengthening education and training for disease prevention workers and volunteers.
5. Setting up a vector surveillance mechanism to check places with a high mosquito density probability and promptly wipe out vector sources.

Secondary Prevention

1. Constructing a disease surveillance mechanism for prompt control of suspected cases; strengthening disease surveillance and disease trend evaluation through official epidemic reporting systems, emerging disease surveillance, public reporting, and symptom declaration forms.
2. Setting up emergency/contingency mechanisms to promptly investigate suspected transmission sources, spraying insecticide to eliminate those sources, and publicizing the importance of eliminating vector-breeding sites to prevent infection.

Tertiary Prevention

1. Establishing guidelines for dengue fever and diagnosis and treatment for severe cases.
2. Organizing continuing education workshops for medical personnel to raise health care quality and lower mortality rates.

Accomplishments

The following strategies have yielded remarkable results: strengthening border quarantine efforts; improving disease surveillance systems; providing subsidies to support local governments to implement prevention and control programs; periodically convening the Cross-Ministerial Meeting on Measures to Combat Mosquito-Borne Diseases to facilitate communication between the central and local governments; cooperating with the National Mosquito-Borne Diseases Control Research Center. There were only ten indigenous cases in Taiwan in 2017 and zero cases in 2021, hitting the second lowest and the lowest record over the past five years. The aforementioned achievements are remarkable under the conditions of the serious global epidemic of dengue, frequent international interactions, and climate change, which resulted in rapid propagation of mosquito vectors.

Primary Prevention

1. Distributed health education and promotional materials, including leaflets, posters, banners, the Combat Manual for Dengue Fever, and VCDs.
2. Produced promotional materials, such as epidemic control programming and newspaper ads, which called on the general public to eliminate breeding sources. These included TV commercials and short films for screening in TV slots reserved for public service announcements.
3. Published the Guidelines for Dengue Control to be the reference for local health organizations.



Guidelines for Dengue /
Chikungunya Control(14E)

4. Formulated the Community Mobilization Plan for Cleaning Up Breeding Sources of Vectors. Taiwan CDC encouraged community organizations in southern Taiwan to propose plans to CDC units and organize volunteer teams to exterminate mosquitoes. In total, 1,078 teams of volunteers were recruited. On average, they performed more than 4.5 operations per month.
5. Encouraged experts to conduct studies in insecticide efficiency and mosquito resistance to promote better insecticide use.
6. Promoted dengue fever vector mosquito surveys and the Dengue Fever Control Plan. Implementation was entrusted to the health bureaus of high-risk counties and cities in southern Taiwan (areas infested with *Aedes aegypti* mosquitos).

Secondary Prevention

1. Established an incentive system to encourage physicians to report cases, in turn, enabling early detection of the disease. Medical professionals, including physicians, who reported the year's first indigenous case in each city and county were awarded US\$130, and those who reported an imported case were awarded US\$80.
2. Continued fever screening at international airports and seaports to limit disease importation. Around 89% of imported dengue cases were detected at ports.
3. Encouraged clinics and hospitals to use NS1 rapid test to facilitate early diagnosis and implementation of subsequent measures that prevent further transmission of the disease.
4. The Cross-Ministerial Meetings on Measures to Combat Mosquito-Borne Diseases are held monthly not only to enhance communication, cooperation and collaboration between central and local governments, but also to supervise and assist local governments in implementation and prevention efforts for vector born disease.

Tertiary Prevention

About 3,246 clinical physicians attended dengue diagnosis and treatment training courses on-line on July 31, 2021.

Future Prospects

After Taiwan suffered a serious dengue outbreak in 2015, from 2016 to 2020 Taiwan implemented several prevention and control strategies that have yielded concrete results, which will serve as the foundation for Taiwan CDC to strengthen the cooperation between central and local governments to combat dengue fever. Additionally, Taiwan CDC will continue to strengthen border quarantine efforts, improve disease surveillance systems, raise public awareness through diverse channels, and stay abreast of the technological trends for preventing and controlling communicable diseases in order to respond to upcoming challenges.

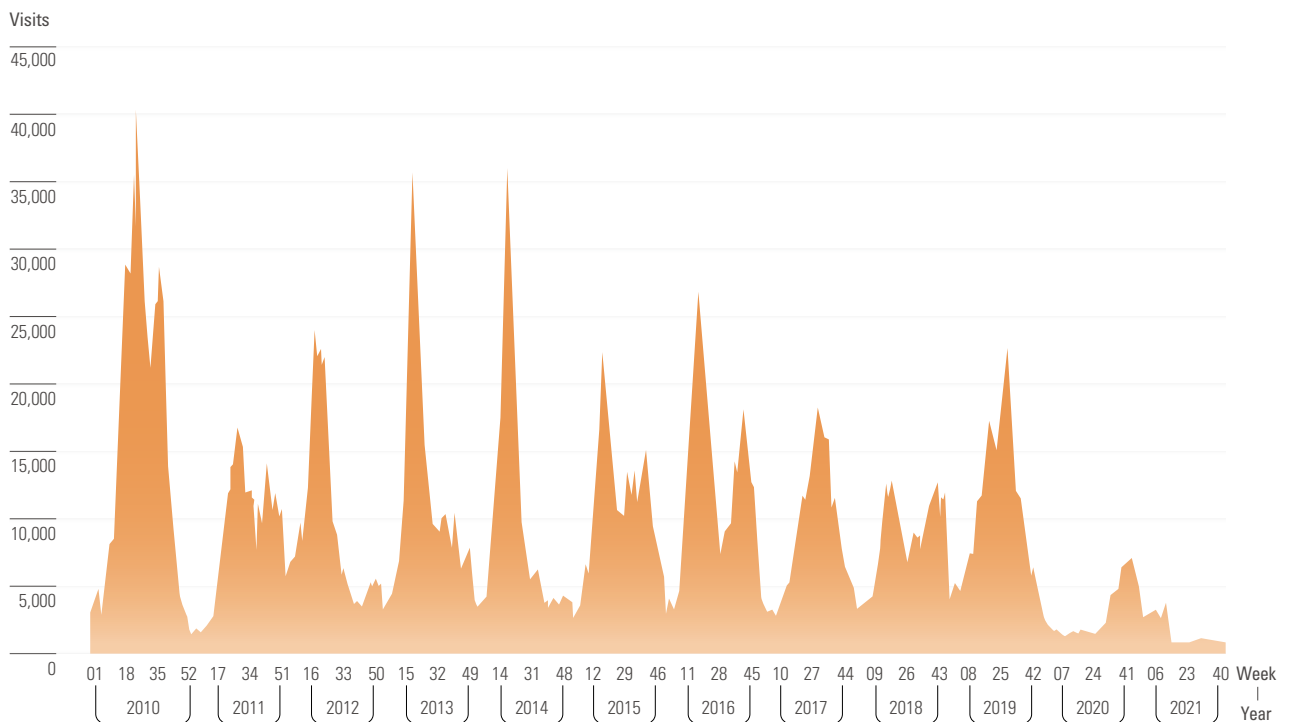
Enteroviruses

Enterovirus belongs to a group of small RNA viruses, including polioviruses, Coxsackie A viruses, Coxsackie B viruses, echoviruses, and other enteroviruses. Enterovirus 71 (EVA71) has significantly higher pathogenicity compared to other known enteroviruses, especially regarding neurological complications. Enteroviruses are found in the gastrointestinal tract (the stool or mouth of infected persons) and respiratory tract (such as saliva, sputum, or nasal mucus). Infections can be produced by direct contact with the secretions of infected persons or with contaminated surfaces or objects.

Current Status

According to survey data gathered over a period of several years by Taiwan CDC and National Health Insurance Administration (NHI), the number of weekly outpatients and emergency visits for enterovirus infection increases in late March and peaks around mid-June. It decreases after mid-June. There is usually another smaller outbreak when schools reopen in September (Figure 3-10). Many types of enteroviruses exist around the world. Humans appear to be the only known host and source of transmission. The patient is contagious before disease onset, and the infectivity lasts for weeks after the patient is recovered. There are currently no preventive vaccines for non-polio enteroviruses in Taiwan and no known highly efficacious medicines to eliminate the virus once it is inside the

Figure 3-10 The Number of Weekly Outpatient and Emergency Visits for Enterovirus Infection in Taiwan, 2010 - 2021



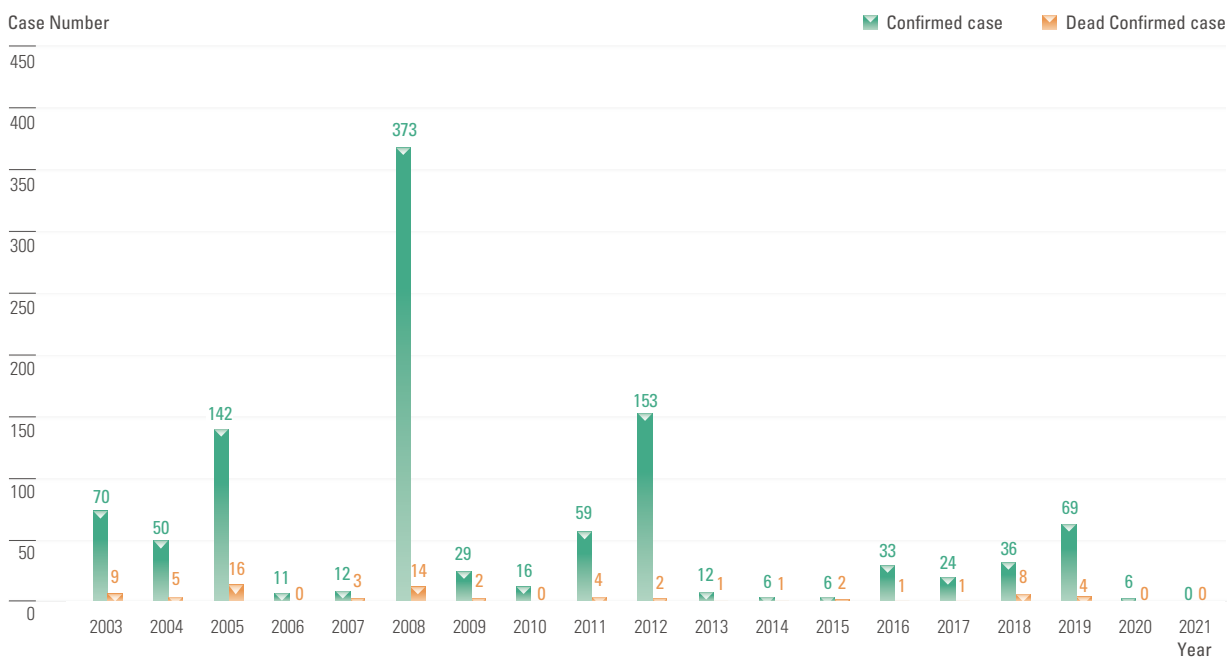
human body. Therefore, enteroviruses will continue to pose a threat to human health in the foreseeable future.

The major symptoms of enterovirus infection are herpangina and hand-foot-and-mouth disease (HFMD). According to various surveys, enterovirus infection trends suggest that children under the age of 5 are more prone to critical complications and death. EVA71 is the most commonly seen serotype of cases of enterovirus infection with severe complications (EVSC) in Taiwan. In 2021, no severe case confirmed. (Figure 3-11)

Accomplishments

1. Established multiple and real-time surveillance systems for enterovirus infections, covering patients of enterovirus infection (HFMD and herpangina), severe cases, clustering, virus isolation, and typing.
2. Constructed a medical service network, including 6 regional chiefs, 82 responsible hospitals and 8 contracted laboratories. Experts were invited to visit responsible hospitals and provide guidance. Training programs within responsible hospitals and hospitals in their neighborhoods were subsidized.
3. Cooperated with local governments
 - (1) Conduct regular inspections for environmental sanitation, provide hand-washing facilities and related prevention measures in schools, kindergartens, baby care

Figure 3-11 The Volume of Confirmed Cases and Deaths of EVSC in Taiwan, 2003 - 2021



centers, hospitals, clinics, postpartum care facilities, and other public gathering places. To reduce the risk of infection, Taiwan CDC strengthened its inspection on kindergartens and nursery homes during the epidemic.

- (2) Enhance health education on enteroviruses prevention and control for the general public and organize training for professionals.
4. Established consultation channels staffed by clinical professionals. The professionals provided clinical health care consultation and guidelines for treating enterovirus complications.
5. “The Manual for Enterovirus Prevention” and “The Handbook for Enterovirus Prevention for Child Care Workers” list all necessary precautions. These materials are provided on the Taiwan CDC website and updated when needed.
6. Workshops are held on the clinical treatment of critical enterovirus complications or neonatal enterovirus infection by hospitals and societies to enhance doctors’ skills in treating the disease, raise treatment quality, and reduce mortality rates and sequelae.
7. According to the risk of EVSC clustering, the recommendation of class suspension has been revised for the pre-school education and care institutions, which are high-risk groups.
8. Research and development progress of EVA71 vaccine in Taiwan: After accepting the technology of EVA71 vaccine from the National Health Research Institutes, two domestic biotechnology companies have completed Phase II clinical trials. Both of them have completed the Phase III clinical trials and applied for vaccine approval in Taiwan.

Future Prospects

1. Enterovirus Prevention Enhancement

- (1) Increase public awareness of hand-washing and not going to school or work when sick.
- (2) Enhance caregivers’ awareness of prodromal complications for enterovirus infections with severe complication.
- (3) Raise the awareness of pregnant women, care workers and medical staff for prevention and risk of neonatal enterovirus infection.
- (4) Strengthen the implementation of infection control measures in hospitals or nursing homes to reduce the risk of neonatal enterovirus clusters.

2. Continuous monitoring of epidemic changes, timely adjustment of prevention and control strategies.

3. Follow the development progress of EVA71 vaccine.

COVID-19 Pandemic Control

Current Status

In 2021, COVID-19 continued to pose a serious threat as it spread around the world for a second year. As of December 31, 2021, there were 286,858,296 confirmed cases of COVID-19 and 5,444,396 deaths, meaning an average fatality rate of 1.9%.

As the number of imported cases of COVID-19 in Taiwan continued to increase, several local outbreaks emerged. When the country entered the stage of community transmission in the middle of May, the nationwide epidemic warning was raised to Level 3. By the end of July, the outbreaks were contained, rendering only sporadic community infections.

As of December 31, 2021, there were 17,121 confirmed cases in Taiwan. Of the 17,121 confirmed cases, 14,609 were domestic; 2,460 were imported; 36 were naval crew members aboard the Panshi fast combat support ship; 3 were infections on an aircraft; 1 case has an unknown source of infection; 14 cases' sources of infection were under investigation.



The CECC raises the nationwide epidemic warning to Level 3 on May 15, 2021. Stricter nationwide restrictions are put in place to prevent large-scale community transmission

Accomplishments

1. Pandemic Surveillance

Taiwan CDC used a variety of surveillance mechanisms and reporting channels to understand domestic and international pandemic trends and keep close contact with international bodies for disease information sharing. Taiwan CDC continued to gather global pandemic information, including the trends in the spread of new variants and vaccine effectiveness in countries around the world, through international cooperation and exchanges and adjusted pandemic prevention policies. Furthermore, Taiwan CDC built a COVID-19 surveillance system to monitor and understand the variants individuals in Taiwan were infected with.

2. Border Quarantine

In response to the global pandemic situation and to prevent Delta, Omicron, and other variants from spreading to the country, Taiwan maintained strict border control measures throughout 2021. Travelers coming to Taiwan needed to obtain a COVID-19 PCR test result issued within three days of boarding at the place of departure and use

the Quarantine System for Entry to complete a health declaration before boarding. From July 2, 2021, all travelers who entered Taiwan via an airport or a seaport were required to take a saliva-based PCR test. They also had to stay at a quarantine hotel or a group quarantine facility to undergo 14 days of quarantine to reduce the risk of community transmission caused by imported cases.

3. Community Disease Prevention

Taiwan CDC adjusted domestic disease prevention measures based on developments in the pandemic situation. Government agencies were instructed to formulate disease prevention measures and guidelines for various venues under their supervision. Taiwan CDC also implemented expanded screening and enhanced COVID-19 surveillance measures, which effectively uncovered and broke hidden transmission chains. Additionally, local health authorities and civil affairs agencies continued to work together to form care networks and track as well as provide care for people undergoing home isolation, home quarantine, or self-health management.

4. Vaccination

In order to quickly acquire safe and effective vaccines, Taiwan pursued multiple avenues, including international investment (participation in the COVAX mechanism led by the WHO, GAVI, and CEPI), procurement from manufacturers, and domestic production. The COVID-19 vaccine rollout began on March 22, 2021, with vaccinations being first provided to the priority groups listed by the Advisory Committee on Immunization Practices; relevant adjustments were also made as needed. As of December 31, 2021, the coverage rate was 79.99% for the first dose, 69.07% for the second dose, 0.02% for an additional dose, and 0.66% for a booster dose.

Taiwan not only actively negotiated supply agreements with international manufacturers but also received strong support from diplomatic allies and friendly



When the rollout of COVID-19 vaccines began on March 22, 2021, Premier Su Tseng-chang and Minister of Health and Welfare Chen Shih-chung took the lead in getting vaccinated



Taiwan expresses thanks to the United States, Japan, Lithuania, the Czech Republic, Poland, and Slovakia for donating in total more than 9 million vaccine doses.

nations, including the United States, Japan, Lithuania, the Czech Republic, Poland, and Slovakia, who altogether donated more than 9 million doses of vaccine. Additionally, Taiwanese enterprises and civil organizations also made a contribution to vaccine supply. For instance, TSMC, Hon Hai Precision Industry Co. Ltd./YongLin Foundation, and Buddhist Tzu Chi Charity Foundation jointly donated a total of 15 million doses of the BioNTech vaccine.

5. Medical Treatment Response and Supplies Preparedness

- (1) In response to the COVID-19 pandemic, Taiwan CDC strengthened infection control measures and inspection mechanisms for hospitals, long-term care and social welfare institutions, and laboratories. Taiwan CDC conducted unannounced inspections and implemented response plans and drills.
- (2) Ensuring the Communicable Disease Control Medical Network operated effectively to respond to the pandemic, including the establishment of a community testing network, patient triage mechanism, and bi-directional referrals as well as the implementation of infection control measures at healthcare facilities, medical care institutions, and densely populated institutions.
- (3) Planning and establishing group quarantine facilities and expanding collaborative efforts to establish quarantine hotels and build local quarantine fleets of vehicles to transport people to their places of quarantine.

- (4) Creating an online platform where health care workers can take classes and seek consultations about the management of severe COVID-19 cases.
- (5) Continuing to requisition domestically manufactured medical masks, surgical masks, N95 masks, isolation gowns, and coveralls, in accordance with the law, to meet the demand for masks sold under the name-based mask distribution system as well as the needs of health workers and public officials.
- (6) Procuring and stockpiling antiviral drugs (including injectable and oral medication) and monoclonal antibodies for COVID-19 treatments of patients.

6. Health Education and Campaign

The CECC held press conferences to announce important pandemic information, policies, and measures. The CECC also made educational materials on key topics and produced disease prevention videos that were translated into several foreign languages. Diverse media channels, including broadcast media, new media, and disaster warning systems, were deployed to further help provide the latest domestic and international pandemic information and disease prevention policies and measures to the public.

7. Smart Disease Prevention

Taiwan CDC continued to develop smart disease prevention systems. Besides the Quarantine System for Entry, Tracing System, Digital Fencing System, contact tracing text messaging, and Disease Prevention Expert, Taiwan CDC developed the Taiwan Social Distancing app, showing users their exposure to confirmed cases without using personal information. Taiwan CDC also set up the Epidemiological Investigation Assistance Platform, which provides hotspot maps, tracking locations under investigation, and searching data on contact tracing text messaging system, in order to support frontline disease prevention workers in their efforts to quickly investigate outbreaks and reduce disease spread.

Future Prospects

COVID-19 is a historic pandemic that has severely affected nations around the world. New variants have presented new challenges. Taiwan has fought the disease by combining strict border controls, management measures for health care institutions, and a high-degree of compliance from the general public and delivered outstanding COVID-19 prevention performance that was ranked among the top in many international rankings. Viruses, however, know no borders. Therefore, we hope that all countries will continue to cooperate on COVID-19 response in order to end the pandemic and achieve the goal of global health security.

Emerging Infectious Diseases (EID) Response

Emerging Infectious Diseases (EIDs) risk surveillance, response and preparedness

In recent years, rapid changes in the global ecosystem and frequent international exchanges have resulted in the occurrence and spreading of many emerging infectious diseases (EIDs), which recognize no geographical borders and spread rapidly.

This has threatened public health, economic development, and even national security. The SARS outbreak in 2003, the MERS-CoV outbreak in 2012, and the Ebola outbreak in 2014 are cases in point. EIDs surely have drawn international attention. In light of this, Taiwan CDC proposed the "Surveillance, Response, and Preparedness Plan for the Risk from Emerging Infectious Diseases", which was approved by the Executive Yuan on the 9th of June in 2015, to effectively prevent and control EIDs. The program started in 2016 and will come to an end in 2021. It aims at maintaining the core capacities at the designated Point of Entrys (PoEs) based on the IHR, expanding the capabilities of testing and diagnosis of emerging pathogens, strengthening preparedness and emergency response, enhancing training and conducting drills to counter possible bioterrorism, and increasing international cooperation.

Accomplishments

1. Successfully maintained the core capacities at 7 designated PoEs based on the IHR and improved skills for monitoring EIDs and risk assessment.
2. Increased to 15 diagnostic methods for emerging pathogens and advanced diagnostic technology and capacity.
3. Carried out proper maintenance for both software and hardware in the Center for Infectious Disease Control and Prevention, Taiwan CDC. In addition, drills, exercises and multiple channels of training courses were offered for more than 420 persons.
4. Conducted training programs and exercises for the Biohazard Response and Verification Expert Team (BRAVE) and maintained the equipment. More



Personal Protective Equipment(PPE) Training for Support Staffs



Certification of Biohazard Response and Verification Expert Team(BRAVE)

than 80% of BRAVE members obtained certification. These efforts ensured a sufficient capacity for bioterrorism response.

5. Commanders and deputy commanders participated in 661 CDCMN consultation meetings and COVID-19 international web conferences, provided opinions and shared experience.

Infection Control and Biosafety

Healthcare-associated Infection Control

Current Status

The SARS outbreak highlighted the importance of infection control in hospitals. To improve patient safety and combat healthcare-associated infections, Taiwan CDC coordinates annual inspection programs, gathers surveillance data on the occurrence of healthcare-associated infections and antimicrobial resistance, and formulates infection control guidelines.

Our goals are:

1. To reduce healthcare-associated infections through national action plans and compilation of infection control guidelines.
2. To improve the performance of infection control programs in hospitals by boosting the quality of infection control inspection programs and sharing infection control experiences in on-site audits.
3. To continue promoting hospital participation and strengthening data quality in the Taiwan Healthcare-associated Infection and Antimicrobial Resistance Surveillance (THAS) system.
4. To promote infection control and reduce healthcare-associated infections in long-term care facilities by implementing infection control inspections.

Accomplishments

1. Infection Control Inspections

Starting in 2008, Taiwan CDC commissioned the Joint Commission of Taiwan to implement a quality improvement project for infection control inspections. Experienced infection control practitioners and infectious disease specialists joined local health authorities in conducting on-site inspections. Since 2017, the inspection frequency for each hospital was adjusted to at least once in every two years. In

2021, in response to COVID-19 outbreak, the infection control inspections were canceled. Instead, Taiwan CDC conducted the unexpected infection control inspections. Of 487 hospitals inspected, 20 of them failed to pass the inspections. The pass rate was 95.9%.

2. Healthcare-associated Infection Surveillance and Reporting

Hospitals may either provide nosocomial surveillance data through web-based entry or convey their data electronically through interchange platform to the reporting system. More than 487 hospitals enrolled in reporting in 2021. Participating hospitals and health authorities could retrieve feedback reports from the system, including infection densities, most common pathogen for healthcare-associated infection, their antimicrobial resistance proportions, etc.

3. Infection Control Journal

Taiwan CDC commissioned the Infection Control Society of Taiwan to publish the bimonthly Infection Control Journal, which provides healthcare workers with information on trends and research related to the prevention and control of healthcare-associated infections.

4. Infection Control Inspections in Specific Facilities

In response to the COVID-19 outbreak, the 2021 routine infection control inspections in specific facilities were canceled from May 20, 2021, to enable facilities to concentrate on preventing outbreaks, reduce personnel gathering and lessen the burden on facilities. For facilities originally scheduled to be inspected in 2021 but had not completed the inspections, the inspections were planned to be postponed to 2022. As of the announcement date of the cancellation of the inspections, on-site inspections of 130 residential long-term care facilities had been completed, including 9 veterans' homes, 91 postpartum care facilities, and 30 residential mental rehabilitation facilities.

Future Prospects

1. Draft, implement and revise regulations and guidelines on healthcare-associated infection based on recommendations announced by the WHO and leading countries. The information Taiwan CDC gathers from around the world on policies, laws, regulations and implementation results will serve as a reference for policymaking.
2. Revise the infection control inspection quality improvement project on an annual basis, according to the implementation experiences from previous years and external recommendations.



Infection Control Journal was published to provide healthcare workers with information on trends and research related to the prevention and control of healthcare-associated infections.

3. Continue to promote hand hygiene and the care bundles that prevent device-associated infections including central line-associated bloodstream infections (CLABSI), ventilator-associated pneumonia (VAP) and catheter-associated urinary tract infections (CAUTI). Thus, enable hospitals to make sustained progress in patient safety and healthcare quality, as well as reduce medical costs by reducing healthcare-associated infections.
4. Continue to improve usefulness, simplicity, and efficiency of nosocomial surveillance system. It is expected that data reported to THAS system will be useful for quality improvement activities.
5. Continue to conduct the infection control inspections of long-term care facilities in order to improve health care quality, reduce healthcare-associated infections and prevent outbreaks.



Taiwan Healthcare-associated infection and Antimicrobial resistance Surveillance (THAS) System

Antimicrobial Resistance

Current Status

Antimicrobial resistance (AMR) has become a major global crisis. In response to the increasingly serious threat posed by AMR, Taiwan CDC implemented the National Antimicrobial Stewardship Program, established multi-channel surveillance on multidrug-resistant organisms (MDROs), conducted hospital accreditation and hospital infection control inspection related to the antimicrobial stewardship, carried out coordinated infection control interventions, and implemented appropriate use of antimicrobials to alleviate the AMR crisis. Furthermore, Taiwan CDC proactively created relevant guidelines, e-learning materials, hand hygiene and antimicrobial awareness campaigns to engage the public to curb AMR.

Our goals are:

1. To strengthen surveillance of antimicrobial resistant pathogens and to control the spread of carbapenem-resistant Enterobacteriaceae.
2. To conduct hospital accreditation and hospital infection control inspection to request or encourage all hospitals to implement antimicrobial stewardship.
3. To provide a series of e-learning courses for the antimicrobial stewardship to strengthen understanding and awareness among healthcare workers.
4. To hold national campaigns to raise awareness of the public and healthcare workers.
5. To cooperate with human health and animal sectors to combat AMR.



Accomplishments

1. Surveillance of Antimicrobial Resistant Pathogens

Taiwan CDC has conducted AMR surveillance via the National Infectious Disease Reporting System (NIDRS) and the Taiwan Nosocomial Infection Surveillance (TNIS) system for years. To further improve the AMR surveillance efficacy, Taiwan CDC has added a new reporting function, namely the Antimicrobial Resistance and Use Management and Surveillance Module, to the TNIS system to collect laboratory testing data of clinical isolates since March 2017. The TNIS system further incorporated tailored visualization reports and formally reformed as THAS System in 2020. Hospitals are encouraged to report cases through Electronic Data Interchange mechanism. More than 180 hospitals enrolled in this module in 2021.

2. Hospital accreditation and hospital infection control inspection related to antimicrobial stewardship

Three indicators have been identified to evaluate the antimicrobial stewardship through the hospital accreditation and hospital infection control inspection system, namely leadership and accountability of antimicrobial stewardship program, surveillance and management mechanism of antimicrobial use, and surveillance and precaution measure of MDROs.

3. National campaigns

To raise awareness of hand hygiene and AMR, Taiwan CDC continued to support the WHO's World Hand Hygiene Day (May 5) and the World Antibiotic Awareness Week (November). Taiwan CDC invited delegates from several relevant government agencies, health professional associations, leaders and healthcare workers from hospitals to attend the launch ceremony and to show the public their commitment to improve hand hygiene and combat antimicrobial resistance. Campaign information was also

distributed to all healthcare facilities and healthcare workers were encouraged to display their engagements in practicing hand hygiene and tackling AMR.

Future Prospects

1. Promote hospitals to participate in the Antimicrobial Resistance and Use Management and Surveillance Module in THAS while strengthening surveillance of AMR.
2. Continue to require or encourage all hospitals to implement the antimicrobial stewardship.
3. Continue to strengthen surveillance of antimicrobial-resistant pathogens and promote cooperation between human health and animal sectors to combat antimicrobial resistance.



World Antibiotic Awareness Week Campaign 2021, "Spread Awareness, Stop Resistance", supporting WHO and increasing awareness of global antibiotic resistance.

Laboratory Biosafety and Biosecurity Management

Current Status

Legislative and Regulatory Changes

On December 15, 2021, the "Regulations Governing Management of Infectious Biological Materials" was amended and announced with the following major amendments:

1. Require the institution to assign a biosafety officer to supervise biosafety management affairs.
2. The institution is not required to set up a biosafety committee if the number of personnel does not reach 30, but the possession, use, and storage of Risk Group (RG) 3 to RG4 pathogens, select agents, and toxins are prohibited.
3. Laboratories and storage places that use and store RG3 to RG4 pathogens should establish a biorisk management system.
4. The local government health bureaus are responsible for reviewing the qualifications of the biosafety officer and biosafety committee of the institution under its authority.
5. Amend the notification objects of abnormal incidents in laboratories and storage places, and the type of abnormality that must be notified to the competent authorities at all levels, the notification period, the investigation and reporting period.

Biosafety Mechanism Registration

By December 2021, 581 entities had set up biosafety management units and reported to Taiwan CDC, in which 578 entities had established biosafety committees and 3 entities had a designated biosafety specialist staff. Those 581 entities include 24 government agencies, 162 medical institutions, 57 academic research institutions and 338 other groups.

Biosafety Inspections of Microbiological and Biomedical Laboratories

In response to the COVID-19 epidemic, Taiwan CDC has replaced the annual laboratory biosafety inspection procedure with a documentary review. In 2021, total 20 high containment laboratories had completed biosecurity review and 15 laboratories that have introduced biorisk management system had completed review of their system operation.

After 2020, the local health bureaus had conducted the second year of biosafety onsite inspection for the testing departments of the 139 designated isolation and response hospitals for infectious diseases in Taiwan to confirm the continued maintenance of laboratory safety protection and operation practices.

In order to ensure the maintenance of COVID-19 examination capacity in Taiwan, the local health bureaus had conducted biosafety onsite inspection of the laboratories of the 249 designated COVID-19 examination institutions and all non-conformities had been improved within the required period.

An accident of laboratory-acquired SARS-CoV-2 infections

In early December 2021, an accident of laboratory-acquired SARS-CoV-2 infections occurred in Taiwan. A worker in an animal biosafety level 3 (ABSL-3) laboratory at a research institute was infected with SARS-CoV-2. The Central Epidemic Command Center (CECC) had immediately requested that the laboratory be shut down and that a biosafety on-site inspection be conducted for the 12 high containment laboratories operating with the SARS-CoV-2 virus in Taiwan to prevent similar laboratory-acquired infections from happening again.

After investigation by the CECC expert team, the cause of the laboratory-acquired infection was inferred to be the noncompliance of the laboratory staff in entering and leaving the laboratory, the noncompliance of wearing and removing personal protective equipment (PPE), and the noncompliance of using safety equipment (e.g., Biosafety Cabinet), resulting in the infection of the staff.

The CECC Expert Panel's recommendations for improvements to the research institute include:

1. Strengthen the functions and responsibilities of the biosafety committee.
2. Review the applicability of the current biosafety practices and standard operating procedures of the institute.
3. Establish and implement internal biosafety auditing protocols.
4. Establish competency assessment criteria for laboratory staff.
5. Strengthen the verification system of staff training and education.
6. Establish a proactive follow-up and monitoring mechanism for laboratory accidents.
7. Develop a medical monitoring plan for staff.

Future Prospects

The “Regulations Governing Management of Infectious Biological Materials” was amended in 2021, and all establishments that possess, preserve, and use pathogens and biotoxins above RG2 should assign a biosafety officer to supervise internal biosafety affairs, such as conducting annual internal laboratory audits and supervising emergency response drills in laboratories. In order to enhance the laboratory biosafety self-management capability of the institution. In addition, with the official announcement of ISO 35001: Biorisk management for laboratories and other related organizations in 2019, all high containment laboratories in Taiwan should establish a laboratory biorisk management system in 2022. By 2020, 19 of the 22 high containment laboratories in Taiwan had already established and implemented the laboratory biorisk management system. It is believed that the implementation of the laboratory biorisk management system will enhance the biosafety management of these laboratories.



Taiwan CDC had commissioned the Taiwan Accreditation Foundation (TAF) to hold a training course on laboratory biorisk management before the COVID-19 outbreak in Taiwan was raised to Level 3 outbreak alert in 2021.

capability of the institution. In addition, with the official announcement of ISO 35001: Biorisk management for laboratories and other related organizations in 2019, all high containment laboratories in Taiwan should establish a laboratory biorisk management system in 2022. By 2020, 19 of the 22 high containment laboratories in Taiwan had already established and implemented the laboratory biorisk management system. It is believed that the implementation of the laboratory biorisk management system will enhance the biosafety management of these laboratories.

Outbreak Investigation

Current Status

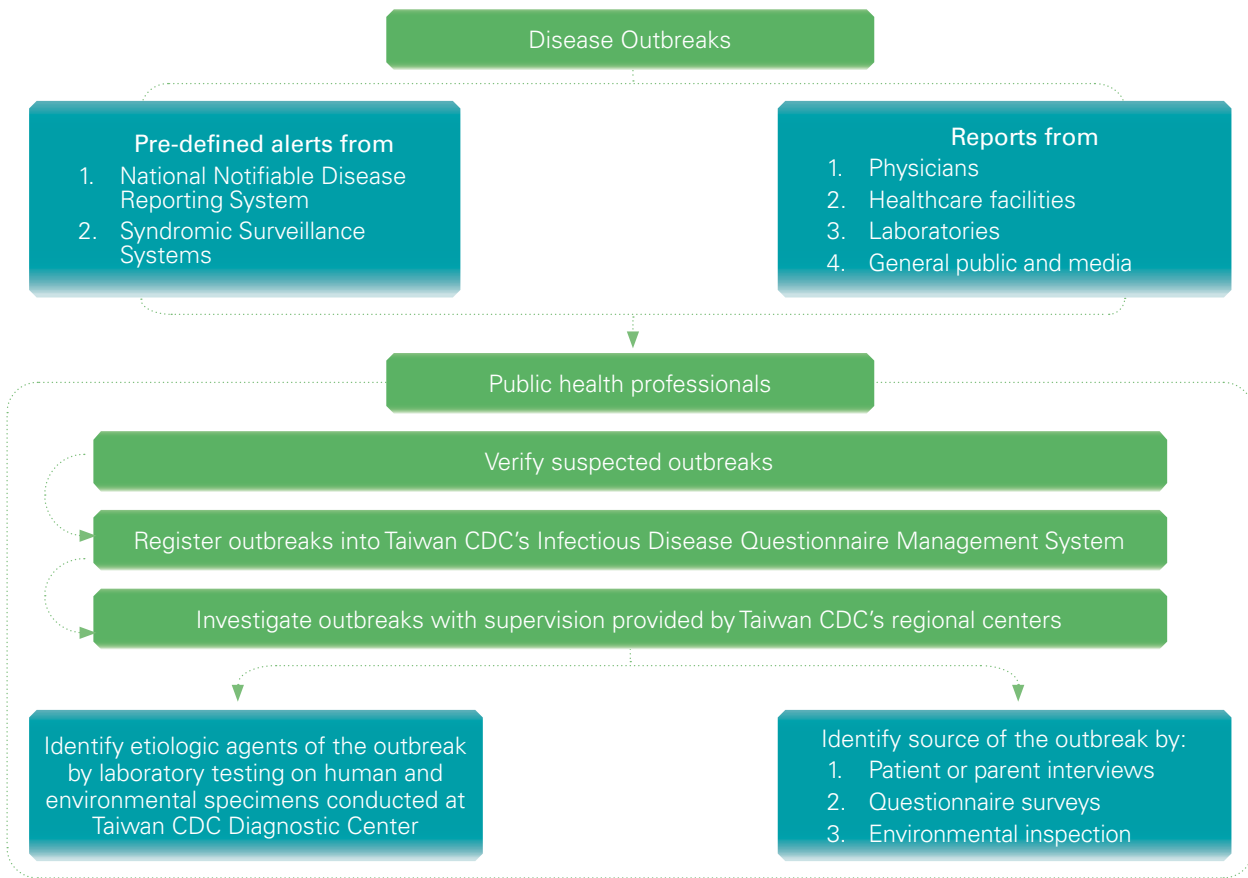
One of the core capacities of public health departments is investigating disease outbreaks to implement control and prevention measures. Outbreak investigations are challenging because the cause and source are frequently unknown and could cause public concern and anxiety. There may be hostility and defensiveness if an individual, product, or institution is suspected of being the source of an outbreak. In such pressure-packed settings, public health investigators have to remain calm, professional, and objective.

In Taiwan, outbreaks are mainly detected through pre-defined alerts or activity reports. Local public health professionals will verify suspected outbreaks conduct outbreaks investigations and implement control measures with the supervision by Taiwan CDC's regional offices (Figure 3-12).

Field Epidemiology Training Program and Medical Officers

The Field Epidemiology Training Program (FETP) of Taiwan CDC was established in 1984 to train public health professionals as disease investigators. The program is a 2-year on-the-job training focusing on hands-on field investigations and analysis of public health surveillance data. In 2005, Taiwan CDC began to recruit medical officers in preparation for emerging infectious diseases. Since then, FETP has become mandatory for newly recruited medical officers.

Figure 3-12 Flowchart of Outbreak Investigation



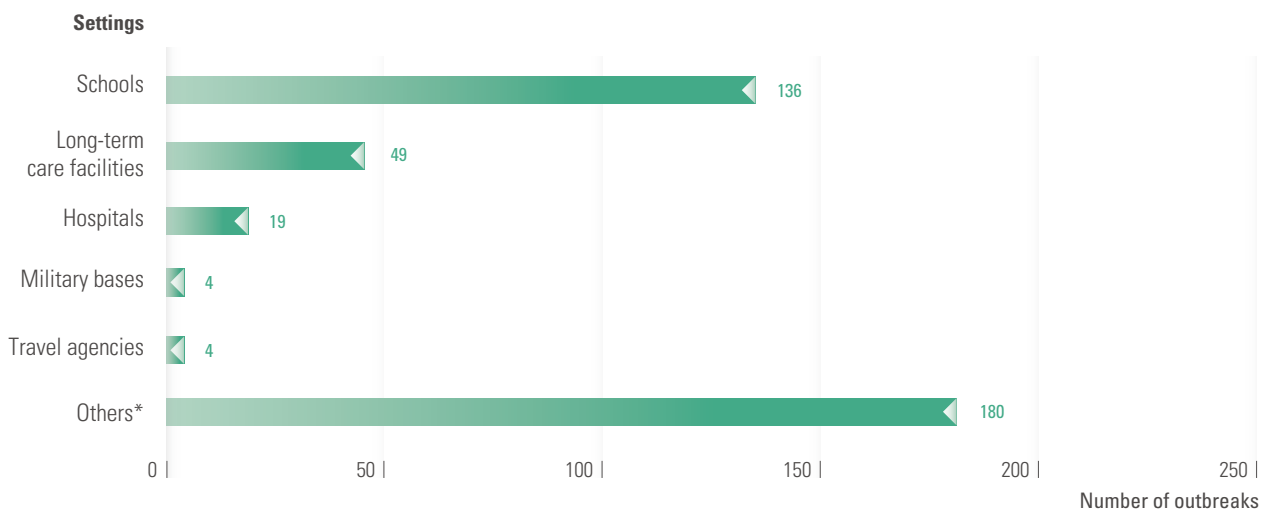
Accomplishments

1. In 2021, of 921 suspected outbreaks registered into Taiwan CDC's Infectious Disease Questionnaire Management System and investigated by public health authorities, 392 (43%) were confirmed outbreaks.
2. The top four reported diseases/syndromes of confirmed outbreaks were acute diarrhea (n = 285, 73%), enterovirus (n = 35, 9%), varicella/chickenpox (n = 29, 7%), and acute respiratory infection (n = 26, 7%) (Table 3-5).
3. The top three outbreak settings for communicable diseases other than COVID-19, were schools (n = 136, 35%), long-term care facilities (n = 49, 13%), and hospitals (n = 19, 5%) (Figure 3-13).
4. In response to the COVID-19 epidemic, Taiwan CDC established a rapid response team in 2020 and assisted in conducting disease surveillance, risk assessment and communication, outbreak investigation, and providing clinical case management guidance. During May to July 2021, Taiwan had a large-scale community transmission and raised the COVID-19 alert to Level 3 nationwide. During this period, the top 10 largest COVID-19 outbreaks occurred in wholesale markets or slaughterhouses (n = 3), long-term care facilities (n = 3), electronics factories (n = 2), construction workers (n = 1), food suppliers (n = 1), and Mahjong players (n = 1), with more than 700 outbreak-associated cases and 4,000 contacts quarantined. In addition, there were 37 COVID-19 outbreaks in hospitals during May to July 2021.

Table 3-5 Number of Confirmed Outbreaks by Reported Diseases/Syndromes – Taiwan, 2021 (n = 392)

Reported diseases/syndromes	Number of outbreaks
Acute diarrhea	285
Enterovirus	35
Varicella/chickenpox	29
Acute respiratory infection	26
Tuberculosis	17
Total	392

3-13 Number of Outbreaks by Setting – Taiwan, 2021 (n = 392)



*Other settings including household, workplace, restaurants, correctional facilities and unknown.

Note: COVID-19 outbreaks were not included in the analysis.

- By the end of 2021, there were 19 medical officers at Taiwan CDC. Their medical specialties included infectious disease, internal medicine, family medicine, emergency medicine, gastroenterology, cardiology, and pathology.

Future Prospects

- Strengthen collaborations with partners, including local health departments, food and agricultural authorities, universities, and other academic institutes.
- Enroll newly recruited medical officers and public health professionals of interest from Taiwan CDC and local health departments into FETP.
- Collaborate with international networks of FETP to enable rapid response in outbreak investigations and to contribute to global health diplomacy.
- Strengthen workforce building to prepare for and respond to emerging and reemerging public health threats.



04

International Health

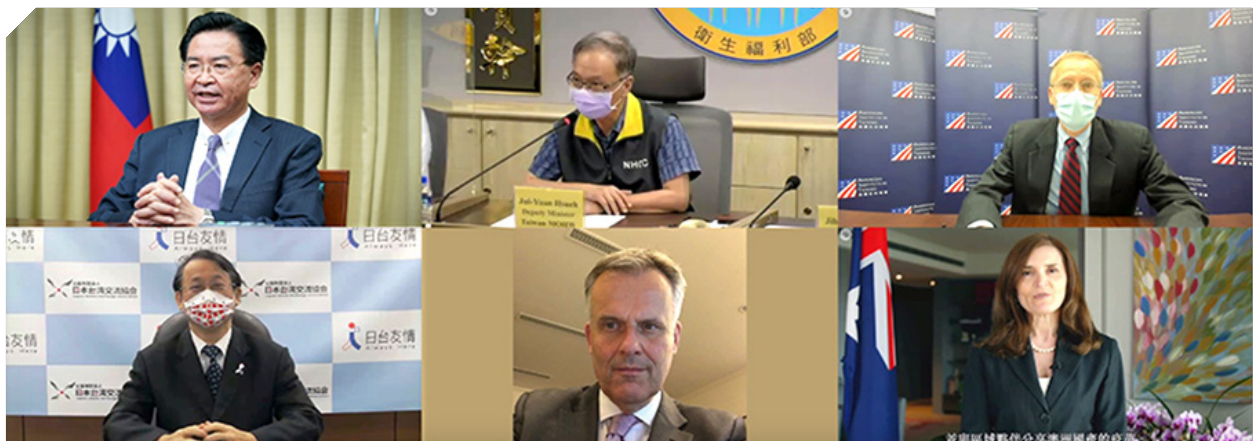
International Cooperation

The COVID-19 pandemic shows again that viruses know no borders and international cooperation is key to controlling the spread of infectious diseases. Therefore, Taiwan CDC has made great efforts to enhance international health exchanges by strengthening bilateral and multilateral relationships, sharing experiences and information with other countries, and participating in or holding online international public health conferences and related workshops. Global cooperation is the best way to fight against infectious diseases.

Accomplishments

International Training Program

1. "COVID-19 Vaccine Rollout: Experiences and Challenges": Under the Global Cooperation Training Framework (GCTF), Taiwan, the United States, Japan, the United Kingdom, and Australia co-organized a virtual international workshop entitled "COVID-19 Vaccine Rollout: Experiences and Challenges" on May 18, 2021. A total of 135 experts from 36 countries were invited to attend the virtual workshop to discuss topics related to COVID-19 vaccines, ranging from vaccine introductions and safety to vaccine distribution, logistics, cold chain management, priority lists, adverse reactions, and vaccine hesitancy. The virtual workshop provided a platform for participants to improve regional COVID-19 prevention capacity and prevent threats posed by infectious diseases.



COVID-19 Vaccine Rollout: Experiences and Challenges, May 18, 2021

2. "Digital Tools for Addressing Infectious Disease in the Asia-Pacific Region: Challenges and Opportunities": In response to the evolving COVID-19 situation, digital technology has been widely utilized to support COVID-19 surveillance and responses, facilitate related disease prevention and control efforts, and strengthen disease prevention cooperation and collaboration among APEC economies. With the APEC approval, Taiwan hosted an APEC conference entitled "Digital Tools for Addressing Infectious Disease in the Asia-Pacific Region: Challenges and Opportunities" on August 25 and 26, 2021. A total of 165 domestic

and international experts from 19 countries registered to attend the conference. Through remote conferencing technology, they shared experiences of harnessing digital tools against COVID-19 and other infectious diseases. This conference aimed to serve as a platform for APEC economies to exchange experiences of developing digital tools and to strengthen their collaborations to overcome the challenges posed by the COVID-19 pandemic.



Digital Tools for Addressing Infectious Disease in the Asia-Pacific Region: Challenges and Opportunities, August 25-26, 2021

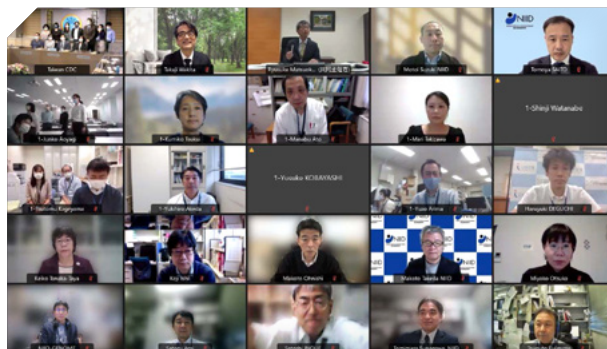
3. “10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference”: Taiwan CDC and the South Asia Field Epidemiology and Technology Network (SAFETYNET) co-organized the “10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference” on November 1 through 5, 2021. The theme of this online conference was “combating emerging and reemerging public health threats through regional field epidemiology training networks.” A total of 403 people registered for this event, including those from member FETPs in 20 countries in the Southeast Asian and Western Pacific regions and trainees as well as epidemiological experts from the member FETPs in Europe, the United States, Africa, and the Eastern Mediterranean. Participants shared information about infectious disease surveillance and investigation as well as their experiences relating to COVID-19. The conference was composed of eight pre-conference workshops, 13 oral keynote speeches, and 102 research papers (six from Taiwan) were presented at the conference.



10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference, November 1 to 5, 2021

Bilateral and Multilateral Cooperation Progress Report

1. Taiwan-Japan Bilateral Cooperation
 Taiwan CDC and Japan's National Institute of Infectious Diseases cooperated in conducting 11 joint infectious disease research projects and held the 18th Japan-Taiwan Symposium via videoconferencing on October 29, 2021. Taiwan and Japan discussed their preparations and



18th Japan-Taiwan Symposium, October 29, 2021

responses for the Olympics and other competitions held during the pandemic, COVID-19 surveillance, the benefits and side effects of COVID-19 vaccination, and the emergence of new variants. FETP members from the two countries also shared their disease investigation experiences.

New Southbound Policy

Taiwan CDC has been working in conjunction with other government agencies to implement the New Southbound Policy. Taiwan CDC has strengthened cooperation and exchanges in infectious disease prevention and control with New Southbound countries and established the New Southbound Health Center to build a joint prevention and control network for infectious diseases and prevent cross-border transmission of diseases.

1. Strengthening cooperation and exchange with New Southbound countries:

Taiwan has close ties with Southeast Asian countries in terms of trade and tourism. Therefore, Taiwan CDC has chosen diseases that are more prevalent in Southeast Asia, namely dengue fever and tuberculosis, as the focus of cooperation in disease prevention and control.

(1) Exchanges and cooperation of dengue fever prevention and control: Cooperate with Indonesia on the Dengue Prevention and Control Cooperation Program under New Southbound Policy:

A collaborative team consisting of Taiwanese and Indonesian public health experts held a training workshop via videoconferencing to train 25 volunteers to become the “seed instructors” to deliver health education in communities and mobilize communities to prevent diseases. A total of 25 people completed this training and conducted surveillance and analysis of vector mosquito density in their communities. On September 8 and 9, 2021, under the Taiwan-Indonesia Dengue Control and Prevention Program, a virtual roundtable was held for Taiwan and Indonesia to discuss vector data surveillance, community health promotion, school-based health education, case surveillance, medical cooperation, and the geographic information system (GIS). From November 23 to 25, 2021, the “Result Presentation of Taiwan-Indonesia Dengue Control and Prevention Program” was held online. Topics included the current status of dengue control in Indonesia, use and outlook of GIS, socioeconomic investigations relating to dengue control, use of dengue virus serological reagents, community health education activities, surveillance of vector mosquito density, and the conclusions of the cooperation program. Attendance from Indonesia totaled 787 people.

(2) Exchanges and cooperation in tuberculosis prevention and control: Cooperate with Vietnam on the Taiwan-Vietnam TB Control Collaborative Project.

In 2021, Taiwan CDC helped the Quảng Ninh Province of Vietnam to build an MDR-TB contact investigation module and hold three virtual meetings to discuss TB cases. On December 7, 2021, Taiwan CDC organized the “2021 Result Presentation of Tuberculosis

Prevention Cooperation Program under New Southbound Policy” remotely, where Taiwan’s public health representative gave a presentation titled “Taiwan-Vietnam TB Precision Medicine Strategy and Outlook in the Post-Pandemic Era.” Associate Professor Dr. Nguyen Binh Hoa, the Vice President of National Lung Hospital in Vietnam, was invited to give opening remarks. TS.BS. Nguyen Dinh Tuan, the manager of National Lung Hospital in Vietnam, was also invited to discuss TB surveillance and treatment during the COVID-19 pandemic in Vietnam. A total of 114 people participated in this virtual event.



2021 Result Presentation of Tuberculosis Prevention Cooperation Program under New Southbound Policy, December 7, 2021

2. New Southbound Health Center:

Taiwan CDC provides services such as health education on infectious diseases, counseling, and health care transfers for individuals traveling between Taiwan and New Southbound countries.

- (1) In 2021, Taiwan CDC updated the health management leaflets or videos and health examination forms for the 11 countries included in the New Southbound policy (Indonesia, the Philippines, Thailand, Malaysia, Vietnam, India, Myanmar, Brunei, Cambodia, Singapore, and Sri Lanka).
- (2) As travel between Taiwan and the New Southbound countries is expected to increase in the post-pandemic era, the risk of infectious disease transmission will likewise increase. Taiwan CDC has planned to make adjustments to the services starting 2022, and strengthen cooperation between the public and private sectors in order to make health services more accessible.

International Exchanges in 2021

1. Interaction with the WHO and Other Countries in Support of the Global Disease Prevention Network

- (1) Used International Health Regulations (IHR) channels to notify the WHO of confirmed COVID-19 cases. Also, Taiwan CDC shared disease investigation information, contacts, and tracking data with IHR channels and countries around the world.
- (2) Participated in WHO professional meetings in order to understand research trends and key points relating to viruses, vaccines, and clinical treatments.

2. Interaction with APEC Members

- (1) Attended APEC Life Sciences Innovation Forum (LSIF) video conferences, including “Enabling a Resilient Vaccination Ecosystem,” “Combatting Vaccine Hesitancy

to Foster Resilient Life-Course Immunization Programs,” “Financing Life-Course Immunization for COVID-19 Response & Beyond,” “Building the Right Regulatory Environment for COVID-19 Response & Long Term Health Resilience,” “LSIF Workshop on Antimicrobial Resistance (AMR) – Lessons Learned from COVID-19 to Better Address AMR,” and “Cooperation to Secure Health & the Economy: The Arrival of the APEC Action Plan on Vaccination.

- (2) Attended the video conferences organized by the APEC Business Advisory Council (ABAC) and related organization, including “Public-Private Dialogue on Reopening Borders for Safe and Seamless Travel,” “Launch of Beyond the Pandemic: Building Back Better from Crises in Asia and the Pacific,” and “Pandemic and the Economy – Investment for the Future.”
- (3) Attended the 1st and 2nd APEC Health Working Group (HWG) meetings in 2021, to share our COVID-19 disease prevention and control experiences with APEC members.
- (4) Attended the APEC LSIF Executive Board Meeting.
- (5) Attended the 11th APEC High-Level Meeting on Health & the Economy.

3. Invitations to Participate in International Meetings to Share Disease Prevention Information

Taiwan CDC was invited to international meetings held by the Ministry of Foreign Affairs and Taiwan overseas missions, International Cooperation and Development Fund, European Economic and Trade Office, European Chamber of Commerce Taiwan, and non-governmental organizations or academic entities from the United States, European Union, Germany, Hungary, Slovenia, Japan, Vietnam, and Australia to share our COVID-19 disease prevention policies and experiences.

Future Prospects

The fast-spreading COVID-19 pandemic continues to cause major disruptions across the globe. To prevent such a pandemic from happening again, all countries need to have the capabilities to rapidly and effectively detect and respond to infectious diseases and other health threats. As a result, Taiwan CDC will continue to strengthen our bilateral and multilateral cooperation with other countries and international public health institutes. Under the US-Taiwan Global Cooperation Training Framework (GCTF), Taiwan CDC will continue to provide assistance to its counterparts in the Asia Pacific and Southeast Asian regions to enhance their disease surveillance and diagnosis capabilities and core capacities that are important to detect, assess, report, notify, verify and respond to the threats and challenges presented by emerging infectious diseases. In addition, we will continue to seek more opportunities for active participation in the international arena to help ensure a world safe and secure from infectious disease threats and to promote global health security as an international security priority that will be beneficial to us and the region.

Implementation of the IHR

WHO International Health Regulations

The WHO International Health Regulations (IHR) are a legal instrument to help the international community to prevent and respond to public health risks that have the potential to cross borders and threaten people worldwide. The main purpose of the IHR is to implement public health responses that can prevent and control the spread of diseases across borders while limiting interference with international transport and trade. The IHR also require that state parties investigate, evaluate and report public health risks and emergencies while reacting promptly to these threats.

Over the years, international transportation has become more convenient, which leads to frequent movement of people and goods. Diseases can spread far and wide via international travel and trade. A health crisis in one country can impact livelihoods and economies in many parts of the world, such as the severe acute respiratory syndrome (SARS) outbreak in 2003. For these reasons, in 2005 the WHO's World Health Assembly (WHA) revised and passed the new IHR, inviting countries around the world to join. The regulations, which took effect in 2007, cover public health incidents and emerging or re-emerging diseases. The WHO has declared six Public Health Emergency of International Concern (PHEIC) events so far. Those events included H1N1 (or swine flu) in 2009, polio in 2014, Ebola in West Africa from 2014 to 2016, Zika from 2015 to 2016, Ebola virus disease (EVD) in the Democratic Republic of the Congo from 2018 to 2020, MERS in 2013, and the ongoing COVID-19 pandemic also constituted a public health threat and crisis worldwide.

Meanwhile, the IHR establish a number of procedures and practices for assessing whether an affected country or region is facing a public health emergency of international concern (PHEIC). The purpose of this model is to prevent an epidemic from occurring in a place where it is not yet confirmed to be a communicable disease. The new IHR also strengthen the National Focal Point (NFP) for each country. The NFP is the state-designated center responsible for communicating with the WHO on public health incidents that have the potential to become an international concern.

Following the IHR, Taiwan CDC, the TFDA, Ministry of Foreign Affairs, Council of Agriculture, and relevant departments and ministries work with the WHO and other countries to conduct prevention and control measures for communicable diseases and other major public health events.

Operations of IHR Focal Point in Taiwan

1. Receiving information on epidemics or public health incidents that meet WHO IHR standards for reporting:

WHO established the Event Information Site (EIS) for IHR National Focal Points (NFPs) and has granted Taiwan's access in 2009 by the WHO Director General's Office. If an epidemic or public health incident occurs that meets IHR standards for reporting, the WHO uses IHR channels to alert each country, including Taiwan.

2. Establishing a national, cross-departmental communication channel for forwarding of IHR information promptly:

A cross-departmental contact point has been established in Taiwan CDC to facilitate timely correspondence with the WHO IHR on information regarding major public health incidents. Agencies with available counterparts include departments within the Ministry of Health and Welfare, the Taiwan Food and Drug Administration, the Ministry of Foreign Affairs, the Ministry of the Interior, the Ministry of Transportation and Communications, the Bureau of Animal and Plant Health Inspection and Quarantine, local health departments, and related authorities. This channel ensures prompt reporting, communication and responses to related events.

3. Case referral and reporting diseases or public health events meeting IHR standards:

The Taiwan IHR focal point serves as a point of single contact for international referral of communicable disease cases (each country's IHR NFP is the counterpart of case referral). Through the IHR channel, relevant countries are informed of follow-up investigation results to facilitate attending and monitoring referred cases. If a PHEIC occurs, Taiwan immediately informs the WHO IHR contact point, relevant country IHR focal point partners, and international public health organizations.

Accomplishments

Owing to its experience with the SARS epidemic in 2003, Taiwan has vigilantly kept track of information concerning the Covid-19 outbreak that occurred in Wuhan, China in December 2019. On December 31, 2019, Taiwan sent an email to the International Health Regulations (IHR) focal point under the World Health Organization (WHO), informing WHO of its understanding of the disease and requesting further information from WHO. The intelligence was one of the first emails to alert WHO to the possible danger of Covid-19, and which was also verified in the official report from IPPPR (Independent Panel for Pandemic Preparedness and Response), reported in the 74th World Health Assembly in 2021.

Given the lack of clarity at the time, as well as the many rumors that were circulating, Taiwan's aim was to ensure that all relevant parties remained alert, especially since the outbreak occurred just before the Lunar New Year holiday, which typically sees tremendous amounts of travel. The actions mean that this channel serves not only as the contact point for emerging public health events but also as an early warning correspondent.

In 2021, Taiwan CDC referred and acquired over 1000 items of public health risks of international importance through the NFP and EIS mechanisms. Among the referrals and received items, the majority were investigation collaboration and assistance requests for Covid-19 cases and contacts. Furthermore, as a member of the global village, Taiwan devotes itself to contributing towards health safety in international society.

International Ports Quarantine Activities

Current Status

Situated in a subtropical zone with thriving international tourism and trade sectors, Taiwan is highly vulnerable to tropical diseases. To early detect the import of disease and ensure public health, the government established quarantine offices at airports (Songshan, Taoyuan, Taichung and Kaohsiung), seaports (Keelung, Suao, Taipei, Taichung, Mailiao, Kaohsiung, and Hualien), and the three terminals (Kinmen, Matsu, and Makung) of the “Mini Three Links” with Mainland China.

To meet WHO’s International Health Regulations (IHR, 2005) and prevent the import of diseases by aircraft and ships, Taiwan CDC revised the Regulations Governing Quarantine at Ports. These authorize quarantine units to take all necessary quarantine measures against inbound ships and aircraft together with their crew and passengers for national security and public health protection. Revisions included:

1. Improved Information Management: Enhanced the one-stop information system for quarantine operations. Made the quarantine process and information management more efficient.
2. Streamlined and Standardized Operations: Called for timely revision and standardization of operational procedures in response to the latest epidemic information and historical events.
3. Quarantine Procedure Follow-up: All inbound aircraft and ships, including their crew and passengers, are subject to quarantine to prevent disease importation. After release from quarantine, follow-up health checks may be performed.
4. IHR Core Capacities at Designated Points of Entry (PoE): Strengthens and maintains core capacities at designated PoEs.

Accomplishments

1. One-Stop Information Service

Establishing the one-stop information system for all information regarding quarantine operations. This included quarantine operations for aircraft and ships, ship sanitation certificates, vaccinations, fee collection, and online statistics.

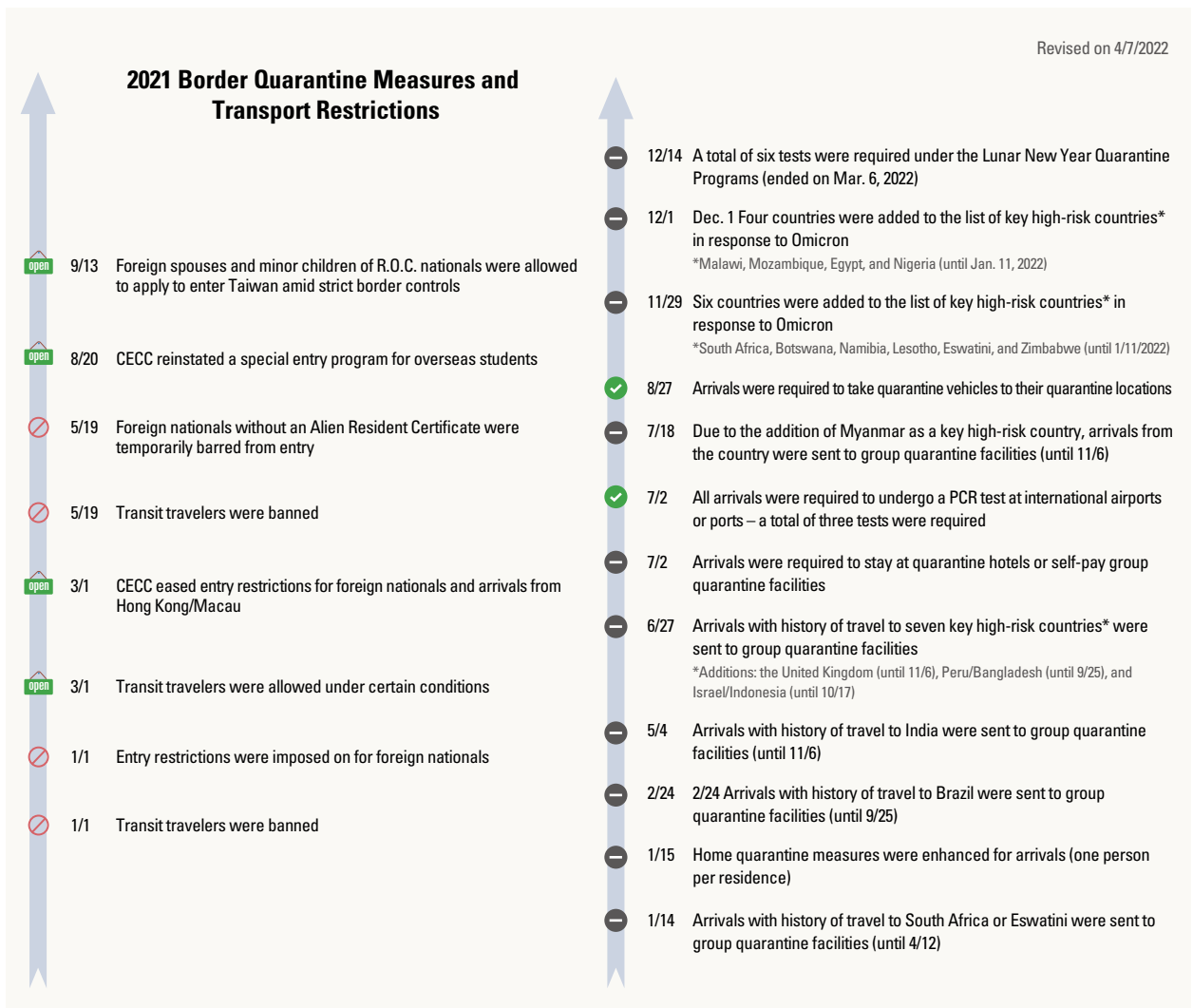
2. Aircraft and Ship Quarantine:

- (1) Any aircraft with crew or passengers exhibiting communicable disease-like symptoms or death must notify Taiwan CDC and document the event. Taiwan CDC will take appropriate measures.
- (2) Any ship arriving at a port in Taiwan must declare the state of its sanitation and passengers’ health before arrival via telegraph, telex, fax, mobile phone or e-mail. Permission to enter the port is granted after the report is reviewed.

(3) Possible scenarios for onboard quarantine:

- A. For aircraft: According to the event or emergency, Taiwan CDC may decide to execute aircraft onboard quarantine or other control measures.
- B. For ships: In the following cases, quarantine officers may board a ship to implement quarantine measures.
 - a. The inbound ship did not apply for quarantine.
 - b. It has applied but failed to meet quarantine requirements.
 - c. It has reported a passenger/crew member suspected of suffering from a communicable disease.
 - d. There was an abnormal death of animals.
 - e. There was a suspected illness or death on the ship.

The following diagram shows the state of quarantine in 2021:



3. Crew and Passenger Inspection and Quarantine

All arriving passengers are required to have their body temperature measured using infrared thermometers for early detection and prevention. Passengers showing symptoms are required to fill out the Communicable Disease Survey Form. Depending on the severity of symptoms and travel history, those individuals are required to offer on-site specimens and subject to hospitalization and/or submit to follow-up tests by local health authorities.

Arriving passengers who become ill after entry are encouraged to seek medical advice and inform the doctor of their recent travel history. In 2021, there were a total of 474,232 arrivals at international airports/ports and points of entry of the mini-three-links. In response to the COVID-19 pandemic, arrivals had to show a negative COVID-19 test report within the last three days and complete the health declaration on the Quarantine System for Entry prior to boarding their plane or ship. From July 2, Taiwan CDC further strengthened quarantine measures by implementing enhanced quarantine and health monitoring for arrivals, including requiring all arrivals to take a COVID-19 PCR test. In 2021, 2,592 arrivals with symptoms were detected. Blood testing on 93 arrivals detected eight cases of dengue fever and one case of Chikungunya fever. A total of 234,248 COVID-19 tests were administered to arrivals (including arrivals without symptoms); of these, 517 people were confirmed to have COVID-19.

4. COVID-19 Border Quarantine Achievements

(1) Important Border Quarantine Measures

A. Requiring arrivals to provide a health declaration to know their health conditions

Effective January 24, 2020, arrivals from Mainland China, Hong Kong, and Macau had to fill out a COVID-19 Health Declaration Card providing their personal information, travel history, and health condition. On February 11, the requirement became mandatory for all arrivals. Also, in response to home quarantine measures for arrivals, from February 3, the COVID-19 Health Declaration Card and the COVID-19 Home Quarantine Notice were combined to become the COVID-19 Health Declaration and Home Quarantine Notice. Besides truthfully stating their health condition, arrivals had to fill in the address of their place of quarantine, their phone number, and other personal information to support follow-up care and tracking by health authorities and civil affairs officials.

B. Tightened entry restrictions and strict border control

On March 19, 2020, Taiwan tightened entry restrictions for foreign nationals. Those who were granted permission to enter the country were required to undergo a 14-day home quarantine, and arrivals with history of travel to key high-risk countries were subjected to enhanced quarantine measures. On June 29, 2020, in consideration of international pandemic trends and commercial trade and

humanitarian needs, entry restrictions for foreign nationals and people from Hong Kong and Macau were eased. On January 1, 2021, in light of the severity of the pandemic and to maintain domestic disease prevention efforts and protect the health of people in Taiwan, further restrictions on entry of non-Taiwanese nationals as well as stricter quarantine measures were implemented. On March 1, 2021, in consideration of the global pandemic situation, domestic disease prevention capacity, and commercial and economic needs, Taiwan conditionally allowed entry of foreign nationals. To reduce the burden on quarantine and health systems when the nation implemented Level 3 restrictions, effective May 19, 2021, foreign nationals without an Alien Resident Certificate were barred from entering the nation (except those who obtained entry permission for emergencies or humanitarian reasons). When the nationwide epidemic alert was lowered to Level 2 on July 27, 2021, strict border restrictions remained in place to keep the Delta variant at bay.

- C. Enhancing fever screening and health evaluations to detect travelers with symptoms
Health monitoring of arrivals was implemented at airports/ports. Infrared thermal imaging cameras were used to measure arrivals' temperatures. Additionally, arrivals with abnormal temperatures or reporting their symptoms were asked about details of their travel history, occupation, contact history, and cluster information (TOCC). They were also screened for COVID-19 symptoms, such as abnormal sense of taste or smell, and required to follow the instructions of airport/port quarantine officers on how to undergo testing, seek medical attention, or undertake other mandatory measures.
- D. Launching a hospital transport mechanism for suspected COVID-19 cases to reduce burden on the community-based epidemic prevention capacity
Under a strict, standard procedure, suspected cases with fever or other symptoms were transported directly to contracted hospitals for treatment and were placed under isolation to be separate from the general public. The transport mechanism allowed suspected cases to be referred to medical or community epidemic prevention units in a timely manner to facilitate follow-up care and management.
- E. Requiring arrivals from key high-risk countries to stay at group quarantine facilities and get tested to reduce the risk of variants spreading
At the end of 2020, COVID-19 variants began to emerge. Taiwan CDC responded to the emergence of the variants by enforcing stricter quarantine measures for arrivals with history of travel to designated countries within the previous 14 days. A special quarantine plan was implemented for arrivals from key high-risk countries. Under the plan, arrivals should stay in group quarantine facilities and adhere to relevant testing requirements. The details of this plan are below:

- a. Alpha: Applied to arrivals with history of travel to the United Kingdom on December 23, 2020; on January 14, 2021, the plan applied to South Africa and Eswatini.
- b. Gamma: Applied to arrivals with history of travel to Brazil on February 24, 2021.
- c. Delta: Applied to arrivals with history of travel to India on May 4, 2021; on June 27, this plan applied to arrivals from the United Kingdom, Peru, Israel, Indonesia, and Bangladesh; on July 18, Myanmar was included in this plan.
- d. Omicron: Applied to arrivals with a travel history to South Africa, Botswana, Namibia, Lesotho, Eswatini, and Zimbabwe from November 29, 2021. On December 1 added Malawi, Mozambique, Egypt, and Nigeria were included.

F. Enhancing quarantine and health monitoring measures for all arrivals to contain further spread of the disease

In response to the global spread of the Delta variant, on July 2, 2021, Taiwan CDC enhanced border quarantine and monitoring measures for inbound travelers. All travelers had to take a COVID-19 PCR test upon arrival. They were required to take quarantine vehicles to quarantine hotels or self-pay group quarantine facilities. Before completing their quarantine, they had to take another PCR test. During the self-health management period following the end of quarantine, they had to take rapid tests at home. In addition, viral genome sequencing was conducted on the samples of imported cases.

(2) Enhanced Quarantine Response and Management for Airports and Airlines

A. Requiring arrivals to be tested at the airport and wait for their test results at government quarantine facilities to reduce the risk of community spread associated with travelers with symptoms
 The Taoyuan, Kaohsiung and Songshan, and Taichung international airports established onsite sample collection stations on February 6, February 26, and October 16, 2020. Arrivals with

Procedure of Saliva Sample Collection

Note: Please do not eat, drink, chew gum, or smoke, etc. 1 hour before sample collection so as not to affect the quality of the sample.

- 1 Please be sure that your face mask covers your nose and mouth.
- 2 Use alcohol-based hand sanitizer to clean your hands.
- 3 Twist open the specimen bottle.
- 4 Cough up by clearing the throat and close your mouth to keep the saliva in your mouth for about 1 minute.
- 5 Take off your mask and gently spit 1 to 2 ml of saliva into the specimen bottle, being careful not to get saliva on the outside the specimen bottle.
- 6 Put your mask back on.
- 7 Close and tighten the lid of the specimen bottle; confirm that there is no leakage.
- 8 Wipe clean the surface of the specimen bottle using wet wipes provided.
- 9 Use alcohol-based hand sanitizer to clean your hands.
- 10 After the sample is placed in a double zipper plastic bag and the zipper bag is sealed tightly, please disinfect the outside of the zipper bag with alcohol.

Finish

Central Epidemic Command Center Toll-free hotline : 1922

Flow chart showing the saliva test sample collection process for all arrivals to Taiwan starting from July 2, 2021

mild symptoms could undergo throat or nasal swab tests at the airports to ensure that such arrivals were separate from other inbound travelers and to maintain hospital capacity. Effective as of April 3, after having their samples collected, arrivals had to stay at group quarantine facilities to await their test results and were only allowed to return home or go to quarantine hotels if testing negative. On September 1, a throat/nasal swab test required for arrivals was changed to a deep-throat saliva test.

B. Arranging charter (private) flights and adopting anchorage quarantine for the repatriation of citizens stranded in high-risk areas to strengthen the management of persons at risk of infection

Taiwan CDC helped arrange charter (private) flights to carry Taiwanese nationals stranded in high-risk countries, such as Indonesia and Myanmar, back to Taiwan and implement the anchorage quarantine procedure at Taoyuan International Airport for such individuals returning to Taiwan. The procedure included several measures, such as arrival group separation, fever screening, physician health evaluations, transport to group quarantine facilities for asymptomatic returnees, and transport to the hospital for individuals with suspected symptoms to strengthen management of those at risk of being infected.

C. Implementing the Fall-Winter COVID-19 Prevention Program to strengthen border and quarantine measures

The Fall-Winter COVID-19 Prevention Program was launched on December 1, 2020. Under the program, all people planning to enter or transit in Taiwan, regardless of their status or reason for travel, were required to provide the result of a COVID-19 PCR test taken within the three working days before the scheduled departure time of their flight. On December 14, 2021, Taiwan CDC revised the rule of the three working day and changed it to three calendar days.

D. Protecting front-line workers at high risk of infection by providing protective equipment and enforcing health management protocols

Front-line staff at ports and flight crew members frequently come into contact with people returning to Taiwan from overseas. To protect these workers, Taiwan CDC therefore drew up health monitoring guidelines for health workers and other personnel involved in quarantine, specimen collection, and other related procedures. The Civil Aeronautics Administration (CAA) under the Ministry of Transportation and Communications also set regulations governing the protective equipment of crew members as well as safety and protection measures for passengers, in order to ensure a safe working environment. For crew members on long-haul flights, the CAA formulated the "Operational Principles for R.O.C (Taiwanese) Airlines' Air Crewmembers to Implement Health Control Measures for Epidemic Prevention," which airlines should follow to manage accommodation and transportation at outstations, in-flight personal protection, and quarantine measures of crew members after return. These guidelines were issued to ensure

the effectiveness of disease prevention measures for crew members, to protect their health, and to maintain air transport operations.

- E. Implementing a monitoring program for designated high-risk workers in international airports to lower the risk of cluster infection
A monitoring program for certain high-risk workers in international airports was effective on August 30, 2021. Under this monitoring program, designated high-risk workers at the Taipei, Taoyuan, Taichung, and Kaohsiung international airports, such as airport/aircraft cleaners, staff at testing stations, and personnel responsible for managing arrivals with symptoms, had to take a government-funded rapid test every seven days. The program was put in place to bolster surveillance capacity at the border.



Premier Su Tseng-chang inspected border quarantine operations at Taoyuan International Airport.



Distributed home rapid test kits and health education materials to travelers arriving at Taoyuan International Airport

(3) Enhanced Quarantine Measures for Seaports and Vessels

- A. Requiring all vessels entering a port to provide detailed health declarations for all crew members and to take action immediately in case of an abnormality
The captain of a ship that docks at a Taiwanese port after departing from a foreign port shall provide a Maritime Declaration of Health and a Health Declaration of Crew Members on Board. If anyone on the ship has COVID-19 symptoms or there is a suspected/confirmed COVID-19 case onboard, Taiwan CDC shall evaluate the health of all people on the ship. Suspected cases shall be sent to the hospital for treatment. Investigations shall be conducted on the confirmed cases, and contacts shall be isolated.
- B. Continuing to revise ship and crew guidelines and ship quarantine mechanisms to ensure strict management
Taiwan CDC issued guidance on Disease Prevention Measures for Ships at Berth and Health Monitoring of Crew Members, requiring ships entering a port of Taiwan to make relevant declarations, crew members to make declarations

and report any symptoms, and the ship operator (captain) to enforce disease prevention measures and make response plans in case of a suspected case onboard. Taiwan CDC formulated the Operational Procedures for Emergency Medical Care for Crew Members on Ships Transiting through a Port of Taiwan to set up the mechanisms of telemedicine and onshore medical treatment for people in need of urgent care for non-communicable diseases. Additionally, Taiwan CDC issued other quarantine protocols, including full ship quarantine and full crew change, the rules for crew exchanges on ships berthing at Taiwanese ports, and quarantine channels for crew members leaving Taiwan within three days of disembarking. Taiwan CDC, working together with supervisory authorities of vessels, continued to make rolling changes to disease prevention plans for commercial ships, cruise liners, offshore wind turbine installation vessels, fishing boats, and other ships, so as to balance disease prevention risks and the operation of the maritime industry.

C. Establishing disease prevention guidelines and monitoring mechanisms for port workers to ensure border safety

Taiwan CDC formulated disease prevention guidelines for different categories of port workers, based on their duties and risks of exposure to regulate levels of personal protection equipment, cleaning and disinfection measures, and



Minister of Health and Welfare Chen Shih-chung inspected border quarantine implementation among commercial ship crews and deep-sea fishing boat crews at Kaohsiung Port.

other related areas. Besides the guidelines, Taiwan CDC prioritized port workers for COVID-19 vaccination to ensure they were fully protected. In November 2021, Taiwan CDC implemented a regular health monitoring program for people who frequently board ships, in order to detect COVID-19 cases as soon as possible.

(4) Using the Quarantine System for Entry to Support Community Disease Prevention

A. Taiwan CDC took hold of front-line workers' practical needs and quickly built a system to understand the health status of arrivals, as part of its border and quarantine measures. When checking in at the airline counter at their place of departure, travelers could use their mobile phone to scan a QR Code to log into the Quarantine System for Entry website. Travelers could complete a health declaration on the system while waiting to board their flight to Taiwan. Upon arrival in Taiwan, travelers would receive a health declaration receipt and quarantine form via text message and should show these documents to quarantine officials to clear immigration.

B. Enhancing education and communication channels and improving the usage rate of the online health declaration system

Taiwan CDC continued to encourage travelers to follow the four steps to complete their online declaration: scanning, entering data, receiving a text message, showing your text message. The usage rate of the system was over 99%.

C. Linking different systems and integrating data from various databases

Taiwan CDC verified travelers' identities by using the National Immigration Agency's Advance Passenger Information System. Travelers' related information, such as travel history and symptoms, were linked to the Smart Quarantine Multifunctional System to reduce repeated entry of data by quarantine officials. Data were also imported into the Tracing System to help improve the effectiveness of community disease prevention efforts and to build a data sharing mechanism.

Follow quarantine rules Lunar New Year Quarantine Program 2021/12/14-2022/2/14
Enjoy your carefree return

Instructions for passengers before arrival in **Taiwan** and clearance at the airport

1 Requirements to be prepared
 A personal mobile phone (with internet access)

Documents	A (14+0+7)	B (10+4+7)	C (7+7+7)	Government Project (14+0-7)
RT-PCR test report issued within 3 days	V	V	V	V
Quarantine hotel reservation confirmation	V	V	V	V
Proof of vaccination (paper-based/electronic) (Children under 12 exempt)	×	×	V	Follow the requirements of the Ministry
Personal information of family member(s) observing the "one person per room rule" (Name, ID number, telephone number of the family members)	×	V	V	×

2 Online health declaration before boarding

Log in the Quarantine System for Entry (within 48 hrs before your flight arrival)

Choose a quarantine program:
 A 14+0+7
 B 10+4+7
 C 7+7+7

Show your certificate at an airport check-in counter
 (Includes: Quarantine System for Entry certificate, PCR test report (All travelers), Proof of vaccination (Travelers choosing the Program C))

3 Clearance upon arrival

Turn on your phone and receive a text message
 Present your certificate and documents
 Receive a rapid test reagent
 Take a deep-throat saliva test
 Take a quarantine vehicle to your quarantine hotel

Central Epidemic Command Center Toll-free hotline : 1922

- D. Updating the Quarantine System for Entry in response to the changes to border policies
Taiwan CDC tweaked the functions of the Quarantine System for Entry in response to the entry restrictions and quarantine measures for flight crew members subjected to a digital fence, persons granted entry under a diplomatic bubble, and travelers from key high-risk countries to ensure community disease prevention and safety.

5. Control of Disease Vectors in Ports

To control vector density (i.e., any infectious disease carrier such as rats or mosquitoes) at ports and prevent the spread of communicable diseases, Taiwan CDC adopted the following measures:

(1) Rat Surveillance and Control:

- A. Putting out anticoagulant baits in places where rats are rampant. Baits are replenished every 10 to 15 days to ensure efficacy.
- B. Examining captured rats for parasites and testing blood serum for *Rickettsia typhi*, plague, and hantavirus.

(2) Mosquito Surveillance and Control:

Mosquitoes are vectors of several communicable diseases, including yellow fever and dengue fever. The mosquito population density is closely related to the development of an epidemic. To understand the variety and quantity of mosquitoes, the following methods were adopted:

- A. Discovering and Eliminating Breeding Sources of Dengue Fever Vectors: Empty containers that are prone to retain water (bottles, jars, tires, etc.) are checked monthly to prevent vector breeding.
- B. Setting Ovitrap: Traps are placed around the port/airport for mosquitoes to lay eggs. The inside of the traps are laid with pieces of coarse cloth moistened with Temephos to kill the larvae after they hatch. The traps are replaced monthly, and the number of eggs laid was used for calculating the mosquito population density in the port areas.
- C. Surveying Adult Mosquitoes: Lamps are hung in selected places for trapping mosquitoes to identify their species and track their activities.

- (3) Organizing International Port Sanitary Groups: Members consist of port authority personnel and stakeholders, including customs, immigration, Taiwan CDC regional centers, animal and plant quarantine, the National Security Bureau, representatives of airline companies, cargo terminal, and other relevant organizations. These representatives meet every three to six months to coordinate action plans and implement policies concerning port security and sanitation.

6. IHR Core Capacities at Designated PoE

Taiwan has 7 designated PoEs (4 airports and 3 seaports). These PoEs meet the requirements of IHR (2005) core capacities and are able to cover over 96% of passengers and 78% of cargo movements in order to ensure national health and safety. To ensure that these designated PoEs are able to maintain core capacities and coordinate infrastructure operations, under supervision of Homeland Security Office of the Executive Yuan, an external evaluation is required every 5 years and annual self-assessment is conducted. In 2021, the self-assessment results of the 7 designated PoEs are all full marks.

7. Other Sanitation Control Measures

(1) Shipboard Sanitation Control: To prevent the spread of diseases on ships on international routes, Taiwan CDC imposes ship control measures in accordance with IHR (2005) and the Regulations Governing Quarantine at Ports.

A. Implementation of IHR (2005) on June 15, 2007, included issuance of required sanitary documents for international shipping such as the Ship Sanitation Control Exemption Certificate and the Ship Sanitation Control Certificate. Taiwan CDC granted these documents a six-month period of validity. On these documents, shipping crew must identify and record all areas of ship-borne public health risks, and the required control measures conducted.

B. To prevent rats from running to shore along mooring cables, rat guards must be hung on every cable. Ships that fail to do so would be immediately reported and put on record for quarantine reference the next time they call on the port.

(2) Since direct voyage routes between several authorized fishery ports in Taiwan and China were permitted, local health authorities began to conduct additional quarantine work to prevent transmission of communicable diseases.

8. Promoting Travel Health

A total of 32 travel clinics, distributed across the country, provide pre-travel preventive medicine, vaccines and consultation for measures to prevent disease during travel. At the same time, Taiwan CDC established the Training Center for Travel Medicine to promote related education and research, and it provides people with the latest international travel health information via Taiwan CDC's official website.

The "2021 International Symposium on Travel Medicine" was held in Taipei on November 5, 2021. Dr. Lin Hwei Chen, past president of the International Society of Travel Medicine (ISTM), and Dr. Ujiie Mugen, National Center for Global Health and Medicine, Japan, were invited to give a speech about the experience on COVID-19 Pandemic. Taiwan CDC's medical officers and experts shared their international travel medical expertise and the latest developments. Professional medical personnel

from travel clinics and related workers were invited to participate in the discussion to enhance the professional knowledge of travel medicine.

9. Reinforced Border Quarantine and Cross-Border Collaboration for Disease Prevention-Phase I Project (2018-2022)

In addition to continuing to strengthen the existing quarantine practices, the establishment of Smart Quarantine Network, the improvement of quarantine personnel quality and quantity, the promotion for the concept of travel medicine, and the active sharing of experiences with other countries have all contributed to an increase in Taiwan's capabilities for border quarantine at its international ports and emergency preparedness. This has effectively relieved the stress on disease prevention domestically and prevented infectious diseases from spreading into Taiwan.

Future Prospects

1. With limited manpower and equipment, CDC aimed to strengthen quarantine capacities and effectively execute quarantine measures to prevent any import of disease.
2. Cultivate professional quarantine personnel, encourage the development of new quarantine techniques, and improve quarantine officers' performance.
3. Further eradicate vectors on ships and monitor rat and mosquito populations in port areas to avoid the spread of communicable diseases.
4. Continue to maintain and strengthen core capacities at the seven designated PoEs based on the IHR (2005) in order to extensively improve respond capabilities of our international ports and prevent the spread of disease in our nation.
5. In response to the COVID-19 pandemic, Taiwan adopted strict border control measures that required arrivals to make health declarations, monitor their health and follow other related rules. Taiwan CDC continued to monitor global epidemic risks as well as the capacities for border management and community disease prevention and would review and adjust prevention strategies accordingly to keep people safe.



05

Scientific Research
and Development

Research, Development and Manufacturing

Current Status

Taiwan CDC is the competent authority governing laboratory testing for communicable diseases and development of testing technologies in Taiwan with three major focuses:

1. Laboratory testing for communicable diseases, the establishment of testing standards, and training of professionals; the establishment, analysis, and application of a biorepository and pathogenic microorganism genome database; the appointment, commission, and approval of institutions for laboratory testing; the planning and execution of regulations governing laboratory biosafety and quality assurance.
2. Development and transfer of laboratory testing technologies.
3. Planning and execution of policies governing the manufacturing of anti-snake venom serum and vaccines.

In addition, facing emerging and re-emerging communicable diseases, Taiwan CDC puts great emphasis on international collaboration with a focus on information exchange, experience sharing, and laboratory technology advances.

Accomplishments

The National Laboratory System for Public Health in Taiwan

Taiwan CDC supervises quality management of the National Laboratory System conducting diagnostic testing of major infectious diseases, which includes 249 COVID-19 designated labs, 11 Novel Influenza A virus infections designated labs, 16 commissioned labs, 260 authorized labs, and 1 anatomical pathology lab. All of the indicators, including laboratory testing for detection of 10 priority diseases, specimen referral and transport system, effective modern point of care and laboratory-based diagnostics, as well as laboratory quality system, were verified to have sustainable capacity and thus reached the full-score level. In 2021, Taiwan CDC national laboratories conducted 237,897 tests and were accredited by TAF according to ISO 15189 from March 13, 2021, to March 12, 2024.

National Influenza Center (NIC)

During the COVID-19 pandemic in 2021, the influenza activity was low in Taiwan and globally. In Taiwan, no seasonal human influenza virus was detected and isolated. In 2021, a reassortant swine-origin influenza A(H1N2)v virus was isolated from a 5-year-old girl. Full-genome sequencing and phylogenetic analyses of this virus revealed that it is a novel reassortant virus containing hemagglutinin (HA) and neuraminidase (NA) gene segments derived from swine influenza A(H1N2) viruses and the other 6 internal genes are from human A(H1N1)pdm09 viruses.

Viral Respiratory Diseases Laboratory

1. Developed real-time reverse transcription polymerase chain reaction (real-time RT-PCR) test with high sensitivity and specificity for detection of SARS-CoV-2.
2. Established a national laboratory network of SARS-CoV-2 with a capacity of 153,702 real-time RT-PCR tests per day, comprised of 249 laboratories.
3. Performed multiplex real-time PCR reactions, which targeted Influenza A and B, human adenovirus, RSV, coronaviruses (229E, OC43, NL63, HKU1, MERS), human metapneumovirus, bocavirus, parainfluenza type 1-4, Enterovirus, Rhinovirus, Parvovirus B19, HSV1, HSV2, CMV, VZV, *Legionella pneumophila* and *Mycoplasma pneumoniae*, for diagnosis of unexplained severe pneumonias and respiratory disease clusters.
4. In 2021, no measles case was confirmed from 64 reported cases and the other pathogens that caused febrile and rash were detected by using real-time PCR reactions. Among them, Varicella zoster virus (n=2), and adenovirus (n=1) were found from these reported cases. No rubella cases were confirmed from 40 reported cases in 2021. Among them, Varicella zoster virus (n=2), and adenovirus (n=2) were found from these reported cases.

Viral Enteric and Diarrhoeal Diseases Laboratory

1. Norovirus is the main cause of acute gastroenteritis (AGE) outbreaks in Taiwan. In 2021, 124 (50.8%) of 244 AGE outbreaks were laboratory diagnosed as Norovirus infection. Of them, GII.2 accounted for 59 (47.5%) was the major genotype causing norovirus outbreaks in Taiwan.
2. Join the global pediatric norovirus strain surveillance network for monitoring the emergence of new or rare strains and for developing vaccines that protect against the most common strains.
3. To better understand foodborne pathogens distribution and genotypes in Taiwan, a nanopore sequence technology was applied to real-time sequencing the whole genome sequence data of acute gastroenteritis pathogens which is directly from clinical materials.

HIV and Emerging Diseases Laboratory

1. Continued HIV drug resistance surveillance survey among treatment naïve patients. Subtype B is the most common subtype in Taiwan and the overall drug resistance rate for any class of anti-HIV drugs was around 15.8% in 2020.
2. There were no HIV or HCV infections due to blood-transfusion in Taiwan from 2015 to 2021.
3. In case of any Enterovirus outbreak, both Pan-EV real-time RT-PCR and EV semi-nested RT-PCR are available and prepared for rapid identification of suspected patients. 13 eligible medical centers are approved and authorized for both laboratory diagnostic methods applied in EV infection.

Vector-Borne Viral and Rickettsial Diseases Laboratory

1. Developed a rapid multiplex nucleic acid assay for anaplasmosis, ehrlichiosis and murine typhus to provide medical diagnosis and control measures of the diseases.
2. In 2021, a total of 12 imported dengue cases and an imported chikungunya case were identified. No indigenous dengue and chikungunya cases had occurred during 2021. Dengue virus genome sequences provided essential information on the global expansion and genetic evolution of vector-borne viruses.
3. In 2021, a total of 292 scrub typhus cases and 30 murine typhus cases were detected by a laboratory-based surveillance project. The results provide essential epidemiological information for disease control.

Bacterial Respiratory Diseases Laboratory

1. In 2020 and 2021, a total of 480 cases of invasive pneumococcal disease (IPD) were notified. The incidence was 1.0 cases per 100,000 population, and the case fatality rate was 7.1%. Among invasive *Streptococcus pneumoniae* strains, the most prevalent serotypes were 23A, 15A, 19A, and 34. Toward penicillin, cefotaxime, and erythromycin, 60%, 75%, and 13% strains were susceptible, respectively.
2. In 2020-2021, a total of 677 cases of Legionnaires' disease were laboratory-confirmed, including 551 males and 614 cases older than 50 years.

Bacterial Enteric and Emerging Diseases Laboratory

1. Analysis and comparison of carbapenem-resistant Enterobacteriaceae by next generation sequencing.
2. Analysis of full genome sequences of SARS-CoV-2 by next generation sequencing.
3. Employed high-throughput sequencing for unknown pathogen discovery.

Parasitic Diseases Laboratory

1. Diagnosed imported malaria cases and identified *Plasmodium* to the species level by rapid test, microscopic and molecular methods.
2. Conducted amoeba and toxoplasma diagnosis in high-risk populations.
3. Intestinal and blood parasite smears were made and sent to about 60 hospitals in 2021 to improve the competence in parasite microscopy of medical technicians and increase the detection rate.

Mycotic Diseases Laboratory

1. Conducted diagnostic assays and molecular epidemiology studies of fungal and sexually-transmitted pathogens.

2. Performed *Candida haemulonii* species complex identification to monitor *Candida auris* infections in Taiwan.
3. Carried out G-NICE (Gonococci-National Isolate Collection for Epidemiology) for the surveillance of resistance trend and molecular epidemiology study on *Neisseria gonorrhoeae*. In 2021, 1.3% of isolates were decreased susceptibility to third-generation cephalosporin (cefixime MIC \geq 0.25 mg/L, ceftriaxone MIC \geq 0.125 mg/L); 0.9% of isolates were resistant to azithromycin (MIC \geq 2 mg/L).

Tuberculosis Research Center and Mycobacterial Disease Laboratory

1. Continued expansion of advanced molecular detection technologies such as whole genome sequencing and targeted next generation sequencing for comprehensive detection of resistance to 14 drugs and for facilitating investigation of tuberculosis transmission.
2. Adopted the One Health approach through cooperating with the Council of Agriculture to establish a *bovine tuberculosis* (bTB) surveillance program. The burden of human bTB in Taiwan was 1%; of which, 29.1% *Mycobacterium bovis* isolates were concurrently resistant to isoniazid and pyrazinamide.
3. Carried out external quality assurance program by monitoring >97% clinical tuberculosis experimental data and quality index of 42 authorized tuberculosis laboratories through the Laboratory Information Management System, by performing AFB smear rechecking and by conducting on-site visits.
4. Continued surveillance of BCG adverse reaction, drug-resistant tuberculosis, tuberculosis clusters and leprosy.

Vector Biology Laboratory

1. Conducted ectoparasite identification of rats from harbor-airport surveillance.
2. Performed data analysis of dengue vector surveillance weekly.
3. Conducted species identification of mosquitoes collected from malaria vector (*Anopheles minimus*) surveillance and harbor-airport mosquito surveillance.
4. Carried out virus detection on *Culex* vectors of Japanese encephalitis and *Aedes* vectors by request.

Establishment and Application of a Pathogen Genome Sequence Database in Taiwan

Taiwan Pathogenic Microorganism Genome Database (TPMGD) – is accessible to the general public online. Any user can apply for an account to browse the website and perform a comparative analysis with over 44,000 Taiwanese pathogen sequences, containing simple epidemiological information. In the comparative analysis of databases,

bioinformatic tools are available online, such as blast with Taiwan local virus gene database. Furthermore, the WHO-recommended composition of influenza virus vaccine strains was updated over time. A new version of the database (<https://genin.cdc.gov.tw/TPMGDWeb/Default.aspx>) has been designed and reopen to the general public in 2021.



Manufacturing of Serums and Vaccines

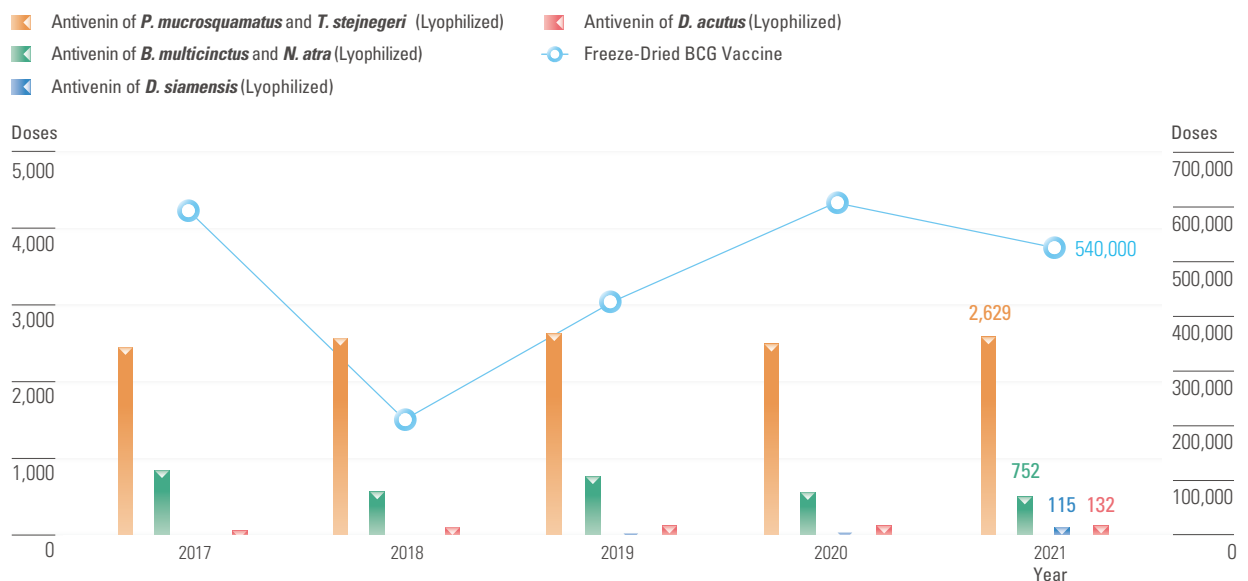
1. Production of Bio-Products

- (1) A total of 262 liters of antivenom immunoglobulins was separated from the blood of hyperimmunized horses in 2021.
- (2) A supply of 543,628 doses of vaccines and antivenoms was available in 2021 (Figure 5-1). Income from the sales of these biologics totaled about US\$3.06 million.

2. Contract manufacturing

In 2021, a total of 4,230 doses of antivenin and 540,000 doses of BCG were supplied by the contract manufacturer, operated by the bioproduction plant of the National Health Research Institutes.

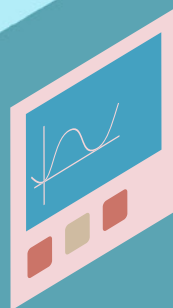
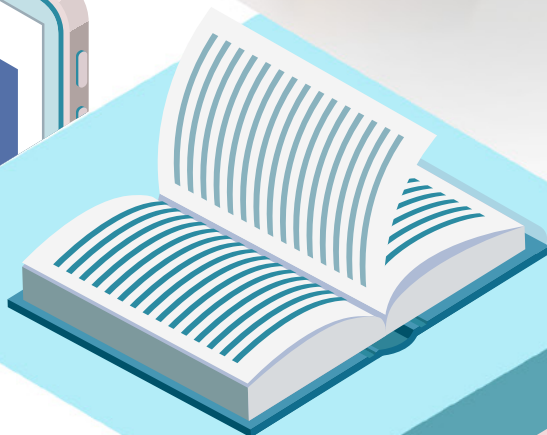
Figure 5-1 Biologics Supplied by Taiwan CDC in 2017~2021



Marketing and Publications



06



Marketing and Publications

Current Status

To improve public awareness about communicable diseases and related policies, as well as public support for Taiwan CDC's efforts, the agency created a health marketing program. The program aims to promote disease prevention among the general public through a series of interactive events.

Goals

To strengthen risk communication with the public, improve public awareness, and involve everyone in efforts against epidemics.

Accomplishments

1. Media Monitoring and Timely Response

A news monitoring and alert mechanism was set in place to enhance communication of communicable disease control policies. In 2021, a total of 56,807 pieces of related news were reported in response to public concern over matters related to disease control. Competent authorities voluntarily held press conferences and issued press releases to keep the public informed and intensify policy communication. Moreover, 348 press conferences were held and 820 press releases were issued.



2. Integrated Marketing of Disease Prevention

Each year Taiwan CDC selects specific diseases to focus on. Through focusing on specific diseases, Taiwan CDC aims to spread key messages related to disease control and increase public health awareness. In 2021, Taiwan CDC's major focuses were COVID-19, tuberculosis, AIDS and seasonal influenza.

(1) Press conferences: When announcing disease prevention measures and new communicable diseases, Taiwan CDC holds press conferences to improve awareness about major policies and achievements. To echo the World TB Day and its theme for 2021 "The Clock Is Ticking", Taiwan CDC held a special event "The Clock Is Ticking to End TB" on March 23 at Chiang Kai-Shek Memorial Hall Democracy Boulevard, as a response to simultaneous "Light up for TB" events across the world.



Facing potential human health threats posed by influenza, every year Taiwan CDC promotes measures for preventing influenza and the importance of vaccination through different channels before the influenza season begins. Taiwan CDC held an event “Let Us Stay Healthy Together” to help different groups of people to understand the benefits of the influenza vaccination. A total of two press conferences were held to give updates on the outbreak along with press releases.

(2) Creative Promotional Materials: To promote disease prevention concepts, Taiwan CDC makes creative, stylish, and useful promotional materials available online for use.

3. Communicable Disease Reporting and Consultation Hotline: 1922

To provide a convenient channel for communicable disease reporting and consultation, Taiwan CDC has operated the easy-to-remember, toll-free hotline “1922” since 2003. By calling 1922, users can access 24-hour case reporting service, communicable disease counseling service, prevention policy promotion, and control measure information all year round.

In 2021, the 1922 hotline received 9.87 million calls and made 92,978 referrals. 91% of users said they were satisfied.

4. Social Marketing Media

To reach different groups of target audiences, Taiwan CDC is constantly looking for new marketing channels. In 2021, besides continuing to improve the existing marketing strategies via traditional channels such as print media, TV and radio broadcast, Taiwan CDC also developed interactive digital marketing strategies.



Marketing channels include:

- (1) The Internet: The Internet's influence is far-reaching and powerful, and it has become an important marketing tool for Taiwan's media. Taiwan CDC also focused on the Internet as a marketing channel.
- (2) Featured Multimedia and Tools: Responding to Internet trends, Taiwan CDC uses popular online social media tools to promote healthy living and disease prevention. Taiwan CDC established an online disease prevention community on Facebook, LINE@, and Instagram. These sites promote communicable disease control and act as a bridge for Taiwan CDC to communicate with people over the Internet.
- (3) The Taiwan CDC 1922 Facebook fan page already has more than 1.06 million followers. Besides daily epidemic information, the page offers lifestyle news such as weather reports along with epidemic prevention information, comics, and themed activities to interact with fans. Taiwan CDC also posted creative videos on YouTube which attracted more than 0.29 million people subscribed.

Taiwan CDC LINE@ issues at least two push notifications to share the latest information on disease prevention every week. Taiwan CDC LINE@ already has more than 10 million followers. Additionally, Taiwan CDC launched LINE @ chatbot - the Disease Control Butler, an AI "chatbot" jointly developed by HTC Corp., on September 28, 2017. LINE @ chatbot - the Disease Control Butler, has been providing basic consultations on influenza vaccination since its launch.



LINE users can also use the chatbot to access phone consultations as well as ask information about contracted healthcare facilities for further consultations. The chatbot is responsive, significantly shortening the time required for people seeking consultations.

5. Correspondence Letters

To provide up-to-date information on communicable diseases, clinical treatments, and disease prevention policies, Taiwan CDC sends special correspondence letters to the healthcare community. In 2021, Taiwan CDC sent out 22 medical correspondences and reached 5,263 regular subscribers.

6. Corporate Cooperation

Taiwan CDC cooperates with private companies and foundations that are also involved in disease prevention to maximize resource efficiency, creativity, and marketing opportunities and improve awareness of related issues.

To promote public awareness about influenza vaccination, Taiwan CDC has proactively cooperated with HTC Corp. and PX Mart Co., Ltd. to develop the LINE @

致醫界通函

關鍵字: 日期(起): 日期(迄): 搜尋

2021 - 9 9	結核病接觸者及早完成潛伏結核感染(LIPI)檢驗與治療，可有效預防發病，且與COVID-19疫苗接種...	2021 - 9 7	為及早診斷疑似結核病，籲請醫療院所針對有疑似症狀者加強執行胸部X光檢查、檢體採檢送驗及通...
2021 - 8 30	為及時偵測Delta變異株進入社區風險，定醫診所協助配合發放公費COVID-19家用快篩試劑予高風...	2021 - 7 17	COVID-19專家諮詢會議決議，參照國際最新建議擴大甲株抗體與免疫調節劑建議使用對象(疾病管制...
2021 - 6 30	新型冠狀病毒 (SARS CoV 2) 感染臨床處置暫行指引新增抗凝血劑使用建議，以降低COVID 19病...	2021 - 6 12	COVID 19診治指引新增單株抗體使用建議，以對不同嚴重程度個案提供最佳治療(疾病管制署致醫界...
2021 - 6 2	指揮中心訂有因應COVID-19疫情醫療照護工作人員提前返回工作建議，俾利醫療照護工作人員之人...	2021 - 5 28	為加速COVID-19通報及送驗程序，修訂疑似嚴重特殊傳染性肺炎病例通報流程，請醫師加強疑似個...
2021 - 5 25	因應國內疫情升溫，COVID-19專家諮詢會議盤點確診病患治療原則 (疾病管制署致醫界通函第456號)	2021 - 5 18	本年首例日本腦炎確診個案已出現，籲請醫師提高警覺，加強疑似病例通報(疾病管制署致醫界通函...

Correspondence Letters

chatbot - the Disease Control Butler and provide the public with convenient access to influenza vaccination.

Many people in Taiwan travel during summer vacation. To prevent people from contracting communicable diseases during their trips and create a safety net to combat epidemics, Taiwan CDC cooperated with Watsons, a health care and beauty care chain store, to urge people to prepare travel kits to protect against infectious diseases. Campaign materials for elevating public awareness were available at some 550 Watsons stores in Taiwan with staff pharmacists advising people about things that need to be considered before, during, and after a trip.

Corporates are encouraged to pay more attention to disease prevention and to cooperate with the government to prevent communicable diseases.

Future Prospects

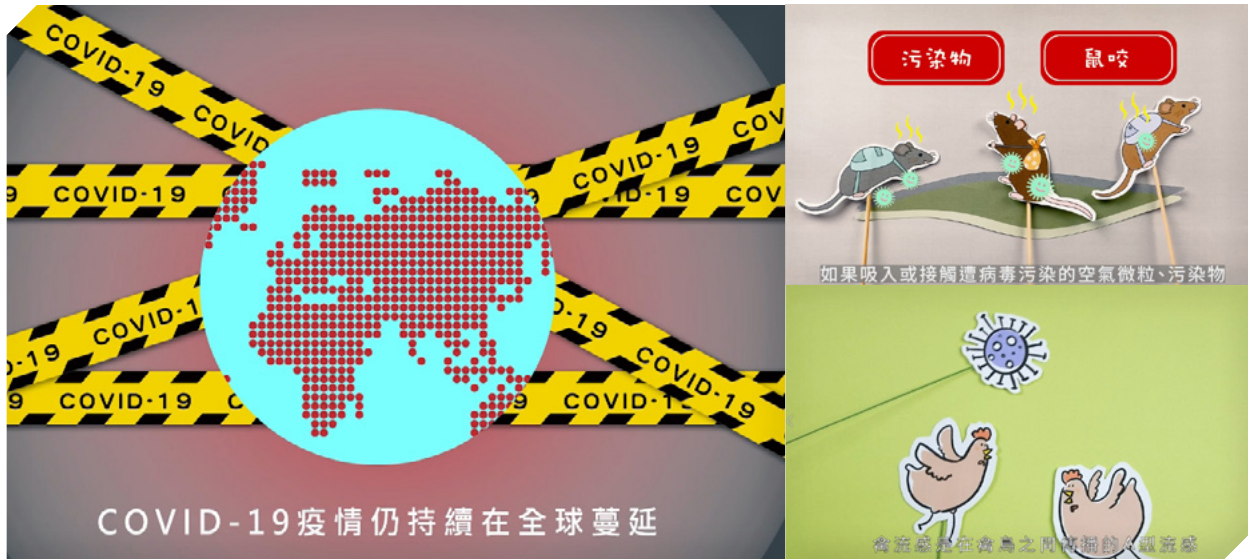
Taiwan CDC will continue to promote disease prevention, develop new marketing channels, and improve risk communication concerning infectious diseases to ensure the health and wellbeing of the people in Taiwan.

Educational materials on Health and Sanitation:

CF

(<https://www.youtube.com/user/taiwandcdc>)

COVID-19, Hantavirus syndrome and Novel Influenza A virus infections



Poster and Flyers

(<http://www.cdc.gov.tw>)

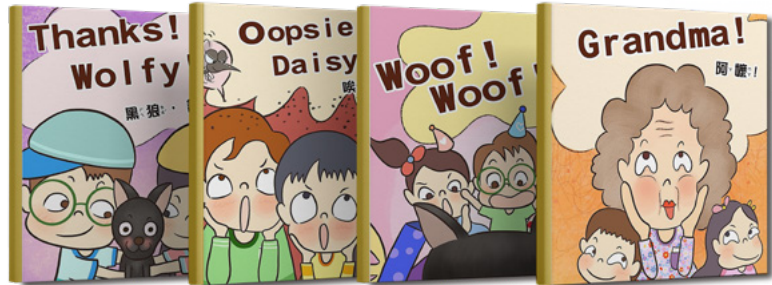
COVID-19, Influenza, and AIDS



Periodicals and Books



Guidelines for Dengue / Chikungunya Control (14E)



CHELSEA AND FRIENDS 2021



The Art of Personified Disease 1



The Art of Personified Disease 2



The Essential Topics of COVID-19 Critical Care



HIV/AIDS Prevention and Control Manual



Taiwan Epidemiology Bulletin



Infection Control Journal



Taiwan Tuberculosis Control Report 2020



CDC Annual Report 2020



Statistics of Communicable Diseases and Surveillance Report 2020 (English version)



Statistics of Communicable Diseases and Surveillance Report 2020 (Traditional Chinese version)

2021 Summarized Chronology of Events

Jan

The Fall-Winter COVID-19 Prevention Program remained effective:

-- All inbound travelers were required to provide a negative COVID-19 PCR test report issued within three working days of their incoming flight's scheduled departure time.

-- People must wear masks in the following types of public venues: health care facilities, public transportation, places of consumption, learning places, sports and exhibition venues, entertainment venues, religious and worship places, offices and business venues.

-- Screening at the outpatient departments and emergency departments of hospitals were strengthened for patients with community-acquired pneumonia to enhancing inpatient testing as well as health monitoring among health care personnel.

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Given the continued severity of COVID-19 worldwide, entry to Taiwan for foreign nationals were suspended, except for Alien Resident Certificate holders, short-term business travelers, diplomats, or spouses and minor children of specific groups, foreign nationals.

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In response to the continued severity of COVID-19 and the new coronavirus strain in South Africa, travelers with history of travel to South Africa or Eswatini in the past 14 days were required to undergo quarantine at group quarantine facilities and undergo special testing after arrival in Taiwan.

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As quarantine measures were strengthened, arriving travelers must provide proof of the place of their quarantine. In principle, travelers should quarantine at a group quarantine facility or quarantine hotel and follow the one person per residence requirement. Group quarantine facilities were open to R.O.C. nationals in consideration of the high demand for travel to Taiwan before the Lunar New Year holiday.

Feb

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Taiwan signed a contract with Moderna to purchase 5.05 million doses of Moderna's COVID-19 vaccine.

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In response to the continued severity of COVID-19 and the new coronavirus strain in Brazil, inbound travelers with history of travel to Brazil in the last 14 days were required to quarantine in group quarantine facilities and undergo testing.

Mar

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Individuals identified as close contacts of confirmed COVID-19 cases should observe the rule of one person per residence during mandatory isolation. Those whose homes don't meet the requirements of home isolation should be isolated in a quarantine hotel or group quarantine facility.

◆
1

Entry to Taiwan was allowed for foreign nationals (including those entering for medical purposes) under certain conditions. Short-term business travelers from low- and medium-risk countries could apply for shortened quarantine periods in Taiwan. The program to allow transit travel at Taoyuan International Airport was reinstated.

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3

The first shipment of 117,000 doses of the AstraZeneca COVID-19 vaccine arrived in Taiwan.

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22

The COVID-19 vaccine rollout began for the first priority group, medical personnel working at COVID-19 wards, working at negative pressure isolation wards, or performing tests. Taiwan CDC launched the after-vaccination health reporting platform Taiwan V-Watch, through which members of the public could report their health conditions after COVID-19 vaccination.

◆
23

To commemorate World Tuberculosis Day 2021, Taiwan CDC held "The Clock Is Ticking to End TB" press conference as a response to the simultaneous "Light Up for TB" events across the globe.

Apr

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4

The first batch of the AstraZeneca COVID-19 vaccine allocated through the COVAX Facility, containing 199,200 doses, arrived in Taiwan.

10

Travelers with recent history of travel to the United Kingdom, South Africa, or Eswatini were no longer required to stay at group quarantine facilities after arrival in Taiwan. Such travelers could instead undergo the 14-day quarantine at a quarantine hotel or follow the one person per residence rule to quarantine at their residence.

13

The Pre-exposure Prophylaxis (PrEP) project was implemented to provide government-funded medication, HIV prevention education, counseling, STD testing, and drug addiction assessment and referral services, and other integrated and personalized services.

May

4

In response to the continued severity of COVID-19 in India, inbound travelers with history of travel to India in the last 14 days were required to quarantine in group quarantine facilities and undergo testing.

11

In response to the increased risk of community transmission, Taiwan raised its nationwide epidemic warning to Level 2 (local cases of unknown sources). Under the Level 2 warning, social distancing and mask wearing were required in places of business, public facilities, and gatherings. Organizers should cancel outdoor gatherings/events of over 500 people and indoor gatherings/events of over 100 people, and food and beverage service owners should implement contact information registration.

14

The Taiwan Social Distancing app was launched and available for download by the general public. The app uses Bluetooth technology to record de-identified data of contacts to establish contact history for users.

15

In response to an increasing level of COVID-19 community transmission, Taiwan announced the closure of leisure and entertainment venues, a halt to all religious pilgrimages and processions, and the closure of elementary and middle school campuses to the public. Furthermore, the epidemic warning for Taipei and New Taipei cities was raised to Level 3 (at least three community clusters within a week or 10 domestically transmitted cases from unknown sources in one day). Other measures included the closure of sports and exhibition venues as well as educational facilities, mandatory mask-wearing outdoors, the advice against movement or gatherings unless necessary, and suspension of social gatherings involving five or more people indoors or 10 or more people outdoors.

16

Medical institutions nationwide introduced measures to reduce capacities, deciding whether a consultation should be conducted as scheduled or be postponed based on the urgency of the medical treatment, the risks associated with a delayed consultation, and the risk of transmission.

18

Taiwan, the United States, Japan, the United Kingdom, and Australia co-organized a virtual Global Cooperation and Training Framework (GCTF) workshop titled "COVID-19 Vaccine Rollout: Experiences and Challenges."

19

Taiwan temporarily barred foreign nationals without an ARC and transit travelers from entering the country.

19

Taiwan raised its epidemic warning to Level 3 nationwide.

28

Taiwan received its first batch of Moderna's COVID-19 vaccine.

28

Taiwan signed contracts with Medigen Vaccine Biologics Corp. and United Biomedical Inc. to purchase 5 million COVID-19 vaccine doses from each company.

Jun

10

The CECC implemented expanded community testing measures, including increasing community testing stations, encouraging businesses to use rapid testing kits, and introducing self-paid rapid testing in clinics.

27

In response to the global spread and high transmissibility of the Delta variant, travelers arriving in Taiwan from "key high-risk countries" were required to quarantine in group quarantine facilities for 14 days and undergo PCR tests for COVID-19 upon checking in and at the end of their quarantine period.

Jul

13

On the condition that epidemic prevention guidelines would be followed, local governments could adjust the restrictions on outdoor or indoor places, sports venues, and dining establishments. Leisure and entertainment venues, educational facilities, exhibition and sports competition venues, and swimming pools should remain closed.

22

Taiwan signed a supply agreement with Moderna to purchase a total of 36 million doses of Moderna's COVID-19 vaccine in the next two years in response to the threats posed by SARS-CoV-2 variants and in order to provide vaccinations for more groups of people.

27

Taiwan lowered its nationwide epidemic alert level to Level 2 and announced general principles. The general principles included mandatory mask-wearing when outside except when consuming food and beverages, contact information registration, social distancing, and crowd control or capacity limit management at commercial business venues and public places. Others included the limits of 50 people in indoor gatherings and 100 people in outdoor gatherings and implementation of epidemic prevention rules in places with dine-in services. Some leisure and entertainment venues, educational facilities, and swimming pools should remain closed.

Aug

20

As the pandemic subsided, Taiwan began opening its borders to international students who would study in the country in the 2021 academic year.

23

As the Delta variant spread around the world, five surveillance measures were implemented: enhanced surveillance at designated locations in communities, increased wastewater surveillance sites, monitoring of certain high-risk personnel at international airports, the study on the seroprevalence of SARS-CoV-2 antibodies among blood donors, and strengthened surveillance of the packaging of imported frozen food.

25
26

Taiwan hosted the APEC web conference called "Digital Tools for Addressing Infectious Disease in the Asia-Pacific Region: Challenges and Opportunities."

Sep

2

Taiwan received its first batch of 930,000 doses of the BNT COVID-19 vaccine donated by Taiwan Semiconductor Manufacturing, Hon Hai Precision Industry Co. Ltd./YongLin Foundation, and Buddhist Tzu Chi Charity Foundation.

Oct

1

The government-funded seasonal influenza vaccination campaign was launched.

29

The 18th Taiwan-Japan Symposium was held via videoconferencing.

Nov

1~5

Taiwan CDC held the 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference, and the theme was "Combating emerging and re-emerging public health threats through regional field epidemiology training networks."

11

In response to an influx of inbound travelers before the Lunar New Year holiday, Taiwan CDC announced three options to undergo quarantine during the holiday for arrivals: 1. Travelers complete the 14-day quarantine at a quarantine hotel and practice an additional seven-day self-health management (14+7); 2. Travelers quarantine at a quarantine hotel for 10 days, spend the remaining four days quarantining at home, and then practice the seven-day self-health management (10+4+7); 3. Travelers quarantine at a self-paid group quarantine facility or quarantine hotel for seven days, spend the remaining seven days quarantining at home, and then practice the seven-day self-health management (7+7+7).

30

Setting the theme for its campaign as "Fight HIV/AIDS and Share Love", Taiwan CDC released its first Instagram filter and Facebook avatar frame to invite the public to join World AIDS Day events.

Dec

2

In response to the emergence of the Omicron variant, people who completed their COVID-19 primary series vaccination at least five months ago were eligible for a third dose.

28

Taiwan's Digital COVID-19 Certificate became available for download and use to support Taiwanese citizens' faster entry into the European Union and other countries.

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