

The Quarantine Measures of Distant Water Fishing Vessels Crew During the COVID-19 Pandemic, Taiwan, 2020–2022

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Abstract

At the beginning of 2020, the COVID-19 pandemic spread rapidly worldwide. Taiwan established the Central Epidemic Command Center, restricted entry of foreigners, and implemented 14-day quarantine measures since March 2020. Because of the unique characteristics of distant water fisheries, most crew members were foreigners who had been fishing overseas for a long time, then returned to Taiwan with vessels after fishing seasons, and unloaded catches in a short term. After evaluating the operation of the industry and risks of contact at open sea, the Fisheries Agency, collaborating with the Taiwan Centers for Disease Control, established special quarantine measures for distant water fishing vessels and crew members. Also, the Fisheries Agency coordinated and supervised various stakeholders, including local governments, fishery associations, and the industry, to implement and adjust control measures according to the latest pandemic situation.

Crew members without contact history on the sea were exempt from quarantine. In contrast, those with contact history were subjected to home quarantine, on-vessel quarantine, or depart directly without entering the community. As for the fishing vessels departing in a short term, the crew members were required to stay on vessels for compulsory health management. Also, the Fisheries Agency dynamically monitored the contact history of fishing vessels at sea through the 24-hour Vessel Monitoring System (VMS). Quarantine areas were set up in fishing ports to implement and manage

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quarantine measures. Meanwhile, fishery-related laws, regulations and sanction mechanisms were formulated to impose the monitoring responsibility on ship owners.

During the five fishing seasons from March 2020 to October 2022, 2,570 distant water fishing vessels and 47,985 crew members returned to Taiwan. The case confirmation rate was 0.23% (110/47,985), which was significantly lower than the rate of inbound personnel at international ports (1.93%) during the same period (relative risk: 0.12, $p < 0.05$). No clusters occurred in fishing ports in the study period, indicating that the quarantine measures were effective and could be used as a reference for emerging infectious diseases in the future.

Keywords: COVID-19, quarantine, fishing vessel, epidemic prevention, vessel monitoring system (VMS)

week 35–week 36, 2023 (Aug. 27, 2023–Sep. 9, 2023)

DOI: 10.6525/TEB.202309_39(18).0002

Weekly Data of Notifiable Inases (by week of diagnosis)

Case diagnosis year		Week 35★		Week 1-35			
Classification	Disease Diagnosed	2023	2022	2023		2022	
				Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
	Cholera	0	0	1	0	0	0
Category II	Typhoid fever	0	0	6	5	2	1
	Paratyphoid Fever	1	0	10	1	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Shigellosis	1	3	44	12	54	3
	Amoebiasis	0	0	179	73	128	47
	Enterohemorrhagic E.coli Infection	0	1	0	0	2	0
	Anthrax	0	0	0	0	0	0
	Diphtheria	0	0	0	0	0	0
	Meningococcal Meningitis	0	0	3	0	1	0
	Poliomyelitis	0	0	0	0	0	0
	Acute Flaccid Paralysis	2	0	42	0	17	0
	Measles	0	1	2	2	1	0
	Rubella	0	0	0	0	0	0
	Dengue Fever	1,258	0	4,187	136	29	27
	West Nile Fever	0	0	0	0	0	0
	Acute Viral Hepatitis type A	2	2	60	2	111	1
	Malaria	0	0	1	1	2	2
	Chikungunya Fever	0	0	6	6	0	0
	Hantavirus syndrome	0	0	6	0	3	0
	Zika virus infection	1	0	3	3	0	0
	Mpox	9	0	304	13	3	3
Category III	Acute Viral Hepatitis type B	0	1	89	4	64	0
	Acute Viral Hepatitis type C	17	10	377	1	297	2
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	1	1	10	3	9	0
	Acute Viral Hepatitis, untyped	1	0	7	1	0	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	1	0	12	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	2	0
	Japanese Encephalitis	0	0	21	0	19	0
	Legionnaires' Disease	14	6	248	6	218	1
	Mumps	2	4	183	6	145	0
	Neonatal Tetanus	0	0	0	0	0	0
Pertussis	0	0	0	0	0	0	
Tetanus	0	1	4	0	3	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	0	30	0	19	0
	Endemic Typhus Fever	0	0	18	0	10	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	39	0	595	7	0	0
	Invasive Pneumococcal Disease	5	0	197	1	121	0
	Leptospirosis	1	1	34	0	34	0
	Listeriosis	1	3	132	2	101	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	1	1	14	1	11	1
	Q Fever	0	1	2	0	3	0
	Scrub Typhus	4	2	119	0	164	0
	Toxoplasmosis	0	1	23	2	18	0
	Tularemia	0	0	0	0	0	0
Severe Fever with Thrombocytopenia Syndrome	0	0	0	0	1	0	
Severe Pneumonia with Novel Pathogens	333	221,415	1,391,848	18,125	5,425,643	26,487	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	1	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0	

- ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
- MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
- Numbers of Mumps and Tetanus are based on reported cases and summed up by week of report.
- "Mpox" has been listed as a Notifiable Infectious Disease since June 23, 2022.
- "Severe Pneumonia with Novel Pathogens": The case definition has been revised to include patients who have both a positive test for SARS-CoV-2 and associated complications since March 20, 2023. Additionally, it has been modified from Category V to Category IV since May 1, 2023.

Suspected Clusters

- Nineteen clusters related to Upper respiratory tract infection (9), Diarrhea (8), and Enterovirus (2) were reported during week 35.

Imported Infectious Diseases

- There were 10 imported cases from at least 8 countries/areas during week 35.
 - Dengue Fever:** 6 cases from Malaysia (2), Cambodia (1), Laos (1), Vietnam (1) and Thailand (1).
 - Severe Pneumonia with Novel Pathogens:** 1 case from Korea.
 - Influenza Case with Severe Complications:** 1 case from Japan.
 - Mpox:** 1 case from USA.
 - Zika virus infection:** 1 case from Thailand.
- During week 1-35, there were 18,413 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,125), Dengue Fever (136) and Amoebiasis (73).
- During week 1-35, imported cases of notifiable diseases were from at least 47 countries/areas. The top three were China (3,169), Japan (722) and Thailand (191).

Summary of Epidemic

- **Japanese Encephalitis:** In the midst of the epidemic season, the risk of new cases is expected to be detected in all counties.
- **Influenza:** The epidemic is on the rise, and the risk of transmission is expected to increase as schools begin.
- **Enterovirus:** The risk of transmission is expected to increase as schools begin.
- **Dengue Fever:** The risk of transmission is increasing due to several factors. Epidemics in Southeast and South Asia are either rising or currently in an epidemic period, leading to an increase in imported cases. Moreover, recent typhoons are causing rainfall, further escalating the vector indices.

Weekly Data of Notifiable Inases (by week of diagnosis)

Case diagnosis year		Week 36		Week 1-36			
Classification	Disease Diagnosed	2023	2022	2023		2022	
				Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
	Cholera	0	0	1	0	0	0
Category II	Typhoid fever	0	0	6	5	2	1
	Paratyphoid Fever	1	0	11	1	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Shigellosis	5	1	49	12	55	3
	Amoebiasis	5	7	184	74	135	48
	Enterohemorrhagic E.coli Infection	0	0	0	0	2	0
	Anthrax	0	0	0	0	0	0
	Diphtheria	0	0	0	0	0	0
	Meningococcal Meningitis	0	0	3	0	1	0
	Poliomyelitis	0	0	0	0	0	0
	Acute Flaccid Paralysis	1	0	43	0	17	0
	Measles	0	0	2	2	1	0
	Rubella	0	0	0	0	0	0
	Dengue Fever	1,985	8	6,170	149	37	31
	West Nile Fever	0	0	0	0	0	0
	Acute Viral Hepatitis type A	3	1	63	3	112	1
	Malaria	0	0	1	1	2	2
	Chikungunya Fever	0	0	6	6	0	0
	Hantavirus syndrome	0	0	6	0	3	0
	Zika virus infection	0	0	3	3	0	0
Mpox	16	0	320	12	3	3	
Category III	Acute Viral Hepatitis type B	1	2	90	4	66	0
	Acute Viral Hepatitis type C	6	14	382	1	311	2
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	10	3	9	0
	Acute Viral Hepatitis, untyped	2	0	9	1	0	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	1	0	13	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	2	0
	Japanese Encephalitis	0	0	21	0	19	0
	Legionnaires' Disease	10	5	258	6	223	1
	Mumps	4	3	187	7	148	0
	Neonatal Tetanus	0	0	0	0	0	0
Pertussis	0	0	0	0	0	0	
Tetanus	1	0	5	0	3	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	3	0	33	0	19	0
	Endemic Typhus Fever	2	0	20	0	10	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	45	0	640	7	0	0
	Invasive Pneumococcal Disease	4	2	201	1	123	0
	Leptospirosis	2	2	36	0	36	0
	Listeriosis	6	3	138	2	104	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	1	2	15	1	13	1
	Q Fever	0	0	2	0	3	0
	Scrub Typhus	2	6	121	0	170	0
	Toxoplasmosis	0	0	23	2	18	0
	Tularemia	0	0	0	0	0	0
Severe Fever with Thrombocytopenia Syndrome	0	0	0	0	1	0	
Severe Pneumonia with Novel Pathogens	314	239,204	1,392,162	18,131	5,664,847	28,243	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	1	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0	

1. ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
2. MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
3. Numbers of mumps and tetanus cases are summed up by the week of report.
4. "Mpox" has been listed as a Notifiable Infectious Disease since June 23, 2022.
5. "Severe Pneumonia with Novel Pathogens": The case definition has been revised to include patients who have both a positive test for SARS-CoV-2 and associated complications since March 20, 2023. Additionally, it has been modified from Category V to Category IV since May 1, 2023.

Suspected Clusters

- Forty-five clusters related to Upper respiratory tract infection (27), Diarrhea (9), TB (6), Varicella (2) and Enterovirus (1) were reported during week 36.

Imported Infectious Diseases

- There were 22 imported cases from at least 12 countries / areas during week 36.
 - Dengue Fever:** 13 cases from Vietnam (5), the Philippines (3), Indonesia (2), Laos (1), Malaysia (1) and Thailand (1).
 - Severe Pneumonia with Novel Pathogens:** 6 cases from Denmark (1), Thailand (1), Japan (1), China (1), Korea (1) and Hong Kong (1).
 - Acute Viral Hepatitis type A:** 1 case from Myanmar.
 - Mumps:** 1 case from Vietnam.
 - Amoebiasis:** 1 case from Indonesia.
- During week 1-36, there were 18,434 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,131), Dengue Fever (149) and Amoebiasis (74).
- During week 1-36, imported cases of notifiable diseases were from at least 48 countries/areas. The top three were China (3,170), Japan (723) and Thailand (193).

Summary of Epidemic

- Influenza:** The epidemic is increasing.
- Enterovirus:** The epidemic is increasing.
- Dengue Fever:** The risk of transmission is increasing due to several factors. Epidemics in Southeast and South Asia are either rising or currently in an epidemic period, leading to an increase in imported cases. Moreover, recent rainfalls may lead to an increase in vector indices in some counties, further escalating the risk of transmission.

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