

International Travel and Dengue Fever at The Taoyuan International Airport, Taiwan, 2014–2018

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Abstract

Imported dengue infections leading to subsequent local outbreaks continue to be a public health concern in Taiwan. Taiwan Centers for Disease Control has implemented fever screening at international airports for early detection of febrile travelers who may have infectious diseases. We evaluated characteristics in inbound passengers diagnosed with dengue to identify at-risk groups and provide health promotion. Febrile travelers from dengue-endemic countries have been requested for dengue tests at airports since 2003 in Taiwan. A confirmed case was defined as a febrile traveler with a positive result in any of the following tests: dengue non-structural protein 1 (NS1) antigen, RT-PCR, or ≥ 4 -fold increase in antibody titers. We enrolled dengue cases reported by quarantine officers at the Taoyuan International Airport during 2014–2018. Data on demographics, travel destinations, reasons for travel, and clinical symptoms were analyzed and compared between citizens and non-citizens. We identified 645 imported dengue cases, including 291 citizens and 354 non-citizens. Among them, 347 (54%) were male and the median age was 32 years (range: 5–73 years). Three hundred (47%) cases were detected during July – October; 611 (95%) had traveled to or from countries in Southeast Asia.

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Independent travel was the most common reason for travel (n = 217, 34%). Among non-citizens, 118 (33%) were migrant workers. Of 626 cases with fever (tympanic temperature $\geq 38^{\circ}\text{C}$), 269 (42%) had self-reported febrile illness. Other symptoms included respiratory symptoms (29%), gastrointestinal symptoms (4%), and rash (3%). Non-citizen cases were more likely to report no symptoms compared to citizen cases (20% vs. 13%, $p < 0.05$). Quarantine officers should consider dengue screening for febrile travelers based on travelers' countries of departure and reasons for travel, regardless of their subjective symptoms. We recommended that preventive strategies, including health education before traveling and health service provision to foreigners, be implemented to reduce the risks of contracting and spreading dengue.

Keywords: Fever screening, dengue, airport, border quarantine, imported

Investigation of an Indigenous Case of Dengue Fever and Control Measures, Taichung City, 2019

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Abstract

On October 12, 2019, we confirmed an indigenous case (Case A) of dengue fever (DF) who lived in the faculty residence of University X in Xitun District, Taichung City. After epidemiologic investigation, we found that the primary case might be an imported DF case (Case B) who had traveled to India earlier. During Case B's viremic period, she went to study at University X and the classroom was only 200 meters away from the residence of Case A.

Both cases were infected by the type 2 dengue virus and had an epidemiological link, so we concluded that Case B was the infectious source of Case A. To mitigate this outbreak, the Taiwan Centers for Disease Control, Taichung City Government, and University X worked together to eliminate the breeding sites, apply chemical spray, trace contacts, and implement health surveillance. Since Dengue NS1 antigen rapid test (NS1 test) assists doctors in diagnosing and shortening the time to report. We recommend encouraging physicians in clinics to use the NS1 test and schools should have DF prevention strategies and random inspection programs to prevent DF.

Keywords: indigenous, dengue fever, epidemiology investigation, NS1 antigen rapid test, campus

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Weekly Data of Notifiable Inases (by week of diagnosis)

Case diagnosis year		Week 31★		Week 1–31			
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	1	0	3	3	2	1
	Paratyphoid Fever	0	0	8	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Shigellosis	2	2	39	11	49	3
	Amoebiasis	8	2	165	66	120	42
	Enterohemorrhagic E.coli Infection	0	0	0	0	0	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	37	0	16	0
	Measles	0	0	2	2	0	0
	Rubella	0	0	0	0	0	0
	Dengue Fever	255	0	1,142	92	15	15
	West Nile Fever	0	0	0	0	0	0
	Acute Viral Hepatitis type A	1	0	54	2	103	1
	Malaria	0	0	1	1	2	2
	Chikungunya Fever	0	0	5	5	0	0
	Hantavirus syndrome	0	0	5	0	3	0
	Zika virus infection	0	0	2	2	0	0
Mpox	6	0	260	12	3	3	
Category III	Acute Viral Hepatitis type B	0	1	80	4	58	0
	Acute Viral Hepatitis type C	7	11	340	0	266	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	9	3	7	0
	Acute Viral Hepatitis, untyped	1	0	5	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	0	0	11	0	0	0
	Haemophilus Influenza type b Infection	0	1	0	0	2	0
	Japanese Encephalitis	1	3	19	0	15	0
	Legionnaires' Disease	7	2	198	6	194	1
	Mumps	0	10	166	5	130	0
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	0
Tetanus	0	0	4	0	2	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	2	29	0	17	0
	Endemic Typhus Fever	0	1	17	0	8	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	25	0	447	5	0	0
	Invasive Pneumococcal Disease	5	2	182	1	119	0
	Leptospirosis	0	2	30	0	29	0
	Listeriosis	2	9	121	1	89	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	0	11	0	6	1
	Q Fever	0	0	2	0	2	0
	Scrub Typhus	6	11	99	0	137	0
	Toxoplasmosis	1	2	22	2	16	0
	Tularemia	0	0	0	0	0	0
	Severe Fever with Thrombocytopenia Syndrome	0	0	0	0	1	0
Severe Pneumonia with Novel Pathogens	553	150,671	1,390,375	18,123	4,721,379	19,344	
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 are based on reported cases and summed up by 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

- Twenty-two clusters related to Diarrhea (7), Upper respiratory tract infection (6), TB (5) and Enterovirus (4) were reported during week 31.

Imported Infectious Diseases

- There were 9 imported cases from at least 3 countries/areas during week 31.
Dengue Fever: 7 cases from Thailand (5) and Vietnam (2).
Typhoid fever: 1 case from Indonesia.
Legionnaires' Disease: 1 case from Thailand.
- During week 1–31, there were 18,347 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,123), Dengue Fever (92) and Amoebiasis (66).
- During week 1–31, imported cases of notifiable diseases were from at least 47 countries/areas. The top three were China (3,166), Japan (719) and Korea (183).

Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens:** The epidemic is decreasing.
- **Japanese Encephalitis:** In the midst of the epidemic season, the risk of new cases is expected to be detected in all counties.
- **Dengue Fever:** During the epidemic season, recent rainfalls may lead to an increase in vector indices in some counties, and the risk of epidemic transmission rises.

Weekly Data of Notifiable Inases (by week of diagnosis)

Case diagnosis year		Week 32★		Week 1–32			
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	1	0	4	4	2	1
	Paratyphoid Fever	1	0	9	1	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Shigellosis	2	1	41	11	50	3
	Amoebiasis	5	3	170	71	123	44
	Enterohemorrhagic E.coli Infection	0	0	0	0	0	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	0	1	37	0	17	0
	Measles	0	0	2	2	0	0
	Rubella	0	0	0	0	0	0
	Dengue Fever	446	5	1,588	100	20	20
	West Nile Fever	0	0	0	0	0	0
	Acute Viral Hepatitis type A	1	3	55	2	106	1
	Malaria	0	0	1	1	2	2
	Chikungunya Fever	1	0	6	6	0	0
	Hantavirus syndrome	0	0	5	0	3	0
	Zika virus infection	0	0	2	2	0	0
Mpox	12	0	272	12	3	3	
Category III	Acute Viral Hepatitis type B	3	0	83	4	58	0
	Acute Viral Hepatitis type C	8	7	348	1	273	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	9	3	7	0
	Acute Viral Hepatitis, untyped	0	0	5	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	0	0	11	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	2	0
	Japanese Encephalitis	2	3	21	0	18	0
	Legionnaires' Disease	10	8	208	6	202	1
	Mumps	4	4	170	5	134	0
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	0
Tetanus	1	0	5	0	2	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	0	29	0	17	0
	Endemic Typhus Fever	0	2	17	0	10	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	37	0	484	6	0	0
	Invasive Pneumococcal Disease	3	0	185	1	119	0
	Leptospirosis	1	0	31	0	29	0
	Listeriosis	0	2	121	1	91	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	1	11	0	7	1
	Q Fever	0	0	2	0	2	0
	Scrub Typhus	5	12	104	0	149	0
	Toxoplasmosis	0	0	22	2	16	0
	Tularemia	0	0	0	0	0	0
Severe Fever with Thrombocytopenia Syndrome	0	0	0	0	1	0	
Severe Pneumonia with Novel Pathogens	450	150,011	1,390,824	18,124	4,871,390	20,899	
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.
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Suspected Clusters

- Twenty-two clusters related to Upper respiratory tract infection (11), Diarrhea (5), TB (5) and Enterovirus (1) were reported during week 32.

Imported Infectious Diseases

- There were 18 imported cases from at least 10 countries/areas during week 32.
 - Dengue Fever:** 9 cases from Thailand (3), India (1), Malaysia (1), Vietnam (1), the Philippines (1), Singapore (1), and Laos (1).
 - Amoebiasis:** 3 cases from Indonesia (3).
 - Typhoid fever:** 1 case from Indonesia.
 - Paratyphoid Fever:** 1 case from Indonesia.
 - Severe Pneumonia with Novel Pathogens:** 1 case from China.
 - Chikungunya Fever:** 1 case from Thailand.
 - Acute Viral Hepatitis type C:** 1 case from Japan.
 - Influenza Case with Severe Complications:** 1 case from China.

- During week 1–32, there were 18,366 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,124), Dengue Fever (100) and Amoebiasis (71).
- During week 1–32, imported cases of notifiable diseases were from at least 47 countries/areas. The top three were China (3,168), Japan (720) and Korea (183).

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.
- **Dengue Fever:** During the epidemic season, there is a recent increase in the vector indices, leading to an elevated risk of disease transmission.

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