

Epidemiological Analysis of Scrub Typhus, Central Taiwan, 2015–2020

Yu-Chun Chang*, Kung-Ching Wang, Min-Tsung Lin, Ching-Fen Ko, Jhy-Wen Wu

Abstract

Scrub typhus is a rickettsial disease transmitted to humans through the bite of chigger mites infected with *Orientia tsutsugamushi*. We analyzed the data of the cases in central Taiwan from 2015 to 2020 to find out the epidemiology and high-risk groups of scrub typhus infections.

A total of 273 confirmed cases were identified, and 3 of them were imported cases. The risk factors of scrub typhus infection in Taichung and Changhua were hiking in the mountainous area and exposure to brushwood or grassy areas, whereas in Nantou the agricultural exposure.

In 2019, one worker from the environmental protection bureau was infected with scrub typhus. The investigation showed that the patient might have been infected due to the lack of proper personal protection at work. Taichung City Government then held educational training for the general population and implemented rodent control measures, and no further cases were reported.

The most important measure to prevent scrub typhus infection is avoiding contact with infected chiggers. Therefore, it is important to educate people that personal protection measures should be taken when approaching high-risk areas in outdoor activities.

Keywords: Central Taiwan, Scrub typhus, incidence, risk factor

Central Region Center, Centers for Disease Control,
Ministry of Health and Welfare, Taiwan
Corresponding author: Yu-Chun Chang*
E-mail: cyc770603@cdc.gov.tw

Received: Oct. 21, 2021
Accepted: Apr. 07, 2022
DOI: 10.6525/TEB.202304_39(7).0001

week 11–week 13, 2023 (Mar. 12, 2023–Apr. 1, 2023)

DOI: 10.6525/TEB.202304_39(7).0002

Case diagnosis year-week		Week 11★		Week 1-11			
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
Category II	Acute Flaccid Paralysis	2	0	8	0	5	0
	Acute Viral Hepatitis type A	0	10	24	0	74	0
	Amoebiasis	4	3	54	14	45	12
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	2	2	0	0
	Cholera	0	0	0	0	0	0
	Dengue Fever	0	0	15	15	0	0
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus syndrome	0	0	2	0	1	0
	Malaria	0	1	1	1	1	1
	Measles	0	0	0	0	0	0
	Meningococcal Meningitis	0	0	0	0	0	0
	Paratyphoid Fever	0	0	1	0	0	0
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	0	0	0	0
	Shigellosis	2	2	11	3	20	0
	Typhoid fever	0	0	0	0	0	0
	West Nile Fever	0	0	0	0	0	0
Zika virus infection	0	0	0	0	0	0	
Mpox	4	-	12	2	-	-	
Category III	Acute Viral Hepatitis type B	1	2	33	1	26	0
	Acute Viral Hepatitis type C	11	18	131	0	92	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	1	2	1	3	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	4	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionnaires' Disease	1	7	56	0	78	0
	Mumps	7	4	54	1	49	0
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	0
Tetanus	0	0	1	0	1	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	1	0	10	0	6	0
	Endemic Typhus Fever	0	0	3	0	0	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	3	0	43	1	0	0
	Invasive Pneumococcal Disease	5	11	77	1	39	0
	Leptospirosis	2	0	6	0	7	0
	Listeriosis	7	3	43	0	26	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	0	5	0	0	0
	Q Fever	0	0	1	0	2	0
	Scrub Typhus	0	0	27	0	32	0
	Toxoplasmosis	1	2	5	0	7	0
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome	0	0	0	0	0	0
	Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Severe Pneumonia with Novel Pathogens	60,762	610	1,358,652	17,918	4,808	3,907
Yellow Fever	0	0	0	0	0	0	

- ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
- MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
- Numbers of mumps and tetanus cases are summed up by the week of report.
- Since 2022/6/23, "Mpox" has been listed as a Notifiable Infectious Disease.

Suspected Clusters

- Forty clusters related to Diarrhea (23), Upper respiratory tract infection (7), Enterovirus (7), Tuberculosis (2) and Varicella (1) were reported during week 11.

Imported Infectious Diseases

- There were 1,072 imported cases from at least 20 countries/areas during week 11.

Severe Pneumonia with Novel Pathogens : 1,071 cases from Japan (68), Thailand (19), Korea (16), Hong Kong (11), USA (9), Singapore (8), Australia (7), Vietnam (6), UAE (5), China (3), Germany (3), Turkey (3), the Philippines (2), Malaysia (2), New Zealand (2), Indonesia (2), Netherlands (1), Austria (1), UK (1), North Macedonia (1), and Unknown (901).

Mpox : 1 case from Japan.

- During week 1–11, there were 17,960 imported cases from at least 45 countries/areas. The top three countries are China (3,151), Japan (696), and Korea (175).
- During week 1–11, the notifiable diseases with the highest number of imported cases is Severe Pneumonia with Novel Pathogens (17,918).

Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens**: The epidemic is gradually declining.
- **Mpox**: There is a continuous increase in sporadic cases with unknown sources of infection, raising the risk of domestic transmission.
- **Influenza**: The epidemic remains the same in the past two weeks.
- **Enterovirus**: The epidemic is slightly rising.

Case diagnosis year-week		Week 12★		Week 1-12			
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
Category II	Acute Flaccid Paralysis	4	1	12	0	6	0
	Acute Viral Hepatitis type A	3	4	27	1	78	0
	Amoebiasis	8	2	62	17	47	12
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	2	2	0	0
	Cholera	0	0	0	0	0	0
	Dengue Fever	2	0	17	17	0	0
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus syndrome	0	0	2	0	1	0
	Malaria	0	0	1	1	1	1
	Measles	0	0	0	0	0	0
	Meningococcal Meningitis	0	0	0	0	0	0
	Paratyphoid Fever	0	0	1	0	0	0
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	0	0	0	0
	Shigellosis	1	2	12	4	22	0
	Typhoid fever	0	0	0	0	0	0
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	0	0	0	0	0	0	
Mpox	5	-	17	3	-	-	
Category III	Acute Viral Hepatitis type B	4	4	37	2	30	0
	Acute Viral Hepatitis type C	10	17	141	0	109	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	1	0	3	1	3	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	4	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	0	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionnaires' Disease	2	8	58	0	86	0
	Mumps	4	3	59	2	52	0
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	0
	Tetanus	1	0	2	0	1	0
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	1	10	0	7	0
	Endemic Typhus Fever	0	0	3	0	0	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	4	0	47	1	0	0
	Invasive Pneumococcal Disease	6	3	83	1	42	0
	Leptospirosis	2	1	8	0	8	0
	Listeriosis	8	3	51	0	29	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	0	5	0	0	0
	Q Fever	0	0	1	0	2	0
	Scrub Typhus	1	3	28	0	35	0
Toxoplasmosis	1	1	6	0	8	0	
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome	0	0	0	0	0	0
	Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Severe Pneumonia with Novel Pathogens	8,547	810	1,367,196	18,080	5,618	4,629
Severe Pneumonia with Novel Pathogens (complications)	617	-	617	1	-	-	
Yellow Fever	0	0	0	0	0	0	

- ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
- MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
- Numbers of mumps and tetanus cases are summed up by the week of report.
- Since 2023/03/20, Severe Pneumonia with Novel Pathogens has been adjusted to be notifiable only for complications.

Suspected Clusters

- Thirty-nine clusters related to Diarrhea (19), Upper respiratory tract infection (15), Enterovirus (3), Tuberculosis (1) and Varicella (1) were reported during week 12.

Imported Infectious Diseases

- There were 169 imported cases from at least 13 countries/areas during week 12.
 - Severe Pneumonia with Novel Pathogens:** 162 cases from Japan (8), Korea (5), Thailand (4), Vietnam (2), USA (2), the Philippines (2), UK (1), Germany (1), Hong Kong (1), Macau (1), France (1) and Unknown (134).
 - Severe Pneumonia with Novel Pathogens (complications):** 1 case from USA.
 - Dengue Fever:** 2 cases from Vietnam and Malaysia.
 - Acute Viral Hepatitis type A:** 1 case from Indonesia.
 - Acute Viral Hepatitis type B:** 1 case from Vietnam.
 - Amoebiasis:** 1 case from the Philippines.
 - Mpox:** 1 case from Japan.
- During week 1–12, there were 18,133 imported cases from at least 45 countries/areas. The top three countries are China (3,151), Japan (705) and Korea (180).
- During week 1–12, the notifiable diseases with the highest number of imported cases is Severe Pneumonia with Novel Pathogens (18,080).

Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens:** The epidemic is gradually declining.
- **Mpox:** Cases with unknown sources of infection are still increasing, raising the risk of domestic transmission.
- **Influenza:** The epidemic remains the same in the past few weeks.
- **Enterovirus:** The epidemic is rising.

Case diagnosis year-week		Week 13★		Week 1-13			
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
Category II	Acute Flaccid Paralysis	1	0	13	0	6	0
	Acute Viral Hepatitis type A	4	1	31	1	79	0
	Amoebiasis	10	5	72	19	52	14
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	2	2	0	0
	Cholera	0	0	0	0	0	0
	Dengue Fever	2	0	19	19	0	0
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus syndrome	0	0	2	0	1	0
	Malaria	0	0	1	1	1	1
	Measles	0	0	0	0	0	0
	Meningococcal Meningitis	0	0	0	0	0	0
	Paratyphoid Fever	1	0	2	0	0	0
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	0	0	0	0
Shigellosis	2	0	14	4	22	0	
Typhoid fever	0	1	0	0	1	0	
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	0	0	0	0	0	0	
Mpox	2	-	19	3	-	-	
Category III	Acute Viral Hepatitis type B	1	7	38	2	37	0
	Acute Viral Hepatitis type C	7	11	148	0	120	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	1	3	1	4	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	4	0	0	0
	Haemophilus Influenza type b Infection	0	1	0	0	1	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionnaires' Disease	3	6	61	1	92	0
	Mumps	3	5	62	2	57	0
	Neonatal Tetanus	0	0	0	0	0	0
Pertussis	0	0	0	0	0	0	
Tetanus	0	0	2	0	1	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	1	0	11	0	7	0
	Endemic Typhus Fever	0	0	3	0	0	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	2	0	49	1	0	0
	Invasive Pneumococcal Disease	3	5	86	1	47	0
	Leptospirosis	1	0	9	0	8	0
	Listeriosis	2	2	53	0	31	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	0	5	0	0	0
	Q Fever	0	0	1	0	2	0
	Scrub Typhus	0	0	28	0	35	0
Toxoplasmosis	2	2	8	0	10	0	
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome	0	0	0	0	0	0
	Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Severe Pneumonia with Novel Pathogens	-	1,566	1,367,196	18,080	7,184	5,504
	Severe Pneumonia with Novel Pathogens (complications)	638	-	1,255	3	-	-
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, Gonorrhea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
- Numbers of mumps and tetanus cases are summed up by the week of report.
- Since June 23, 2022, "Mpox" has been listed as a Notifiable Infectious Disease.
- Since March 20, 2022, "Severe Pneumonia with Novel Pathogens" has been adjusted to be notifiable only for complications.

Suspected Clusters

- Twenty-eight clusters related to Diarrhea (15), Upper respiratory tract infection (10), Enterovirus (2) and Tuberculosis (1) were reported during week 13.

Imported Infectious Diseases

- There were 6 imported cases from at least 4 countries/areas during week 13.
 - Severe Pneumonia with Novel Pathogens (complications):** 2 cases from Indonesia (1) and Thailand (1).
 - Dengue Fever:** 2 cases from Indonesia (1) and Maldives (1).
 - Legionnaires' Disease:** 1 case from USA.
 - Amoebiasis:** 1 case from the Indonesia.
- During week 1–13, there were 18,140 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,080), Amoebiasis (19) and Dengue Fever (19).
- During week 1–13, imported cases of notifiable diseases were from at least 45 countries/areas. The top three were China (3,151), Japan (705) and Korea (180).

Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens (complications):** The epidemic is gradually declining.
- **Mpox:** Cases with unknown sources of infection are still increasing, raising the risk of domestic transmission.
- **Influenza:** The epidemic remains the same in the past few weeks.
- **Enterovirus:** The epidemic is rising.

The Taiwan Epidemiology Bulletin series of publications is published by Centers for Disease Control, Ministry of Health and Welfare, Taiwan (R.O.C.) since Dec. 15, 1984.

Publisher: Jen-Hsiang Chuang

Editor-in-Chief: Yung-Ching Lin

Executive Editor: Hsueh-Ju Chen, Hsin-Lun Lee

Address: No.6, Linsen S. Rd, Zhongjheng District, Taipei City 10050, Taiwan (R.O.C.)

Telephone No: +886-2-2395-9825

Website: <https://www.cdc.gov.tw/En>

Suggested Citation:

[Author].[Article title].Taiwan Epidemiol Bull 2023;39:[inclusive page numbers]. [DOI]