

Risk Assessment on Zika Virus Infection in Taiwan

Shu-Wan Jian^{*}, Chia-Lin Lee, Ding-Ping Liu

Abstract

The geographical distribution of Zika virus has spread explosively since 2015. In February 2016, WHO declared that the clusters of microcephaly and neurological disorders reported in Brazil and French Polynesia constituted a Public Health Emergency of International Concern (PHEIC). Evolving Zika virus epidemic and scientific evidence of a causal link between Zika virus and neurological disorders, adding to that competent mosquito vectors had inhabited in Taiwan, a few Asian countries are Zika endemic, and frequent travelling between countries in America, Southeast Asia and Taiwan, posed a threat to Taiwan that prompted the risk assessment.

We estimated the probability and population-level impact of Zika virus disease in Taiwan by referring to risk assessments on Zika virus disease, the international risk assessment framework and algorithm, viral characteristics, global epidemiology, disease severity and other information currently available.

To date, the evidence indicated that sporadic cases of Zika are expected in the future. The likelihood of Zika clusters reported in Taiwan depending on the evolution of Zika in Southeast Asia. The sickness is usually mild while the impact on infected pregnant women about their fetuses developing brain abnormalities and patients developing neurological complications should be monitored.

Epidemic Intelligence Center, Centers for Disease Control, Ministry of Health and Welfare, Taiwan
Corresponding author : Shu-Wan Jian^{*}
E-mail : ellejian@cdc.gov.tw

Received : Mar. 11, 2016
Accepted : May. 4, 2016
DOI : 10.6525/TEB.20160607.32(11).001

Infection prevention measures are recommended for the general population and for pregnant women in particular including protection themselves from exposure to mosquitos and sexual contact with an infected partner. Pregnant women and women who are planning to become pregnant should consider delaying travel to areas with Zika. Travelers should wait a month to donate blood and take strict safe-sex precautions after visiting Zika-prone areas. Zika virus disease is notifiable and Taiwan CDC has activated the agency-level command center for Zika to strengthen preparedness and response efforts, including healthcare system preparedness planning, prevention of Zika importation, border quarantine and vector control.

Keywords: Zika virus, Microcephaly, Guillain-Barré syndrome, *Aedes* mosquito, Pregnant women

Dengue Fever in Southeast Asia

Hsiao-Chi Wang^{1*}, Chia-Lin Lee¹, Ding-Ping Liu¹, Tsung-Chiang Fu²

Abstract

Dengue fever has spread substantially over the past 50 years, with 70% of cases in Southeast Asia. High temperature, international population movement and socioeconomic factors affect the epidemic dynamics of dengue fever worldwide. We systematically reviewed the epidemic pattern in Southeast Asia to estimate the trends of imported dengue fever and, if necessary, enhance entry screening at airports in Taiwan.

Based on the information released by WHO and public health authorities of Southeast Asian countries in 2007–2014, the trend of dengue fever surged, particularly in Indonesia, Thailand and the Philippines. The major epidemics occurred at 3–5 year intervals and the dengue epidemic season ranges roughly from May to October. Most dengue and dengue hemorrhagic fever cases were children under 15 years of age and adults 20–44 years of age. The case fatality rate of dengue has declined or remained the same while the age of dengue death has increased annually.

Overall, Taiwanese traveling to Southeast Asia during the epidemic season have higher risk of contracting dengue fever. Monitoring the epidemic dynamics in Southeast Asia helps to estimate the trend of imported cases in Taiwan. The irregularity of dengue statistics publications and divergent case definitions of severe dengue/dengue hemorrhagic fever among countries limit the international comparison of disease burden. We recommend that information exchange framework of infectious diseases should be established to improve data completeness and standardization.

Keywords: Dengue fever, Southeast Asian Countries, Imported dengue fever

¹ Epidemic Intelligence Center, Centers for Disease Control, Ministry of Health and Welfare, Taiwan

² National Science and Technology Center for Disaster Reduction, Taiwan

DOI : 10.6525/TEB.20160607.32(11).002

Corresponding author : Hsiao-Chi Wang^{1*}

E-mail : betty07734@cdc.gov.tw

Received : Dec. 2, 2015

Accepted : Mar. 17, 2016

week 20–21 (May. 15–May. 28, 2016) DOI: 10.6525/TEB.20160607.32(11).003

Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases (by week of diagnosis)

Classification	Case diagnosis week Disease Diagnosed ¹	Week 20		Week 1–20	
		2016	2015	2016	2015
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	0	0	13	7
	Acute Viral Hepatitis type A	24	3	300	31
	Amoebiasis	7	10	98	143
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	4	3
	Cholera	0	0	0	4
	Dengue Fever	7	8	544	218
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	0
	Malaria	0	0	5	4
	Measles	0	3	4	6
	Meningococcal Meningitis	0	1	2	2
	Paratyphoid Fever	0	0	0	3
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	2	2	86	79
	Typhoid fever	0	0	2	13
	West Nile Fever	0	0	0	0
Category III	Acute Viral Hepatitis type B	5	2	37	45
	Acute Viral Hepatitis type C ⁵	1	6	76	88
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	1	0	8	1
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	4	1
	Haemophilus Influenza type b Infection	0	0	5	1
	Japanese Encephalitis	0	0	1	0
	Legionellosis	3	2	42	60
	Mumps ²	15	16	212	299
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	0	6	48
	Tetanus ²	0	1	3	3
	Category IV	Botulism	0	0	1
Brucellosis		0	0	0	0
Complicated Influenza		3	36	1827	427
Complicated Varicella ⁴		0	1	15	24
Endemic Typhus Fever		1	3	4	6
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		5	9	297	255
Leptospirosis		3	1	19	23
Lyme Disease		0	0	0	0
Melioidosis		0	0	5	11
Q Fever		2	1	15	15
Scrub Typhus		14	7	104	114
Toxoplasmosis		0	2	5	5
Tularremia		0	0	0	0
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections ⁶	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
4. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".
5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.

Suspected Clusters

- Fifteen clusters were reported, including 5 diarrhea clusters, 5 upper respiratory tract infection clusters, 4 tuberculosis clusters, and 1 influenza-like illness cluster.

Imported Infectious Diseases

- 14 confirmed cases were imported from 5 countries during Week 20 of 2016.

Country Disease	Indonesia	Vietnam	Thailand	Japan	China	Total
Dengue Fever	4	2				6
Amoebiasis	2				1	3
Shigellosis	2					2
Hepatitis A				1		1
Zika virus infection			1			1
Leptospirosis	1					1
Total	9	2	1	1	1	14

Note: The statistics listed in this table include imported cases that were either confirmed or updated* in the previous week.

- A total of 250 confirmed cases were imported from 23 countries in 2016.
- Top 3 imported diseases : Dengue fever (108), Amoebiasis (43), Shigellosis (39).
- Top 3 countries responsible for most imported cases : Indonesia (117), Philippines (19), Malaysia (19).

Summary of Epidemic

- **Enterovirus** : The enterovirus activity has increased continuously. During Week 20, the number of visits to outpatient services and ER for enterovirus infection was higher than that during Week 19. Coxsackie A virus is currently the dominant strain circulating in the community. This year, a total of 34 cases of enterovirus 71 infection, including 3 severe cases, 27 mild cases and 4 suspected severe cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.
- **Dengue Fever** : Imported cases have continuously been reported. The recent average temperature in southern Taiwan is over 32°C with intermittent rain, which favors mosquito growth. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.

- **Zika Virus Infection** : One imported case has been confirmed during Week 20. The global epidemic of Zika virus infection has continued to increase. Thus far, at least 60 countries and/or territories worldwide, have reported local outbreaks of Zika virus infection, including 39 countries and/or territories in Latin America and the Caribbean region, 10 countries and/or territories in Oceania, 4 countries in Asia, and 1 country in Africa. Taiwan CDC has issued a travel notice of Level 2: Alert for Zika virus for the aforementioned 54 countries and territories.

Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 21		Week 1—21	
Classification	Disease Diagnosed ¹	2016	2015	2016	2015
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	0	0	13	7
	Acute Viral Hepatitis type A	29	4	329	35
	Amoebiasis	6	6	104	149
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	4	3
	Cholera	0	0	0	4
	Dengue Fever	5	7	548	225
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	0
	Malaria	0	0	5	4
	Measles	0	7	4	13
	Meningococcal Meningitis	0	0	2	2
	Paratyphoid Fever	0	0	0	3
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	4	1	90	80
Typhoid fever	0	1	2	14	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	3	5	40	50
	Acute Viral Hepatitis type C ⁵	10	6	86	94
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	0	0	8	1
	Acute Viral Hepatitis untype	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	4	1
	Haemophilus Influenza type b Infection	0	0	5	1
	Japanese Encephalitis	0	0	1	0
	Legionellosis	1	2	43	62
	Mumps ²	7	14	219	313
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	1	6	49
	Tetanus ²	0	1	3	4
Category IV	Botulism	0	0	1	1
	Brucellosis	0	0	0	0
	Complicated Influenza	3	27	1830	454
	Complicated Varicella ⁴	0	2	15	26
	Endemic Typhus Fever	0	1	4	7
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	11	10	308	265
	Leptospirosis	1	0	20	23
	Lyme Disease	0	0	0	0
	Melioidosis	0	0	5	11
	Q Fever	3	0	18	15
	Scrub Typhus	27	6	131	120
	Toxoplasmosis	0	0	5	5
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections ⁶	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
4. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".
5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.

Suspected Clusters

- Thirteen clusters were reported, including 5 diarrhea clusters, 3 tuberculosis clusters, 2 varicella clusters, 1 enterovirus infection cluster, 1 upper respiratory tract infection cluster, and 1 influenza-like illness cluster.

Imported Infectious Diseases

- 17 confirmed cases were imported from 6 countries during Week 21 of 2016.

Disease \ Country	Indonesia	Thailand	Singapore	Malaysia	China	Japan	Total
Dengue Fever	2	1	1	1			5
Amoebiasis	4						4
Hepatitis A		2			1	1	4
Shigellosis	2	1					3
Scrub Typhus		1					1
Total	8	5	1	1	1	1	17

Note: The statistics listed in this table include imported cases that were either confirmed or updated* in the previous week.

- A total of 267 confirmed cases were imported from 23 countries in 2016.
- Top 3 imported diseases : Dengue fever (113), Amoebiasis (47), Shigellosis (42).
- Top 3 countries responsible for most imported cases : Indonesia (125), Thailand (24), Malaysia (20).

Summary of Epidemic

- Enterovirus**: The enterovirus activity has increased slowly and the peak of enterovirus season is fast approaching. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been confirmed recently. This year, a total of 45 cases of enterovirus 71 infection, including 3 severe cases, 37 mild cases and 5 suspected severe cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.
- Dengue Fever** : Imported cases have continued to be reported. The recent high temperatures and the continuous occurrence of intermittent rain have promoted mosquito growth, elevating the risk of dengue transmission. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.

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.

Address : No.6, Linshen S. Road, Taipei, Taiwan 100 (R.O.C.) **Telephone No** : (02) 2395-9825

Publisher : Hsu-Sung Kuo

Editor-in-Chief : Wan-Ting Huang

Executive Editor : Hsueh-Ju Chen, Hsiu-Lan Liu

Website : <http://www.cdc.gov.tw/>

Suggested Citation :

[Author].[Article title].Taiwan Epidemiol Bull 2016;32:[inclusive page numbers]. [DOI]