

Impacts of Publicly Funded Dengue NS1 Antigen Rapid Test Program on Notification Timeliness, Taiwan, 2013–2017

Ling-Ling Lin*, Chu-Tzu Chen, Yu-Min Chou, Chin-Hui Yang

Abstract

Dengue is an acute infectious disease spreading by mosquitoes. Symptoms of patients may experience subclinical symptoms, fever, rash, or warning signs such as lethargy, restlessness or liver enlargement, even severe hemorrhage or organ damage. Because most patients have obscure symptoms, improving the detection of cases and the timeliness of notification and implementing vector control and epidemic investigation in early phase are keys to prevention of dengue epidemic. On September 17, 2015, Taiwan Centers for Disease Control entrusted National Health Insurance Administration to manage the publicly funded “Dengue NS1 Antigen Rapid Test program” to encourage medical institutions to utilize the reagents for early diagnosis. We analyzed the situation of medical institutions providing dengue NS1 antigen rapid diagnostic test. The program was implemented in 5 counties or cities, and the proportion of reagents provided by regional hospitals was the highest (87%), and the proportion provided by clinics was the lowest (8%). In addition, we found that after the implementation of the program, the notification timeliness of dengue fever confirmed cases improved both in medical institutions providing the tests and nationwide, indicating that the implementation of the program had positive impact on early detection of dengue cases and management of epidemics. In addition to using the rapid test, we recommended to raise the awareness of the public and healthcare professionals on clinical symptoms of dengue fever. Thus,

Division of Acute Infectious Diseases,
Centers for Disease Control, Ministry
of Health and Welfare, Taiwan
DOI: 10.6525/TEB.201908_35(16).0001

Corresponding author: Ling-Ling Lin*
E-mail: lingling@cdc.gov.tw
Received: Jun. 13, 2018
Accepted: Nov. 19, 2018

when an epidemic occurs, the community and neighboring medical institutions could respond earlier in seeking medical care and alertness in case notification to reduce the risk of outbreak spreading.

Keywords: Dengue, Dengue NS1 antigen rapid test, notification time

week 31–32(Jul. 28–Aug. 10, 2019)

DOI: 10.6525/TEB.201908_35(16).0002

Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis year		Week 31★		Week 1–31			
Classification	Disease Diagnosed	2019	2018	2019		2018	
				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	1	39	0	48	0
	Acute Viral Hepatitis type A	1	4	54	14	58	22
	Amoebiasis	4	6	202	97	171	77
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	6	0	25	24	2	2
	Cholera	0	0	0	0	2	0
	Dengue Fever	30	16	358	294	143	133
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	1	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0	1	0
	Malaria	0	0	2	2	1	1
	Measles	4	0	112	45	31	7
	Meningococcal Meningitis	0	0	2	0	5	1
	Paratyphoid Fever	2	0	5	4	4	3
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	1	19	16	6	5
	Shigellosis	4	3	89	31	96	32
	Typhoid fever	1	0	18	14	7	5
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	1	0	2	2	1	1	
Category III	Acute Viral Hepatitis type B	6	2	65	1	78	6
	Acute Viral Hepatitis type C	11	11	362	2	278	3
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	7	1	5	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	1	1	25	1	26	0
	Haemophilus Influenza type b Infection	1	0	1	0	4	0
	Japanese Encephalitis	2	2	19	0	34	0
	Legionellosis	6	4	165	11	101	2
	Mumps	11	11	360	2	346	5
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	22	0	13	0
Tetanus	0	0	1	0	4	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	4	2	40	1	29	0
	Endemic Typhus Fever	1	0	13	1	18	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	7	4	267	2	305	0
	Leptospirosis	6	2	46	0	33	0
	Listeriosis	1	6	116	1	108	0
	Lyme Disease	0	0	1	1	0	0
	Melioidosis	5	0	12	0	9	1
	Q Fever	0	0	14	2	8	1
	Scrub Typhus	13	14	266	3	200	0
	Severe Complicated Influenza	56	24	1301	6	827	5
	Toxoplasmosis	0	0	8	0	11	1
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 Coronavirus	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
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 2018/1/1, "Listeriosis" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Thirty clusters were reported during week 31, including 6 tuberculosis clusters, 4 diarrhea clusters, 6 upper respiratory tract infection clusters, 12 influenza-like illness clusters, 1 fever of unknown origin cluster, and 1 enterovirus cluster.

Imported Infectious Diseases

- There were 43 imported cases from 8 countries during week 31 of 2019.

Diseases \ Countries	Philippines	Vietnam	Cambodia	Myanmar	Thailand	Indonesia	Malaysia	USA	Total
Dengue Fever	8	6	6	2	1	2	2		27
Chikungunya Fever				4	2				6
Measles	1	2							3
Shigellosis	1		1						2
Paratyphoid Fever			1					1	2
Acute Hepatitis B					1				1
Zika virus infection				1					1
Typhoid fever						1			1
Total	10	8	8	7	4	3	2	1	43

Note: The table summarized the number of imported cases that were either **confirmed** or **updated** in the given week.

- There are 576 imported cases from 27 different countries in 2019. The top 3 countries are Indonesia (186), Vietnam (87), and the Philippines (70).
- Top 3 imported diseases are Dengue Fever (294), Amoebiasis (97), and Measles (45).

Summary of Epidemic

- **Enterovirus:** Taiwan is in the midst of enterovirus season. However, the epidemic has slowed down continuously.
- **Dengue Fever:** The dengue epidemic in neighboring countries is increasing. As the imported cases has increased in Taiwan, high temperature and chance of rain, therefore the risk of indigenous dengue epidemic still exists in Taiwan.
- **Japanese Encephalitis:** Taiwan is in the midst of Japanese encephalitis season. New cases are expected to primarily in central and southern Taiwan.

Weekly Data of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis year		Week 32★		Week 1-32			
Classification	Disease Diagnosed	2019	2018	2019		2018	
				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	0	2	39	0	50	0
	Acute Viral Hepatitis type A	3	2	57	16	60	24
	Amoebiasis	4	10	206	98	181	81
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	3	2	28	27	4	4
	Cholera	0	2	0	0	4	0
	Dengue Fever	16	11	374	306	154	141
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	1	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	0	0	1	0
	Malaria	0	0	2	2	1	1
	Measles	1	0	113	46	31	7
	Meningococcal Meningitis	0	0	2	0	5	1
	Paratyphoid Fever	0	0	5	4	4	3
	Poliomyelitis	0	0	0	0	0	0
	Rubella	1	1	20	17	7	6
	Shigellosis	0	2	89	31	98	33
Typhoid fever	0	0	18	14	7	5	
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	0	0	2	2	1	1	
Category III	Acute Viral Hepatitis type B	2	3	67	1	81	6
	Acute Viral Hepatitis type C	9	13	371	2	291	3
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	7	1	5	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	2	25	1	28	0
	Haemophilus Influenza type b Infection	0	0	1	0	4	0
	Japanese Encephalitis	1	0	20	0	34	0
	Legionellosis	5	2	170	11	103	2
	Mumps	11	14	371	4	360	6
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	1	2	23	0	15	0
Tetanus	0	0	1	0	4	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	3	40	1	32	0
	Endemic Typhus Fever	1	0	14	1	18	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Invasive Pneumococcal Disease	10	8	277	2	313	0
	Leptospirosis	3	4	49	0	37	0
	Listeriosis	5	3	121	1	111	1
	Lyme Disease	0	0	1	1	0	0
	Melioidosis	2	1	14	0	10	1
	Q Fever	0	1	14	2	9	1
	Scrub Typhus	8	15	274	3	215	0
	Severe Complicated Influenza	50	20	1351	6	847	5
Toxoplasmosis	1	1	9	1	12	1	
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 Coronavirus	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
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. Since 2018/1/1, "Listeriosis" was listed as a Notifiable Infectious Disease.

Suspected Clusters

- Twenty-four clusters were reported during week 32, including 5 tuberculosis clusters, 7 diarrhea clusters, 4 upper respiratory tract infection clusters, 7 influenza-like illness clusters, and 1 enterovirus cluster.

Imported Infectious Diseases

- There were 21 imported cases from 12 countries during week 32 of 2019.

Countries \ Diseases	Myanmar	Vietnam	India	Indonesia	Philippines	France	Macau	Korea	Thailand	China	Singapore	Cambodia	Total
Dengue Fever	1	2	3	1	2				1		1	1	12
Chikungunya Fever	3												3
Acute Hepatitis A							1	1					2
Toxoplasmosis						1							1
Measles		1											1
Amoebiasis				1									1
Rubella										1			1
Total	4	3	3	2	2	1	1	1	1	1	1	1	21

Note: The table summarized the number of imported cases that were either **confirmed** or **updated** in the given week.

- There are 597 imported cases from 27 different countries in 2019. The top 3 countries are Indonesia (188), Vietnam (90), and the Philippines (72).
- Top 3 imported diseases are Dengue Fever (306), Amoebiasis (98), and Measles (46).

Summary of Epidemic

- **Enterovirus:** The epidemic has slowed down continuously, but it is still in the midst of enterovirus season. Coxsackie A virus is currently the most frequently isolated virus type. In addition, EV71 is still circulating in the community.
- **Dengue Fever:** The dengue epidemic in neighboring countries is increasing. As the imported cases has increased in Taiwan, heavy rains have occurred in some areas, and high temperature recently, therefore the risk of indigenous dengue epidemic still exists in Taiwan.

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: Jih-Haw Chou

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: <http://www.cdc.gov.tw/rwd/english>

Suggested Citation:

[Author].[Article title].Taiwan Epidemiol Bull 2019;35:[inclusive page numbers]. [DOI]