

### Evaluation of Dengue Vector Surveillance System, 2011–2013, Tainan

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#### Abstract

Dengue has been a major public health issue in Taiwan for many years, especially in areas of Tainan, Kaohsiung and Pingtung which with *Aedes aegypti* distributed. Centers for Disease Control in Taiwan built dengue vector surveillance system in 2005 for monitoring the distribution of dengue vectors and evaluating control measures. Good vector surveillance is important to control dengue. Therefore, we evaluated dengue vector surveillance system and analyzed data from 2011 to 2013 in Tainan. We found that the system was good in simplicity, flexibility and stability. Furthermore, it could provide ecological background of dengue vector, such as geographical distribution. On the other hand, the disadvantages of the system are low completeness in some vector indices and former Tainan County. We recommend that the importance of indices in the system should be re-evaluated and the data completeness of first-line investigators should be strengthened. Furthermore, increasing the education of first-line investigators in low incident areas is necessary to elevate the quality of surveillance. Finally, if the system can combine epidemiological and entomological surveillance information, it will be helpful to evaluate the risk of epidemic and adjust control measures in time.

**Keywords:** Dengue; Vector Surveillance System; Vector Indices; Dengue Vectors; Tainan

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DOI : 10.6525/TEB.20150811.31(15).001

Received : Dec. 26, 2014

Accepted : Mar. 02, 2015

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## Exploring the Effectiveness of Dengue Outbreak Control Measures, Chun-Ri Township, Ping-Tung County, 2013

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### Abstract

In April 2013, a dengue outbreak occurred in Chunri Township, Pingtung County, an area rarely reporting dengue. With the cooperation between Taiwan Centers for Diseases Control and the local government, the effect of control measures was fair, halting the outbreak involving a total of 36 cases within 3 months. Analysis of risk factors for dengue incidence revealed that higher vector indexes and poor law enforcement were associated with increased dengue occurrence two weeks later. Thorough vector breeding sources elimination facilitated by law enforcement is crucial in the control of dengue epidemics.

**Keywords:** Indigenous dengue; Control measures; Coordination and cooperation; Law enforcement; Source reduction

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Kaohsiung-Pingtung Regional Center, Centers  
for Disease Control, Ministry of Health and  
Welfare  
DOI : 10.6525/TEB.20150811.31(15).002

Received : May. 01, 2014  
Accepted : Jan. 08, 2015  
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week 29–30 (Jul. 19–Aug. 1, 2015)

DOI: 10.6525/TEB.20150811.31(15).003

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

Case diagnosis week		Week29		Week 1–29		
Classification	Disease Diagnosed <sup>1</sup>	2015	2014	2015	2014	
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	3	10	23	
	Acute Viral Hepatitis type A	5	1	52	67	
	Amoebiasis	7	2	197	138	
	Anthrax	0	0	0	0	
	Chikungunya Fever	0	0	4	6	
	Cholera	0	0	4	3	
	Dengue Fever	79	46	436	353	
	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	1	0	1	1	
	Malaria	1	1	7	10	
	Measles	0	0	27	17	
	Meningococcal Meningitis	0	0	2	3	
	Paratyphoid Fever	0	0	1	6	
	Poliomyelitis	0	0	0	0	
	Rubella	0	0	6	5	
	Shigellosis	4	3	99	88	
	Typhoid fever	2	1	19	14	
West Nile Fever	0	0	0	0		
Category III	Acute Viral Hepatitis type B	5	2	68	60	
	Acute Viral Hepatitis type C <sup>4</sup>	7	6	122	97	
	Acute Viral Hepatitis type D	0	0	1	0	
	Acute Viral Hepatitis type E	0	0	1	8	
	Acute Viral Hepatitis untype	0	0	2	3	
	Congenital Rubella Syndrome	0	0	0	0	
	Enteroviruses Infection with Severe Complications	0	0	4	6	
	Haemophilus Influenza type b Infection	0	0	1	2	
	Japanese Encephalitis	2	2	22	11	
	Legionellosis	7	3	96	72	
	Mumps <sup>2</sup>	19	17	447	496	
	Neonatal Tetanus	0	0	0	0	
	Pertussis	0	3	55	27	
	Tetanus <sup>2</sup>	0	0	6	2	
	Category IV	Botulism	0	0	2	0
		Brucellosis	0	0	0	0
Complicated Influenza		17	18	724	1672	
Complicated Varicella <sup>3</sup>		2	0	34	35	
Endemic Typhus Fever		2	0	18	14	
Herpesvirus B Infection		0	0	0	0	
Invasive Pneumococcal Disease		6	12	326	384	
Leptospirosis		2	2	29	29	
Lyme Disease		1	0	1	0	
Melioidosis		0	0	16	11	
Q Fever		0	0	23	34	
Scrub Typhus		25	21	184	206	
Toxoplasmosis		0	0	6	7	
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 <sup>5</sup>	0	0	0	0	
	Lassa Fever	0	0	0	0	
	Rift Valley Fever	0	0	0	0	
	Middle East Respiratory Syndrome Coronavirus Yellow Fever	0 0	0 0	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

- Twelve clusters were reported, including 4 diarrhea clusters, 4 upper respiratory tract infection clusters, 2 influenza-like illness clusters, 1 tuberculosis cluster, and 1 varicella cluster.

## Imported Infectious Diseases

- 9 confirmed cases were imported from 6 countries during Week 29 of 2015.

Country Disease	Indonesia	Myanmar	Philippines	China	USA	Malaysia	Total
Dengue Fever	2	1				1	4
Amoebiasis	1		1				2
Hepatitis A				1			1
Typhoid fever		1					1
Lyme Disease					1		1
<b>Total</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>9</b>

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

- A total of 364 confirmed cases were imported from 26 countries in 2015.
- Top 3 imported diseases : Dengue fever (128), Amoebiasis (118), Shigellosis (53).
- Top 3 countries responsible for most imported cases : Indonesia (223), Philippines (22), China (20).

## Summary of Epidemic

- **Dengue Fever** : The ongoing dengue outbreak has increased. The number of new cases in Week 29 was 2.4 times higher than that in Week 28. The epidemic has continued to grow and showed signs of expansion in North District and Annan District, Tainan City. New cases of dengue have continued to occur in West Central District, Tainan City. In addition, new sporadic cases have been confirmed in Kaohsiung City. Furthermore, the Breteau Index in most village are high, prompting the risk of an outbreak remains.
- **Enterovirus** : Although the epidemic is expected to gradually slow down, it still remained at its peak. Coxsackie A16 virus is currently the dominant strain circulating in the community. So far, a total of 4 cases of severe enterovirus infection have been confirmed. Of these cases, two died.
- **MERS** : The government of South Korea announced the MERS epidemic was over. All contacts have been removed from quarantine. On July 28, Taiwan CDC has removed the MERS travel notice for South Korea and Bahrain.

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

Case diagnosis week		Week 30		Week 1—30	
Classification	Disease Diagnosed <sup>1</sup>	2015	2014	2015	2014
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	2	10	25
	Acute Viral Hepatitis type A	4	2	56	69
	Amoebiasis	6	4	203	142
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	4	6
	Cholera	0	0	4	3
	Dengue Fever	127	92	563	445
	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	1	1
	Malaria	0	0	7	10
	Measles	0	0	27	17
	Meningococcal Meningitis	0	0	2	3
	Paratyphoid Fever	0	0	1	6
	Poliomyelitis	0	0	0	0
	Rubella	0	0	6	5
	Shigellosis	2	2	101	90
Typhoid fever	2	0	21	14	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	3	2	71	62
	Acute Viral Hepatitis type C <sup>4</sup>	5	0	127	97
	Acute Viral Hepatitis type D	0	0	1	0
	Acute Viral Hepatitis type E	0	0	1	8
	Acute Viral Hepatitis untype	0	0	2	3
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	4	6
	Haemophilus Influenza type b Infection	0	0	1	2
	Japanese Encephalitis	1	1	23	12
	Legionellosis	2	2	98	74
	Mumps <sup>2</sup>	15	17	462	513
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	1	55	28
	Tetanus <sup>2</sup>	0	1	6	3
	Category IV	Botulism	0	0	2
Brucellosis		0	0	0	0
Complicated Influenza		12	15	736	1687
Complicated Varicella <sup>3</sup>		1	1	35	36
Endemic Typhus Fever		1	0	19	14
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		5	4	331	388
Leptospirosis		2	2	31	31
Lyme Disease		0	0	1	0
Melioidosis		0	0	16	11
Q Fever		1	2	24	36
Scrub Typhus		16	21	200	227
Toxoplasmosis		0	1	6	8
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 <sup>5</sup>	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".  
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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 8 diarrhea clusters, 2 tuberculosis clusters, 2 upper respiratory tract infection clusters, and 1 influenza-like illness cluster.

### Imported Infectious Diseases

- 14 confirmed cases were imported from 5 countries during Week 30 of 2015.

Country Disease	Philippines	Indonesia	Vietnam	Thailand	Cambodia	Total
Dengue Fever	6	1	1	1	1	10
Amoebiasis		3				3
Hepatitis A	1					1
Total	7	4	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 376 confirmed cases were imported from 26 countries in 2015.
- Top 3 imported diseases : Dengue fever (138), Amoebiasis (121), Shigellosis (53).
- Top 3 countries responsible for most imported cases : Indonesia (227), Philippines (29), China (19).

### Summary of Epidemic

- **Dengue Fever** : The ongoing dengue outbreak has increased in Tainan City. The number of new cases reported in Week 30 is 1.3 times higher than that reported in Week 29, reaching a new record over the last decade. The epidemic has continued to show signs of expansion in North District, Annan District and West Central District, Tainan City. In addition, new sporadic cases have been confirmed in Kaohsiung City and the first indigenous case in Pingtung County has been reported. Furthermore, the Breteau Index in most village are high, prompting the risk of an outbreak remains.
- **Enterovirus** : Although the epidemic is expected to gradually slow down, it still remained at its peak. Coxsackie A virus is currently the dominant strain circulating in the community. So far, a total of 4 cases of severe enterovirus infection have been confirmed. Of these cases, two died.

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 2015;31:[inclusive page numbers]. [DOI]