

衛生署疾病管制局



Dengue in Taiwan— Epidemiological Characteristics and Strategic Challenges in Disease Prevention

Jhy-Wen Wu, Ph.D.
Centers for Disease Control, Taiwan, R.O.C

Taiwan CDC
http://www.cdc.gov.tw


Presenter Disclosures

Jhy-Wen Wu


(1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

“No relationships to disclose”

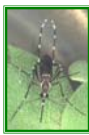
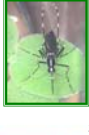
衛生署疾病管制局



Distribution of Dengue Vectors




- **Aedes aegypti**
 - ◆ Geographically limited to the **South of Taiwan**
 - ◆ More important in the epidemiology of dengue in southern Taiwan
- **Aedes albopictus**
 - ◆ Distributed **throughout the island**
 - ◆ Below the sea level of 1500 m

Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局




Characteristics of Dengue Outbreaks in Taiwan

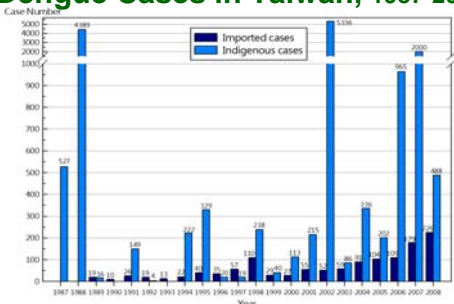
- **Non-endemic**
- **Mainly in southern Taiwan**
- **Peaked in October-November**
- **From imported to indigenous cases**

Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局




Trend of Imported and Indigenous Dengue Cases in Taiwan, 1987-2008

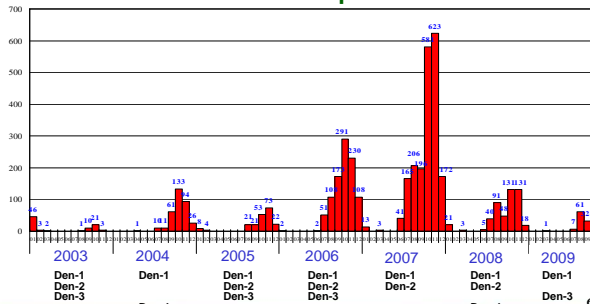


Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局



Indigenous Dengue Cases in Taiwan 2003-Sep.2009



Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局

Origins and Serotypes of Imported Dengue Cases, 2003-Sep.2009

Origins	Serotypes					Number of case (%)
	DF-1	DF-2	DF-3	DF-4	Non-type	
Vietnam	81	51	21	3	108	265 (28)
Indonesia	44	45	32	26	97	244 (26)
Philippines	12	19	28	12	41	112 (12)
Thailand	30	11	3	16	41	101
Cambodia	3	12	6	2	28	51
Myanmar	4	4	9		24	41
Malaysia	14	9	3		10	36
Singapore	6	5	1		11	23
India	2	3			13	18
China	6				4	10
Bangladesh		2	4		2	8
Other	5			2	10	17
Total	207	162	107	61	389	926

Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局

Origins and Serotypes of Dengue Cases, Jan-Sep.2009

Origins	Serotypes					Number of case
	DF-1	DF-2	DF-3	DF-4	Non-type	
Indonesia	8	11	8	9	28	64
Vietnam	22	5	3		14	44
Thailand	7	2			7	16
Philippines	1	2	4	1	4	12
Cambodia		7				7
India		2			4	6
Myanmar					3	3
Singapore		1			1	2
Pakistan				1	1	2
Malaysia	1					1
Uncertain					1	1
Taiwan	1		26		74	101 (39)
Total	40	30	41	11	137	259 (100)

Taiwan CDC
http://www.cdc.gov.tw

- 衛生署疾病管制局
- ### Challenges of Dengue Prevention in Taiwan
- **Increase in international travel**, leading to the increased threat of the imported dengue viruses
 - **Weak awareness among resident in high-risk areas for dengue outbreak reflects in lacking of active prevention measures**, including self-recognition of symptoms of dengue and source reduction of mosquito vectors.
- Taiwan CDC
http://www.cdc.gov.tw

- 衛生署疾病管制局
- ### Strategies of Dengue Prevention
- **Reducing the introduction of dengue viruses into Taiwan**
 - ◆ **Passenger quarantine** - Airport Fever Screening system
 - ◆ **Health education advocacy** to travelers to/from dengue-endemic countries
 - **Preventing the occurrence of local dengue outbreak**
 - ◆ Disease and vector Surveillance
 - ◆ Health education
 - ◆ Communication and community mobilization
 - ◆ Law enforcement
- Taiwan CDC
http://www.cdc.gov.tw


- 衛生署疾病管制局
- ### Fever Screening at Airports
- **Identifying the introduction of dengue viruses** into Taiwan by travelers
 - Using the **dengue virus NS1 antigen rapid test** for on-site detection of dengue cases
 - **Providing mosquito nets and repellents to febrile passengers** to avoid mosquito bites during the viremic period
- Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局

Detection of Imported Cases 2003-2009

Year	Hospital/Clinic	Fever Screening	Others	Total case number
2003	43 (73%)	10 (17%)	6 (10%)	59 (100%)
2004	29 (32%)	57 (63%)	5 (5%)	91 (100%)
2005	47 (45%)	46 (44%)	11 (11%)	104 (100%)
2006	50 (46%)	47 (43%)	12 (11%)	109 (100%)
2007	87 (49%)	75 (42%)	17 (9%)	179 (100%)
2008	95 (42%)	103 (46%)	28 (12%)	226 (100%)
2009.09	60 (38%)	86 (54%)	12 (8%)	158 (100%)

- **Fever Screening** at airports & seaports since July 2003
- **Dengue Rapid Test (NS1)** at airports since June 2008



Taiwan CDC
http://www.cdc.gov.tw

衛生署疾病管制局

Health Education Advocacy to travelers to/from endemic countries

- **High-risk Groups**
 - ◆ Tourists
 - ◆ Foreign labors
 - ◆ Taiwan's new immigrants (foreign spouses)
- **Cooperation of private sectors**
 - ◆ Travel agencies and brokers companies of foreign labor and missions abroad
- **Personal Protection**
 - ◆ Apply repellents to exposed skin and clothes
 - ◆ Wear long-sleeved tops and pants

Taiwan CDC
http://www.cdc.gov.tw

13

衛生署疾病管制局

Disease Surveillance

- **Notifiable Disease Surveillance system**
 - ◆ Use standardized **DF/DHF case definition (WHO)**
 - ◆ **Report** suspected case to health authority **within 24 hours** (by internet)
 - ◆ **Award** NTD 2,500 to doctor for reporting a confirmed imported case and NTD 4,000 for a first indigenous case at the city/county level
- **Expanded Investigation on Confirmed/Positive cases**
- **Others**
 - ◆ A toll-free hotline, 1922, operated by Taiwan CDC
 - ◆ Award to self-report dengue patients

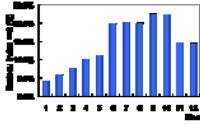
Taiwan CDC
http://www.cdc.gov.tw

14


衛生署疾病管制局

Dengue Vector Surveillance

- **Survey of Vector Density**
 - ◆ Larvae and pupae
 - ◆ Adults
- **Key Breeding Containers**
 - ◆ Water buckets
 - ◆ Pottery pots
 - ◆ Flower vases
- **Detection of Virus-carrying Adult Mosquitoes**



The percentage of villages with DF vector, 2008



Taiwan CDC
http://www.cdc.gov.tw

15

衛生署疾病管制局

Community Mobilization

- Encourage communities to organize **volunteers to eliminate mosquito-breeding containers** in southern counties and cities
- Apply the approach of **Communication for Behavioral Impact (COMBI)**




Taiwan CDC
http://www.cdc.gov.tw

16

衛生署疾病管制局

Health Education

- **Environmental Management**
 - ◆ Container management
 - ◆ Elimination of breeding sites
- **Personal Protection**
 - ◆ Apply repellents to exposed skin
 - ◆ Wear long-sleeved tops and pants
- **Enhancement on Reporting**
 - ◆ Remind doctors to aware and notify suspected dengue cases



Taiwan CDC
http://www.cdc.gov.tw

17

衛生署疾病管制局

Law Enforcement

- **Communicable Disease Control Act**
 - ◆ Classifies dengue fever as a **Category 2 communicable disease** for which reporting of cases should be made within **24 hours**
 - ◆ Requires residents to eliminate *Aedes*-breeding containers by themselves after receiving notification or an announcement issued by local health agencies
 - ◆ Allow a public health agencies to have **access to public or private places to conducting control measures** in collaboration with **police** and other locally important persons (e.g. the village leader)

Taiwan CDC
http://www.cdc.gov.tw

18

Performance

- **Fever screening at airports** is an effective measure to identify imported dengue cases
- In 2009, the dengue outbreak occurred major in Kaohsiung City, is **well-controlled. Therefore, further spread of dengue viruses** into other cities and counties was avoided.
- Dengue has **not become an endemic disease** in Taiwan

19



Thank You
for Your Attention

20