

## Country Report on Dengue Fever/Dengue Haemorrhagic Fever and Japanese Encephalitis in Vietnam

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### 1. Introduction

Dengue fever/dengue haemorrhagic fever (DF/DHF) occurred in Viet Nam in 1959, since then it has become endemic in the country. Three major outbreaks in 1983, 1987, and 1991, occurred during the last ten years.

DF/DHF has widely circulated not only in the deltas of the Red and Mekong rivers, but also along the central coastal areas. In other places the disease can be considered invasive from endemic foci and its severity depends on nature of transportation between the places and endemic foci. DF/DHF outbreaks have occurred not only in urban but also in rural areas. In remote mountainous areas which are hardly accessible the disease is not found even in the three major outbreak years of 1983, 1987, and 1991. In these areas *Aedes aegypti* confirmed the main vector of DF/DHF is not present.

*Key words:* Dengue fever, dengue haemorrhagic fever, Japanese encephalitis, Vietnam

### 2. Epidemiology

In 1991, a major outbreak occurred in North Viet Nam. In 1992 the number of dengue cases in the South was much higher than those in the North and Central Viet Nam.

The north Vietnam is subtropical zone, but the south Vietnam is tropical therefore in these zones monthly dengue distribution is also different. In the north dengue cases have often appeared in April then increased between July and October with the peak in July, August. In the south the disease occurred all the year round with high incidence from April to November. The number of cases peaked in July, August.

**Table 1.** DF/DHF morbidity and mortality in Vietnam. 1991.

| Region      | Morbidity |              | Mortality |              |
|-------------|-----------|--------------|-----------|--------------|
|             | No        | Rate/100,000 | No        | Rate/100,000 |
| North       | 52424     | 167.4        | 83        | 0.26         |
| Central     | 18675     | 210.8        | 88        | 1.0          |
| Highland    | 982       | 47.7         | 4         | 0.2          |
| South       | 39287     | 166.7        | 270       | 1.1          |
| All country | 111368    | 169.4        | 445       | 0.7          |

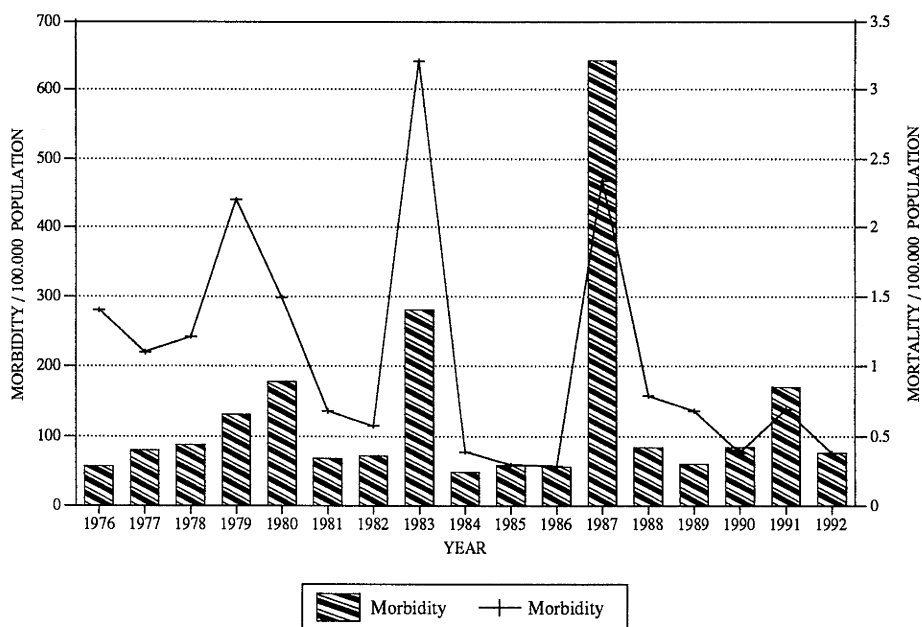


Fig. 1. DF/DHF morbidity and mortality in Vietnam, 1976-1992

Table 2. DF/DHF morbidity and mortality in Vietnam, 1992.

| Region      | Morbidity |              | Mortality |              |
|-------------|-----------|--------------|-----------|--------------|
|             | No        | Rate/100,000 | No        | Rate/100,000 |
| North       | 2894      | 9.1          | 6         | 0.02         |
| Central     | 5853      | 62.3         | 8         | 0.09         |
| Highland    | 405       | 18.6         | 2         | 0.09         |
| South       | 41888     | 174.1        | 255       | 1.06         |
| All country | 51040     | 76.2         | 271       | 0.4          |

### 3. LABORATORY DIAGNOSIS:

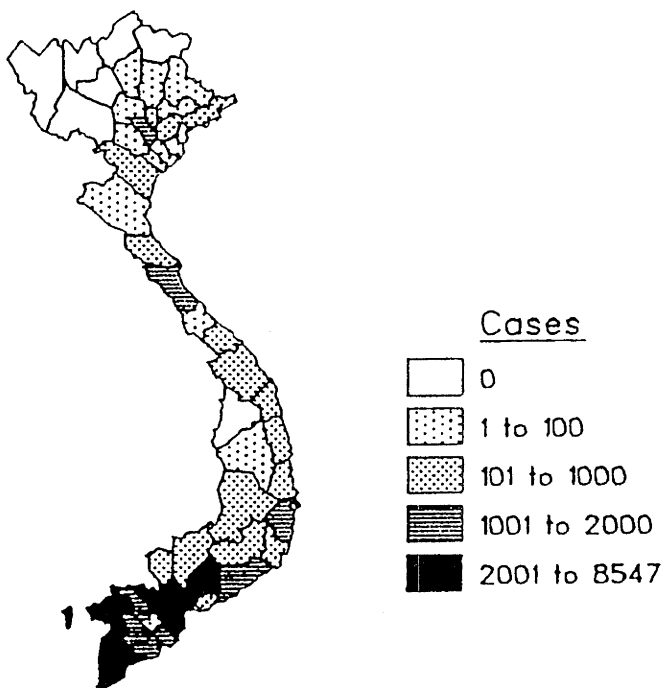
The blood specimens of patients were examined by HI, MAC-ELISA, virus isolation in dengue laboratory of the National Institute of Hygiene and Epidemiology, Hanoi. The results as follows:

Dengue virus was isolated in clone C6/36 of *Aedes albopictus* then identified by monoclonal antibody. Dengue types 1 and 2 were often observed.

### 4. MEASURES FOR OUTBREAK PREVENTION AND CONTROL:

#### 4.1 Outbreak prevention:

When the vector index are at the risk, it is necessary to mobilize 80% of total households to apply traditional measures for larvae and mosquito control as follows:



**Fig. 2.** Number of DF cases by Province, Vietnam, 1992

**Table 3.** DF/DHF distribution by month in Vietnam. 1991–1992.

| Month        | 1991         |              | 1992        |              |
|--------------|--------------|--------------|-------------|--------------|
|              | North        | South        | North       | South        |
| 1            | 5            | 1826         | 157         | 533          |
| 2            | 6            | 641          | 94          | 346          |
| 3            | 5            | 773          | 30          | 282          |
| 4            | 284          | 1416         | 38          | 823          |
| 5            | 3159         | 2807         | 136         | 1970         |
| 6            | 6114         | 4729         | 61          | 1640         |
| 7            | 15019        | 7107         | 384         | 4158         |
| 8            | 12388        | 7008         | 1196        | 9515         |
| 9            | 6871         | 5106         | 531         | 7315         |
| 10           | 5381         | 3950         | 154         | 7032         |
| 11           | 2894         | 3196         | 87          | 5757         |
| 12           | 298          | 728          | 36          | 2517         |
| <b>Total</b> | <b>52424</b> | <b>39287</b> | <b>2894</b> | <b>41888</b> |

- Clean the water cisterns and receptacles, cover them with lids.
- Clear away the discarded things which contain water and fill up holes with stagnant water around the houses.
- apply larvivorous fishes in the receptacles ornamental aquariums.
- Replace daily water in the flower vases.
- Clean regularly drainage system.
- Apply nets and curtains to prevent mosquito from entering the houses through doors and windows or repel them by fumigation of citronella leaves, litsea cubeba leaves, china tree leaves.
- Apply mosquito coils/sticks (2-4 sticks for every 24m<sup>2</sup> of dwelling houses.

#### 4.2 Outbreak control:

When outbreak bursts it is necessary to control immediately the *Ae. aegypti* population infected with dengue virus around the houses in combination with traditional measures.

**\*Before spray operation:**

Test susceptibility of *Ae. aegypti* to the applied insecticides. If 98-100% of mosquitoes died that means the vector is sensible with the insecticide, if less than 80% it is resistant, if 80-97% the test should be repeated.

\*Sprayers of Fontan ULV, Leuco mini ULV or Leuco HD ULV with nozzle size 0.5-1 are used for the spray of following insecticides:

-ULV application:

|                |                               |
|----------------|-------------------------------|
| Malathion ULV  | 0.26-1.66g/24m <sup>2</sup>   |
| Baytex ULV     | 0.26-0.9g/24m <sup>2</sup>    |
| Permethrin ULV | 0.012-0.024g/24m <sup>2</sup> |
| Sumithion L100 | 10-15ml/40-150m <sup>2</sup>  |

**Table 4.** Confirmed diagnosis of DF/DHF in the north Vietnam, 1991-1992:

| Year | Serodiagnosis |     |    | Virus isolation |     |    |
|------|---------------|-----|----|-----------------|-----|----|
|      | Specimens     | (+) | %  | Specimens       | (+) | %  |
| 1991 | 1018          | 405 | 40 | 139             | 62  | 45 |
| 1992 | 649           | 67  | 10 | 27              | 5   | 19 |

**Table 5.** Dengue virus types isolated in the north Vietnam, 1991-1992:

| Year | Virus types |    |    |    | Total |
|------|-------------|----|----|----|-------|
|      | D1          | D2 | D3 | D4 |       |
| 1991 | 12          | 48 | 1  | 1  | 62    |
| 1992 | -           | 5  | -  | -  | 5     |

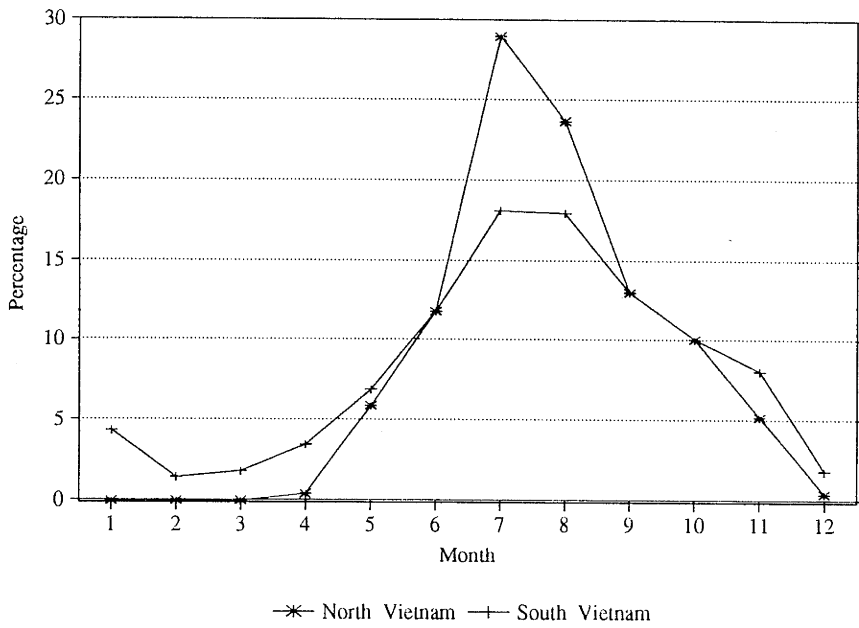


Fig. 3. DF/DHF monthly distribution in Vietnam, 1991

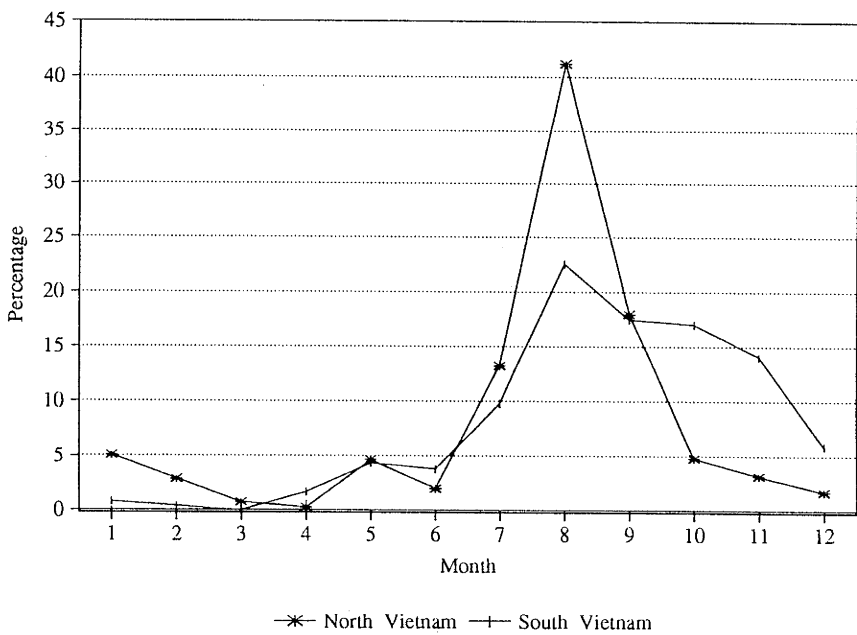


Fig. 4. DF/DHF monthly distribution in Vietnam, 1992

**Table 6.** Distribution of confirmed dengue cases by age in the north Vietnam. 1991–1992:

| Age group | 1991 |       | 1992 |       | Total |       |
|-----------|------|-------|------|-------|-------|-------|
|           | No   | %     | No   | %     | No    | %     |
| 0–1       | 2    | 0.5   | —    | —     | 2     | 0.4   |
| 1–4       | 23   | 5.7   | 5    | 7.5   | 28    | 5.9   |
| 5–9       | 29   | 7.2   | 10   | 14.9  | 39    | 8.3   |
| 10–14     | 47   | 11.6  | 17   | 25.4  | 64    | 13.6  |
| 15–19     | 31   | 7.7   | —    | —     | 31    | 6.6   |
| 20–24     | 59   | 14.6  | 8    | 11.9  | 67    | 14.2  |
| 25–29     | 66   | 16.3  | 12   | 17.9  | 78    | 16.5  |
| 30–34     | 72   | 17.8  | 5    | 7.4   | 77    | 16.3  |
| 35–39     | 26   | 6.4   | 1    | 1.5   | 27    | 5.7   |
| 40–44     | 16   | 4.0   | 1    | 1.5   | 17    | 3.6   |
| 45–49     | 14   | 3.5   | 2    | 3.0   | 16    | 3.4   |
| 50+       | 20   | 4.9   | 6    | 9.0   | 26    | 5.5   |
| Total     | 405  | 100.0 | 67   | 100.0 | 472   | 100.0 |

—ULV application is done around the patient houses with diameter of 100–400 on the contrary of wind direction by the speed of 3–5 km/h.

|                |             |
|----------------|-------------|
| Malathion ULV  | 112–693g/ha |
| Baytex ULV     | 112g/ha     |
| Permethrin ULV | 5–10g/ha    |
| Sumithion L100 | 250–300g/ha |

\*It is necessary to mobilize 100% of total households to apply traditional measures as mentioned in item 3.

#### 4.3 Determination of effective control of outbreak:

Followings are the standards of outbreak stop:

—For vector: 10 days after the insecticide application and the last time of larvae control:

|                |               |
|----------------|---------------|
| Density index: | 0.00–0.20     |
| House index:   | less than 10% |
| Breteau index: | less than 5   |

To obtain the above indices, 2–3 rounds of the spraying at the interval of 7–10 days are needed.

—For patient: No new patients occurred in 20 days after the last spraying.

**4.4 Health education:**

–Provide materials to disseminate people common knowledge about the symptoms, transmission of DF/DHF.

–Guideline for application of various traditional control measures such as environmental sanitation, destroy of *Ae. aegypti* breeding sites, larvivorous fish application, cover of receptacles with lids, use of mosquito sticks.

–Posters, pictures for health education on DF/DHF, mosquito control.