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SURVEILLANCE OF DENGUE HEMORRHAGIC FEVER CASES IN THAILAND. (U)  
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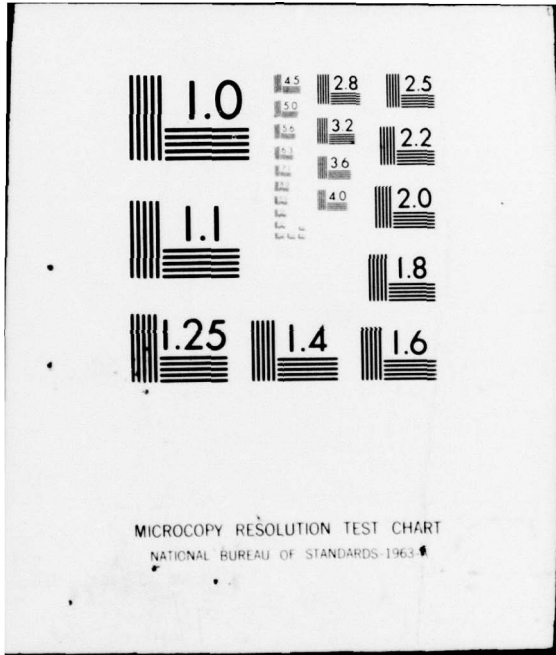
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6 Surveillance of Dengue Hemorrhagic Fever Cases in Thailand.

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10 Pairatana/Gunakasem, M. D.  
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The objective of this research was

**OBJECTIVE:** To provide laboratory confirmation of clinically diagnosed arbovirus infections reported to the Ministry of Health. *In Thailand,*

**BACKGROUND:** In the Kingdom of <sup>Thai</sup>Thailand Dengue Hemorrhagic Fever (DHF) remains the greatest identifiable cause of hospitalization and death among children under the age of 15 years. Control of this mosquito-borne virus infection will require a knowledge of its prevalence and distribution. In 1973 a laboratory based serological surveillance program for DHF was initiated by the Ministry of Health to confirm reported clinically diagnosed Hemorrhagic Fever (HF). Adequate collection of blood samples was achieved in 1974. An earlier report contains the results from laboratory surveillance of DHF in 1973 and 1974 (1). The present report compares the results of laboratory surveillance over the years 1974 and 1975. In addition to surveillance for dengue infections, the program allowed the serological confirmation of other infections such as Japanese encephalitis (JE).

**DESCRIPTION:** The filter paper disc collection method and Hemagglutination Inhibition (HI) testing have been previously described (2). In 1973 acute and convalescent bloods from clinically diagnosed DHF patients were submitted for serological testing from sixty provincial hospitals throughout the Kingdom. Blood was submitted from an additional ten hospitals in 1974 and 1975 (Figure 1). Although the blood samples collected were rather unsatisfactory in 1973, good blood samples were obtained from all hospitals in 1974 and 1975.

**PROGRESS:** In 1975, 4,682 pairs of acute and convalescent dried blood spots on filter paper discs were submitted from provincial hospitals for DHF serological evaluation (Table 1). This represents a 164% increase over the 2,850 pairs submitted in 1974. During the same periods, however, the number of cases of clinically diagnosed HF reported to the Ministry of Health rose 215% from 8,160 cases in 1974 to 17,573 in 1975. The increased specimens received by the serological laboratory in 1975 probably reflected an increased incidence of disease and an increased participation in the surveillance program. Regional participation for 1975 is shown in Table 1.

Dengue virus infections were confirmed in 2,362 of the 4,682 patients or 55% of those studied in 1975. This is an increase from the 37% confirmation seen in 1974. The frequencies of confirmation are similar for the four of Thailand indicating similar clinical criteria for diagnosis of DHF in all areas. (Table 2). The distribution of the cases submitted and confirmed throughout the year peaked during the epidemic season from May through September similar to that seen in 1974. The proportion of laboratory confirmed cases of DHF for each month was essentially similar, indicating that the clinical diagnosis was not influenced by the time of year (Figure 2).

Laboratory confirmed dengue infections were compared by age for the four regions of Thailand (Figure 3). The median age of infection for patients tested from the whole Kingdom was six years. There was little difference in the median age for the four regions. A similar median age of infection from 70 provincial hospitals was found in 1974 and for clinically diagnosed patients in Bangkok between 1971 and 1973 (3). This suggested that similar epidemiologic factors influence attack rates in Bangkok and in Thailand as a whole.

DHF was misdiagnosed more often in the age group less than three years old (Figure 4). This may reflect the difficulty of precise diagnosis or perhaps a higher frequency of primary dengue infections in this age group. Primary dengue infections might not be identified by the testing methods employed. Laboratory confirmation of clinical diagnosis for age groups greater than three years is significantly higher in 1975 than in 1974 indicating either a better understanding of the criteria for diagnosis of DHF by the hospital physician or possibly improved case selection because of increased numbers of patients.

The incidence of HF may be calculated using the figures reported to the Ministry of Health. The incidence of confirmed DHF may be estimated using these figures and those developed by the laboratory surveillance program. The ratio of confirmed cases to clinically diagnosed cases rose in 1975 compared to 1974 ( Table 3).

The methods employed for the laboratory confirmation of dengue infections were applied to the serological confirmation of JE cases. Acute and convalescent bloods were submitted on 349 clinically diagnosed cases of encephalitis seen in all regions of Thailand ( Table 4). Forty percent or 129 cases were serologically confirmed as JE infections. The JE infections were found in all four regions of Thailand and occurred in all but the first two months of 1975.

**DISCUSSION:** A long-term surveillance of infection is one of the prerequisites for decision making in any control program. Such a program for DHF is presently active in Thailand and has confirmed approximately 50% of the reported cases of HF as due to dengue infection. Such a program will allow for the identification of the factors which influence epidemiologic patterns and allow for rapid implementation of control measures.

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2. Top, F. H., Jr., Gunakasem, P., Chantarasri, C., et al.: Serologic diagnosis of dengue hemorrhagic fever using filter paper discs and one dengue antigen. Southeast Asian J. Trop. Med. and Pub. Hlth. 6: 18-24, 1974.
3. Bancroft, W. H., Snitbhan, R., Gunakasem, P., and Scott, R. M. : A Review of Two Systems for Reporting Cases of Hemorrhagic Fever. The SEATO Medical Research Laboratory Annual Report, March 1974.

Table 1. Cases Submitted for Laboratory Confirmation for Dengue Infection from Provincial Hospital, 1975

| Regions   | Clinical Diagnosis of Submitted Cases |     |              | Total Cases |
|-----------|---------------------------------------|-----|--------------|-------------|
|           | HF                                    | PUO | NO Diagnosis |             |
| North     | 500                                   | 0   | 14           | 514         |
| Northeast | 1798                                  | 13  | 80           | 1891        |
| Central   | 1502                                  | 39  | 112          | 1653        |
| South     | 601                                   | 2   | 21           | 624         |
| Thailand  | 4401                                  | 54  | 227          | 4682        |

Table 2. Result of HI Tests for Dengue Infection in HF Patients Submitted from Provincial Hospital, 1975

| Region    | Number of Cases Submitted for Blood Test | Cases with Recent Dengue Infection |         |
|-----------|--|------------------------------------|---------|
|           |  | Number                             | Percent |
| North     | 464                                      | 270                                | 58      |
| Northeast | 1776                                     | 944                                | 53      |
| Central   | 1488                                     | 867                                | 58      |
| South     | 554                                      | 281                                | 50      |
| Thailand  | 4282                                     | 2362                               | 55      |

Table 3. Hemorrhagic Fever, Incidence Rate and DHF Specific Case Rate from Provinces of Thailand, 1975

| Region    | Reported<br>Incidence Case<br>Rate Per 100,000<br>Age 15 Years | DHF Specific<br>Case Rate Per<br>100,000<br>Age 15 Years | DHF Specific Case Rate<br>Per Incidence Rate |       |
|-----------|--|--|--|-------|
|           |  |  | 1974   | 1975  |
| North     | 66.3   | 38.5   | 1:2.2  | 1:1.7 |
| Northeast | 90.0   | 47.8   | 1:2.5  | 1:1.8 |
| Central   | 141.0  | 82.2   | 1:2.4  | 1:1.7 |
| South     | 45.3   | 23.0   | 1:2.4  | 1:1.9 |
| Thailand  | 90.5   | 50.4   | 1:2.4  | 1:1.7 |

Table 4. Japanese Encephalitis Infection in Clinical Encephalitis Cases from 70 Provinces of Thailand, 1975

| Region    | Total Case<br>Tested | Number of JE Infection |         |
|-----------|----------------------|------------------------|---------|
|           |                      | Number                 | Percent |
| North     | 116                  | 27                     | 23      |
| Northeast | 137                  | 45                     | 33      |
| Central   | 92                   | 57                     | 62      |
| South     | 4                    | 0                      | 0       |
| Thailand  | 349                  | 129                    | 40      |

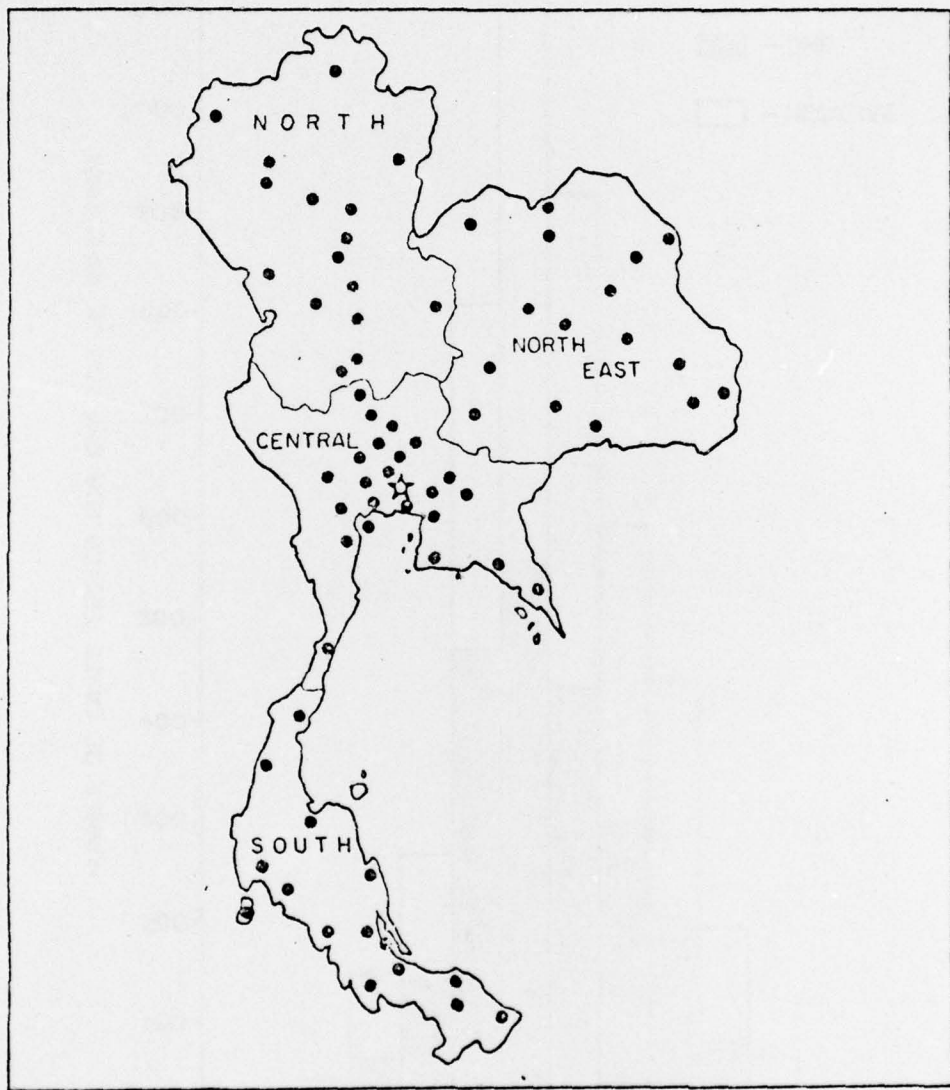


FIGURE 1. MAP DEMONSTRATING PROVINCES OR TOWNS OF STUDY (●) 1975

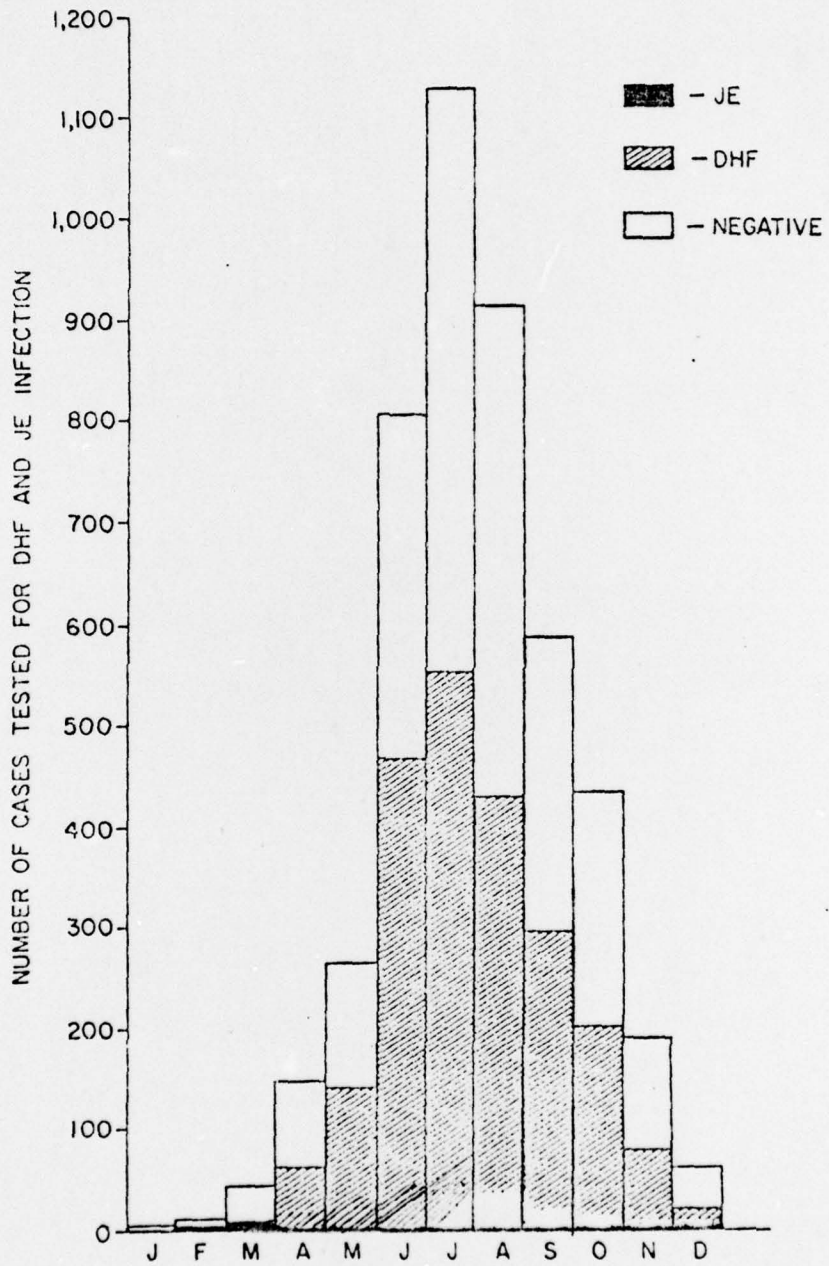


FIGURE 2. MONTHLY LABORATORY CASE CONFIRMATION FOR DHF AND JE INFECTION IN PROVINCES OF THAILAND, 1976

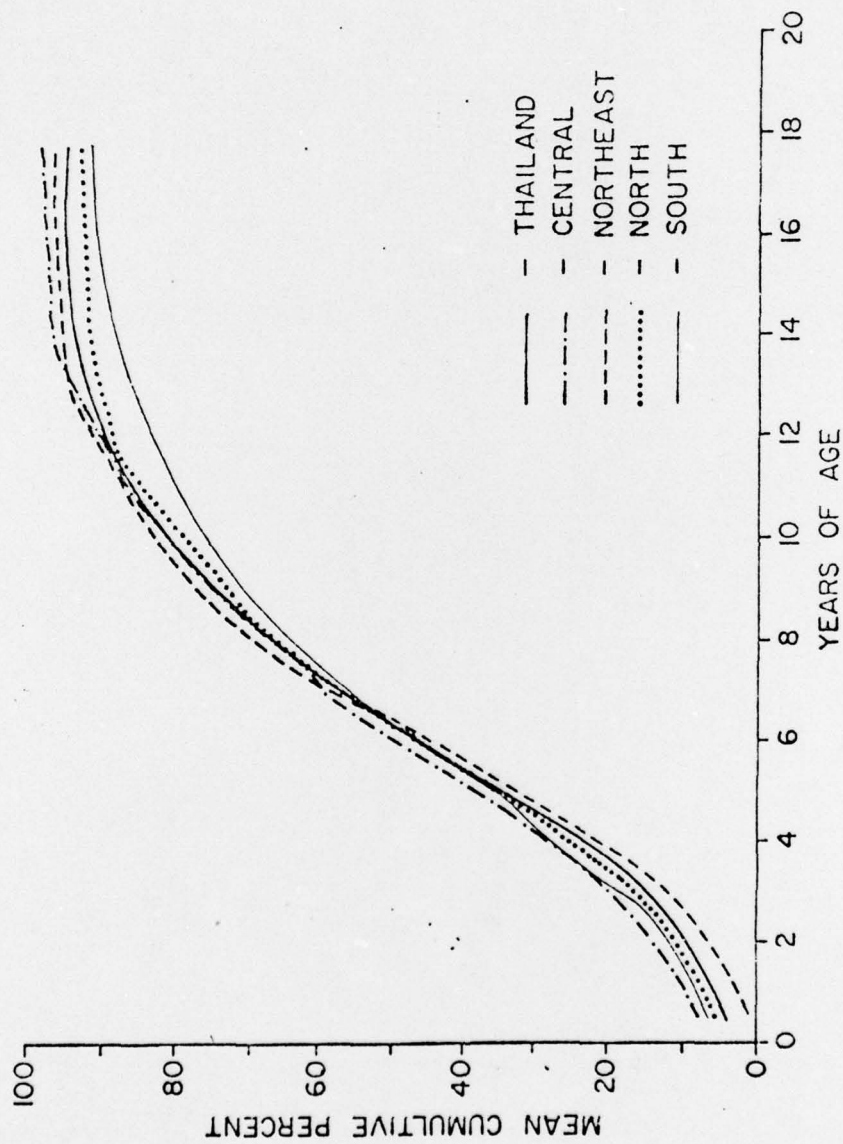


FIGURE 3. AGE DISTRIBUTION OF DHF SPECIFIC CASES (LABORATORY CONFIRMED) IN PATIENTS HOSPITALISED WITH HEMORRHAGIC FEVER IN PROVINCIAL HOSPITALS IN THAILAND, 1975.

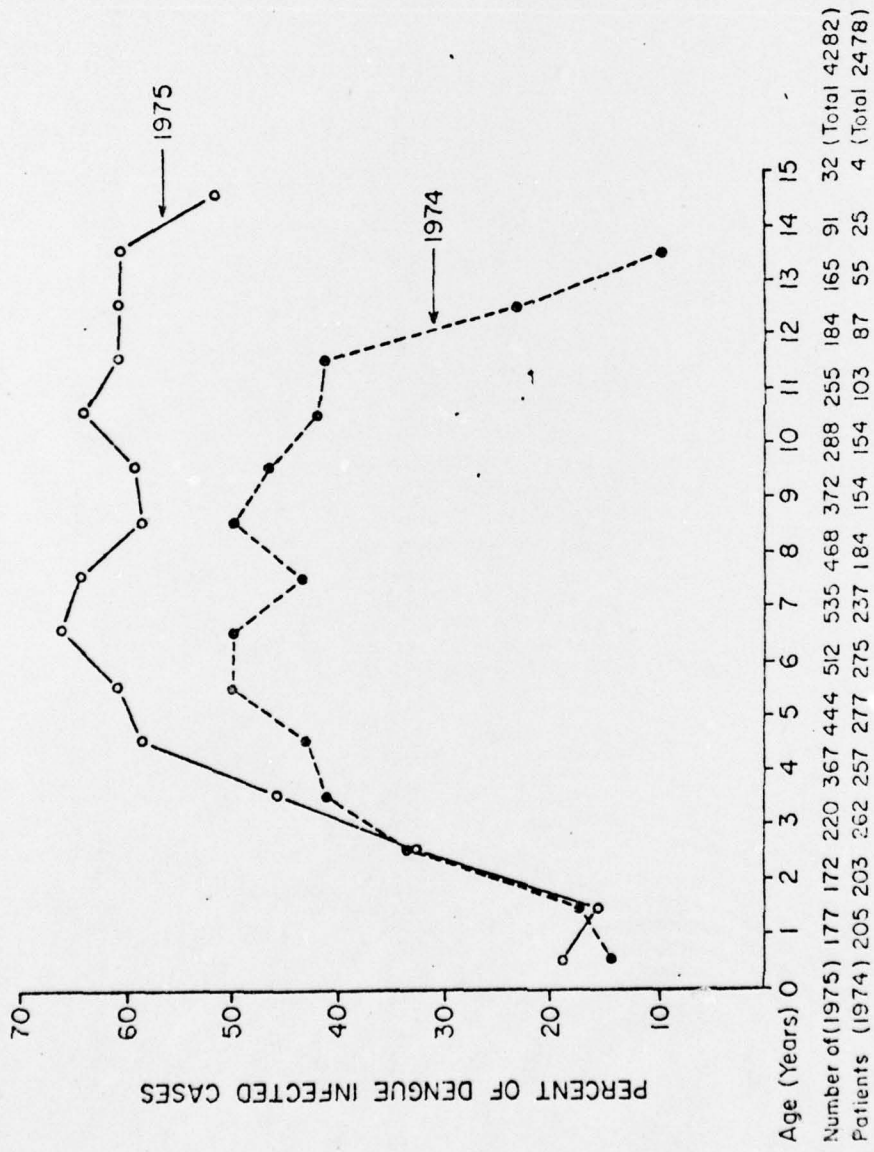


FIGURE 4. DENGUE INFECTED CASE RATIO IN EACH AGE GROUP AMONG CASES SUBMITTED FOR TEST FROM PROVINCIAL HOSPITALS IN THAILAND, 1974 AND 1975

Number of (1975) 177 172 220 367 444 512 535 468 372 288 255 184 165 91 32 (Total 4282)  
 Patients (1974) 205 203 262 257 277 275 237 184 154 154 103 87 55 25 4 (Total 2478)

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