

SURVEILLANCE OF JAPANESE ENCEPHALITIS CASES IN THAILAND

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INTRODUCTION

Japanese encephalitis (JE) an acute illness is endemic over a large part of countries in Asia. This disease is maintained throughout the year and sporadic human cases have been reported. Japanese encephalitis virus (JEV) is transmitted by *Culex* mosquitoes and it infects a number of vertebrate species. There have been reports of JE epidemic in the 3 provinces of the North and Northeast of Thailand (Bunnag, 1967; Yamada, 1970; Grossman, 1973 a, b) and JEV was recovered from human, mosquito vectors and animal hosts, (Grossman, 1973 a,b; Gould, 1974; Johnson, 1974). The information provided

evidence of the existence of JEV with periodic outbreaks of human encephalitis in 3 provinces of Thailand. However, the studies from these reports were confined only to a few provinces with JE outbreak. The annual reports of the Ministry of Public Health reveals the occurrence of encephalitis of unspecified etiology from the 72 provinces of Thailand. The purpose of this study was to employ the hemagglutination-inhibition (HI) test to study the number of encephalitis cases caused by JEV to the total encephalitis cases admitted to provincial hospitals of Thailand. The incidence of JE cases in each region and the ecologic factors of JE are reported herein.

Table 1
Results of HI test in patients for JE confirmation.

Regions	1974		1975		1976	
	Total	JE cases	Total	JE cases	Total	JE cases
North	82	23 (28)	116	27 (23)	75	14 (19)
Northeast	71	17 (24)	137	45 (33)	89	24 (27)
Central	67	24 (36)	92	57 (62)	40	14 (35)
South	18	6 (33)	4	0	33	7 (21)
Total	238	70 (29)	349	129 (40)	237	59 (25)

Percentage of JE cases shown in parenthesis.

MATERIALS AND METHODS

Acute and convalescent blood samples were collected from encephalitis cases ad-

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mitted to the hospitals of 57 provinces of Thailand. Blood specimens were absorbed onto small filter papers (Carl Schleicher and Scheull Co., Keene, New Hampshire, No. 720-E $\frac{1}{2}$ inch diameter) and clipped on individual patient forms. JEV and dengue 2 virus antigens were used. Microtiter HI tests adapted

from Clark and Casals (1958) and Sever (1962) were employed for serologic diagnosis.

JE virus was diagnosed as the etiologic agent of encephalitis on the basis of a fourfold rise in antibody titer to JEV regardless of the titer of initial serum, or a titer greater or equal to 1 : 640 in both sera.

RESULTS

As shown in Table 1 clinical cases of encephalitis from 57 provinces were tested by HI test in 1974, 1975 and 1976 and the percentage of JE cases are 29, 40 and 25. The total cases admitted was lowest from the southern region of Thailand.

The study in 1976 shows human cases of JE occurred every month of the year in Thailand as seen in Fig. 1, with low incidence in the dry months. Fig. 2 shows JE cases in the 4 regions with lowest incidence in the

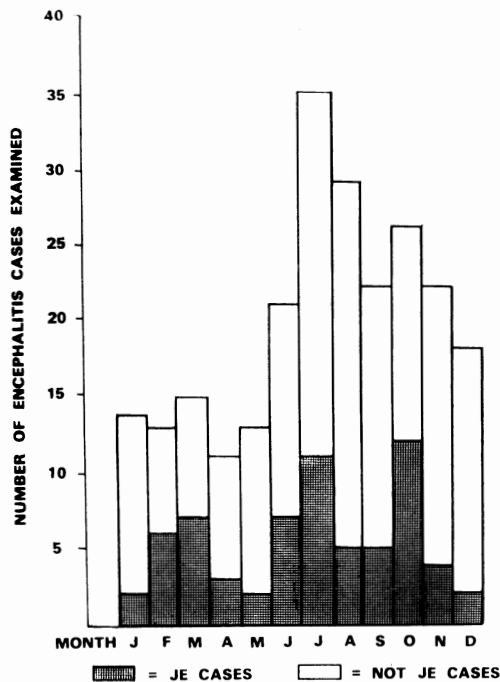


Fig. 1—Number of JE cases from provincial hospitals in 1976.

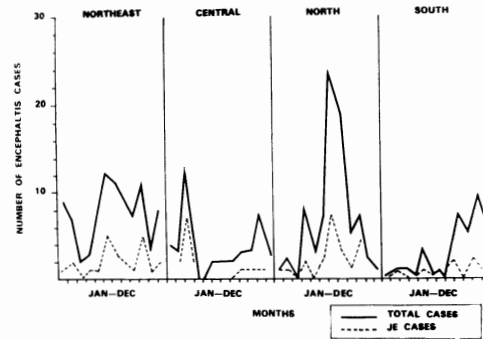


Fig. 2—Laboratory confirmation (HI test) for JE infection in encephalitis cases from 4 regions of Thailand, 1976.

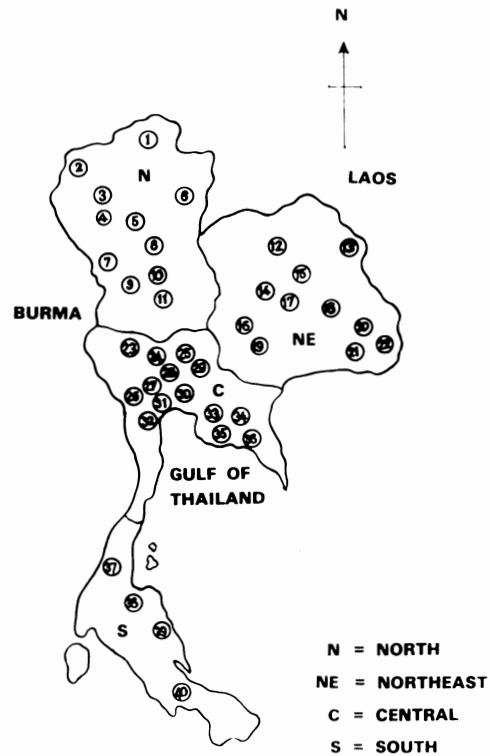


Fig. 3—Distribution of provincial areas with Japanese encephalitis in Thailand in 1974, 1975 and 1976.

south. Incidence of JE cases varied from month to month and the number of total encephalitis cases also varied in the 4 regions.

Eight hundred and twenty-four paired sera of encephalitis cases from 57 provinces of

Table 2

Distribution of JE cases in 40 provinces in 4 regions of Thailand in 1974, 1975 and 1976.

No. of provinces	JE in provinces in each region						
	North	Northeast		Central		South	
Chiang Rai	1	Udon Thani	12	Uthai Thani	23	Ranong	37
Mae Hong Son	2	Nakon Phanom	13	Chainat	24	Surat Thani	38
Chiang Mai	3	Khon Kaen	14	Lop Buri	25	Nakhon Si-Thammarat	39
Lamphun	4	Sakon Nakhon	15	Kanchanaburi	26	Songkhla	40
Lampang	5	Chaiyaphum	16	Suphan Buri	27		
Nan	6	Kalasin	17	Ayutthaya	28		
Tak	7	Roi Et	18	Saraburi	29		
Phrae	8	Nakhon Ratchasima	19	Pathum Thani	30		
Kamphaeng Phet	9	Ubon Ratchathani	20	Nakhon-Pathom	31		
Uttaradit	10	Surin	21	Samut-Songkhram	32		
Phitsanulok	11	SiSaket	22	Chon Buri	33		
				Prachin Buri	34		
				Rayong	35		
				Chantaburi	36		

Note : Total of 57 provinces submitted blood drawn from clinical encephalitis cases on day of admission and discharge. Patients from 40 provinces show JE infection.

Thailand were confirmed for JE infection in 1974, 1975 and 1976. HI test shows that the encephalitis cases caused by JEV were from 40 provinces. Fig. 3 shows the distribution of provinces and towns with JEV proven cases in the 4 regions of Thailand. The names of each province are listed in Table 2 and the indicated numbers of the provinces correspond with the numbers of the areas in Fig. 3.

In Fig. 4 JE occurred in all ages but a higher incidence in age group of more than 6 years. At 14 years of age there was only one encephalitis case submitted for test and was positive for JEV.

DISCUSSION

The results of this study reveal the occurrence of JE cases in Thailand throughout

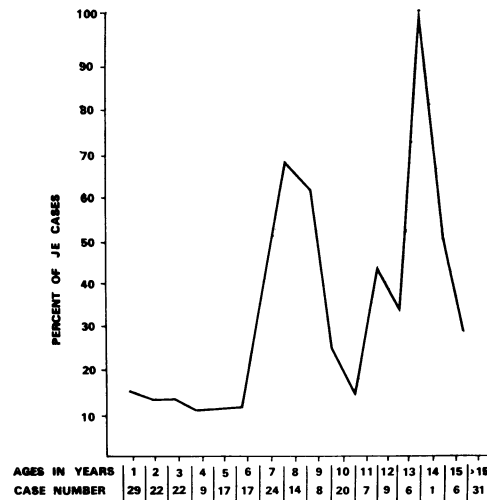


Fig. 4—Percentage HI positive for JE virus infection in encephalitis cases, 1976.

the year. The pattern of disease is endemic and distributed all over Thailand. Previous reports described JE proven cases from a few provinces in North and Northeast. The trend of encephalitis cases from the annual report of the Ministry of Public Health shows increase in the past 10 years. The incidence of JE cases from this study is either from new cases or the verification of existence of old cases on improvement of reporting system.

The coexistence of Japanese encephalitis and dengue hemorrhagic fever in the same areas was reported by Grossman (Grossman, 1973). This present study provides further data on the distribution of JEV in Thailand. It has been proven that dengue hemorrhagic fever (DHF) is endemic in every province of Thailand (Gunakasem *et al.*, 1981). JE and DHF occur in the same epidemic period but are not similar in other epidemiological patterns.

In this present study the confirmed JE cases seems to be very low in 1976. There were only 59 encephalitis cases caused by JEV. In view of JE inapparent infection reported by Grossman (1973), the ratio of JE infection without encephalitis to encephalitis cases is 300 : 1. Thus the estimation of JE with encephalitis in 1976 will be 413. This expected JE cases should warrant the Ministry of Public Health to search for the appropriate measures in reducing the severity, or the prevention of JEV infection in Thailand, especially to ascertain sources of JEV infection manifested by fever of unknown origin.

SUMMARY

This surveillance study reveal the incidence of Japanese encephalitis cases throughout the year with an increase during the rainy-season. JEV attacks all ages, but with a high incidence found in age group between 8 to

14 years determined from the studies in 1974, 1975 and 1976 and records of distribution in 40 provinces of Thailand. The severity of infection is high to warrant virus surveillance by the Ministry of Public Health.

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