

ANNUAL PROGRESS REPORT

SEATO Medic Study No. 5 Survey for Prevalence of Arbovirus
Antibodies Among Residents of Thailand
and Neighboring Countries

Project No. 3A 025601 A 811 Military Medical Research Program
S.E. Asia

Task 01: Military Medical Research Program
S.E. Asia

Subtask 01: Military Medical Research Program
SEASIA (Thailand)

Reporting Installation: US Army-SEATO Medical Research Laboratory
APO 146, San Francisco, California

Division of Medical Research Laboratories
Department of Virology

Period Covered by Report: 1 April 1963 to 31 March 1964

Principal Investigator: Major Scott B. Halstead, MC

Associate Investigator: Dr. Suchinda Udomsakdi

Reports Control Symbol: MEDDH-288

Security Classification: UNCLASSIFIED

consistent with the hypothesis that much if not most group B antibody measured was due to single or multiple dengue virus infections with production of heterologous JE Nt antibody. Limited experience with CG-BT-10 (an unidentified group B agent closely related to but distinct from JE) have shown no definite evidence of human infection with this agent. Chikungunya HI antibody has shown a high degree of correlation with chik neutralizing antibody. Chikungunya antibody has been found in sera of residents of all sections of Thailand, Laos, South Vietnam (Saigon, An Gian Province and Ban Phu) Burma and Calcutta, India.

BODY OF REPORT

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Objective: To map the distribution of arthropod borne viruses in Thailand and adjoining nations in Southeast Asia by serologic study of humans.

Description: The study is conducted by performing serologic tests on survey sera obtained from residents of various geographical, climatologic and ecologic habitats in Thailand and environs. Antibody patterns observed are compared with data obtained from intensive study areas and hospital study where infecting agents are known.

Progress: In 1962, 1498 young adult residents of North, Central and Northeast Thailand were bled. Hemagglutination-inhibition tests were performed for chikungunya and group B arboviruses (using dengue 1 as test antigen). Group B antibodies were extremely prevalent in Central and Northeast Thailand (Chiangmai Area). Since persons sampled were Army inductees it is presumed that the population represents a cross section of the young males in each area sampled. If so, there should be a rural bias to the sample as the Thai population is predominantly rural. From this premise, initially it was assumed that the group B antibody measured might represent Japanese encephalitis which is thought to be widely distributed in Thailand. However, contradictory evidence has been obtained from Japanese encephalitis neutralization tests performed on selected HI positive or negative sera. Of 52 HI positive sera from the north Central Plain, 23, or less than 50% had positive LNI for JE (1.7)(Table 32). In the Northeast, even fewer HI positive sera were positive for JE Nt. These data leave unresolved the question of human experience with JEV in Thailand. The degree of heterologous Nt antibody produced by single or multiple dengue virus infections is not known, but it must be substantial. It is conceivable, then that most group B antibody measured was caused by dengue virus infection.

Chikungunya HI and Nt antibody showed a high degree of correlation. Distribution of HI antibodies in Table 31 may be assumed to represent chikungunya virus. Note the high prevalence in Central and Northeast Thailand and lower prevalence in North Thailand.

Opportunity has been presented to study sera collected from urban and rural residents of Laos (Vientiane and Meo tribesmen) and South Vietnam (Saigon and Ban Phu, Central Highlands) (Tables 33, 34 and 35). Antibody patterns in Vientiane and Saigon resemble those of Central and Northeast Thailand. The Montangard tribesmen sampled in Ban Phu exposed to a mountain valley habitat had serologic evidence of JE virus infection but very little chikungunya. Meo tribesmen coming from a remote area of North Laos had no detectable chikungunya antibody and evidence of remote group B experience, perhaps JE (HI but no CF antibody detected).

Summary and Conclusions: Residents of Bangkok, Thailand, Vientiane, Laos and Saigon, Vietnam have serologic evidence of chikungunya and dengue virus infections while tribal populations from mountainous areas of Laos and Vietnam had little evidence of past chikungunya experience and serologic results suggesting past JE infections rather than dengue.

Table 31. Incidence of HI antibodies to chikungunya and dengue viruses in residents of Thailand.

Region	Residence *	Chikungunya No. pos./No. sampled	%	Dengue No. pos./No. sampled	%
Central	Ayudhaya	24/34	70.59	33/34	97.06
	Nakornsawan	169/206	82.04	203/206	98.54
	Pisanuloke	95/153	62.09	142/153	92.81
North	Nan	1/18	5.56	4/18	22.22
	Chiengmai	130/533	24.39	193/533	36.21
North- east	Korat	87/109	79.82	106/109	97.25
	Surin	60/133	45.11	121/133	90.98
	Khonkaen	110/132	83.33	126/132	95.45
	Ubol	29/60	48.33	56/60	93.33
	Udonthanee	45/120	37.5	93/120	77.5
Total		750/1498		1077/1498	

* General area of the residence of studied groups.

Table 32. Correlation of HI and Nt antibody in Thailand survey sera. Chikungunya and dengue 1 used as HI antigens. Chikungunya and JE virus used as Nt antigens. Nt tests done in HKC without addition of accessory factor.

Area of Thailand	Chikungunya Nt (LNI)				JE Nt (LNI)			
	HI	Neg. 0-1.0	Equiv. 1.0-1.6	Pos. 1.7 and >	HI	Neg. 0-1.0	Equiv. 1.0-1.6	Pos. 1.7 and >
	Central Plain	+ *	0	1	4	+ *	5	1
	- **	3	2	0	- **	1	0	0
North Central Plain	+	5	14	26	+	12	17	23
	-	20	0	1	-	3	2	8
Northeast	+	4	9	76	+	67	27	13
	-	36	1	3	-	16	5	2

* HI titer 1:20 or greater.

** HI titer less than 1:20.

Table 33. Occurrence of HI antibody in normal children in Saigon, South Vietnam, November 1963.

Ages (Inclusive)	Antigen			
	Chikungunya		Dengue	
	No. Pos.*/No. tested	% pos.	No. Pos.*/No. tested	% pos.
1 - 2	0/23	0.0%	3/23	13.0%
3 - 5	7/15	46.0%	12/15	80.0%
6 - 8	5/19	26.0%	15/19	78.0%
9 - 12	8/16	50.0%	15/16	93.0%

Table 34. Incidence of HI antibody to chikungunya and Japanese encephalitis with correlation of neutralizing antibody in adult residents of Ban Phu, Central Highlands, South Vietnam, 1962.

Virus	HI Test No. Pos.*/No. tested	Correlation Test				
		No.	Result	< 1.0	1.0-1.6	1.7
Chik	13/119 (10.9%)	13	Pos.	5	5	3
		12	Neg.	10	2	0
JE	107/119 (89.1%)	44	Pos.	9	12	23
		1	Neg.	1	0	0

* Pos. = 1:20 or greater.

Table 35. Serologic studies on sera from residents of Vientiane and Meo tribesmen in Laos, 1963.

Location	HI			CF						
	Chik	d 1	JE	Chik	d 1	d 2	d 3	d 4	Cg Bt* 10	Cg Lt** 77
Vientiane	14/43	37/43	42/43	12/43	18/43	20/43	15/43	5/43	5/43	17/43
Meo	0/35	5/35	9/35	0/35	1/35	1/35	1/35	1/35	0/35	0/35

* Virus recovered in Thailand, related to but not identical with JEV.

** Thailand strain of JEV.