SEATO MEDICAL RESEARCH STUDY ON Rickettsial Diseases in Thailand

Coordinators:	Samrit Jatinandana, Captain, MC, RTN, Deput Director, SEATO Medical Research Laboratory Sittiboon Puranavej, Wing Commander, MC, RTAF, Chief Division of Research (Thai Component) Phillip E. Winter, Major, MC, Chief Dept, of Epidemiology and Special Studies
Principal Investigators:	Sittiboon Puranavej, Wing Commander, MC, RTAF Phillip E. Winter, Major, MC Vichai Sankasuwan, Major, MC, RTA Pichitra Pongpradit, MD Premthavi Bodhidatta, Lieutenant, MC, RTAF
Assistant Investigators:	Bospan Prakoppanichakij, B.sc, (Pharm) Suparasri Pumsuwan, B.sc, (Pharm) Cheodchai Chuenchitra, B.sc. (Med. Tech.)

Period of Report 1 April 1967—31 March 1968

Objectives To determine the distribution and seasonal variation of rickettsial diseases in Thailand; identify arthropod vectors and mammal reservoirs and alternate hosts, and serve as required as a consultative laboratory.

Description A search for evidence of infection of man and other animals by rickettsiae of scrub typhus, murine typhus, Q—fever and the spotted fever group is being carried out in Thailand, by means of isolation attempts and serologic methods.

Small mammals (primarily rodents) are trapped in selected areas. Ectoparasites are collected, identified and pooled. Tissue specimens and ectoparasite pools are inoculated into white mice or guinea pigs for isolation attempts.

Patients hospitalized with fever of unknown origin from several provincial hospitals were examined for evidence of rickettsial infection. Paired sera were collected from these patients for serologic diagnosis; in most cases a blood specimen was also inoculated into mice or guinea pigs for rickettsial isolation attempts. A single serum specimen was obtained from a sample of outpatients at these same hospitals. The sample was selected without regard to presenting complaint. These specimens were used to derive crude antibody prevalence ratios.

Progress 1. Scrub typhus ecology. Field trips were made in June, September and December 1967 to Pak Thong Chai, Korat province, the site of the 1965 scrub typhus epidemic. These months were selected as representing months of moderate, high and low rainfall respectively. A total of 163 animals were collected

on the three trips; from these 43 strains ef R. tsutsugamushi were recovered. All collections were made in sylvatic habitats. Table 1 summarizes the collections by host and month. No striking differences in rickettsial isolation ratio by month of collection are seen. Rickettsiae were recovered from rats, shrews and bats. These data indicate that R. rattus, R. rajah and T. glis may be important reservoirs throughout the year in this area. Most chiggers collected from these various species were Leptotrombidium (L) deliensis. No chigger pools yield rickettsiae.

Table 2 presents the results of attempts to isolate scrub typhus rickettsiae from the blood of patients hospitalized with fever of unknown origin (FUO). Forty seven strains of R. tsutsugamushi were recovered from 722 FUO patients at Korat provincial hospital, and 27 strains from 247 FUO patients at Ubol provincial hospital. Recoveries were more common in the rainy season than in the dry summer season. The agent can be found in reservoir hosts in the area all year around. Transmission is limited by variations in chigger population, but also by the diminished farming activity during the dry season.

The age distribution of cases were similar in Korat and Ubol as summarized in Table 3. Although no sex selection is apparent in the Ubol cases. in Korat males predominate 4:1. By occupation, 63 of the 74 cases are farmers or gardeners.

Paired sera from 401 FUO patients in Korat Provincial Hospital were examined for scrub typhus antibody by the immunofluorescence (I.F.) test, using KG Kt antigen. Of these, 24 (6%) showed a titer rise between acute and convalescent specimen. Of 68 pairs from FUO patients in Ubol, 13 (20%) showed a diagnostic titer rise.

2. Murine typhus, spotted fever and Q—fever: Seven strains of R. mooseri were recovered from 853 FUO patients at Korat hospital and one strain from 197 FUO patients at Ubol. Table 3 presents the age distribution of these 7 patients, of whom 5 were male and 2 female. Two of these 8 patients were farmers, the remainder were urban dwellers.

The homes of six of these patients were visited in January 1968. A total of 197 Rattus exulans were collected, which yielded 18 strains of R. mooseri. One additional strain was recovered from 302 Xenopsylla cheopis collected from these rodents.

Sera were collected from inpatients and outpatients at provincial hospitals in the northeast and southern regions of Thailand. The patients referred to above are included in this group. Sera were examined for antibodies to murine typhus, Q—fever and spotted fever group rickettsiae, and will be examined for antibodies to other agents as time permits.

Collections were made at Korat Provincial Hospital from November 1966 thru March 1968, at Ubol Provincial Hospital from July 1967 through March 1968 and at Songkhla—Haadyai hospitals in July and August 1967. Table 4 summarizes the serologic results obtained. The prevalence of Q—fever antibody varied from 0.4% at Ubol to 2.1% at Korat. Murine typhus antibody prevalence varied from 0.5% at Songkhla—Haadyai to 4.9% at Korat. Spotted fever group antibody is more uniform in distribution, about 3% in all areas. Data have not yet been analyzed by age, sex, residence and occupation.

Table 1. Recovery of R. tsutsugamushi, by host species, Pak Thong Chai, June, September and December 1967,

Host Species	Strains Recovered/Animals Tested			
	June	September	December	Total
Rattus rajah	4/6	3/12	8/33	15/51 (29%)
Rattus rattus	3/9	4/9	8/24	15/42 (36%)
Rattus sabanus	—	—	2/5	2/5
Rattus niviventer	—	—	1/1	1/1
Tupaia glis	2/7	3/21	4/10	9/38 (24%)
Hylomus suillus	1/1	—	—	1/1
Callosciurus finlaysoni	1/1	—	0/3	1/4
Callosciurus caniceps	—	—	0/2	0/2
Tragurus javanica	—	—	0/1	0/1
Hylopetes spp.	—	—	0/1	0/1
Viverricula indica	—	—	0/1	0/1
Bats	1/1	1/1	—	2/2
Misc. avian spp.	0/10	0/4	—	0/14
	12/35 (34%)	11/47 (23%)	23/81 (28%)	46/163 (28%)

Table 2. Monthly isolation of R. tsutsugamushi from patients with FUO hospitalized in Korat and Ubol Provincial Hospitals, 1967–8.

Month	Season	Strains Recovered/Patients	
		Korat	Ubol
Mar 1967	Summer (Hot, Dry)	0/69	—
Apr ,,		0/28	—
May ,,		2/45	—
Jun 1967	Rainy (Hot, Wet)	5/67	—
Jul ,,		12/82	—
Aug ,,		8/95	—
Sept ,,		3/67	5/58
Oct 1967	Winter (Cool, Wet)	7/95	12/76
Nov ,,		5/89	9/50
Dec ,,		4/37	1/32
Jan 1968		1/48	0/31
		47/722 (6.5%)	27/247 (10.9%)

Table 3. Age distribution of 82 patients from whom scrub typhus or murine typhus was recovered, Korat and Ubol Provincial Hospitals, 1967–8.

Age Group	Number of Patients	
	Scrub typhus	Murine typhus
0–10	0	0
11–20	10	1
21–30	18	1
31–40	20	4
41–50	16	1
51–60	2	1
61–	3	0
(Age not given)	5	—

Table 4. Prevalence of complement–fixing antibodies for Q–fever, murine typhus and spotted fever group from in–and out–patients at Korat, Ubol and Songkhla, 1967–8.

Province/Patient Status	Agent, No. positive*/No. Tested		
	Q–fever	Murine typhus	Spotted fever gr.
Korat/inpatient	15/823	37/822	19/520
Korat/outpatient	40/1320	65/1242	13/441
Total	55/2143 (2.6%)	102/2064 (4.9%)	32/961 (3.3%)
Ubol/inpatient	0/241	0/242	6/211
Ubol/outpatient	3/458	8/492	14/383
Total	3/699 (0.4%)	8/734 (1.1%)	20/594 (3.4%)
Songkhla–Haadyai Inpatient	1/59	0/59	1/61
Songkhla–Haadyai Outpatient	2/144	1/144	5/144
Total	3/203 (1.5%)	1/203 (0.5%)	6/205 (2.9%)

* Positive = titer of 1:10 or greater.