衛生動物部門　長谷川　恩

１９８０年度に於ける衛生動物部門の活動は、研究室の漸進的な整備と相俟って着実に進展したと言い得る。この年に於ける当部門の活動は、ネズミ類調査・蚊類調査その他の昆虫類調査及び寄生虫調査の四分野に大別され得る。以下その夫々について簡単にとりまとめて結果を報告したい。尚その詳細に関しては、表題を記した論文として発表したので、ここでは改めての説明は省略する。

A）ネズミ類調査

前年度に引続き、チャンタブリ地区内に選定した９調査区 Chantaburi 市内 Zone Ⅰ－Ⅳ Chantanimit（以上都市地区），Bo（Ampho Klung），Sam Rong（Ampho Phong Na-mron）Tagad－Ngao 及び Toong Ben Cha（Ampho Thamai）（以上農村地区）を対象として調査を続行した。最終的には９地区夫々について、３日間づつ３回の調査が行われ総計１０４６個体の住家性ネズミが捕獲された。この全個体について、ネズミの個体に関する調査（体長、尾長、後肢長、耳長並びに体重測定）繁殖状況調査（妊娠率、胎児数、生育度等）外部及び内部寄生虫の研究、細菌学的検索が実施された。更に１９８１年２月以降は、実際的な捕獲方法を主眼として、各種捕獲器の比較検討研究を開始しつつあり、この仕事は次年度に継続される。

この結果に関する詳細は、１９８０年１１月２７日に開かれた Evaluation Conference に於て、タイ側の担当者 Mongcol CHENCHITTIGUL により講演された他、次へ論文として公表された。

○ Mongcol CHENCHITTIGUL, Somchai DAENGIPIUM, Kasin SUPHAPATHOM, Chanya SOROS, Rujini SANGWONWAS, Megnmi HASEGAWA, Takeshi ITOH, Kenji, OHTA and Boonluan PHANTHUMACHINDA（１９８１）
A study on house rodents in Chantaburi Province. "Promotion of Provincial Health Services". Interim Report II. : ２５５－２６８

○ Megumi HASEGAWA, Mongkol CHENCHITTIGUL and Boonluan PHANTHUMA-CHINDA（in press）Studies on house－rodents in Chantaburi Province Southeast Asian Journal of Tropical Medicine & Public Healtn.

○ 長谷川　恩・Mongcol CHENCHITTIGUL（１９８１）
タイ国チャンタブリ地区に於る住家性ネズミに関する調査研究。
第３３回日本衛生動物学会誌上発表

B) 蚊類調査

長崎大学医学部医動物学教室より派遣された森章夫博士が3カ月の短期専門家として来タイ、主として蚊の個体群生態学に基く研究活動をチャンタブリ地区に於て展開した。

この内容は森博士自身によりEvaluation Conferenceの席上発表され、且、次の論文として公表された。尚目下更に内容を検討し、別の論文として学会誌に発表すべく作業を進めつつある。

○ Akio MORI, Thumrong PHONCHEVIN, Boonluan PHANTHUMACHINDA and Prakong－Phan－Urai（１９８１）
Observation on the distribution of Aedes aegupti and Ae. albopictus in rural area Chantaburi.
"Promotion of Provincial Health Services", Interim Report II, 299.

尚、森博士の仕事とは別に、チャンタブリ市内に於て住宅内生息種の連続採集調査が目下進行中であるが、これはまだ取りまとめの段階にまで到っていない。

C) その他の昆虫類調査

チャンタブリ地区に見られる熱帯性潰瘍については、現在まだ原因が不明である。本疾患は毎年雨期の開始とともに発生し、相当多数の住民がこれに悩まされている。この媒介には小型のハエ類の関与が予想される所から、当研究室では本年度よりその研究調査に着手し、基礎的な疫学調査を実施した。この結果は次の論文として発表された。

○ Megumi HASEGAWA, Kenji OHTA, Wattanasin THAISRIVONGS and Chantra SUKSINGHA（１９８１）
Preliminary report on the prevalence of ulcer in Chantaburi Province.
"Promotion of Provincial Health Services", Interim Report II., １０１－１０６

○ Megumi HASEGAWA, Kenji Ohta, Wattanasin THAISRIVONGS and Chantra SUKSINGHA（１９８１）（in Thai）
Journal of Department of Medical Sciences（in press）

また、チャンタブリ地区に於けるゴキブリ類に関する基礎調査を５月に実施し、住家性種として８種の存在を確認した。

本調査は、国内委員の一人である朝比奈正二郎博士の協力によって行われたもので、その内容は次の論文として発表した。

○ Syoziro ASAHINA and Megumi HASEGAWA（１９８１）
A brief survey of domiciliary cockroaches in Chantaburi Province
"Promotion of Provincial Health Services", Interim Report II, ３００－３０４

○ Syoziro ASAHINA, and Megumi HASEGAWA（in press）

Research Note. "A brief survey of domiciliary cockroaches in Chantaburi Province"

Southeast Asian Journal of Tropical Medicine and Public Health.

D) 寄生虫調査

前年に引続き、寄生虫に関する調査は、本研究室の主要なる業務となった。

１９８０年度に於いて実施した本調査の対象表数は総計２７４６名であって、その寄生虫検出状況は表１に示す如くである。

寄生虫の中、特にぎょう虫（Enterobius vermicularis）については、通常の糞便検査でその正確な実情を把握することは不可能である。従って、この検査については本研究室で作制したスコッチテープスライドが使用された。この調査対象表は総計１５４０名であった。その中８８０名はPropokklao 病院小児科の入院患者で

表1. １９８０年チャンタブリ地区に於ける寄生虫検査結果の綜合成績

Ampho	Village	Male	Female	Total	Ss	Ev	To	HW	Tt	Al	Op	Fh	Td	% of Hook Worm
Thamai	Tagad－Ngao	282	314	596	3	12	6	97	30	15	2			16.3 %
	Toong Ben Cha	61	77	138		1	3	45	1	1				32.6 %
Khlung	Bo	103	176	279		1	3	66		2	1			23.7 %
	Sueng	158	195	353	7		15	127		2				40.0 %
PongNamron	Sam－Rong	544	539	1183	23	3	6	242	4	2		1	1	20.5 %
Lam Sing	Pliu	113	84	197		1	4	64		1				32.5 %
TOTAL		1361	1385	2746	33	18	37	641	35	23	3	1	1	23.3 %

Remarks： Ss＝Strongyloides stercolaris　　Ev＝Enterobius vermicularis

To＝Trichostrongylus orieentalis　　HW＝Hook Worm

Tt＝Trichuris trichiura　　Al＝Ascaris lumbricoides

Op＝Opistorchis Sp.　　Fh＝Fasciola hepatica

Td＝Taenidae Sp.

同科医長Dr. Prakit KASEMSARNの協力を得て、検査方法自体の検討も兼ねた３日連続検査を実施し得た。この結果本寄生虫はこの地区に於てはむしろ釣虫を上廻る寄生率を示す事が確認された。

更に本年度に於ては、住民の寄生虫駆除対策にも着手し、Sam Rong（Ampho Phong Namron），Tagad－Ngao（Ampho Thamai），Sueng（Ampho Klung）及びPliu（Ampho Lam Sing）の４村に於て全村民を対象にした駆除薬投与を実施できた。夫々に於ける実績は表２に示す通りである。

表2. 村に於ける全村民駆除実施結果

村　　名	実　施　日	人　　口	投薬表数	率
Sam－Rong	Aug. 15	1051	897	85.3 %
Sueng	Oct. 6,12	850	695	81.3 %
Tagad－Ngao	Nov. 17	567	286	48.7 %

尚、Pliu に関しては3月末日現在集計中で、まだ、最終結果を得ていないため、本表から除いた。

以上の各結果については、以下の結論文として発表した。

○ Megumi HASEGAWA （ 1981 ）
Studumi on the parasitic infection in the project field in Chantaburi Province.
"Promotion of Provincial Health Services," Interim Report II. 269－282

○ Megumi HASEGAWA （ 1981 ）
Study on mass treatment of parasitic infection in Chantaburi Province.
"Promotion of Provincial Health Services," Interim Report II. 283－289

○ Megumi HASEGAWA （ 1981 ）
Survey on pin Worm infectinn in Chantaburi province.
"Promotion of Provincial Health Services." Interim Report II. ：291－298

更に以上の内容については、長谷川がEvaluation Conference に於て講演発表し、更に12月4～6日バンコック、マヒドン大学を会場として開催された。医療技術研修学会においても同内容について発表を行った。

衛生動物部門の成果と問題点

本来衛生部門は本プロジェクトにあっては独立した位置が与えられてはいない。然し、タイ側及びプロジェクトの理解のもとに、独自の研究室を持ち、可成り自由且広沢に調査研究活動が進められ得ていることは感謝である。

余談乍ら、本プロジェクトの如きは、当然独自の研究室の設備があって後に展開されるべきものであって、若し、細菌、生化学などの専門の研究設備を持ち得るならば、更に著しい成果の進展を見るであろうことは、本部門の成果に照らしても明である。もっとも、研究室の内容については、まだ不備の点が多い。例えば使用する洗滌水は市の水道を利用しているが、その水質は研究調査を実施するためには極めて劣悪なものである。電力事情も非常に不安定で精密な電気機器の使用に耐えない。且、新研究室開設に伴うべき当然の経常費の増加が予算として計上されていないため、電力使用に関しての制限の申し入れを受ける如き現状で、

従って開設についてのタイ側からの設備投資は殆ど零に近く、辛うじて各種の研究用器機を専門家の個人研究費を以て、購入充当せざるを得たい状況にある。

こうした諸条件を考慮すると、前項に述べた研究活動の成果は可成り満足すべきものであった。特にタイ側の本部門の協力者が個人的に極めて有能な人材であった事実も預って力があった。ネズミに関する調査の如きはDivision of Medical Entomology (Department of Medical Sciences)より派遣されたMongcol CHENCHITTIGULは、既に全面的に業務を担当し得る程に成長している。こういう人材こそ、更に日本に於て、十分の研修の機会を与えることが望ましい。寄生虫調査に関しては未だタイ側からの協力者が得られない。この研究調査は、一つの地域の公衆衛生活動の現状を計測する指標としては最も適当なものであるがタイ側はまだその点に充分着目し得ていない。その蒙を開の意味からも、この分野の専門家の派遣が考慮せられるべきである。

但し、本年度に調査を実施したSueng (Ampho Klung)及びPliu (Ampho Lam Sing)の両地区は本プロジェクトの対象調査地区には含まれていない村であって、いづれも住民の自発的な要望により調査を開始することとなった所である。恐らく、プロジェクトの調査フィールドに於ける寄生虫調査の実施を聞き、当研究室へその実施を要求して来たもので、これは単に衛生動物部門のみならず、本プロジェクトが漸次チャンタブリ地区の住民の中に定着しつつある証査として評価し得るであろう。また、本研究室に於ては、本年度より、広く昆虫全般にわたっての標本の集収を開始した。これは我々のプロジェクトが終了した後に、実質的なプロジェクトの遺産として、研究教育資料に供したいとの希望に基いて開始したものであり、遅々ではあるが可成りの点数の標本が集収されつつある。これに関する正確な分類同定には夫々の専門的な知識が必要である。時を得てこの為の専門家の派遣も要請したい。

本年度、プロジェクト独自のInterim Report以外に各種の専門誌及び学会(タイ国内向け)に於て、その成果を発表すべく努力したことは、前項に述べた通りである。これは、プロジェクト自身をタイ人に熟知させる為にも有効であった。今后ともこの種の努力は継続して行きたい。

次年度以降への展望

過去2年間衛生動物部門の専門家として、現地にあった長谷川が4月1日チームリーダーとしての任を帯びることとなった。幸、後任として決定している武衛和雄博士は、長谷川の古い知人であり、且同じ研究分野の同僚でもあった。従って、この点の受け渡しに関しては危惧は無い。

寄生虫及びネズミの調査に関しては当分の間、長谷川が折を見て担当することとなろう。望むことは、衛生動物部門を本プロジェクトのActivity V の中に正式に位置づけ、これまでの成果を更に進展せしめると共に、他の部門を含めての日本人専門家の為の研究室を持ちその中に、永久的な昆虫標本室を設備するべく国内委JICAの特段の努力を期待したい。

昭和５５年度 プロジェクト活動報告書　渡 辺 正 夫

1. 昭和５５年度活動実績（敬称略）

1－1　専門家の派遣

昭和５５年度の専門家派遣は、1）細菌　太田建爾　　2）臨床検査　酒井　寛

3）衛生動物　森　章雄の３名であった。

1）～ 2）は１ヶ年の長期派遣専門家、3）は３ヶ月の派遣期間であった。

1－2　専門家の帰国

一方、昭和５５年度の専門家の帰国は 1）細菌　伊藤　武、2）食品分析　豊田正武

3）公衆衛生　前川秀幸　4）衛生動物　森　章雄（同一年度内）、5）生化学　宮崎武夫の

５名であった。

従って、昭和５５年度のチームの構成は下記の通り

	氏　名	分　野	派　遣　期　間	所属先
1	熊岡　爽	チーム リーダー	⟹ 昭和５２年４月２３日～昭和５６年３月３１日	な　し
2	長谷川　恩	衛生動物	⟹ 昭和５４年４月１０日～昭和５６年４月　９日	な　し
3	森　章雄	〃	⟺ 昭和５６年８月２９日～１１月３０日	長崎大学
4	伊藤　武	細　菌	⟹ 昭和５４年４月２１日～昭和５５年４月２０日	都立衛生研究所
5	太田　建爾	〃	⟺ 昭和５５年４月　１日～昭和５６年３月３１日	〃
6	豊田　正武	食品分析	⟹ 昭和５４年８月１１日～昭和５５年８月１０日	国立衛生試験所
7	前川　秀幸	公衆衛生	⟹ 昭和５４年９月　５日～昭和５５年９月　４日	神奈川県立小田原保健所
8	宮崎　武夫	生　化　学	⟹ 昭和５３年４月１１日～昭和５５年４月１０日	瀬田病院
9	酒井　寛	臨床検査	⟸ 昭和５５年４月２３日～昭和５６年４月２２日	国立大阪病院
10	渡辺　正夫	業務調整	⟹ 昭和５５年３月１３日～昭和５６年３月３１日	ＪＩＣＡ

※　プロジェクトの協力期間の延長に伴ない、下記の専門家の任期延長が昭和５５年度内に決定した。

熊岡爽一　（１ケ月）

新チームリーダーへの事務引き継ぎ

長谷川恩　（３ケ年）

新チームリーダー

渡辺正夫　（１ケ年）

業務調整

１－３　調査団の派遣

本年度内に、派遣された調査団数は３、人数は１５名であった。派遣目的、期間等下記の通り。

１－３－１　基礎整備事業事前調査団

派遣目的：イ）地域保健活動向上計画に係る基礎整備事業（水供給施設の設置）の事前調査

ロ）関連資料の収集

派遣期間　昭和５５年７月９日～昭和５５年７月２２日

構　成

深井考之助	総括	
福見秀雄	公衆衛生	
柳川城二	衛生工学	
大倉理	業務調整	

１－３－２　エバリエーション調査団

派遣目的　イ）プロジェクトに対するタイ側との合同エバリュエーションの実施

ロ）プロジェクトの協力期間延長の為の新Ｒ／Ｄの締結

派遣期間　昭和５５年１１月１２日～昭和５５年１２月３日

構　成

深井考之助	総括	※引き継き、基礎整備事業の実施設計チームに参加　１２月１４日帰国
西三郎	衛生行政	※１１月１７日帰国
豊川裕之	疫学	※１１月１９日帰国
百井一郎	公衆衛生	
朝比奈正二郎	医動物	
大倉理	業務調整	

なお、本エバリュエーション調査団の団員は、すべて地域保健活動向上計画の国内委員

会のメンバーであった。

1－3－3　基礎整備事業実施設計調査団

派遣目的　基礎整備事業につき、事前調査の結果をうけ、実施設計のとりまとめ

派遣期間　昭和55年11月30日～昭和55年12月27日

構　成　深井考之助　総括　※エバリュエーション調査団から引き継き参加。
12月14日帰国

柳川城二　水道計画　※12月14日帰国

寺沢英二　業務調整　※12月14日帰国

伊藤嘉一　実施計画

杉浦昇　施設計画

岸川良己　水源計画

なお、その他プロジェクト関係者との打ち合せを目的として、8月14日、JICA医療協力部担当理事長谷川正男（医療協力部道下高一同行）、10月5日JICA医療協力部長中沢幸一が各々プロジェクトサイトであるチャンタブリを訪れた。

又、医科学局ウイルス研究所に供与されている電子顕微鏡の修理の為、北野幸男が9月4日から10日間派遣された。

1－4　研修員の受入れ

昭和55年度の研修員受入れは4名であった。2名が高級研修員、1名が準高級研修員であり、本年度がプロジェクトの協力期間延長の交渉時期であったことをうかがわせる。又、すべて1ケ月未満の短期視察であった。

研修員の氏名、研修先等下記の通り。

氏名 所属先	研修先	期間	備考
Dr Sutat Guptarak Project Direcpor of Project. Dehtg Director Genesal of Depatwet of Meaical Sieces	外務省　JICA	昭和55年6月　5日～6月22日	高級
Dr Manasvi Uhpard Director General of Repatwet of Meaical Suiecs.	外務省　JICA	昭和55年8月　4日～8月15日	高級
Dr Prayura Kunasol Chieb, Sectiae of Outhreak Investigatiar, Divisiar of Epidenialogy	厚生省　JICA	昭和56年3月22日～4月12日	一般
Dr Dumrorg Bhanthumksol Head, Rehatwet of Pathalogy, Prapakklao Hospital	同上	同上	準高級

1－5　機材供与について

昭和５５年度機材供与は下記の通り。

番号	便　　名	C.I.F Bangkok	B/L, Tnsurane	主　要　材　料
1	NAGARIT 31 Oct '80	¥ 1,002,868	YHBK－37 IC/TE-E 33912	Calcium Hypochorite
2	JL　465 28 Nov '80	¥ 2,714,948	131-57682803 IC/TE-E 34418	Muller Hilton Medium
3	Sea King 02 Feb '81	¥31,964,108	YBK－15 1160-15110- 0080436	Willy's Laboratory Mill
4	Hallbarg 18 Jan '81	¥12,070,490	YB－35 IC/TE-E 35062	Ampoule Construction
合計		¥47,752,414		

なお、1月18日 Hallbongで到着した機材のうちFreez Dryer は、破損が発見された為、日本に返送し、保険求償手続き中である。

又、機材供与の現地調達分として、他に、トランスフォーマー（Ɓ125,000）、コンピューター用メモリーアップグレードキット（Ɓ156,000）が各々供与されている。

1－6　携行材料について

昭和５５年度に供与された携行材料は、下記の通り。

番号	便　　名	C.I.F. Bargkok	E/L, Insurane	主要材料	備　考
1	ＴＧ６０１ ５月１７日	¥　５３９,７４５	217-09972561 31390　1668	A ccupensor	酒井専門家
2	ＴＧ６０１ ５月１７日	¥　３３０,８３３	217-09972550 31390　1669	Gaw Agar	太田専門家
3	ＴＧ６０１ ６月１８日	¥　３３１,１４７	217-14103121 31390　2819	Green-P	〃
4	ＴＧ６０１ ６月１８日	¥　５９１,３３２	217-14103751 31390　2820	Glucomesser	酒井専門家
5	ＴＧ６０１ ７月２５日	¥　４１９,８５２	217-14103751 31390　4087	Insect net	熊岡専門家
6	Hallborg ７月２３日	¥　８２８,８４４	YB-26 IC/TE-E 32633	Plasticcap	〃
7	ＴＧ６０１ ９月１３日	¥　４０９,７８５	217-14119560 31390　5991	Bat	森　専門家
8	ＴＧ６０１ ９月２１日	¥　７１,２０５	217-14119604 31390　6239	Ethyl Alchal	〃
9	ＣＸ５０１ １１月１４日	¥　４１７,７００	160　15581542 不　明	Steel Locker	〃
合計		¥3,９４０,４４３			

1－7　レポートの発行

昭和５５年度に発行されたレポートは下記の通り。

1－7－1　“コレラ、チフス、赤痢の予防”（タイ語）　昭和５５年４月

プロジェクトサイトの衛生担当官が使用することを前提にタイ語で作成した。

1－7－2　Inerim Report Ⅱ　　昭和５６年２月

昭和５５年１１月の共同エバリュエーション実施時の講演会の発表内容を中心に、学術論文集として発行した。

1－7－3　タイ国地域保健活動向上計画報告書Ⅳ　　昭和５６年１月

昭和５５年度のプロジェクトの活動内容を編集した。

なお、本プロジェクトに係るレポートについては、昨年度までに

ⅰ）タイ国医療協力基礎調査報告書

ⅱ）タイ国地域保健向上計画総合報告書

ⅲ）タイ国地域保健向上計画報告書Ⅰ

ⅳ）タイ国地域保健向上計画報告書Ⅱ

ⅴ）タイ国地域保健向上計画報告書Ⅲ

ⅵ）“Promatioe of Provircial Health Servies Project”

“Irteim Repat”

が、発刊済みである。

1－8　プログレスレポートの発行

昭和５５年度のプログレスレポートの発行は下記の通り

1－8－1　Progress Report No Ⅱ

April ～June　1980

1－8－2　Progress Report No Ⅲ

July ～Sehtenle　1980

1－8－3　Progress Report No Ⅳ

October ～Decenlen　1980

1－8－3　Progress Report No Ⅰ

January ～Mach　1981

なお、これらProgress Reportは、資料として報告書に添付されている。

1－9　コーディネーテングコミッティーについて

昭和５５年度のコーディネーテングコミッティーは、１０月２日に医科学局内で開催された。

主な議題は下記の通り

ⅰ）過去５ケ年間のプロジェクトのレビュー

ii) １１月に予定されているプロジェクトの共同エバリュエーションの手法

iii) プロジェクトの協力期間の延長について

iv) 公衆衛生研究所構想について

なお、これとは別に、昭和５６年度の機材供与と研修員の受入数について、タイ側の素案を作成するためのサーキュレーションが、１１月と昭和５６年２月に行なわれた。

Progress Report No. II

Project : Promotion of Provincial Health Services

April - June 1980

As the progresses of Activity V - Community Participation in Health Promotion, now some of the fundamental health status of the villagers has been clarified. In every tambon respitatory tract infection is common, anemia existed widely among villagers and the biggest problem among children is malaria which is also a problem facing the health authorities.

I. Expert

1. Mr. Takeo Miyazaki, expert in Biochemistry, has finished his term from 11 April 1978 to 10 April 1980.

2. Dr. Takeshi Itoh, expert in Bacteriology has also returned to Japan after one year working in Thailand from 21 April 1979 to 20 April 1980.

3. Dr. Kenji Ohta, a new expert in Bacteriology, arrived in Bangkok on 1 April 1980 to replace Dr. Takeshi Itoh. Dr. Ohta will stay in Thailand until 31 March 1981.

4. Mr. Hiroshi Sakai, Laboratory Technologist, arrived on 24 April 1980. His schedule will last until 23 April 1981.

II. Fellowship

Dr. Sutas Guptarak, Project Director, went to Japan from June 15, to June 22, 1980 for discussing with the Japanese authorities on the extension of the project.

III. Project's activity

3.1 Activity I

3.1.1 Strengthening of the PHL as a clinical diagnostic laboratory

1. Clinical chemistry

Three lots of lyophilized sera, designated as Sigma I, Sigma II and consera, were used to run for the internal quality control during April 1980 to June 1980.

The results are shown in Table I and Table I.

Table 1 Using Sigma I & Sigma II

	Sigma I					Sigma II				
	N	$\bar{X}$	S.D.	$\overset{*}{CV}_{\%}$	Assigned Value	N	$\bar{\lambda}$	S.D.	$\overset{*}{CV}_{\%}$	Assigned Value
Glucose, mg/dl	53	198.9	12.44	6.25	215	35	63.20	5.73	9.06	61
B.U.N., mg/dl	56	64.53	8.5	13.17	59	51	18.04	1.49	8.25	15
Creatinine, mg/dl	57	4.52	0.39	8.62	4.8	53	1.04	0.17	16.34	1.1
Cholesterol, mg/dl	56	242.62	12.70	5.23	224	51	126.19	9.86	7.81	121
Total protein, g/dl	61	6.85	0.47	6.86	6.4	55	5.45	0.38	6.97	5.1
Albumin, g/dl	60	4.6	0.37	8.04	3.9	56	3.65	0.37	10.13	3.2
Na., mEg/L	63	146.84	2.59	1.76	140	61	135.36	2.15	1.58	136
K., mEq/L	61	5.46	0.19	3.47	5.3	59	4.07	0.12	2.94	4
Cl., mEq/L	59	98.45	3.35	3.40	99	44	93.81	3.86	4.11	95
Bilirubin, mg/dl	52	1.34	0.20	14.92	2.1	28	0.84	0.22	26.19	1
Alk. phosphatase	48	53.92	22.44	41.61	91	44	23.37	9.57	40.94	35
GOT	51	46.41	12.28	26.45	90	47	29.74	10.53	35.40	43
GPT	49	60.62	36.06	59.48	91	46	39.09	18.75	47.96	37

Table II Using Consera

	Consera				
	N	$\bar{X}$	S.D.	$\overset{*}{CV}_{\%}$	Assigned Value
Clucose, mg/dl	19	123.63	4.86	3.93	128
BUN, mg/dl	15	18.53	1.72	9.28	17
Creatinine, mg/dl	15	1.22	0.23	19.26	1.1
Cholesterol, mg/dl	17	165.94	13.25	7.98	150
Total protein, g/dl	18	7.00	0.37	5.31	6
Albumin (BCG), g/dl	18	4.66	0.22	4.92	3.55
Na., mEq/L	19	131.21	1.43	1.09	128
K, mEq/L	19	4.29	0.13	3.05	4.2
Cl., mEq/L	19	96.94	2.95	3.04	93
Bilirubin, mg/dl	19	0.39	0.06	17.11	-
Alk. phosp.	14	25.32	6.67	26.37	-
GOT	12	13.33	3.67	27.57	41
GPT	11	5.72	2.05	35.90	28

* Since all tests were performed during the routine conditions, therefore the CV is actually a RCV.

2. Clinical Hematology

a. Number of white blood cell count, automated method : 3,944
b. Number of red blood cell count, automated method : 5
c. Number of platelet count, phase-contrast method : 548
d. Number of test, prothrombin time : 45
e. Number of test, PTT : 6

3. Virology

a. Detection of HBsAg. and Anti HBs

Sera from blood donors and symptomatic patients were examined for HBsAg. and Anti HBs during the three-month period, April - June 1980. The results are shown in Table III.

Table III

Sources of specimen	No. of specimen examined	Positive for HBs Ag.		Positive for Anti HBs	
		No. of specimen	Percent-age	No. of specimen	Percent-age
Blood donors	829	97	11.7	329	39.69
Patients	60	12	20	16	26.67

b. Serodiagnosis and DHF suspected patients

Two hundred and five (205) cases of recent Dengue infection are detected among two hundred and eighty nine (289) cases examined serologically, constituting 70.9 % positive cases.

3.1.2 Strengthening of the PHL as a public health laboratory

1. Examination of feces for surveillance of diarrheal diseases,

a. Number of specimen from PCMO - Patient : 289
- Contact : 490

Number of specimen positive for enteropathogens - Patient : 66
- Contact : 38

b. Number of specimen from Prapokklao Hospital : 2,230

Number of specimen positive for enteropathogen : 517

2. Bacteriologic examiantion of food and water

a. Food, number of specimen : 33

b. Water, number of specimen : 60

3.1.3 Strengthening of the SRL in the three districts hospital and one district health and medical center

The laboratory activities of four SRL during the period of three months are listed as follows :

1. TAMAI DISTRICT HOSPITAL

A. MICROBIOLOGY

- Blood parasitology-Malaria = 1,388

B. HAEMATOLOGY

- Haematocrit = 798
- WBC count = 798
- Diff, count = 798

C. URINE ANALYSIS = 122

2. KLUNG DISTRICT HOSPITAL

A. MICROBIOLOGY

- Gram stain - G.C. = 5
- AF stain - TB = 6
- Blood parasitology - Malaria = 533
- Stool parasitology-Protozoa : Helminths = 21

B. HAEMATOLOGY

- Haematocrit = 290
- Haemoglobin = 377
- WBC count = 309
- Diff. count = 301
- Blood group = 82
- R.P.R. = 106

C. URINE ANALYSIS = 280

3. LAEMSINGHA DISTRICT HOSPITAL

A. MICROBIOLOGY

- Gram stain - G.C. = 1
- AF stain - TB = 2
- Blood parasitology - Malaria = 472
- Stool parasitology - Protozoa : Helminths = 5

B. HAEMATOLOGY

- Haematocrit = 127
- Haemoglobin = 99
- WBC count = 92
- Diff. count = 89
- FBS. = 4
  others
- Rectal swab = 44

C. URINE ANALYSIS = 128

4. PHONG NUM-RON DISTRICT HEALTH AND MEDICAL CENTER

A. MICROBIOLOGY

- Gram stain - Pathogens = 2
- Blood parasitology - Malaria = 701

B. HAEMATOLOGY

C. URINE ANALYSIS = 8

3.2 Activity II

3.2.1 DPHLS

Chemical reagents, bacteriological media and antisera have been supplied by DPHLS to PHL Chanthaburi and Cholburi during April to June 1980.

3.2.2 DFA

1. Analysis results of food samples collected from Chanthaburi

Four bottled water and two ice making plants in Chanthaburi were visited by DFA and PCMO staffs during 19 - 21 May 1980. Samples of raw and treated water including finished product were taken for quality checking. Analyses results showed that microbiological quality of all samples, except treated water from reservoirs of two bottled water and one ice making plants, did not meet the standard of drinking water while the chemical quality did for all samples.

It was observed that the main sources of contamination might be from cleaning and sealing facilities. Advice was recommended to the plant managers.

Some other kinds of food were also collected which the results were as follows.

Fish sauce : Two samples of fish sauce collected from the plant in Tamai had meet the standard quality.

Food color : Two samples of dried salted shrimps collected from Laemsing were found to be colored with non permitted color, Croceine scarlet 3 B.

Pesticide residues : Mangosteen, egg plant, young corn, and rambutan from Chanthaburi city were analyzed for pesticide residues, traces of DDT and dieldrin were found only in egg plant sample.

2. Research work

Under the supervision of Dr. M. Toyoda, the following works had been carried out:

1) L-Glutamic acid : Fifteen samples of fish sauce from Chanthaburi, Chonburi and Bangkok were analyzed. L-Glutamic acid content in first grade fish sauce from original vat was 31.30 mg./ml, the average content in 4 samples of bottled - pure fish sauce was 25.46 mg./ml. and 10 samples of bottled - mix fish sauce was 9.32 mg./ml.

2) Boric acid : Boric acid content in processed foods were compared with those in fresh foods. Boric acid of sixteen samples of fresh mango were in the range of 0.2 - 24.0 ppm. From 15 samples of salted and sweetened mango, 13 samples showed 0 - 17.0 ppm. and 2 samples showed 354.6 - 430.9 ppm. It indicated that the last 2 samples used boric acid as a preservative.

Three samples of fresh turnip contained boric acid 9.8 - 11.0 ppm. and 15 samples of salted and salted - sweetened turnip showed 16.1 - 51.7 ppm.

Three samples of salted peach were also analyzed and found 7.6 - 18.0 ppm.

3.2.3 VRI

1) Isolation and identification of dengue virus

According to the electric current in Chanthaburi province, the deep freezer -70°C could not be operated and controled for keeping of suspected patient serum in Prapoklao hospital. No specimens for virus isolation sent to VRI.

2) Production and standardization of arbovirus reagents

a. Production of antigens

CHIK SA Pr Antigen 0.5 ml. x 246 Amps.

CHIK SA Antigen 0.5 ml. x 10 Amps.

b. Production of reference antisera

Positive control sera

Pool DHF 0.5 ml. x 21 Amps.

3.2.4 DME

1. Entomological study of arbovirus Chanthaburi

Second round Aedes aegypti control was carried out in the month of May and June. 24787 Water containers (85.8% of total) in 6776 houses of 13 locations were applied with Abate larviciding and 7993 houses in 19 locations were treated with Malathion technical grade (details in Tables 1 + 2). Mosquito densities were monitored, the larval density was 70% reduced and the female landing rate was under 2 per man hour for three weeks.

Dengue Haemorrhagic Fever cases were reported mostly from rural areas.

2. Urban rodent study

Rodent study had been going on from January to middle of May when the team had to concentrate on Aedes aegypti contraol. The results are given in the Tables I - VI.

Table 1 Summary of Abate Application - Second Cycle in Chanthaburi Province (1980)

Date Treated	Community	No. Houses in Treated Area	No Houses Treated		No. Houses Untreated		No. of Containers		Amt. Abate used		Amt. Abate given to house owned (gm.)
			Com-plete-ly	Par-tial-ly	Locked (%)	Refused (%)	Treated (%)	Untreated (%)	Kg.	g./ house	
27-28/5/80	Municipality	3,126	1,687	558	721(23.1)	160(5.1)	9,986(85.5)	1,695(14.5)	97.24	43.3	2,900
29/5/80	Chantanimit	890	386	222	219(24.6)	63(7.1)	3,048(81.8)	679(18.2)	27.38	45.0	500
2/6/80	Khao Raya	90	43	13	30(33.3)	(4.5)	398(91.5)	37(8.5)	5.08	90.7	280
2/6/80	Ban Noen-Soung	63	33	8	21(33.3)	1(1.6)	258(93.5)	18(6.5)	2.76	67.3	20
5/6/80	Ban Nong-Bua	106	54	35	12(11.3)	5(4.7)	1,105(78.7)	299(21.3)	12.74	143.1	510
2/6/80	Thamai	555	226	131	159(28.7)	39(7.0)	1,999(81.4)	457(18.6)	18.08	50.6	700
2/6/80	Bangacha	169	70	66	27(15.9)	6(3.6)	1,039(84.5)	191(15.5)	9.56	70.3	170
4/6/80	Na-Yai-Arm	221	95	48	66(29.9)	12(5.4)	468(77.1)	139(22.9)	7.95	55.6	760
4/6/80	Ban Nong-Kla	173	93	33	42(24.3)	5(2.9)	862(92.3)	72(7.7)	10.38	82.4	1,210
4/6/80	Ban Huay-Sa-Ton	99	62	19	16(16.2)	2(2.0)	458(91.8)	41(8.2)	6.11	75.4	290
3/6/80	Khlung	849	426	152	239(28.2)	32(3.8)	2,897(90.8)	293(9.2)	23.61	40.8	880
5/6/80	Ban Pliu	193	107	36	46(23.8)	4(2.1)	913(93.2)	67(6.8)	11.15	77.9	1,440
5/6/80	Makham	242	136	54	48(19.8)	4(1.7)	1,356(91.9)	120(8.1)	14.19	77.7	740
	Total 13 Locations	6,776	3,418	1,375	1,646(24.3)	337(4.9)	24,787(85.8)	4,108(14.2)	246.23	51.4	10,400

Table 2 Summary of Adulticiding (Malathion 96%) Second Cycle in Chanthaburi Province (198)

Date Treated	Community	Total No. Houses	Total Population*	Amt. of Insecticide Used		Total Insecticide Used (ml.)	Insecticide Applied per House (ml./house)
				Leco-HD (lit.)	Mist-Blower (lit.)		
6-7/6/80	Municipality	3,126	19,194	15.000	44.965	59,965	19.18
9/6/80	Chantanimit	890	5,465	7.100	19.390	26,490	29.76
10/6/80	Khao Raya	90	553	-	2.775	2,775	30.83
10/6/80	Ban Noen-Soung	63	387	-	2.260	2,260	35.87
13/6/80	Ban Nong-Bua	106	651	2.800	0.630	3,430	32.36
10/6/80	Thamai	555	3,408	9.500	-	9,500	17.12
10/6/80	Bangacha	169	1,038	5.500	-	5,500	32.54
14/6/80	Na Yai-Arm	221	1,357	-	6.860	6,860	31.04
14/6/80	Ban Nong-Kla	173	1,062	-	4.165	4,165	24.08
14/6/80	Ban Huay-Sa-Ton	99	608	-	1.740	1,740	17.58
11/6/80	Khlung	849	5,213	11.500	6.360	17,860	21.04
13/6/80	Ban Pliu	193	1,185	3.500	-	3,500	18.13
13/6/80	Kao Perid	149	915	2.500	-	2,500	16.78
13/6/80	Nong Chim	392	2,407	-	16.595	16.595	42.33
12/6/80	Makham	242	1,486	3.200	-	3,200	13.22
12/6/80	Ban Nong-Or	30	184	0.625	-	625	20.83
12/6/80	Ban Pa-Thong	414	2,542	3.500	2.860	6,360	15.36
12/6/80	Ban Tan-Moon	100	614	1.500	0.300	1,800	18.00

Table 2 Summary of Adulticiding (Malathion 96%) Second Cycle in Chanthaburi Province (198) (Cont'd)

Date Treated	Community	Total No. Houses	Total Population*	Amt. of Insecticide Used		Total Insecticide Used (ml.)	Insecticide Applied per House (ml./house)
				Leco-HD (Lit.)	Mist-Blower (lit.)		
12/6/80	Ban Tab-Sai	132	810	-	0.975	975	7.39
	Total 19 Location	7,993	49,079	66.225	109.875	176,100	22.03

* Calculated from 6.14 persons/house

From Ministry of Interior (1980)

Total Population in Chanthaburi	321,590
Number of Houses	52,415
Av. Number persons/house	6.14

Rodent Survey in Chanthaburi had been carried out the results are given in the Table I to VI.

Table 1 Summary of Trapping Results

Study Area	Toongbencha Vill. 1		Municipality Zone II		Samrong Vill. 2, 8		Chantanimit Vill. 2, 3, 4	
Date Trapped	Jan. 15-18		Jan. 21-24		Feb. 18-21		Feb. 25-28	
Details of Study	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.
No. Nights (trap placed)	3	18	3	21	3	24	3	27
Total traps set	240	1,440	240	1,680	240	1,920	240	2,160
Total rat captured	10	229	39	268	19	287	38	325
Avg. No. traps/night	80	80	80	80	80	80	80	80
Avg. No. animals/night	3.3	12.7	13	12.8	6.3	11.9	12.7	12.0
Capture rate	4.2	15.9	16.3	15.9	7.9	14.9	15.8	15.0
No. house animals captured	4		15		7		16	
Avg. No. rate captured in one house	0.5		1.95		0.95		1.9	
Max. No. rats captured in one house	4		10		9		5	

Table 1 Summary of Trapping Results (Cont'd)

Study Area	Tagad-Ngao Vill. 4		Municipality Zone I		Ban. Bo Vill. 5, 6		Municipality Zone III	
Date Trapped	March 17-20		March 24-27		April 15-18		April 22-25	
Details of Study	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.
No. nights (trap placed)	3	30	3	33	3	36	3	39
Total traps set	300	2,460	300	2,760	300	3,060	300	3,360
Total rat captured	25	350	60	410	6	416	73	489
Avg. No. traps/night	100	82	100	83.6	100	85.0	100	86.2
Avg. No. Animals/night	8.3	11.7	20.0	12.4	2.0	11.6	24.3	12.5
Capture rate	8.3	14.2	20.0	14.9	2.0	13.6	24.3	14.6
No. house animals captured	12		19		6		19	
Avg. No. rate captured in one house	1.0		2.4		0.24		2.9	
Max. No. rats captured in one house	7		9		1		9	

Table 2 Summary of the Animal Species and Number Captured

Area	Toongbencha Vill. I		Municipality Zone II		Samrong Vill. 2, 8		Chantanimit Vill. 2, 3, 4		Tagad-Ngao Vill. 4	
Date	Jan. 15-18		Jan. 21		Feb. 18-21		Feb. 25-28		March 17-20	
Details of Study	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.
Rattus norvegicus	0	91	32	123	0	123	16	139	2	141
Rattus exulans	7	120	6	126	15	141	20	161	17	178
Rattus rattus	0	1	0	1	1	2	0	2	6	8
Rattus surifers	3	3	0	3	0	3	0	3	0	3
Crocidura murina	0	13	1	14	0	14	1	15	0	15
Bandicota indica	0	0	0	0	1	1	0	1	0	1
Bandicota savelei	0	0	0	0	2	2	0	2	0	2
Total	10	228	39	267	19	286	37	323	25	348

Area	Municipality Zone I		Ban. Bo. Vill. 5, 6		Municipality Zone III		Extra traps*	
Date	March 24-27		April 15-18		April 22-25		Oct.79 - April 80	
Details of Study	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.
Rattus norvegicus	50	191	0	191	35	226	6	232
Rattus exulans	4	182	5	187	21	208	15	223
Rattus rattus	0	8	0	8	0	8	3	11
Rattus surifers	0	3	0	3	0	3	0	3
Crocidura murina	6	21	0	21	17	38	6	44

Table 2 Summary of the Animal Species and Number Captured (Cont'd)

Area	Municipality Zone I		Ban. Bo. Vill. 5, 6		Municipality Zone III		Extra traps*	
Date	March 24-27		April 15-18		April 22-25		Oct.79 - April 80	
Details of Study	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.	No. Coll.	Cumm.
Bandicota indica	0	1	1	2	0	2	0	2
Bandicota savelei	0	2	0	2	0	2	0	2
Total	60	408	6	414	73	487	30	517

* The traps placed by the house owners

Table 3 Summary of Host Flea Data

Area	Host	No. examined	No. infested	% infested	Total Flea	GI*	SI*
Toongbencha Village No. I	Rattus exulans	7	-	-	-	-	-
	Rattus surifers	3	-	-	-	-	-
		10	-	-	-	-	-
Chanthaburi Municipality Zone II	Rattus norvegicus	32	14	43.8	41	1.3	2.9
	Rattus exulans	6	-	-	-	-	-
	Crocidura murina	1	-	-	-	-	-
		39	14	35.9	41	1.1	2.9
Samrong Village No. 2, 8	Rattus exulans	15	2	13.3	3	0.2	1.5
	Rattus rattus	1	-	-	-	-	-
	Bandicota indica	1	-	-	-	-	-
	Bandicota savelei	2	-	-	-	-	-
		19	2	10.5	3	0.2	1.5
Chantanimit Village No. 2, 3, 4	Rattus norvegicus	16	3	18.8	4	0.3	1.3
	Rattus exulans	20	5	25.0	5	0.3	1.0
	Crocidura murina	1	-	-	-	-	-
		37	8	21.6	9	0.2	1.1
Tagad-Ngao Village No. 4	Rattus norvegicus	2	1	50.0	2	1.0	2.0
	Rattus exulans	17	5	33.3	6	0.4	1.2
	Rattus rattus	6	2	22.2	4	0.4	2.0
		25	8	32.0	12	0.5	1.5
Chanthaburi Municipality Zone I	Rattus norvegicus	50	35	70.0	102	2.0	2.9
	Rattus exulans	4	2	50.0	2	0.5	1.0
	Crocidura murina	6	2	33.3	4	0.7	2.0
		60	39	65.0	108	1.8	2.8
Ban Bo Village No. 5, 6	Rattus exulans	5	-	-	-	-	-
	Bandicota indica	1	1	100.0	3	3.0	3.0
		6	1	16.7	3	0.5	3.0
Chanthaburi Municipality Zone III	Rattus norvegicus	35	11	31.5	30	0.8	2.7
	Rattus exulans	21	6	28.6	9	0.4	1.5
	Crocidura murina	17	4	23.5	8	0.5	2.0
		73	21	28.8	47	0.6	2.2
Extra traps	Rattus norvegicus	6	3	50.0	4	0.7	1.3

Table 3 Summary of Host Flea Data (Cont'd)

Area	Host	No. examined	No. infested	% infested	Total Flea	GI*	SI*
	Rattus exulans	15	2	13.3	2	0.1	1.0
	Rattus rattus	3	-	-	-	-	-
	Crocidura murina	6	-	-	-	-	-
		30	5	16.7	6	0.2	1.2
Total		299	98	32.8	229	0.8	2.3

* GI = General Flea Index

* SI = Specific Flea Index

Table 4 Summary of Host Ectoparasite Data

Area	Host	No. examined	Mite			Lice		
			No. infected	% infected	Total	No. infected	% infected	Total
Toongbencha Village No. 1	Rattus exulans	7	1	14.3	1	-	-	-
	Rattus surifers	3	3	100.0	413	-	-	-
		10	4	40.0	414	-	-	-
Chanthaburi Municipality Zone II	Rattus norvegicus	32	23	71.9	318	-	-	-
	Rattus exulans	6	1	16.7	4	-	-	-
	Crocidura murina	1	-	-	-	-	-	-
		39	24	61.5	322	-	-	-
Village No. 2, 8	Rattus exulans	15	-	-	-	-	-	-
	Rattus rattus	1	-	-	-	-	-	-
	Bandicota indica	1	-	-	-	-	-	-
	Bandicota savelei	2	-	-	-	-	-	-
		19	-	-	-	-	-	-
Chantanimit Village No. 2, 3, 4	Rattus norvegicus	16	10	62.5	169	-	-	-
	Rattus exulans	20	3	15.0	5	-	-	-
	Crocidura murina	1	-	-	-	-	-	-
		37	13	35.1	174	-	-	-
Tagad-Ngao	Rattus norvegicus	2	1	50.0	6	-	-	-

Table 4 Summary of Host Ectoparasite Data (Cont'd)

Area	Host	No. examined	Mite			Lice		
			No. infected	% infected	Total	No. infected	% infected	Total
Village No. 4	Rattus exulans	17	7	41.2	14	-	-	-
	Rattus rattus	6	2	33.3	27	-	-	-
		25	10	40.0	47	-	-	-
Chanthaburi	Rattus norvegicus	50	27	54.0	165	-	-	-
Municipality	Rattus exulans	4	-	-	-	-	-	-
Zone I	Crocidura murina	6	1	16.7	1	-	-	-
		60	28	46.7	166	-	-	-
Ban Bo	Rattus exulans	5	-	-	-	-	-	-
Village No. 5,	Bandicota indica	1	-	-	-	-	-	-
6		6	-	-	-	-	-	-
Chanthaburi	Rattus norvegicus	35	24	68.6	148	-	-	-
Municipality	Rattus exulans	21	3	14.3	3	-	-	-
	Crocidura murina	17	-	-	-	-	-	-
		73	27	36.9	151	-		
Extra traps	Rattus norvegicus	6	6	100.0	33	-	-	-
	Rattus exulans	15	7	46.7	13	-	-	-
	Rattus rattus	3	1	33.3	1	-	-	-
	Crocidura murina	6	-	-	-	-	-	-
		30	14	46.7	47	-	-	-
Total		299	120	40.1	1,321	-	-	-

Table 5 Summary of Parasites in Liver Data

Area	Host	No. examined	Capillaria hepatica		Cysticercus fasciolaris	
			No. positive	% positive	No. positive	% positive
Toongbencha	Rattua exulans	7	-	-	-	-
Village No. 1	Rattus surifers	3	-	-	-	-
		10	-	-	-	-
Chanthaburi	Rattus corvegicus	32	25	78.1	11	34.4

Table 5 Summary of Parasites in Liver Data (Cont'd)

Area	Host	No. examined	Capillaria hepatica		Cysticercus fasciolaris	
			No. positive	% positive	No. positive	% positive
Municipality Zone II	Rattus oxulans	6	-	-	1	16.7
	Concidura murina	1	-	-	-	-
		39	25	64.1	12	30.8
Samrong Village No. 2, 8	Rattus exulans	15	-	-	1	6.7
	Rattus rattus	1	-	-	-	-
	Bandicota indica	1	-	-	-	-
	Bandicota savelei	2	-	-	-	-
		19	-	-	-	5.3
Chantanimit Village No. 2, 3, 4	Rattus norvegicus	16	13	81.3	7	43.8
	Rattus exulans	20	1	5.0	-	-
	Crocidura murina	1	1	100.0	-	-
		37	15	40.5	7	18.9
Tagad-Ngao Village No. 4	Rattus norvegicus	2	-	-	-	-
	Rattus exulans	17	-	-	-	-
	Rattus rattus	6	-	-	-	-
		25	-	-	-	-
Chanthaburi Municipality Zone I	Rattus norvegicus	50	36	72.0	19	38.0
	Rattus exulans	4	-	-	-	-
	Crocidura murina	6	-	-	-	-
		60	36	63.3	19	31.7
Ban Bo Village No. 5, 6	Rattus exulans	5	-	-	-	-
	Bandicota indica	1	-	-	-	-
		6	-	-	-	-
Chanthaburi Municipality	Rattus norvegicus	35	30	85.7	22	62.8
	Rattus exulans	21	5	23.8	2	9.5
	Crocidura murina	17	-	-	-	-
		73	35	47.9	24	32.9
Extra traps	Rattus norvegicus	6	5	83.3	5	83.3
	Rattus exulans	15	1	6.7	3	20.0
	Rattus rattus	3	-	-	-	-
	Crocidura murina	6	-	-	-	-

Table 5 Summary of Parasites in Liver Data (Cont'd)

Area	Host	No. examined	Capillaria hepatica		Cysticercus fasciolaris	
			No. positive	% positive	No. positive	% positive
		30	6	20.0	8	26.7
Total		299	117	39.1	71	23.7

Table 6 Summary of Isolation of Enteropathogenic Bacteria Data

Area	Host	No. wxamined	No. positive	% positive	Salmonella epp.	Vibrio para-haemolyticus	So-called NAG-Vibrio	Plesiemonas shigelloides
Toongbencha Village No. 1	Rattus exulans	7	-	-	-	-	-	-
	Rattus surifers	3	-	-	-	-	-	-
		10						
Chanthaburi Municipality Zone II	Rattus norvegicus	16	6	43.8	1	1	2	5
	Rattus exulans	5	2	50.0	-	-	-	2
	Crocidura murina	1	1	100.0	1	1		1
		22	10	45.5	2	2	2	6
Chantanimit Village No. 2, 3, 4	Rattus norvegicus	12	7	58.3	5	2	-	-
	Rattus exulans	10	1	10.0	-	1	-	-
		22	8	36.4	5	3	-	-
Extra traps	Rattus norvegicus	5	4	80.0	1	2	-	2
	Rattus exulans	1	-	-	-	-	-	-
	Crocidura murina	6	6	100.0	3	2	2	1
		18	10	83.3	4	4	2	3
Total		66	28	42.4	11	9	4	9

3.2.5 DCP

1. Report on Bacteriological works

a. One hundred and thirty four specimens were received from PHL Chanthaburi for typing as follows :-

E. coli	65
Salmonella	24
V. cholerae	32
E. tarda	13

b. Supply of antisera and antigens to PHL Chanthaburi

antisera	8 ml.
Widal antigen	6,000 ml.

2. Report on Parasitological work

During the months of April to June 1980, the rats from Chanthaburi were examined for human-endoparasites. Results are given in the table 1-2.

Table 1 Angiostrengylus Cantonensis Found in The Lungs

Area	No. examined	No. positive
Tagad Ngao district, Tamai	25	0
Municipality of Chanthaburi, Zone I	59	6
Ban Bo district, Klung	6	0
Municipality of Chanthaburi, Zone III	73	13
Total	163	19

Table 2 Endoparasites of Rats that can be Human-Endoparasites

Area	No. examined	No positive		
		Hn	Hd.	Rs.
Tagad Ngao district, Tamai	25	2	5	2
Municipality of Chanthaburi, Zone I	59	2	11	15
Ban Bo district, Klung	6	0	0	0
Municipality of Chanthaburi, Zone II	73	8	0	21
Total	163	12	16	38

3.2.6 Cholburi

1. Cholburi Hospital

	April	May	June
Bacteriological examination	6,420	4,285	4,135
Serological examination	1,042	1,130	1,557
Parasitological examination	4,895	4,877	6,033
Mycological examination	443	300	294
Haematological examination	8,650	9,837	11,428
Clinical Chemistry examination	3,640	3,383	3,602
Spinal Fluid examination	348	306	258
Urine examination	4,114	6,052	6,952
Sanitation	94	39	42
Detection for Hepatitis B Antigen	28	24	29
Determination of Protein Fraction	8	12	18
Rabies diagnosis by Fluorescent	-	-	3
Others (Media prep. etc.)	161,500 cc.	123,042 cc.	204,000 cc.

2. Panatnikom District Hospital

	April	May	June
Blood film for Malarial Parasites	400	319	599
Complete Blood count	400	433	599
Blood Chemistry	72	120	79
Blood for VDRL	89	116	105
Blood for Serology test	63	52	60
Stool Examination	40	32	40
Urine Examination	846	738	669
Microbiology	95	92	70
Bleeding Donor / Blood Transfusion	40/46	24/48	47/56

3. Banglamung District Hospital

	April	May	June
Sputum exam	18	8	7
Gram stain	143	135	148
Blood film for parasites	157	178	188

	April	May	June
V.D.R.L.	125	241	175
Pregnancy test	52	37	41
Urine examination	442	343	428
Complete bloodcount	74	99	88
Hematocrit	151	168	132
Stool exam and culture	5	5	15
Rectal swab	28	43	24
F.B.S.	11	26	23
B.U.N.	7	16	6
Creatinine	6	11	4
Uric acid	1	-	1
Chloesterol	4	4	3
Protein	7	1	1
Bilirubin	4	2	6
S.G.O.T.	4	2	6
S.G.P.T.	4	2	6
Alkaline phosphatase	3	2	4
Amylase	-	-	1
Blood group	49	10	6
Volunteer donor	24	5	-
Cross matching	9	9	-
Widal agglutination	9	4	14

4. Ban Bung District Hospital

	April	May	June
Blood for Malaria	165	164	217
V.D.R.L.	39	41	79
Stool Examination	65	82	95
Urine Examination	61	121	94
Complete Blood count	88	89	105
Acid fast Bacilli	2	-	10
Gram Stain	9	5	4

3.3 Activity III

Staffs from PCMO Chanthaburi and Japanese experts have observed the activity of volunteer communicators in the following model areas, which their activity is excellent.

7 - 26 April 1980 Tambon Tagad-Ngao, Tamai district.
12 - 23 May 1980 Tambon Bo, Klung district.
13 - 20 June 1980 Tambon Saikao, Pong Namron district.

3.4 Activity IV

No training activity was performed during this period.

3.5 Activity V

3.5.1 Operational research in Virology

Sero-epidemiological surveys of arbovirus in Chanthaburi

Seven hundreds and ninety seven blood specimens of pre-epidemic season were collected from healthy people from Chanthaburi in May 1980. The determination for HI antibody are undertaken.

3.5.2 Analysis on Causative Agents of G I Diseases

a. Detection of Enteropathogens from Diarrheal Patients

Detection of enteropathogens from diarrheal in- and out-patients of Prapokklao Hospital and Tamai, Pongnamron, Klung and Laemsing district hospitals from April to June 1980 was shown in Table 1.

V. parahaemolyticus was isolated at the highest rate (40%) and other pathogens were enteropathogenic E. coli (27.6%), Shigella (18.0) and 36 cases of Salmonella (9.8%). S. typhi and S. paratyphi were not detected.

In 5% of enteropathogen-positive cases in these 3 months, more than two kinds of pathogenic organisms were found at the same time. Many cases positive with V. parahaemolyticus showed contamination with P. shigelloides, although its pathogenicity has not yet been established.

There were few cases of cholera last year. However, in this year more cases of cholera were found in Thailand. Twenty-seven cases of cholera (16 cases were shown in Table 1, but other 11 cases were detected

from 458 specimens taken from patients' family and contacts) were found in Chanthaburi in April. Six cases were detected in May.

b. Cholera Outbreak

Table 2 showed cholera outbreak from April to June 1980. Number of cholera cases shown here is different from number of V. cholerae shown in Table 1, since carriers of this microorganism, who were detected by culture of fecal specimens from patients' family or contacts, were added.

There were 13 cases (7 in April, 5 in May and 1 in June). Those were mainly speradic cases, but three incidences of apparent massive outbreak were recognised in April.

Biotype and serotype of the isolates were El tor, Ogawa mostly but 2 cases of El tor, Inaba were recognised in May. Those were the first cases isolated in Chanthaburi province.

These isolates were shown sensitivity to every antibiotic commonly used.

c. Incidence of Bacillary Dysentery

Sixty-six cases of Shigella were detected from April to June 1980. Geographical distribution of dysentery cases were shown in Table 3.

As seen in the results obtained in last year and January, February and March, this year, many cases were found in Ampore Muang and Ampore Pongnamron.

The majority of its type was S. flexneri 1b as seen in the last year. The next was S. sonnei. S. Flexneri 2a was increased from January to March, but this type was not detected in this period. Instead, S. sonnei increased in number and this was more than S. flexneri 1b in June.

Table 1 Isolation of Enteropathogenic Bacterin from Diarrheal Cases among In- and Out-Patients of Prapokklao and 4 District Hospitals in Chanthaburi

(April - June, 1980)

Month	No. of cases examined	No. of specimens examined	No. Pathogen -positive cases (%)	No. of isolates	Vibrio cholerae	NAG vibrio	Group F vibrio	V.para-haemo-lyticus	Shigellae	Entero-pathogenic E. coli	S. typhi	Other salmonella
April	630	(1,014)	132(21.0)	135	16	3	-	47	18	36	-	15
May	321	(694)	94(29.3)	103	6	8	-	46	14	23	-	6
June	384	(767)	140(36.5)	146	-	-	1	54	34	42	-	15
Total	1,335	(2,475)	366(27.4)	384	22	11	1	147	66	101	-	36

The number of isolates is greater than the number of positive, because the multiple pathogens isolated a single individual were enumerated as positive in each organism.

Table 2. Outbreak due to Vibrio cholerae, in Chanthaburi Province

(April - June, 1980)

Cases	Date	Place		No. of Patient	No. of Contact	Serotype
1.	April 3	Watmai,	Muang	1	-	Ogawa
2.	April 3	Tokprom,	Klung	1	-	"
3.	April 7-12	Bang Gacha,	Muang	2	1	"
4.	April 9	Watmai,	Muang	1	-	"
5.	April 12-19	Patong,	Pongnamron	3	11	"
6.	April 13	Songpeemong,	Tamai	1	-	"
7.	April 19-23	Saikao,	Pongnamron	1	5	"
8.	May 1	Watmai,	Muang	1	-	"
9.	May 7	Klongnarai,	Muang	1	-	Inaba
10.	May 6	Tokprom,	Klung	1	-	"
11.	May 20	Saikao,	Pongnamron	1	-	Ogawa
12.	May 28	Saikao,	Pongnamron	1	-	"
13.	June 5	Kaenghangmaew,	Tamai	1	-	"

Table 3 Geographical Distribution of Bacillary Dysentery in Chanthaburi Province

(April - June, 1980)

Serotype		Muang	Tamai	Klung	Makam	Pongnamron	Laemsing	Unknown	Total
S. dysenteriae	1	-	-	-	-	-	-	1	1
	2	1	1	-	-	1	-	-	3
S. frexneri	1b	11	2	3	-	5	-	4	25
	2b	2	1	-	1	2	-	-	6
	4	2	-	-	-	-	1	3	6
	B group	1	-	-	-	-	-	-	1
S. boydii	2	-	-	-	-	-	-	3	3
S. sonnei		5	3	3	1	4	1	4	21
Total		22	7	6	2	12	2	15	66

3.5.3 Community Participation in Health Promotion

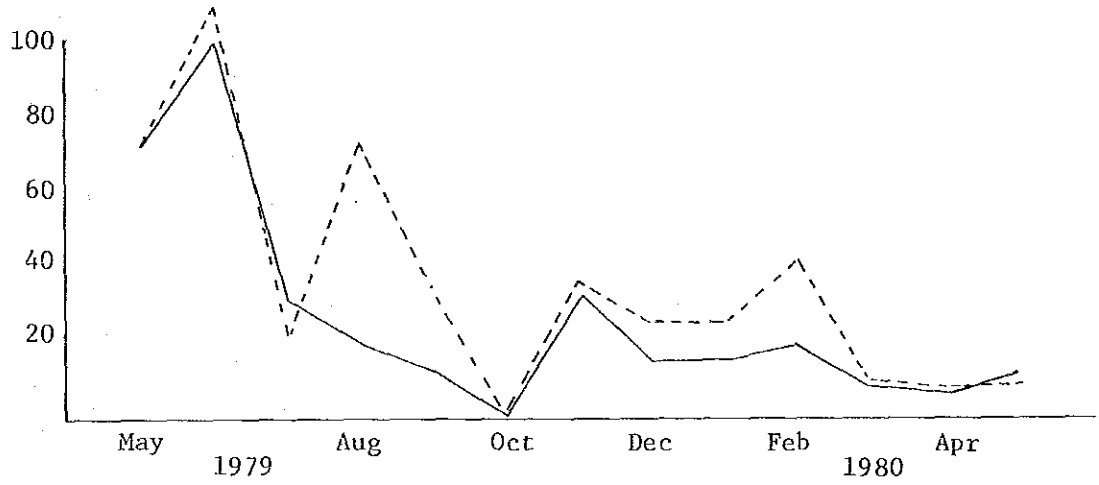
Chanthaburi province was selected as field province in the project "Promotion of Provincial Health Services". The whole province

was, however, too large to do some active trials in community participation in health promotion. Three tambons were, therefore, selected as field tambons. In those tambons, two villages have their volunteer communicators respectively.

Epidemiological Surveillance

It was made obligatory on these volunteer communicators to report febrile and diarrheal cases and birth and death to the health centre. This was the primitive trial of epidemiological surveillance at the village level. This plan has been done for more than one year.

Report of Febrile and Diarrheal Cases from Volunteer Communicators in Village 2 & 8 in Tambon Saikao

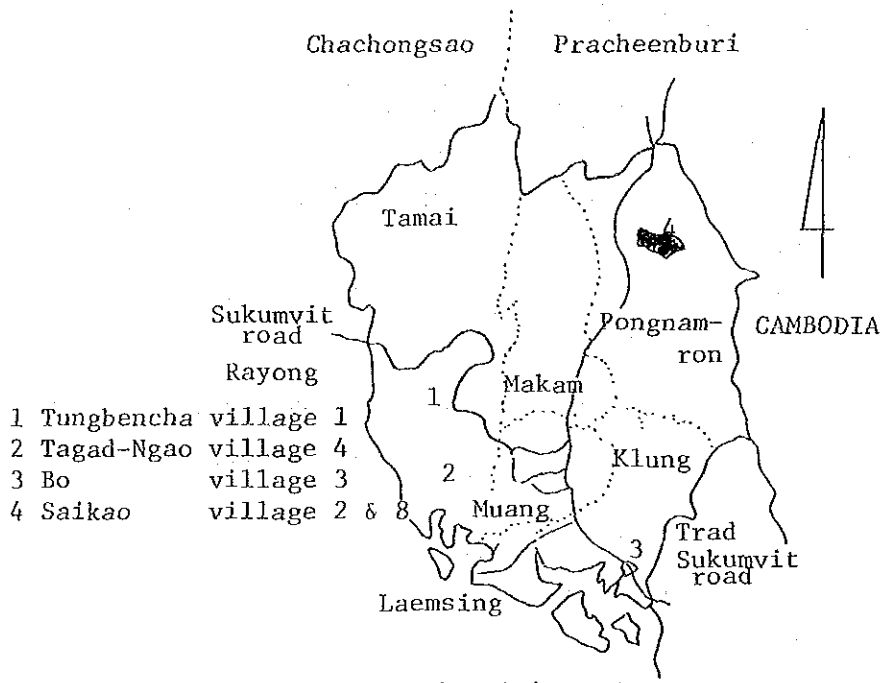


As shown in the figure, fairly large number of cases has been reported. They are expected to report febrile and diarrheal cases everyday. In village 2 & 8 of tambon Saikao, each volunteer takes care of about 50 people. Generally their activity is excellent and better than other tambons presumably because the village is far from medical facilities and they must help each other.

Introduction

It has become necessary to know the present situation of villagers' health before we step into further public health activities. Therefore, one village was selected from each field tambon and another village where no volunteers have not been appointed yet, was selected as a control

village. This is village 1 of tambon Tungbencha. Tambon Tungbencha and Tagad-Ngao locate in Tamai district. Tambon Bo and Saikao locate in Klung and Pongnamron district respectively.



Map of Chanthaburi Province

Tambon Tungbencha is forest area. People take care of fruit and rubber plant. Tambon Tagad-Ngao is near the ocean. People use rain water. During dry season they must carry water from the distant public well. Tambon Bo is near the ocean and partly forest area. They can get water easily from their private wells. Tambon Saikao is mountainous area. People get water from small stream.

Visits by mobile medical team to those villages were planned to get fundamental health data and to follow people's health. Since the rainy season is their agricultural period, they are too busy to visit our mobile medical clinic during that period. Therefore, the service must be given during dry season.

Medical service is planned to meet the following purposes.

1. To get health data from villagers.

2. If the number of visitors to the mobile medical clinic amount to about 30% of whole population, they are considered to reflect whole villagers' health situation.

3. Village volunteer communicators are expected as active promotors for the clinic.

4. Problems in health of villagers in each village are found. Those are informed to the health officers and volunteer communicators. They are given measures how to improve the problems.

5. The same medical service will be repeated every year to follow-up the volunteer's activity and to stimulate volunteers themselves in field villages.

6. In control village only medical service and laboratory examination will be repeated and no particular effort to improve the situation is made.

Method

In the medical service, volunteer communicators take general history of each visitor and measure height and weight. Health officers take medical history and measure blood pressure. Volunteers help doctor's examination and laboratory tests including hematological, biochemical and bacteriological tests. Small amount of blood is taken from each visitor for laboratory tests. Urine was collected for urinalysis only in Saikao and this will be done in every village from now on. Fecal specimen is collected from each visitor to examine parasite infection. Visitors are given medical advice and necessary medicine in the clinic.

Results

As shown in the table, consecutive medical service has been carried out from January to June 1980. More frequent visit cannot be made simply because of shortage in manpower in the Provincial Public Health office. Proportion of visitors to village population ranged from about 20 to 30% except for Saikao.

Medical Service in Control and Field Villages

	Date of Medical Service	No. of Visitors	Population	% of Visitors to Whole Population
Tungbencha Village 1	28 Jan.	78		
(Control village)	4 Feb.	46		
		Total 124	390	31.8
Tagad-Ngao Village 4	7 Apr.	72		
(Field village)	28 Apr.	53		
		Total 125	564	22.1
Bo Village 3	12 May	91		
(Field village)	23 May	49		
		Total 140	545	25.7
Saikao Village 2	13 Jun.	57	665	8.6
Village 8	20 Jun.	79	423	18.7
(Field villages)		Total 136	1,088	12.5

At this period of the study, only fundamental status of villagers' health has been clarified. In the studies to be done in future, villagers' health will be followed up.

According to the clinical impression (diagnosis) made at the medical examination, malaria is the biggest problem among children in Tungbencha and Saikao. In every tambon respiratory tract infection is common. General malaise probably due to anemia would exist widely among villagers.

Clinical Impression Made at the Field Medical Service

	Tagad-Ngao	Bo	Saikao	Tungbencha
Debility	19	16	19	3
No Diseases	16	12	2	32
Malaria	0	8	31	28
Respiratory Tract Infection	28	31	42	28
Neuralgia, Muscle and Joint	11	47	15	7
Diarrhea	4	1	5	2
Skin Diseases	7	7	9	0
Gastrointestinal Disorder	9	25	24	5

Clinical Impression Made at the Field Medical Service (Cont'd)

	Tagad-Ngao	Bo	Saikao	Tungbencha
Psycho-somatic	5	11	4	1
Liver Disease	3	3	7	4
Headache	5	14	7	1
Others	17	52	40	14
Total Number of Diagnosis	124	227	205	125

Five Major Diseases among Admitted Patients to the Prapokklao Hospital (February 1980)

Malaria	20.1%
Upper Respiratory Infection	12.1%
Accident	10.4%
Diarrhea	10.3%
Abortion	5.0%

There seems to be some similarity between clinical impression at the medical service and statistics in the Prapokklao Hospital.

Low Hemoglobin among Villagers

	Mean Hemoglobin Value (Normal Range) (12 - 16g/100ml)	% of Hemoglobin under 12g/100ml among villagers
Tungbencha Village 1 (Control village)	11.4	60%
Tagad-Ngao Village 4	12.5	30%
Bo Village 3	13.1	24%
Saikao Village 2	10.5	85%

Laboratory examination revealed many cases of more or less anemic status in tambon Tungbencha and Saikao. In tambon Tagad-Ngao and Bo, people showed better results than the former two villages. This anemic status is thought to be related to repeated malaria and hook worm infection. In tambon Saikao 85% of visitors revealed subnormal or low hemoglobin value.

Results of Parasitological Survey on Inhabitants in Four Villages

	Tungbencha	Saikao	Tagad-Ngao	Bo
Strongyloides stercolaris	4	1	3	1
Trichostrongylus orientalis			4	2
Hook worm	51	28	63	22
Enteriobius vermicularis	1		1	1
Ascaris lumbricodes				2
Total	56	29	71	28
%	51.4	25.0	53.8	23.3

Infestation Rate in Restaurant Personnel in Tungbencha --- 15.0%

Parasitological survey showed fairly high infestation rate in tambon Tungbencha and Tagad-Ngao. Hook worm infestation was rather high in those villages. This is related to anemia seen in the villagers to some extent.

Anthelmintic is planned to be given to all villagers through volunteer communicators. The mass treatment is in progress and will be repeated for long period in order to eliminate parasite infestation from the particular villages.

It can be said generally that food handlers in restaurants showed much less infestation rate of parasite and intestinal pathogens than other villagers. V. parahaemolyticus was often detected from sea food to be condumed by villagers in a preliminary study.

Conclusion

It must be adequate to carry out the following activities in the field area.

1. To eliminate parasite infestation, repeated treatment by anthelmintic is to be done in the field villages.

2. To decrease hazard from malaria, antimalarials will be distributed to the Health Centres. The drugs can be prescribed to villagers by the request of volunteer communicators.

3. Anemia could be decreased to some extent by those treatment.

4. During dry season, boiling water before drinking and heating food before eating must be taught to villagers repeatedly by volunteer communicators to decrease incidence of intestinal infection.

5. It is to be announced to the public especially to the food handlers that sea food is widely contaminated with intestinal pathogens. They will often cause intestinal infection unless sea food is cooked with heat.

6. The majority of the private wells are contaminated by excreta more or less. Therefore, it is not quite suitable for direct drinking.

Visiting medical service by mobile medical team will be repeated at least once a year to follow health situation of villagers in the field vollages. Information and recommendation are given to the volunteer communicators. Sometimes giving some simple medicine to villagers through volunteer communicators is necessary to stimulate them and to control common diseases such as malaria, parasite infestation, intestinal infection and anemia as a coplication. Improvement and prevention of those major diseases will make general malaise or current infection less among villagers. As for individual disease seen occasionally among villagers medical advice can be asked through wireless telecommunication net work, which has been established recently, even in the remote place like Saikao.

In general, people in Tagad-Ngad-Ngao and Bo have less serious problems in the health than in Saikao where people are rather poor and live far from the medical facilities. So that people are much depending upon volunteer's activity there and helping each other.

June 30, 1980

Soichi Kumaoka

Soichi Kumaoka, M.D.
Japanese Expert Team Leader

Sutas Guptarak

Sutas Guptarak, M.D.
Project Director

Progress Report No. III

Project : Promotion of Provincial Health Services

July - September 1980

Concerning the strengthening of the Division of Food Analysis, many new food analytical techniques have been introduced as well as the existing analytical techniques for food additives and contaminants were improved. At the same time basal data for hygienic situation of food in the model areas in Chanthaburi were collected and studied. This is to pave the way for improving of the provincial health condition concerning food in future.

I. Expert

1. Dr. Masatake Toyoda, expert in Food Analysis and Instrumentation, returned to Japan on 10 August 1980 as his one year assignment was finished.

2. Dr. Hideyuki Maekawa, expert in Public Health, returned to Japan on 4 September 1980 after one year service.

3. Dr. Akio Mori, short term expert in Medical Entomology, arrived on 29 August 1980 and will stay with the project until 30 November 1980.

II. Mission

A Preliminary Water Supply Survey Team for conducting a preliminary survey for the basic design of water supply facilities visited Chanthaburi during 9 - 22 July 1980.

The Team's members are as follows :-

- Dr. Konosuke Fukai — Professor of Osaka University, Team Leader.
- Dr. Hideo Fukumi — Public Health, Visiting Professor, School of Medicine, Juntendo University.
- Mr. Joji Yanagawa — Sanitary Engineering, Ministry of Health and Welfare.
- Mr. Osamu Ohkura — JICA Head Office, Coordinator.

III. Fellowship :

Dr. Manasvi Unhanand, Director-General of the Department of Medical Sciences, went to Japan for an observation tour in the field of Public Health Laboratories Management and Epidemiology during 4 - 15 August 1980.

IV. Project's activity

4.1 Activity I

4.1.1 Strengthening of the PHL as a clinical diagnostic laboratory

1. Clinical chemistry

Two lots of lyophilized sera, designated as Sigma, I, Sigma II were used to run for the internal quality control during July 1980 to September 1980.

The results are shown in Table I.

Table 1 Using Sigma I & Sigma II

	Sigma I					Sigma II				
	N	$\bar{X}$	S.D.	*CV%	Assigned Value	N	$\bar{X}$	S.D.	*CV%	Assigned Value
Glucose, mg/dl	47	192.27	14.33	7.45	215	49	63	5.99	9.50	61
B.U.N., mg/dl	52	57.82	4.79	8.28	59	55	16.84	1.30	7.71	15
Creatinine, mg/dl	52	5.33	0.23	4.31	4.8	54	1.19	0.14	11.76	1.1
Cholesterol, mg/dl	52	244.30	8.82	3.61	224	55	124.65	9.58	7.68	121
Total protein, g/dl	50	6.84	0.43	6.28	6.4	51	5.25	0.86	16.38	5.1
Albumin, g/dl	50	4.15	0.57	13.73	3.9	52	3.33	0.38	11.41	3.2
Na., mEq/L	49	145.24	2.40	1.65	143	51	136.80	3.39	2.47	136
K., mEq/L	49	5.53	0.61	2.89	5.3	51	4.15	0.14	3.37	4
Cl., mEq/L	51	99.27	3.53	3.55	99	52	95.76	2.87	2.99	95
Bilirubin, mg/dl	43	1.71	0.39	22.80	2.1	48	0.92	0.22	23.91	1
Alk. phosphatase	39	57.25	9.37	16.36	91	36	19.68	6.65	33.79	35

Table 1 Using Sigma I & Sigma II (Cont'd)

	Sigma I					Sigma II				
	N	$\bar{X}$	S.D.	*CV%	Assigned Value	N	$\bar{X}$	S.D.	*CV%	Assigned Value
GOT.	49	40.20	7.50	18.65	90	54	17.65	4.78	27.08	43
GPT.	49	46.87	10.75	22.93	91	51	19.48	8.32	42.71	37

* Since all tests were performed during the routine conditions, therefore the CV is actually a RCV.

2. Clinical Hematology

a. Number of white blood cell count, automated method : 6,462
b. Number of red blood cell count, automated method : 8
c. Number of platelet count, phase-contrast method : 1,165
d. Number of test, prothrombin time : 70

3. Virology

a. Detection of HBsAg. and Anti HBs

Sera from blood donors and symptomatic patients were examined for HBsAg. and Anti HBs during the three-month period, July-September 1980. The results are shown in Table II.

Table II

Sources of specimen	No. of specimen examined	Positive for HBs Ag.		Positive for Anti HBs	
		No. of specimen	Percent-age	No. of specimen	Percent-age
Blood donors	406	46	11.33	154	37.93
Patients	81	91	23.46	28	34.57

b. Serodiagnosis and DHF suspected patients

Seventy four (74) cases of recent Dengue infection are detected among the one hundred and fifty one (151) suspected patients examined serologically, constituting 49% of all suspected patients.

4.1.2 Strengthening of the PHL as a public health laboratory

1. Examination of feces for surveillance of diarrheal diseases,

1.1	Number of specimen from PCMO	:	50
	Number of specimen positive for enteropathogens	:	17
1.2	Number of specimen from Prapokklao Hospital	:	1,734
	Number of specimen positive for enteropathogens	:	465

2. Bacteriologic examination of food and water

2.1	Water, number of specimen	:	19

4.1.3 Strengthening of the SRL in the three district hospitals and one district health and medical center

The laboratory activities of four SRL during the period of three months are listed as follows:

1. TAMAI DISTRICT HOSPITAL

1.1	MICROBIOLOGY		
	- Gram stain-G.C.	=	1
	- AF stain TB	=	17
	- Blood parasitology-Malaria	=	2,283
1.2	HAEMATOLOGY		
	- Haematocrit	=	1,423
	- WBC count	=	1,423
	- Diff. count	=	1,423
	- Blood group	=	605
	- Pregnancy test	=	14
	- PF	=	120
1.3	URINE ANALYSIS	=	158

2. KLUNG DISTRICT HOSPITAL

2.1	MICROBIOLOGY		
	- Gram stain Pathogens	=	6
	- Gram stain-G.C.	=	7
	- Blood parasitology-Malaria	=	620

- Stool parasitology-Protozoa: Helminths = 9

2.2 HAEMATOLOGY

- Haematocrit = 331
- Haemoglobin = 299
- WBC count = 287
- Diff. count = 291
- Pregnancy test = 5
- PF = 238

2.3 URINE ANALYSIS = 186

3. LAMSINGHA DISTRICT HOSPITAL

3.1 MICROBIOLOGY

- Gram stain-Pathogens = 2
- Gram stain-G.C. = 3
- AF stain-TB = 14
- Blood parasitology-Malaria = 636
- Stool parasitology-Protozoa: Helminths = 9

3.2 HAEMATOLOGY

- Haematocrit = 193
- Haemoglobin = 140
- WBC count = 141
- Diff. count = 140
- FBS = 2

others

- Rectal swab = 5
- AFB = 2

3.3 URINE ANALYSIS = 156

4. PHONG NUM-RON DISTRICT HEALTH AND MEDICAL CENTER

4.1 MICROBIOLOGY

- Gram stain-Pathogens = 5
- Blood parasitology-Malaria = 2,069

4.2 HAEMATOLOGY

- Haematocrit = 11
- WBC count = 1

- Diff. count = 2
- Pregnancy test = 11
- PF = 577

4.3 URINE ANALYSIS = 156

4.2 Activity II

4.2.1 DPHLS

Chemical reagents, bacteriological media and antisera have been supplied regularly by DPHLS to PHL Chanthaburi and Chonburi during July to September 1980.

4.2.2 DFA

The followings are the analysis of food additives and contaminants in foods which have been performed by DFA under the supervision of Dr. Masatake Toyoda, Japanese Expert in Food Chemistry and Instrumentation.

1) Determination of sulfite

In DFA, original oxidation method has been used as a determination of sulfite, however the sensitivity of this method was not so good and it needed two hours for one analysis. A new simple and accurate modified Rankine method was introduced and this method was so simple that every staff could master it very easily.

As samples, 44 samples of three kinds of dried Thai noodles used to be eaten in Thailand were analyzed and the result is shown in Fig. 1. From 0 to 154 ppm of sulfite were detected from 24 samples of "Wun-sen", 0 - 285 ppm of sulfite were found from 9 samples of "Sen-mee", and 136 ppm of sulfite was detected from one sample of "Keau-teo". These values were less than the permissible maximum residual amount of 500 ppm. Moreover, it was found that sulphur dioxide used as food additives in noodles was decreased about 70% during cooking.

2) Determination of histamine

Some kinds of fish and shellfish produced in Thailand have been exported to other countries, and sometimes it needed to check the

histamine content of these products. For the determination of histamine, a spectrophotometrical method by use of column chromatography that has been applied in Japan has been introduced. After training for one or two months, this method was completely mastered.

Average histamine contents in six samples of canned tuna in oil and 4 samples in brine were respectively 0.196 and 0.169 mg/g, and that of dried shrimp was 0.099 mg/g. As is shown in Table 1, histamine contents of 24 samples collected from Amphore Laemsing, Muang Chanthaburi and Gaw Perid were in the range of 0.08 - 1.32 mg/g less than the poisonous amount, but as one dried short bodied macherel showed a little high histamine content, it will need to pay attention to the histamine in dried macherel samples.

3) Determination of boric acid

Concerning to the determination of boric acid, a routine method used in Japan has been already introduced, but this method showed a defect that if we used a sample containing high amount of NaCl, the measured value became lower than the real value. A newly developed method because that defect was improved by use of chelate extraction was introduced. As is shown in Table 2, the boric acid contents in 12 kinds of fresh mango were in the range of 0.2 - 24.0 ppm (average 9.0 ppm), 6 samples from 7 samples of salted mango showed 1.9 - 13.6 ppm (av. 4.8 ppm) and 6 samples from 7 samples of sweetened mango showed 0 - 17.0 ppm (av. 5.2 ppm) and these values were supposed to be back ground values. However, one salted mango and one sweetened mango contained repectively 354.6 and 430.9 ppm of boric acid, and it showed that boric acid was used as preservatives in these samples. Moreover, boric acids in fresh turnip and salted turnip were also determined.

4) Determination of L-glutamic acid in fish sauce

Fish sauce "Nam pla" is a most popular sauce in Thailand just same as soy sauce in Japan, and according to the quality standard of fish sauce in Thailand, it is essential to determine L-glutamic acid in fish sauce. However, until now its determination has been carried out in another Department and this system has been very inconvenient. Accordingly it was introduced a new good method that L-glutamic acid was analyzed by

gas chromatography after N-trifluoroacetyl-n-buty esterification.

Samples were mainly collected from Chanthaburi and Chonburi, because it is well known that fish sauces are produced in these countries. First grade fish sauce from original vat of one producer in Chanthaburi contained 31.30 mg/ml of L/glutamic acid, second grade fish sauce contained 3.15 mg/ml and first grade fish sauce in bottle showed the average content of 25.46 mg/ml. On the contrary, 10 samples of mixed fish sauce contained L-glutamic acid in the range of 0.89 - 42.10 mg/ml and the average amount of 5.69 mg/ml from 9 samples was similar to the value of second grade products.

Moreover, gas chromatogram of first grade fish sauce showed typical patterns as shown in Fig. 2-a) and c), but mixed fish sauce showed different patterns accordingly from gas chromatogram it is possible to obtain some information in relation to the quality of mixed fish sauce.

5) Detection of ciguatoxin and tetrodotoxin

As DFA has no experiences about the detection methods of both toxins, so bio-assay method in Japan has been introduced.

Concerning to ciguatoxin, 17 kinds of ciguatoxic fishes such as grouper, morey eel, barracouda, snapper and rabbit fish which are assumed to be toxic, were collected from fish markets in Bangkok, and 6 samples such as grid grouper, marbled grouper, great barracuda, long-snouted bream, cat fish and crevalles were collected from fish market in Chanthaburi. Each liver and meat were extracted with ether and the presence of ciguatoxin was checked by mouse test. From any samples ciguatoxin was not detected at all. It means that fishes consumed in Thailand appears to be non-toxic about ciguatoxin.

Concerning to tetrodotoxin, although in Thailand puffer is not used directly for human consumption and only used as duck feeds, puffer poisoning has seldom happened. Therefore, we checked the presence by mouse test. As shown in Table 3, six kinds of puffer and related species were collected from fish markets in Samut Sakorn, Trat and Chanthaburi. Acetic acid-extracted fraction from meat, liver, intestine and ovary were intraperitoneally injected to mouse and observed the presence of paralysis and death time. Although the differences of toxicity among individual fishes were shown, strong toxins were detected from some organs, especially ovaries of green rough-backed blowfish and starry blowfish which

are very popular in Thailand contained high amount of tetrodotoxin, that is, it means if human eat 7 g of the latter ovary of 1,482 MU/g it will cause death to human. Accordingly, about puffers in Thailand as same as in Japan it needs enough control and guidance.

6) Analysis of food addtives and contaminants in food collected in Chanthaburi

Since the beginning of 1978, substantial analysis about this item has been carried out by the staff of DFA. To make a good use of the data obtained through several sampling, the analyzed data were appraised again in detail and those data were classified into items as shown in Table 4. After this summarization, the status of contamination and the trends of violation against Food Sanitation Law in Thailand became clear.

The test items covered residual pesticides, aflatoxin, harmful metals, colors, preservatives, standard qualities of processed foods and drinkings, and mocrobiological tests. Almost all kinds of foods were chosen as the analytical subjects, and every time 60 - 136 samples were collected. The results showed that some cereals and their products contained aflatoxin more than 20 ppb of maximum permissible amount and many colorings not allowed to be used in Thailand have been detected, and moreover in many cases bottled drinking water did not agree with the quality standard of microbiology, then they are checking the each process of factories which produce bottled drinking water in Chanthaburi.

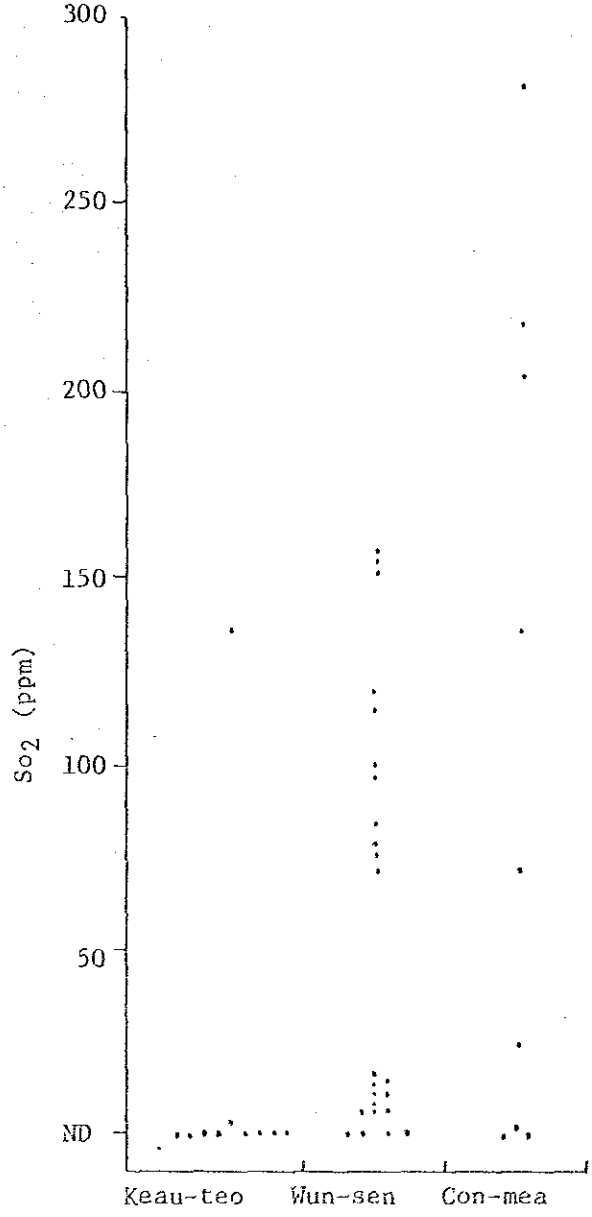


Fig.1 Total So_2 in Thai noodles

Table 1 Histamine Contents in Seafood Products Collected in Chanthaburi

Kinds		Histamine (mg/g)	Average
From Amphore Laemsing			
Sea bream	No.1	0.077	
	2	0.256	
Jew fish		0.155	
Leatherskins "Pla sala"		0.188	
"Pla chaleab"		0.293	0.315
Cat fish	No.1	0.194	
	2	0.105	
Torpedo trevalley		0.240	
Sting ray		0.320	
Short bodied mackerel		1.319	
Dried shrimp	No.1	0.127	0.275
	2	0.422	
Dried squid Sepia spp.		0.241	0.457
Loligo spp.		0.672	
From Gaw Perid			
Sheat fish		0.076	0.094
Sting ray		0.111	
Dried shrimp	No.1	0.233	0.259
	2	0.285	
Dried young octopus		0.123	
From Amphore Muang Chanthaburi			
King salmon		0.254	
Sweetened dried shark products		0.264	0.239
"Pla keaw"		0.227	
Mackerel		0.209	
Fish egg		0.090	

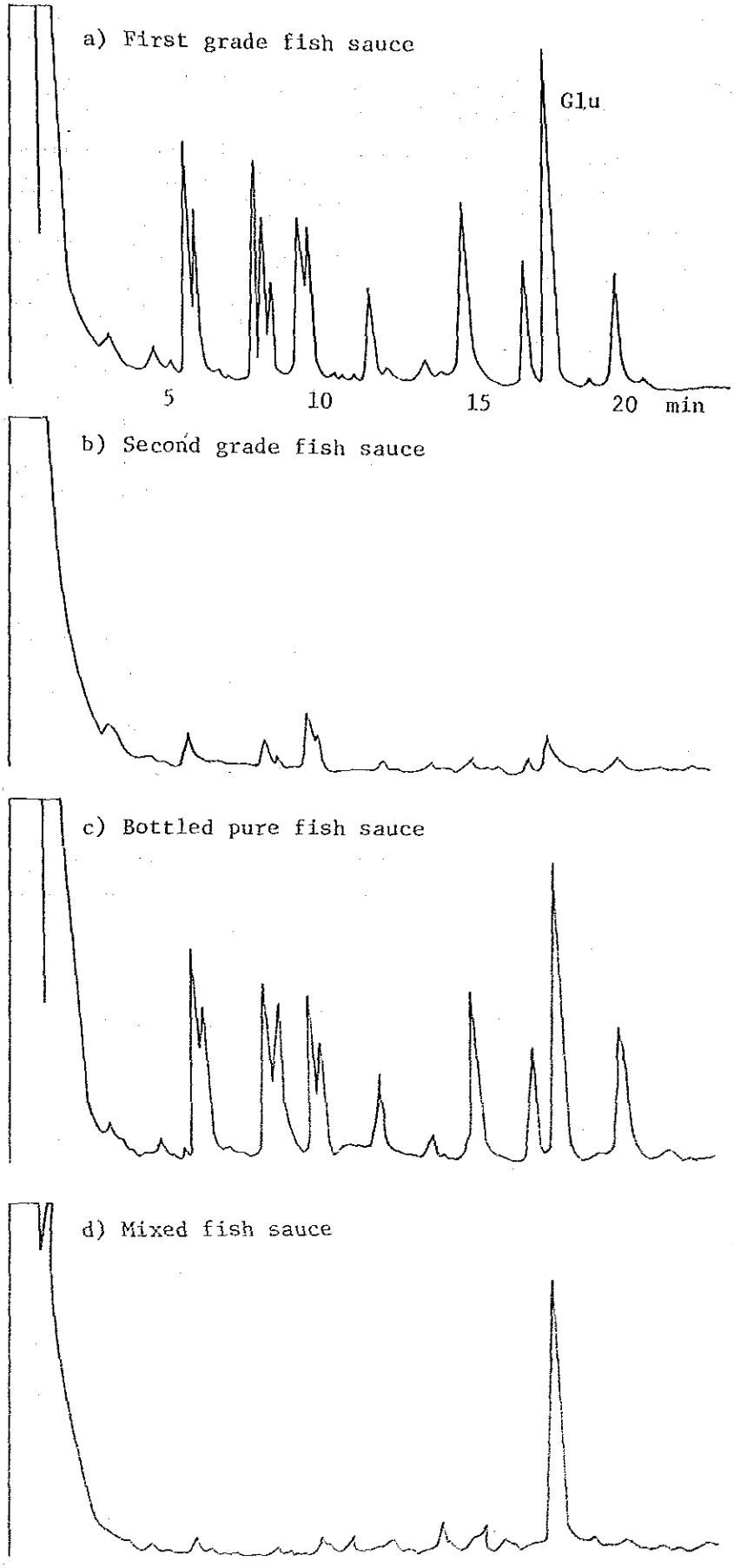


Fig.2 Gan chromatogram of L-glutamic acid derivative in fish sauce

Table 2 Boric Acid Contents in Fresh, Salted and Sweetened Mango

Kind of Fresh mango		H_3BO_3 (ppm)	Soaked mango (Kaew)		H_3BO_3 (ppm)
Kaew	No.1	6.4	Salted mango	No.1	5.0
	2	4.8		2	2.0
Saifon	No.1	7.6		3	2.4
	2	4.7		4	1.9
Ocrong	No.1	ND		5	13.6
	2	6.4		6	354.6
Mun		9.1		7	4.0
Galon		24.0		8	4.8
Tongdam		10.4			
Rad		11.4	Sweetened mango	1	17.0
Nongsang		9.6		2	6.4
Pim-sen-hoa		6.4		3	4.0
Kiosawoai	No.1	11.1		4	ND
	2	8.9		5	3.3
Tubped		19.2		6	ND
Mou		4.3		7	430.9

ND < 1 ppm

Table 3 Check of Tetrodotoxin in Puffer Collected in Samut Sakorn, Trat and Chanthaburi

Kinds	Place	Meat	Skin	Intestine	Liver	Ovary
Spotted rough-backed blowfish	Samut Sakorn	++*	14.1**	20.8	7.7	4.9
(Pak pao lung dang)	Trat	-	-	-	-	+
Green rough-packed blowfish	Samut Sakorn	++	++	9.2	27.0	105.0
(Pak pao lung kaeo)	Trat	+++	3.5	++	2.8	48.6
	Chanthaburi	-	-	+	++	-
		-	+	+	++	-
		-	-	+	+	-
Starry blowfish (Pak pao dao or jud)	Samut Sakorn	+++	2.8	+	3.8	257.1
	Trat	+	-	-	+	1482.0

Table 3 Check of Tetrodotoxin in Puffer Collected in Samut Sakorn, Trat and Chanthaburi (Cont'd)

Kinds	Place	Meat	Skin	Intestine	Liver	Ovary
Blotched porcupine fish (Pak pao num turian)	Chanthaburi	-	-	+	+	-
	Samut Sakorn	-	-	-	++	+++
	Trat	-	-	++	+	-
Three-bar porcupine fish	Chanthaburi	-	++	-	-	-
	Trat	++	++	-	+	++
Ocellated boxfish (Sea liam kradu voa)	Samut Sakorn	+	+	+	++	++

* - : no detect of paralysis
\+ : very weak hind legs paralysis
++ : weak hind legs paralysis
+++ : strong hind legs paralysis

** MU/g of sample

Table 4 Analytical Results of Food Collected from Chanthaburi

Year and Month of Collection	1978 Apr.	1978 Jun.- Jul.	1978 Oct.- Nov.	1979 Mar.	1979 Sep.	1980 Feb.	Total Number
Number of Sample	62	79	80	113	136	83	553
Contaminants							
Pesticide residues	21(0)* **	33(0)	40(1)	36(1)	27(0)	-	157(2)
Aflatoxins	6(2)	10(2)	6(4)	14(2)	-	9(1)	45(11)
Mercury	7(0)	8(0)	5(0)	3(0)	8(0)	24(1)	55(1)
Food additives							
color	24(16)	9(7)	18(12)	3(1)	34(26)	8(5)	96(67)
Preservatives	-	2(0)	2(1)	3(0)	14(4)	1(1)	22(6)
Saccharin	-	-	3(3)	-	-	-	3(3)
Borate	-	6(2)	2(2)	2(0)	8(0)	-	18(4)
Standard quality							
Fish sauce	2(0)	1(1)	1(0)	-	-	3(1)	7(2)
Mono sodium glutamate	2(0)	-	-	-	-	-	2(0)
Canned fish	-	-	-	-	4(0)	-	4(0)
Edible oil	-	-	-	-	2(1)	-	2(1)

Table 4 Analytical Results of Food Collected from Chanthaburi

(Cont'd)

Year and Month of Collection	1978 Apr.	1978 Jun.- Jul.	1978 Oct.- Nov.	1979 Mar.	1979 Sep.	1980 Feb.	Total Number
Beverage	-	4(4)	-	-	2(2)	3(3)	9(9)
Coffee bean powder	-	-	-	-	-	3(0)	3(0)
Food colors	-	-	-	-	-	2(0)	2(0)
Drinking water and ice	-	6(2)	3(0)	-	2(2)	13(8)	24(12)
Microbiological teat	-	-	-	52(6)	35(6)	17(4)	104(16)

* Figures means number of sample tested.

** Figures in parenthesis means number of samples violated the permissible limit or contained unpermitted substances.

4.2.3 VRI

Production and standardization of arbovirus reagents

1. Production of antigens. During July-September 1980.

CHIK SA Pr Antigen 62 x 0.5 amps

Den-4 SA Pr Antigen 77 x 0.5 amps

2. *Production of reference antisera*

a. Positive control sera

Pool DHF 179 x 0.5 amps

b. Immune sera

4.2.4 DME

1. Entomological study of mosquito vectors of Arbovirus *Chanthaburi*

a) The DME team and a short term consultant in Chanthaburi had set up a study on suburban mosquito survey in September. The survey will be going on in October and November.

b) In the morth of September Aedes aegypti density in urban area was monitored. The mosquito density was going up the biting rate from 1.9 mosquito per man hour to 2.6.

2. Urban rodent study

The study on rodent species, ectoparasites endopathogens has been going on. Rodent traps were placed six nights a month in the study zones alternately. In July the capture was done in Chanthaburi zone IV and Toongbencha, August in Chanthaburi zone II and Samrong, September in Chantanimit and Tagad-Ngao. The number of animal traps and species are given in the Table 1.

Table 1 The Summary of Trapping Results

Species	Number of Animals Collected						
	Chanthaburi zone IV	Toong-bencha	Chan. zone II	Samrong Vill. 2&8	Chantanimit	Tagad Ngao	Total
1. Rattus norvegicus	46	-	43	2	36	-	127
2. Rattus exulans	24	2	18	11	17	11	83
3. Suncus murinus	5	-	22	-	26	-	53
4. Rattus rattus	-	-					
5. Unidentified sp.						2	2
							271

4.2.5 DCP

1. Report on Bacteriological works

a) Ninety five specimens were received from PHL Chanthaburi for typing as follows :-

E. coli	36
Salmonella	19
V. cholerae	7
Others	33

b) Supply of antisera and antigens to PHL Chanthaburi

Shigella antisera 6 ml.

Salmonella antisera	12 ml.
Widal antigen	10,000 ml.

2. Report on Parasitological works

During the months of July to September 1980, the rats from Chanthaburi were examined for human-endoparasites. Results are given in Table 1 - 2.

Table 1 Angiostrongylus Cantonensis Found in Lungs

Area	No. examined	No. positive
Municipality of Chanthaburi, Zone IV	75	12
Toongbencha village No.1, Tamai	2	0
Municipality of Chanthaburi, Zone II	96	19
Total	173	31 (18.00%)

Table 2 Endoparasites of Rats That can be Human-Endoparasites

Area	No. examined	No. positive		
		Hx	Hd	R.S.
Municipality of Chanthaburi, Zone IV	75	2	4	19
Toongbencha village No. 1, Tamai	2	0	0	0
Municipality of Chanthaburi	96	10	4	14
Total	173	12 (6.93%)	8 (4.62%)	33 (19.07%)

4.2.6 Cholburi

1. Cholburi Hospital

	July	August	September
1. Bacteriological examination	4,553	3,641	4,186
2. Serological examination	1,217	1,366	1,021
3. Parasitological examination	5,764	5,252	5,470
4. Mycological examination	334	335	401
5. Haematological examination	11,257	9,527	18,164

	July	August	September
6. Clinical Chemistry examination	3,671	3,272	4,324
7. Spinal Fluid examination	354	474	312
8. Urine examination	4,522	5,222	3,951
9. Sanitation	42	29	12
10. Detection for Hepatitis B Antigen	36	29	18
11. Determination of Protein Fraction	-	-	4
12. Rabies diagnosis by Fluorescent	11	8	8
13. Others (Media prep. etc.)	158,556 cc.	172,535 cc.	105,052 cc.

2. Paratnikom District Hospital

	July	August	September
1. Blood film for Malaria	832	683	591
2. Complete Blood Count	832	683	591
3. Blood Chemistry	98	114	96
4. Blood for VDRL	135	131	105
5. Blood for Serology test	124	93	95
6. Stool examination	48	41	51
7. Urine examination	836	673	944
8. Microbiology	110	86	119
9. Bleeding Donor / Blood Transfusion	47/56	44/75	8/64

3. Banglamung District Hospital

	July	August	September
1. Sputum examination	33	34	35
2. Gram stain	132	106	127
3. Blood film for Parasites	260	354	235
4. V.D.R.L.	193	298	194
5. Pregnancy test	51	44	60
6. Urine examination	532	539	477
7. Complete Blood Count	165	290	175
8. Hematocrit	261	360	238
9. Stool examination and culture	20	8	6
10. Rectal swab	15	8	6
11. F.B.S.	15	22	21
12. B.U.N.	5	9	4

	July	August	September
13. Creatinine	4	7	4
14. Uric acid	-	1	1
15. Cholesterol	7	6	2
16. Protein	8	2	-
17. Bilirubin	9	14	11
18. S.G.O.T., S.G.P.T.	9,9	10,10	11,11
19. Blood Grouping	28	23	52
20. Volunteer Donor	15	23	27
21. Cross Matching	12	14	27
22. Widal Agglutination	4	19	4

4. Ban Bung District Hospital

	July	August	September
1. Blood for Malaria	235	234	203
2. V.D.R.L.	39	58	76
3. Stool examination	105	90	104
4. Urine examination	145	115	136
5. Complete blood count	133	124	135
6. Acid fast bacilli	20	17	4
7. Cram stain	6	5	4

4.3 Activity III

In July, August and September anthelmintic was given to all inhabitants in all field villages with cooperation of health officers and village volunteers. This will be repeated further. Village visit for medical examination by mobile medical team will be started from December. The effect of the treatment will be examined by this follow-up study.

A text written in Thai language concerning sanitation and report of previous village medical examination are distributed to health officers and volunteers, so that health officers and volunteers can take necessary action for prevention and control of diseases. Necessary drugs to be distributed to the health centres will hopefully be prepared soon.

4.4 Activity IV

No training activity was performed during this period.

4.5 Activity V

4.5.1 Analysis on Causative Agents in GI Diseases

1. Detection of Enteropathogenic Bacteria from Diarrheal Patients

Out of 1,799 examinations performed in the Chanthaburi PHL, 265 cases revealed positive pathogens, as shown in Table 1. V. parahaemolyticus were isolated highest among diarrheal microorganisms. Its detection rate was 37%, while Enteropathogenic E. coli were the next (32%). Those two bacteria amount to about 70% of all enteropathogens. Shigella were detected in 15% and Salmonella other than S. typhi and S. paratypbi were found in 11%.

Isolated V. cholerae were only 2 cases. This would be due to markedly decreased incidence because of the improved water supply after the rainy season started from June 1980. It is noteworthy, however, that presumable intrahospital outbreak of Salmonella E was taken place in the pediatrics ward of the Prapokklao Hospital. During 10 days in August, 5 cases of Salmonella B group infection were detected from new born infants in the same ward. Serotype of the isolates are under examination. If those were of the same serotype, the outbreak would be considered as intramural infection.

2. Cholera Infection

Cholera cases found in 3 months from July to September was only 2 (one in July and the other in September). A patient found in July was a traveller who stayed at a hotel in Chanthaburi and incidentally visited the hospital with symptoms. This case failed to be followed up, because when the laboratory data were sent to the doctor, the patient had already been discharged and went out of the town. The other patient who was detected in September was a farmer in Tamai district. His infection source was also unclear. His family and contacts revealed all negative of V. cholerae. In this case, bio- and serovar was El tor, Ogawa. The isolates were sensitive to drugs generally used.

3. Incidence of Bacillary Dysentery

Bacillary dysentery cases detected in Prapokklao and 4 district hospitals amounted to 45 during 3 months from July to September. Forty out

of 45 cases were inhabitants of Chanthaburi province. As in the previous period (April-June), geographical distribution showed more cases in Ampore Muang and Pongnamron and 10 cases were found also in Ampore Tamai in this 3 months period (Table 2).

As for serotype, the incidence showed the same pattern as seen in the previous period. S. flexneri 1b and S. sonnei amounted to about 60% of all species isolated.

Table 1 Isolation of Enteropathogenic Bacteria from Diarrheal Cases among In- and Out-Patients of Prapokklao and 4 District Hospitals in Chanthaburi

(July -- September 1980)

Month	No. of cases examined	No. of specimens examined	No. Pathogen-positive cases (%)	No. of isolates	Vibrio cholerae	NAG vibrio	Group F vibrio	V.parahaemolyticus	Shigellae	Enteropathogenic E. coli	S. typhi	Other salmonella
Jul	374	(744)	116(31.0)	133	1	3	-	46	25	45	-	13
Aug	220	(525)	71(32.3)	79	-	7	-	28	12	22	-	10
Sep	235	(530)	78(33.2)	87	1	2	-	37	8	29	-	10
Total	829	(1,799)	265(32.0)	299	2	12	-	111	45	96	-	33

Table 2 Geographical Distribution of Bacillary Dysentery in Chanthaburi

(July -- September 1980)

Serotype		Muang	Tamai	Klung	Makam	Pong-namron	Laem-sing	?	Total	Others
S.dysenteriae	2	-	-	-	-	-	-	-	-	1
	3	1	-	-	-	-	-	-	1	-
A group		-	1	-	-	-	-	-	1	-
S.flexneri	1b	3	3	1	2	3	-	1	13	1
	2b	1	-	-	1	2	-	-	4	-
	3b	-	-	-	-	1	-	-	1	-
	3c	1	-	-	-	-	-	-	1	-
	4	1	-	-	-	-	1	-	2	-
	6	-	-	-	1	-	-	-	1	-
B group		-	1	-	-	-	-	2	3	-
S. boyddi	4	-	-	-	-	1	-	-	1	1
S. sonnei		4	5	-	-	3	-	-	12	2
Total		11	10	1	4	10	1	3	40	5

September 30, 1980

Soichi Kumaoka, M.D.
Japanese Expert Team Leader

Sutas Cuptarak, M.D.
Project Director

Progress Report No. IV

Project : Promotion of Provincial Health Services

October - December 1980

During the period, the evaluation of the project has been performed by the evaluation committee members which consisted of Thai, Japanese and third party members at the Travelodge Hotel, Chanthaburi on 27 November 1980. As the result of the evaluation, the duration of the project has been extended for another three more years. The Record of Discussion has been signed by Head of the Japanese Implementation Survey Team, Under Secretary of State for Public Health and Director-General of the Department of Technical and Economic Cooperation at the Ministry of Public Health, Bangkok on 1 December 1980.

I Expert

Dr. Akio Mori, short term expert in Medical Entomology, finished his three months work in the project and returned to Japan on 28 November 1980.

II Mission

2.1 Dr. K. Nakazawa, Director of Medical Cooperation Department, JICA, visited the project during 30 September 1980 to 8 October 1980 for discussion with Thai and Japanese authorities.

2.2 The Evaluation Team arrived to Thailand for the purpose of evaluation on the achievement of the project during 12 November 1980 to 3 December 1980.

The members of the team are as follows :-

Professor Konosuka Fukai	Research Institute for Microbial Diseases, Osaka University, Team Leader
Dr. Ichiro Momoi	Director, Social Welfare Organization "Saiseikai" Imperial Gift Foundation Inc., Japan
Dr. Shojiro Asahina	Guest Scientists, Ex-Director of Department of Medical Entomology, National Institute of Health, Tokyo
Dr. Saburo Nishi	Chief of Public Health Administration, Institute of Public Health, Japan

Dr. Hiroyuki Toyokawa	Associate Professor, Faculty of Medicine, University of Tokyo
Mr. Osamu Ohkura	Staff, Second Medical Cooperation Division, Medical Cooperation Department, JICA

2.3 The Water Supply Facilities Basic Design Team was sent to the project for the purpose of feasibility study for rural water supply improvement during 30 November 1980 to 27 December 1980.

The members of the team are as follows :-

Professor Konosuke Fukai	Research Institute for Microbial Diseases, Osaka University, Team Leader
Mr. Joji Yanagawa	Chief, Water Supply Division, Water Supply Design and Environmental Sanitation Department, Ministry of Health and Welfare, Japan
Mr. Kazuyoshi Ito	Chief Engineer, Pacific Consultants International L.T.D., Japan
Mr. Noburo Sugiura	Pacific Consultants International L.T.D., Japan
Mr. Yoshimi Kishikawa	- do -
Mr. Eiji Terasawa	Staff, Medical Cooperation Department, JICA

III Project's Activity

3.1 Activity I

3.1.1 Strengthening of the PHL as a clinical diagnostic laboratory

1. *Clinical chemistry*

A lot of lyophilized sera, designated as consera were used to run for the internal quality control during October 1980 to December 1980.

The results are shown in Table I.

Table I Using consera

Test	Consera				
	N	$\bar{X}$	S.D.	CV* %	Assigned value
Clucose, mg/dl	33	87.86	4.55	5.17	81
B.U.N. mg/dl	40	17.91	1.42	7.92	16
Creatinine, mg/dl	38	1.33	0.15	11.27	1.3
Cholesterol, mg/dl	40	169.53	20.56	12.12	180.
Total protein, g/dl	39	6.51	0.24	3.68	6.4
Albumin, g/dl	30	3.96	0.34	8.58	3.81
Na., mEq/L	38	131.09	3.26	2.48	133
K., mEq/L	40	4.35	0.11	2.42	4.3
CL., mEq/L	38	99.24	2.84	2.86	99
Alk. phosphatase	40	21.19	4.01	18.92	-
GOT.	44	21.65	8.79	40.60	31
GPT.	42	15.32	6.20	40.46	14
Bilirubin, mg/dl	34	0.43	0.13	30.23	-

* Since all tests were performed during the routine conditions therefore the CV is actually a RCV.

2. Clinical Hematology

a. Number of white blood cell count, automated method: 6144
b. Number of red blood cell count, automated method : 10
c. Number of platelet count, phase-contrast method : 984
d. Number of test, prothrombin time : 40

3. Virology

a. Detection of HBsAg. and Anti HBs

Sera from blood donors and symptomatic patients were examined for HBsAg. and Anti HBs during the three-month period, October-December 1980. The results are shown in Table II.

Table II

Sources of specimen	No. of specimen examined	Positive for HBS Ag.		Positive for Anti HBs	
		No. of specimen	Percentage	No. of specimen	Percentage
Blood donors	364	40	10.99	144	39.56
Patients	111	18	16.22	34	30.63

b. Serodiagnosis and DHF suspected patients

Three (3) cases of recent Dengue infection are detected among the fourty three (43) suspected patients examined serologically, constituting 6.9% of all suspected patients.

Two cases of recent Japanese Encephalitis were detected among the twenty six specimens submitted for sorologic examination.

3.1.2 Strengthening of the PHL as a public health laboratory

1. Examination of feces for surveillance of diarrheal diseases

1.1 Number of specimen from PCMO & district hospitals : 172
Number of specimen positive for enteropathogens : 36

1.2 Number of specimen from Prapokklao Hospital : 2060
Number of specimen positive for enteropathogens : 541

2. Bacteriologic examination of food and water

2.1 Water, number number of specimen : 70

2.2 Food, number of specimen : 1

3.1.3 Strengthening of the SRL in the three district hospital and one district health and medical center

The laboratory activities of four SRL during the period of three months are listed as follows:

1. TAMAI DISTRICT HOSPITAL

1.1 MICROBIOLOGY

- Gram stain-G.C. = -
- AF stain TB = 3
- Blood parasitology-Malaria = 988

1.2 HAEMATOLOGY

- Haematocrit = 267
- WBC count = 268
- Diff. count = 271
- Blood group = 29
- Pregnancy test = 17
- Platlet = 82

1.3 URINE ANALYSIS = 240

2. KLUNG DISTRICT HOSPITAL

2.1 MICROBIOLOGY

- Cram stain Pathogens = 14
- Cram stain G.C = 9
- AF stain - TB = 8
- Blood parasitology-Malaria = 1205
- Stool parasitology-Protozoa : Helminths = 49

2.2 HAEMATOLOGY

- Haematocrit = 480
- Haemoglobin = 480
- WBC count = 414
- Diff. count = 320
- Pragnancy test = 31
- VDRL. = 107

2.3 URINE ANALYSIS = 165

3. LAEMSINGHA DISTRICT HOSPITAL

3.1 MICROBIOLOGY

- Gram stain-Pathogens = 1
- AF stain-TB = 10
- Blood parasitology-Malaria = 250
- Stool parasitology-Protozoa : Helminths = 2

3.2 HAEMATOLOGY

- Haematocrit	=	66
- Haemoglobin	=	56
- WBC count	=	56
- Diff. count	=	56
- Pregnancy test	=	18
- VDRL.	=	76
- B.UN.N	=	1
3.3 URINE ANALYSIS	=	248

4. PRONG NUM-RON DISTRICT HEALTH AND MEDICAL CENTER

4.1 MICROBIOLOGY

- Gram stain-Pathogens	=	4
- Gram stain G.C.	=	2
- Blood parasitology-Malaria	=	2358

4.2 HAEMATOLOGY

- Haematocrit	=	1
- Haemoglobin	=	15
- Pregnancy test	=	17
- Rectal swab	=	8
4.3 URINE ANALYSIS	=	58

3.2 Activity II

3.2.1 DPHLS

Chemical reagents, bacteriological media and antisera have been supplied regularly by DPHLS to PHL Chanthaburi and Chonburi during October to December 1980.

3.2.2 DFA

The samples from well water in Chanthaburi have been analysed for the Water Supply Facilities Design Team in order to study the feasibilities for well digging in the near future.

Data Sheet of Existing Well

Sample	pH	E.C.	Turbidity	Total No.	Cl	NH_4	O_2 Consumed	Total Bact.	Coliform
S - 2	6.81	-	3	0.05	144	0.01	nil	1.5×10^4	< 2.2
S - 3	7.31	-	3	0.15	14	0.01	1.0	1.0×10^4	15.0 (with E.coli)
S - 4	7.75	-	3	0.25	5	0.01	1.55	5.2×10^4	240
S - 5	6.69	-	3	0.1	26	0.01	nil	1.2×10^4	< 2.2
B - 1	6.35	-	4	0.75	47	0.01	nil	7.1×10^3	240
K - 1	4.41	-	3	0.05	28	0.01	nil	2.9×10^5	> 240
T - 1	4.55	-	4	0.3	12	0.01	nil	580	7.5
T - 2	5.05	-	3	0.65	15	0.01	nil	5.6×10^4	38.0
T - 3	5.15	-	3	0.12	12	0.01	nil	9.0×10^3	240 (with E.coli)
L - 1	6.01	-	15	8.0	16	0.4	nil	480	< 2.2
P - 1	6.55	-	25	2.0	34	0.01	2.59	5.5×10^3	> 240
Standard	6.5 - 8.5		5	0.5	250	0.1	1.0	500	< 2.2

3.2.3 VRI

1) Sero-epidemiological survey of arbovirus in ChanthaBURI

In study the transmission rate of DHF in Chanthaburi, Paired blood specimens were collected from the finger tip of healthy persons of all difference age groups by the filter paper method.

667 blood specimens of post-epidemic season were collected in December 1980 from the same subject. The determination for HI. antibody are undertaking.

2) Production and Standardization of arbovirus reagents.

2.1 Production of reference antisera

2.2.1 Positive control sera

Pool DHF. 0.5 ml × 103 Amp.

3.2.4 DME

1. Entomological study of mosquito vectors of Arbovirus in Chanthaburi

1.1 During the months of November to December 1980 Aedes aegypti survey in Chanthaburi Municipality was monitored. The adult density and larval infestation were as follows:

Aedes aegypti densities in Chanthaburi Municipality Landing

Collection		
Date 1980	14/11	12/12
Female	2.2	1.9
Male	1.3	1.4
Total	3.5	3.3

Larval survey		
Date 1980	14/11	12/11
House Index	52.0	57.3
Container Index	19.5	25.3
Breteau Index	122.0	137.0

2. Urban rodent study

The study on rodent species, ectoparasites and endoparasites has been going on. Sweet-potato was used as the bait of traps. Rodent traps were placed six nights per month in the study zones alternatively. In October 1980 the capture was done in Bo and Chanthaburi zone I, November 1980 in Toongbencha and Chanthaburi zone III and December 1980 in Sam-Rong and Chanthaburi zone IV. The number of animal traps and species are given in Table I.

Table 1. The summary of trapping results

Species	Number animals collected						
	Bo	Chan. Zone I	Toong-bencha	Chan. Zone III	Sam-Rong	Chan. Zone IV	Total
1. R. norvegicus	-	32	-	16	-	34	82
2. R. exulans	15	10	15	18	7	24	89
3. S. murinus	-	-	-	1	-	-	1
4. Undecided sp.	-	-	-	-	1	-	1
							17

Blood parasites, Trypanosoma lewisi, were found in Chanthaburi Zone III, one sample from R. norvegicus, Sam-Rong, one sample from R. exulane and Chanthaburi Zone IV, 2 samples from R. norvegicus and R. exulans.

3.2.5 DCP

1. Report on Bacteriological works

a. Two hundred and fifty six specimens were received from PHL Chanthaburi for typing as follows :-

1.1	Salmonella	50
1.2	E.coli	179
1.3	V.cholerae	4
1.4	Shigella	6
1.5	Edwardsiella tarda	15
1.6	Others	2

b. Supply of antisera and antigens to PHL Chanthaburi

Shigella antisera	10 ml
E.coli antisera	15 ml

2. Report on Parasitological works

During the months of October to December 1980, the rats from Chathaburi were examined for human-endoparasites. Results are given in Table 1, and Table 2.

Table 1. An iostrongylus cantonensis found in the lungs

Area	No. examined	No. positive
Chantanimit	79	7
Tagad-Ngao	12	0
Ban Bo village, No. V, VI	17	0
Municipality Zone I	42	1
Toong Ben Cha vill. No. I	15	0
Municipality, Zone III	35	3
Sam Rong village	66	12
Special	6	0
Total	272	23 (8.45%)

Table 2. Endoparasites of rats that can be human-parasites

Area	No. examined	No. positive		
		Hn	Hd	Rs
Chantanimit	79	8	1	14
Tagad-Ngao	12	0	1	0
Ban Bo village, No. V, VI	17	0	3	0
Municipality, Zone I	42	0	4	9
Toong Ben Cha vill. No.1	15	0	4	0
Municipality Zone III	35	0	3	3
Sam Rong village	66	0	1	5
Special	6	0	0	0
Total	272	8 (2.94%)	17 (6.25%)	31 (11.40%)

3.2.6 Cholburi

1. Cholburi Hospital

		October	November	December
1.	Bacteriological examination	4,874	3,181	3,460
2.	Serological examination	1,242	1,173	1,055
3.	Parasitological examination	3,140	5,266	5,281
4.	Mycological examination	315	248	304
5.	Haematological examination	9,706	9,912	10,512
6.	Clinical Chemistry examination	3,700	3,354	3,288
7.	Spinal Fluid examination	360	240	198
8.	Urine examination	4,966	4,770	4,310
9.	Sanitation	-	41	-
10.	Detection for Hepatitis B Antigen	36	24	42
11.	Determination of Protein Fraction	18	26	22
12.	Rabies diagnosis by Fluorescent	7	11	11
13.	Others (media prep. etc.)	120,125 cc.	105,107 cc	107,000 cc.

2. Panatnikom District Hospital

		October	November	December
1.	Blood film for Malaria	551	449	495
2.	Complete Blood Count	551	449	495
3.	Blood Chemistry	127	123	84
4.	Blood for VDRL	109	136	104
5.	Blood for Serology test	57	40	42
6.	Stool Examination	56	61	52
7.	Unine Examination	1585	1246	1068
8.	Microbiology	132	134	116
9.	Bleeding Donor / Blood Transfusion	29/79	32/62	36/78

3. Benglamung District Hospital

		October	November	December
1.	Sputum Examination	33	29	25
2.	Gram Stain	84	94	142
3.	Blood Film for Parasites	172	192	170
4.	V.D.R.L.	165	249	191
5.	Pregnancy Test	61	36	36
6.	Urine Examination	430	347	321
7.	Complete Blood Count	115	110	72
8.	Hematocrit	170	167	121
9.	Stool Examination and Culture	10	8	10
10.	Rectal Swab	10	6	10
11.	F.B.S.	16	14	17
12.	B.U.N.	5	3	2
13.	Creattinine	5	3	2
14.	Uric Acid	-	-	-
15.	Cholesterol	3	2	-
16.	Protein	-	1	2
17.	Bilirubin	8	2	6
18.	S.G.O.T, S.G.P.T.	7	2	6
19.	Blood Grouping	29	36	10
20.	Volunteer Donor	22	23	4
21.	Cross Matching	16	23	4
22.	Widal Aggluttination	4	11	7
23.	Amylase	-	-	2

4. Ban Bung District Hospital

		October	November	December
1.	Blood for Malaria	314	312	347
2.	V.D.R.L	54	50	43
3.	Stool examination	108	95	73
4.	Urine examination	124	96	127
5.	Complete Blood count	136	117	130
6.	Acid fast Bacilli	18	27	27
7.	Gram Stain	9	11	5

3.3 Activity III

The health officer and volunteer communicators visited village 2 and 9 of Tambon Sueng, Klung district for medical examination and collecting of specimens. Anthelmintics and other necessary drugs were prescribed. Fecal specimens were collected again for second examination after the medication.

3.4 Activity IV

No training activity was performed during this period.

3.5 Activity V

3.5.1 Analysis on Causative Agents of G I Diseases

a. Detection of Enteropathogens from Diarrheal Patients

Detection of enteropathogens from diarrheal in- and out-patients of Prapokklao Hospital and four district hospitals from October to December 1980 was shown in Table 1.

Enteropethogenic E. coli was isolated at the highest rate (58.8%), as shown in Table 1. The detection rate of V. parahaemolytious which was the highest during the previous 3 months period decreased to 19.1%.

Among diarrheal cases due to Enteropathogenic E.coli which showed more than half of all enteropathogens, some diarrheal cases in the neonatal ward who were estimated to be of nosocomial infection were included. The estimation based on the fact that Enteropathogenic E.coli, serovar O 126:K 71 was detected from about 40 diarrheal infants in that neonatal ward during one month from th beginning of November to the beginning of December.

The detection rate of Shigella was 16%, about the same as the previous period. There was no particular change in the detected strain pattern which consisted of S. flexneri 1b, 2b and S. sonnei. As shown in Table 2, geographical distribution revealed the highest incidence in Muang district and 6 - 10 cases respectively in other districts except for Laemsing district.

The detection rate of Salmonella was decreased to 5%. S. Typhi and S. paratyphi were not detected from fecal specimens but 2 cases of S. typhi were detected by culture of blood from febrile patients.

Only one cholera case was found in October. But, 2 carriers of V. cholerae were detected by culture of specimens from its family and contacts.

b. Others

Becteriological determination of fecal specimens from food handlers, their family and workers was performed in field villages in Tagad-Ngao and Bo. A case of Shigella, 2 of Salmonella and 6 of V. parahaemolyticus were detected.

In November, outbreak of diarrhes happened in a Kampuchean refugee camp in Pongnamron. The causative agents were examined bacteriologically without finding possible etiological pathogens. However, incidentally NAG Vibrio were detected from 2 persons and V. parahaemolyticus from 2 persons.

Table 1 Isolation of Enteropathogenic Bacteria from Diarrheal Cases among In- and Out-Patients of Prapokklao and 4 District Hospitals in Chanthaburi (October - December 1980)

Month	No. of cases examined	No. of specimens examined	No. of pathogen-positive cases (%)	No. of Isolates	Vibrio cholerae	NAG Vibrio	Group F Vibrio	V. parahaemolyticus	Shigella	Enteropathogenic E. coli	S. typhi	other Salmonella
Oct	265	596	107(40.4)	116	1	1	-	38	23	49	-	4
Nov	304	663	117(38.5)	122	-	-	-	12	23	81	-	6
Dec	408	881	144(35.3)	150	-	2	-	24	17	98	-	9
Total	977	2,140	368(37.7)	388	1	3	-	74 (19.1%)	63 (16.3%)	228 (58.8%)	-	19 (4.9%)

Table 2 Geographical Distribution of Bacillary Dysentery in Chanthaburi Province (Oct. - Dec. 1980)

District	Muang				Tamai				Laemsing				Klung				Makam				Pongnamron				?				Others				TOTAL	
Month / Species	O	N	D	T	O	N	D	T	O	N	D	T	O	N	D	T	O	N	D	T	O	N	D	T	O	N	D	T	O	N	D	T	TOTAL	
A-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	
1b	1	2	1	4	3	-	2	5	-	-	-	-	1	1	-	2	1	-	2	3	1	2	1	4	-	1	1	2	-	-	1	1	21	36
2a	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
2b	3	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	1	-	1	-	1	-	1	1	1	-	2	10	
4	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	3	
V - X	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
C-4	-	1	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	1	-	1	-	1	1	1	-	2	7	
Sonnei	1	-	1	2	1	-	-	1	-	-	1	1	-	2	-	2	1	-	1	2	-	1	2	3	-	-	1	1	-	1	-	1	13	
Total	7	3	3	13	4	1	2	7	-	-	1	1	1	5	-	6	3	1	5	9	2	5	3	10	-	3	2	5	3	3	1	7	58	

3.5.2 Community Participation in Health Promotion

1. Treatment of Parasite Infection

From villegers own voluntary will, health officer and volunteer communicators in village 2 and 9 of Tambon Sueng, Klung district collected fecal specimens from villagers and asked Dr. M. Hasegawa to examine parasite egg. On 6 October, 1980, these villages were visited by Japanese team with Mr. Mongkol, PCMO and Dr. K. Nakazawa, Director of Department of Medical Cooperation, JICA, Tokyo who incidentally visited Chanthaburi to inspect the activity. About 500 people in these villages were given anthelmintics (Pyrantel) in front of the team members. For the rest of the villagers, the health officers were asked to give the drug for the treatment. After the medication, fecal specimens were collected again from villagers for the second examination. The result of the examination will be reported.

2. Medical Examination in the Field Villages

Mobile medical team which was consisted of 3 medical doctors, 3 nurses, 3 laboratory technicians, Japanese team members and drivers visited the Wat Toongbencha to see and to examine villagers in Tambon Toongbencha as many as possible on 11 and 17 December 1980.

Toongbencha village 1 is the control village of the project activity where they have no health communicators. On these days only 53 people came to see doctors from village 1. Other 106 villagers came from the neighboring villages. However, those visitors were accepted for the study, since those neighboring villages have more or less the same environment and they have had no volunteer system. Toongbencha village 1 is the control village where only medical examination is repeated once a year without expecting any impact from village volunteers because they have no volunteers in the village. This was the second visit by the team since last January.

Clinical Finding

As shown in Table 1, there has been no significant difference in the clinical finding between in the first and the present visit. Respiratory infaction has been the major diseases among villagers. Joint, bone, muscle disorder and neuralgia have been also the big trouble found there. Low back pain is the most common among this category of disorder and probably

due to heavy labor. Cases showing hemoglobin lower than 8.0 g/100 ml were 6 in the present examination. As shown in Table 2, clinical impression of these cases consists of 2 cases of anemia, 3 cases of malaria and one case of peptic ulcer.

Table 1 Clinical Findings (Impression) at the Village Visit in Toongbencha

	Second Visit (Dec '80)		First Visit (Jan '80)
	No.	%	%
Respiratory Tract Infection	36	22.6	31.9
Joint, Bone, Muscle Disorder	34	21.4	13.6
No Particular Diseases	33	20.8	8.8
Gastrointestinal Diseases	19	12.0	14.3
Malaria	13	8.2	16.3
Diarrhea	7	4.4	2.1
Skin Diseases	5	3.1	2.7
Miscellaneous*	12	7.5	10.3
Total	159	100	100

* includes ventricular septal defect 1 and thyrotoxicosis 1.

Table 2 Cases showing Lower Hemoglobin than 8.0 g/100 ml

Clinical Diagnosis	No.
Anemia	2
Malaria	3
Peptic Ulcer	1
Total	6

Laboratory Examination

Table 3 Laboratory Data Obtained from Villagers in Toongbencha

Examination	Mean Value	Normal Range
Hemoglobin g/100 ml	11.0*	12 - 16
Hematocrit	38.4	37 - 46
Total Protein g/100 ml	7.87	6 - 8

* % of villagers showing low hemoglobin under 12 g/100 ml was 69.7% among all visitors.

The most predominant finding obtained from laboratory examination was anemia. At the first visit mean value of hemoglobin of 124 villagers was 11.4 g/100 ml while 11.0 g/100 ml at the present (second) visit. At the first examination about 60% of visitors to the medical service showed low hemoglobin under 12 g/100 ml and about 70% of visitors had low hemoglobin under 12 g/100 ml at the second examination about 11 months later. No improvement has taken place.

Table 4 Pathologic Urinalysis Findings

Examination	Cases
Alubumin positive	24
Glucose positive	3
Bilirubin positive	1
Occult Blood ++ or more	10

Urinalysis revealed 24 cases of positive albuminuris, 3 cases of positive glucose, one case of bilirubinuria and 10 cases of positive occult blood in urine. Those findings were informed to the health officers. A possible diabetes case, one ventricular septal defect case (Hemoglobin 17.4 g/100 ml), one case of thyrotoxicosis and 13 cases of severe anemia were informed to the health officer.

Parasitological Study

Generally the infestation rate was quite high at the second visit to Toongbencha village 1. The detailed comparison of infestation at the first visit and the second one will be shown later.

Conclusion

The medical examination will be repeated on villagers in the control and field villages. The health communicators shall be informed the villagers' health situation and the preventive measures in the field villages of the project. Improved villagers' health resulted from health communicators' activity are expected. Medical findings based on laboratory examination which will be repeated once a year are one of indicators for measuring the improvement. However, Toongbencha is the control tambon where no volunteer has not yet been appointed, so that any significant impact cannot be expected. In this particular area, the medical examination is one of the medical services done by a mobile medical team. It is concluded that no improvement in every aspect of clinical and laboratory findings was seen in this control village.

December 30, 1980

Soichi Kumaoka, M.D.
Japanese Expert Team Leader

Sutas Guptarak, M.D.
Project Director

Progress Report No. I

Project : Promotion of Provincial Health Services

January - March 1981

The activities of the project are steadily progressed as usual. The detection of Rotavirus infection for viral diarrhea has been done in Prapokklao Hospital. It is clear that the disease is seen mostly among children which the detection of Rotavirus infection should be done as routine examination in the Provincial Health Laboratories as early as possible.

I Expert

Dr. K. Ohta, expert inBacteriology, return to Japan after his one year service on 31 March 1981.

II Fellowship

2.1 Dr. Prayura Kunasol, Division of Epidemiology, Office of the Under-Secretary of State, went to Japan for a study tour on 22 March 1981.

2.2 Dr. Damrong Bhanthumkosol, Department Chief of Pathology, Prapokklao Hospital, Chanthaburi, went to Japan for a study tour on 22 March 1981.

III Project's activity

3.1 Activity I

3.1.1. Strengthening of the PHL as a clinical diagnostic laboratory

1. Clinical chemistry

The same lot of lyophilized sera, designated as "Consera" was used to run for the internal quality control during January 1981 to March 1981.

The monthly results are shown in Table I, II and III.

2. Clinical Hematology

a. Number of white blood cell count, automated method : 6079

b. Number of red blood cell count, automated method : 8

c. Number of platelet count, phase-contrast method : 691

d. Number of test, Partial thromboplastin time : 7

3. Virology

a. Detection of HBs Ag. and Anti HBs

Sera from blood donors and patients were examined for HBs Ag. and Anti HBs during the three-month period, January-March 1981. The results are shown in Table IV.

Table IV

Sources of specimen	No. of specimen examined	Positive for HBS Ag.		Positive for Anti HBs	
		No. of specimen	Percentate	No. of specimen	Percentage
Blood donors	588	67	11.39	223	37.92
Patients	193	19	9.84*	38	19.00*

* The low incidence in the patients is due to including of many pediatric patients in this group

b. Serodiagnosis and DHF suspected patients

No sera were submitted for examination during this period.

3.1.2 Srewngthening of the PHL as a public health laboratory

1. Examination of feces for suveillance of diarrheal diseases

1.1 Number of specimen from PCMO & district hospital : 59
Number of specimen positive for enteropathogens : 17

1.2 Number of specimen from Prapokklao Hospital :1,700
Number of specimen positive for enteropathogens : 365

2. Bacteriologic examination of good and water

2.1 Water, number of specimen : 24

2.2 Food, number of specimen : 14

3.1.3 Strengthening of the SRL in the four district hospitals

Four motor-cycles, received from Japanese Government, were distributed to all four district hospitals to support SRL activities. The laboratory activities of four SRL during the period of three months are listed as follows:

1. TAMAI DISTRICT HOSPITAL

1.1 MICROBIOLOGY

- Gram stain-Pathogens	=	1
- Gram stain-G.C.	=	1
- AF stain-TB	=	6
- Blood parasitology-Malaria	=	1,207
- Stool parasitology-Protozoa: Helminths	=	151

1.2 HAEMATOLOGY

- Haematocrit	=	292
- Haemoglobin	=	13
- WBC count	=	285
- Diff. count	=	284
- Pregnancy test	=	23
- VDRL	=	52

1.3 URINE ANALYSIS = 192

2. KLUNG DISTRICT HOSPITAL

2.1 MICROBIOLOGY

- Gram stain-Pathogens	=	9
- Gram stain-G.C.	=	6
- AF stain-TB	=	25
- Blood parasitology-Malaria	=	1,526
- Stool parasitology-Protozoa: Helminths	=	19

2.2 HAEMATOLOGY

- Haematocrit	=	444
- Haemoglobin	=	444
- WBC count	=	310
- Diff. count	=	281
- Pregnancy test	=	38
- VDRL	=	95

2.3 URINE ANALYSIS = 253

3. LAEMSINGHA DISTRICT HOSPITAL

3.1 MICROBIOLOGY

- Gram stain-Pathogens	=	1

- Gram stain-G.C. = 6
- AF stain-TB = 7
- Wet preparation-Fungi = 1
- Blood parasitology-Malaria = 303
- Stool parasitology-Protozoa : Helminths = 22

3.2 HAEMATOLOGY

- Haematocrit = 85
- Haemoglobin = 85
- RBC count = 54
- Diff. count = 54

3.3 URINE ANALYSIS = 162

4. PHONG NUM-RON DISTRICT HOSPITAL

4.1 MICROBIOLOGY

- Gram stain-Pathogens = 10
- Gram stain-G.C. = 4
- AF stain-TB = 10
- Blood parasitology-Malaria = 1,811
- Stool parasitology-Protozoa : Helminths = 8

4.2 HAEMATOLOGY

- Haematocrit = 10
- Haemoglobin = 15
- WBC count = 4
- Diff. count = 19

4.3 URINE ANALYSIS = 98

Table I Routine Quality control of January 1981 Using Consera

Date	B.U.N	Crea-tinine	Sugar	Protein	Albumin	Chole-sterol	Bili-rubin	Sodium	Potassium	Chloride	SGOT	SGPT	Alk Phos.	Remarks
2				6.52	4.00			128	4.3					
5	16.0	1.9	111	6.57	3.97	182		134	4.5	99	2	6	38	
6	15.9	1.3	91.6	6.59	3.9	171		132	4.5	99	20	12	32	
7	19.0	1.5	85.1	6.57	3.67	183		135	4.6	94	27	6	27	
8	16.1	1.4	83	6.75	3.75	186		135	4.6	102	27	18	26	
9	18.3	1.2	86	6.57	3.82	195		133	4.6	96	30	23	29	
12	15.5	1.1	76.9			156		133	4.5	97	33	18	27	
13	17.2	1.1	84	6.39	3.23	195		131	4.4	95	20	15	18	
14	27.4	1.1	84.6	6.57	2.99			131	4.5	96	27	8	23	
15	17.7	1.0	72.4	6.75	3.58	184		129	4.5	93	33	12	26	
16	18.2	1.1	84.6	6.57	3.82			134	4.6	102	20	12	30	
19	14.8	1.3	79.2	6.57	3.0			134	4.6	96	24	22	30	
20	19.5	1.8	81.6	6.39	3.52	155		131	4.5	97	42	32	44	
21	17.2	1.8	77.5	6.75	3.52	176		134	4.6	96				
22	17.5	1.2	92.7	6.93	3.67	185		130	4.4	97				
23	17.1	1.4	87.8			136		127	4.4	97				
26	18.1	1.3	82.6	6.57	3.45	199		130	4.5	90				
27	16.6	1.8	82.9	6.75	3.07	213		132	4.7	94	27	15	28	
28	24.6	1.4	85.7	6.57	3.45	190		133	4.5	98	24	12	24	
29	22.5	1.5	76.6	6.75	3.45	180		129	4.4	102	24	18	22	
30	16.7	1.5	90.4	6.57	3.57			129	4.4	98	24	18	24	

Table I Routine Quality control of January 1981 (continued)

Date	B.U.N	Crea-tinin	Sugar	Protein	Albumin	Chole-sterol	Bili-rubin	Sodium	Potassium	Chloride	SGOT	SGPT	Alk Phos.	Remarks
n	20	20	20	19	19	16		21	21	20	16	16	16	
ΣX	365.9	27.7	1696.2	125.7	67.37	2936		2764	94.5		405	247	448	
ΣX^2	6882.5	39.75	145083	331.9	240.58	541984		363908	425.47	188360	11351	4495	13128	
$\overline{X}$	18.3	1.385	84.81	6.616	3.546	183.5		131.62	4.5	87	25.3	15.4	28.0	
SD	3.069	0.263	7.837	0.129	0.299	14.204		2.319	0.1023	3.0	8.29	6.53	6.0415	
CV	16.7	18.9	9.32	1.95	8.43	7.74		1.76	2.27	3.45	32.76	42.4	21.57	

Table II Routine Quality Control of February 1981 Using consera

Date	B.U.N.	Crea-tinine	Sugar	Protein	Albumin	Chole-sterol	Bili-rubin	Sodium	Potassium	Chloride	SGOT	SGPT	Alk Phos.	Remarks
2	19	1.5	83.3	6.75	3.6		0.44	134	4.5	102	20	18	29.5	
3	21.6	1.4	81.6	6.57	3.4	162.5	0.44	129	4.5	95	20	18	29	
4	23.7	1.4	85.7	6.75	3.4	168.2	0.55	130	4.4	94	20	18	23	
5	18.6	1.4	80.0	6.39	3.3	159.1	0.33	132	4.3	102	24	15	28	
6	17.6	1.2	85.7	6.75	3.3	165.2	0.44	130	4.4	102	20	23	23	
9	17.8	1.5	84.4	6.75	3.7	190.5	0.33	130	5.0	102	27	15	29	
10	19.2	1.2	83.3	6.75	3.7	168.0	0.44	130	4.5	98	24	22	23	
11	18.1	1.4	83.7	6.93	3.6	180.0	0.55	135	4.5	102	32	15	28	
12	17.3	1.4	77.3	6.75	3.6	171.0	0.33	131	4.5	98	24	18	29	
13	19.5	1.4	79.2	6.93	3.75	172.0	0.44	131	4.0	98	30	23	29	
16	15.7	1.4	87.8	6.22	3.6	145.8	0.44	134	4.6	98	24	15	29	
17	18.0	1.4	82.6	6.57	3.5	181.0	0.33	128	4.4	98	24	18	29	
18	19.5	1.3	82.6	6.39	3.52	185.0	0.44	129	4.5	102	20	10	28	
20	17.5	1.5	108.3	6.93	3.45	137.0	0.33	132	4.5	98	34	15	27	
23	17.2	1.3	96.0	6.75	3.6	187.0	0.44	128	4.5	100	27	18	30	
24	16.6	1.4	100	6.57	3.45	184.0	0.33	130	4.4	102	30	12	37	
25	17.6	1.3	83.6	6.75	3.37	180.0	0.44	131	4.4	106	20	12	32	
26	22.9	1.4	92.8	6.75	3.52	175.0	0.33	133	4.6	98	24	15	26	
27	18.0	1.4	100.0	6.57	3.52	172.0	0.44	133	4.5	102	33	12	28	

Table II Routine Quality Control of February 1981 Using Consera (Continued)

Date	B.U.N.	Creati-nine	Sugar	Protein	Albumin	Chole-sterol	Bili-rubin	Sodium	Potassium	Chloride	SGOT	SGPT	Alk Phos	Remarks
n	19	19	19	19	19	18	19	19	19	19	19	19	19	
ΣX	3554	26.5	1657.9	126.82	66.86	3083.3	7.29	2490	85	1897	459	312	546.5	
ΣX^2	6724.16	37.07	145902	847.15	235.56	531487.23	3.412	326396	380.86	179657	11987	5368	15897.25	
$\bar{X}$	18.7	1.39	87.26	6.67	3.52	171.29	0.416	131	4.47	99.84	24.2	16.4	28.8	
SD	2.004	0.075	8.07	0.186	0.122	13.611	0.076	1.986	0.177	2.947	6.876	3.59	3.06	
CV	10.7	5.39	924	2.78	3.46	7.95	18.26	1.51	3.95	2.95	28.4	21.89	10.62	

Table III Routine Quality Control of March 1981 Using Consera

Date	B.U.N.	Crea-tinine	Sugar	Protein	Albumin	Chole-sterol	Bili-rubin	Sodium	Potassium	Chloride	SGOT	SGPT	Alk Phos.	Remarks
2	17.6	1.3	83.8	6.75	3.9	172	0.55				30	15	29	
3	19.0	1.4	96.3	6.93	3.46	185	0.44	130	4.4	98	24	12	29	
4	18.2	1.4	93.3	6.75	3.6	185	0.66	133	4.5	98	24	15	29	
5	19.6	1.4	86.6	6.75	3.37	185	0.33	133	4.5	98	24	15	29	
6	17.0	1.5	76.9	6.39	3.75	167	0.33	133	4.4	98	27	12	28	
9	14.7	1.6	82.7	6.57	3.67	168	0.44	134	4.5	98	27	10	37	
10	19.9	1.5	91.0	6.75	3.75	180	0.22	134	4.5	98	27	12	32	
11	18.1	1.4	100	6.39	3.52	179	0.44	136	4.5	102	20	12	28	
12	19.1	1.4	96.5	6.04	3.67	212	0.77	132	4.4	98	24	18	29	
13	19.0	1.5	103	6.57	3.67	185	0.33	137	4.7	102	20	12	39	
16	15.5	1.7	93.3	6.75	3.75	173	0.44	135	4.5	98	27	15	41	
17	17.6	1.5	88.0	6.39	3.6	191	0.55	132	4.4	98	24	12	29	
18	18.5	1.4	99.3	6.57	3.75	191	0.33	133	4.5	102	27	15	29	
19	18.0	1.5	92.3	6.39	3.75	179	0.77	131	4.4	102	24	15	27	
20	19.5	1.4	100	6.57	3.67	184	0.44	132	4.4	98	20	12	28	
23	19.5	1.6	84.8	6.75	3.6	180	0.33	136	4.6	98	20	10	29	
24	16.0	1.6	92.8	6.57	3.45	186	0.44	132	4.5	98	18	15	27	
25	20.5	1.6	96.2	6.75	3.52	171	0.55	133	4.5	102	20	12	19	
26	18.0	1.7	92.3	6.75	3.6	159	0.66	134	4.5	98	20	15	28	
27	19.0	1.5	92.8	6.93	3.6	187	0.44	134	4.4	98	27	12	29	
30	15.6	1.4	88.8	6.39	3.6	180	0.44				27	10	34	
31	19.0	1.6	96.3	6.57	3.75	180	0.33				27	15	26	

Tabe III Routine Quality Control of March 1981 (continued)

Date	B.U.N.	Creati-nine	Sugar	Protein	Albumin	Chole-sterol	Bili-rubin	Sodium	Potassium	Chloride	SGOT	SGPT	Alk Phos	Remarks
n	22	22	22	22	22	22	19	19	19	22	22	22	22	
Σ X	400.9	32.9	1952.3	145.27	83.22	3987	10.23	2535	85.2	1882	528	291	655	
Σ X^2	7363	49.45	198715	1015.5	301.6	725001	5.215	338279	382.18	186476	12912	3945	19951	
$\bar{X}$	18.22	1.495	88.74	6.48	3.61	181.22	0.465	133.4	4.48	99.0	24	13.2	29.8	
SD	1.61	0.10	16.03	0.45	0.145	10.548	0.1443	1.726	0.081	1.7614	3.30	2.09	4.522	
CV	8.83	6.68	18.08	6.94	4.02	5.82	31.03	1.29	1.81	1.77	13.75	15.8	15.17	

3.2 Activity II

3.2.1 DPHLS

Chemical reagents, bacteriological media and antisera have been supplied regularly by DPHLS to PHL Chanthaburi and Chonburi during January to March 1981.

3.2.2 DFA

1. During the period, DFA has received 2 items of equipment as follows:-

Wiley's Laboratory Mill and accessories	1 set
Vacuum oven	1 set

2. Food, water and beverage samples have been collected from Chanthaburi by DFA's staff on 23 - 25 March 1981.

3.2.3 VRI

Sero-epidemiological surveys of arbovirus in Chanthaburi

The HI antibodies determination of DHF survey is Chanthaburi 1980 had been finished. For the evaluation of the results are undertaken.

3.2.4 DME

During the months of January to March 1981, Aedes aegypti relative density in Chanthaburi municipality was monitored landing collection was done in 45 houses the female landing rate = 2.6 mosquitos per man hour, male landing rate 1.7 mosquitos per man hour, larval survey was done from 180 houses, the Berteau Index = 101.7, Aedes House Index = 52.8 and Receptacle Index = 20.0.

Rodent study was carried out in Chanthaburi Municipality zone II and Chanthanimit village II, III and IV the results are shown in the table 1. Different kinds of traps have been tried so as to evaluate the traps' efficiency.

Table 1. Summary of Host Ectoparasite Data Captured in January 1981

Area	Host	No. examined	Flea		Mite		Lice	
			No. infested	% infested	No. infested	% infested	No. infested	% infested
Chanthaburi Municipality Zone II	Rattus norvegicus	38	8	21.05	13	34.21	-	-
	Rattus exulans	11	5	45.45	1	9.09	-	-
Chatanimit Vill No. II. III. IV	Rattus norvegicus	19	1	5.55	6	33.33	-	-
	Rattus exulans	13	7	53.84	1	7.69	-	-
	Suncus murinus	4	1	25.00	-	-	-	-

3.2.5 DCP

1. Report on Bacteriological works

a. Two hundred and thirty six specimens were received from PHL Chanthaburi for typing as follows :-

Salmonella	33
Enteropathogenic E.coli	123
Other E.coli	68
Proteus sp.	14
No growth	1

b. Supply of antisera and antigens to PHL Chanthaburi

E. coli antisera	20 ml.
Salmonella antigen	6,000 ml.

2. Report on Parasitology works

During the months of January to March 1981, the rats from Chanthaburi were examined for human-endoparasites.

Results are given in the Table 1 and Table 2.

Table 1 Angiostrongylus cantonensis found in lungs

Area	No. examined	No. positive
Municipality Zone II	49	10
Chantanimit District	35	3
Total	84	13 (=15.45%)

Table 2 Endoparasites of rats that can be human parasites

Area	No. examined	No. positive		
		H.nana	H.dimenuta	R. Siriraji
Municipality Zone II	49	0	0	18
Chanthanimit District	35	3	0	10
Total	84	3 (=3.31%)	0	28 (=31.07%)

3.2.6 Cholburi

1. Cholburi Hospital

		January	February	March
1.	Bacteriological examination	2,655	3,183	3,885
2.	Serological examination	986	790	1,355
3.	Parasitological examination	5,309	5,103	5,532
4.	Mycological examination	66	299	292
5.	Haematological examination	8,287	8,284	9,514
6.	Clinical Chemistry examination	3,087	3,044	3,453
7.	Spinal Fluid examination	252	96	343
8.	Urine examination	4,146	7,976	4,266
9.	Sanitation	-	-	56
10.	Detection for Hepatitis B Antigen	15	32	42
11.	Determination of Protein Fraction	8	12	10
12.	Rabies diagnosis by Fluorescent	15	18	14
13.	Hemoglobin Typing	7	10	18
14.	Others (media prep. etc.)	124,000 cc	173,000 cc	199,900 cc.

2. Panatnikom District Hospital

		January	February	March
1.	Blood film for Malarial	500	401	409
2.	Complete Blood count	500	401	409
3.	Blood Chemistry	102	91	104
4.	Blood for VDRL	193	158	110
5.	Blood for Serology test	50	53	51
6.	Stool examination	68	49	64
7.	Urine examination	973	841	1043
8.	Microbiology	124	98	114
9.	Bleeding Donor/Blood transfusion	78/73	27/48	39/54

3. Banglamung District Hospital

		January	February	March
1.	Sputum examination	39	38	18
2.	Gram stain	176	149	123
3.	Blood film for Parasites	132	142	155
4.	Pregnancy test	57	47	55
5.	Urine examination	358	315	349
6.	Complete Blood count	75	96	96
7.	Hematocrit	135	150	152
8.	Stool examination and culture	13	13	13
9.	Rectal swab	20	39	14
10.	F.B.S.	33	16	22
11.	B.U.N.	9	4	4
12.	Creatinine	9	1	4
13.	Uric Acid	-	-	-
14.	Cholesterol	1	3	3
15.	Protein	4	9	4
16.	Bilirubin	4	9	6
17.	S.G.O.T., S.G.P.T.	13	13	12
18.	Blood grouping	23	5	26
19.	Volunteer Donor	18	5	10
20.	Cross matching	13	3	9
21.	Widal Agglutination	1	3	6
22.	Amylase	-	-	-

4. Ban Bung District Hospital

		January	February	March
1.	Blood for Malaria	290	217	203
2.	V.D.R.L	50	38	66
3.	Stool examination	47	45	68
4.	Urine examination	72	80	122
5.	Complete Blood count	134	129	140
6.	Acid fast Bacilli	12	54	53
7.	Gram stain	10	6	11

3.3 Activity III

Mobile medical team which consisted of health officers, Japanese exparts and volunteer communicators has visited the v illagers for medical examination, collecting of fecal specimens and prescription of necessary durgs by the following schedules :-

4 - 7 January 1981 Tagad Nagao, Amphur Tamai

9 - 16 February 1981 Bo, Amphur Klung

4 - 11 March 1981 Saikao, Amphur Pong Namron

3.4 Activity IV

No training activity was performed during this period.

3.5 Activity V

3.5.1 Analysis on Causative Agents of G-I Diseases

a) Detection of Enteropathogens from Dirrheal Patients

Detection of Enteropathogens from Diarrheal in- and Out-patients in Prapokklao Hospital and four district hospitals from January to 16th March 1981 is shown in Table 1. During this period total number of specimens and number of patients examined were 1,500 and 644 respectively. Etiological agents of diarrhea were clarified in 190 cases.

Enteropathogenic E.coli were isolated at the highest rate (102 cases), next were V.parahaemolyticus (53 cases), shigella 31 cases and Salmonella 16 cases.

As in the previous period, S.typhi and S.paratyphi as well as V.cholerae were not detected during this period.

b. Occurrence of Bacillary Dysentery

Thirty-one strains of Shigella were detected from 31 patients in the Provincial Health Laboratory, Chanthaburi from January to 16th March 1981. Among them 25 cases came from Chanthaburi province and 3 from neighbouring provinces and the address of other 3 cases was unclear.

Geographical distribution of bacillary dysentery detected by bacteriological examination was shown in Table 2. As seen previously, more cases were found in Muang district and next were Pongnamron and Tamai. In Ampore Klung, no case was detected during these three months. The detected strains were S.sonnei and S.flexneri 1b.

c. Viral Diarrhea

The etiological agents were detected in only 30% of diarrheal cases found in Chanthaburi province. It is well known that diarrhea is caused not only by bacteria but also by protozoa, virus, parasite or other substances.

Recently diarrhea of viral origin especially diarrhea due to Rotavirus has been considered to be important in the U.S.A., Australia, Japan and Europe. Also in Thailand, investigation on Rotavirus has been done in some institutes. In the Provincial Health Laboratory, Chanthaburi, detection of Rotavirus infection has been done on fecal specimens taken from admitted patients in Prapokklao Hospital. The method used in the study has been taught to the staffs in the virus laboratory of PHL, Chanthaburi.

The results obtained from 66 cases were shown in Table 3. As shown here, it is clear that the disease is seen mostly among children. The highest age among these positive cases was 6 years and the lowest 7 days new-born baby. It was confirmed that about 50% of diarrheal cases were due to this virus among small children under the age of 10.

Based on the fact, detection of Rotavirus infection should be done as routine examination in the Provincial Health Laboratory as early as possible.

Table 1 Isolation of Enteropathogenic bacteria from Diarrheal Cases among In- and Out-Patients of Prapokklao and 4 District Hospitals in Chanthaburi (Jan. - Mr. 16, 1981)

Month	No. of cases examined	No. of specimens examined	No. of pathogen -positive cases (%)	No. of isolates	Vibrio Cholerae	NAG vibrio	Group F vibrio	V. para-haemo-lyticus	Shigella	Entero-pathogenic E.coli	S. typhi	Other Salmonella
Jan.	318	733	79(25.8)	82	-	-	-	18	18	44	-	2
Feb.	205	522	75(40.5)	83	-	1	-	22	7	43	-	10
Mar.	121	245	36(29.8)	39	-	1	-	13	6	15	-	4
Total	644	1,500	190(29.5)	204	-	2	-	53	31	102	-	16

Table 2 Geographical distribution of bacillary dysentery in Chanthaburi province
(Jan. - Mar. 16, 1981)

	Muang	Tamai	Khlung	Makam	Laemsing	Pongnamron	Total
Sl flexneri 1b	4	-	-	-	-	2	6
2b	3	-	-	-	-	-	3
4	1	1	-	-	-	-	2
Other S. flex.group	3	-	-	-	-	2	5
S. boydii 4	-	-	-	-	1	1	2
S. sonnei	3	2	-	1	1	-	7
Total	14	3	-	1	2	5	25

Unknown of address: S.dysenteriae 3(1), Other S.flex. group (1), S.sonnei(1)

Neighboring province: S.flex. 1b (1), S.flex. 2b (1), Other S.flex. group (1)

Table 3 Rota virus from diarrheal cases in Prapokklao Hospital

Age	No. of positive / No. of tested	%
Under 3 months	7/13	53.8
3 - 6 months	1/4	25
6 - 9 months	3/7	42.8
9 - 12 months	5/5	100
1 - 2 years	10/15	66.7
3 - 10 years	3/3	100
Over 11 years	0/19	0
Total	25/66	37.9

As can be seen that the youngest age for rotavirus diarrhes is 7 days and the oldest age is 6 years.

3.5.2 Community participation in health promotion

As described before 1), this study was planned to meet the following purpose.

1. To get health data directly from villagers.
2. Problems in health of villagers are informed to the health officers and village health communicators. They are given measures to solve the problems.
3. In villages health communicators have been selected and given training for two years. One of the important purposes involved in this study is that health communicators' motivation to help villagers is reappraised and is to be encouraged.

The project "Promotion of Provincial Health Services" has three field tambons in Chanthaburi province. One village or two were selected in each field tambon as field villages for detailed epidemiological surveillance activity. Health communicators have been appointed in those field villages. One village where no village volunteers have not been appointed was selected aa control village. In this control village the same study of epidemiological survey and medical examination will be done. But, any measures to improve the situation will not be followed. In Table 1 brief description of those villages will be done.

Table 1 Field Villages and Health Communicators

Village	Health Communicator	Population
Toonghencha village 1 (control village)	0	390
Tagad Ngao village 4	7	564
Bo village 3	10	545
Saikao village 2	10	665
village 8	10	423

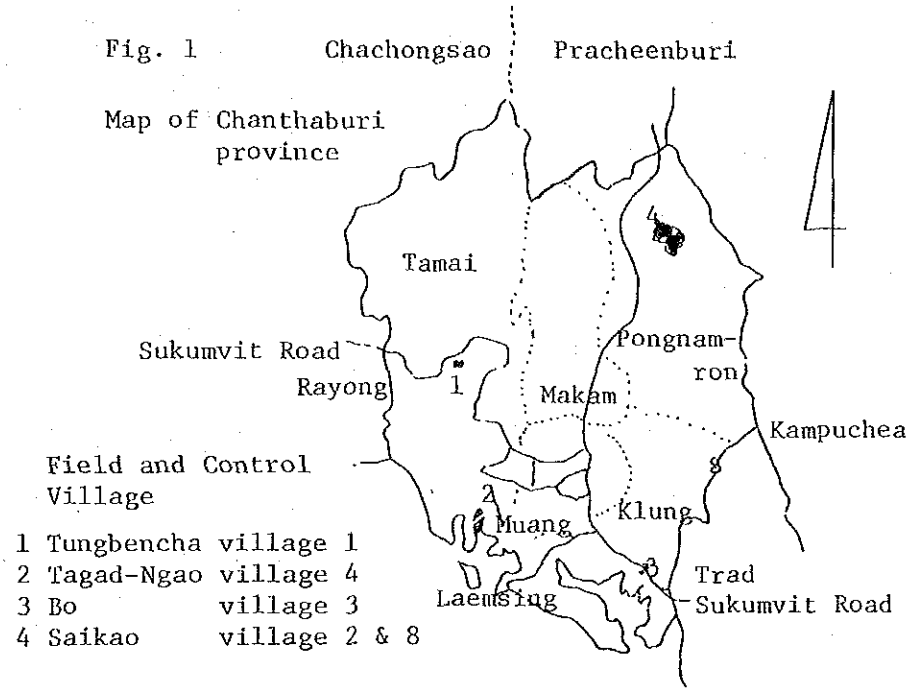
Tambon Toongbencha is forest area. People take care of fruit and rubber plants there. Tambon Tagad Ngao is near the ocean. People work in rice and rush field. They must go up long way to the public wells to get clean water during dry season. Tombon Bo is near ocean. They must have difficulty in getting clean water during dry season. Tambon Saikao is hilly area. People caltivate field to grow cassava and maize. They get water from a small stream which is fairly contaminated.

a. *Epidemiological Surveillance by Health Communicators*

It is a duty for health communicators in the field tambons to report febrile and diarrheal cases everyday to the health centres. This is a primitive trial of epidemiological surveillance at the village level. This activity done by health communicators started since the volunteers were officially appointed in early 1979.

Table 2 Villages where it is a duty for health communicators to report febrile and diarrheal cases everyday to health centre

Village		No. of Health Communicator	Population
Tagad Ngao	Village 4	7	564
	Village 6	9	435
Bo	Village 3	10	545
	Village 7	7	359
	Village 9	9	509
Saikao	Village 2	10	665
	Village 8	10	423



Those villages are shown in Table 2.

b. Health Survey by Means of Village Medical Examination

To obtain detailed data directly from villagers, medical examination by mobile medical team has been given to the selected four villages and one control village. The medical examination was done in Buddhism temples. Registration, physical examination and prescription of the necessary drugs were followed by collection of small amount of blood from finger tip, fecal and urine specimen from each visitor.

Blood hemoglobin, hematocrit, saturation index, total protein, parasite ovae, urinalysis and bacteriological examination of fecal specimens (if necessary) were examined.

Number of visitors to the medical examination was shown in Table 3. Proportion of visitors to village whole population were around 20%. It was characteristic that female visitors exceeded male ones (female about 60% while male about 40%).

Table 3 Village Medical Examination

Village	First Visit		% to Whole Population	Second Visit		% to Whole Population
	Date	Visitors		Date	Visitors	
Toongbencha Village 1 (Control)	Jan. & Feb. 1980	124 M=53 F=71	31.8	Dec. 1980	159 M=56 F=103	40.7
Tagad Ngao Village 4	April 1980	125 M=56 F=69	22.1	Jan. 1981	129 M=53 F=76	22.9
Bo Village 3	May 1980	140 M=51 F=89	25.7	Feb. 1981	114 M=37 F=77	20.9
Saikao Village 2 & Village 8	Jun. 1980	136 M=40 F=96	12.6	Mar.	209 M=82 F=127	19.2

Results

a. Epidemiological Surveillance by Health Communicators

As shown in Figure 2, health communicators' activity in tambon Saikao seems to be better than other tambons. Saikao villagers 2 and 8 are fairly remote place. It is quite necessary for villagers to help each other. Therefore, their health depends largely upon activity of health volunteers and health communicators. In other tambons (Tagad Ngao and Bo), villagers can reach a little more easily to the medical facilities. This would be one reason why health communicators' activity in Saikao has been maintained high.

The important fact in every tambon is that health communicators have maintained their motivation constantly for 2 years without any incentive. This is quite a bright evidence of their reliability.

b. Village Medical Examination

From the end of January to June 1980, mobile medical team visited Toongbencha village 1, Tagad Ngao village 4, Bo village 3 and Saikao villages 2 and8 to examine villagers' health. In every place mild anemia was commonly seen. Health problems found in the medical examination were informed to

each health centre and health communicators as soon as possible so that they may give necessary treatment and health education to villagers.

From December 1980 to March 1981, the mobile medical team visited the same villages again. The size of the first and second medical examination was shown in Table 3. During rainy season (from May to October) and a few months after rainy season, generally villagers are so busy in taking care of fields. It may be wise for the mobile medical team to avoid the busiest season. The second visit started from December 1980 and ended in March 1981. If this sort of study is repeated, visiting the same village in the same period of the year would be recommended in order to obtain the comparable data from villagers.

1. Clinical findings

Clinical diagnosis made in the first and second medical examination is listed in Table 4. It is characteristic that there has been not much difference of the results between at the first and second survey, except for current respiratory infection which is only transient and communicable disease and fluctuate time to time. Joint, bone, muscle diseases are rather common anywhere except for in Saikao. Malaria is rare in Tagad Ngao and Bo. In any tambon, anemia was common condition which may be related to hook worm infestation, repeated malaria and/or inadequate food intake.

Fig. 2 Epidemiological Surveillance by Health Communicators

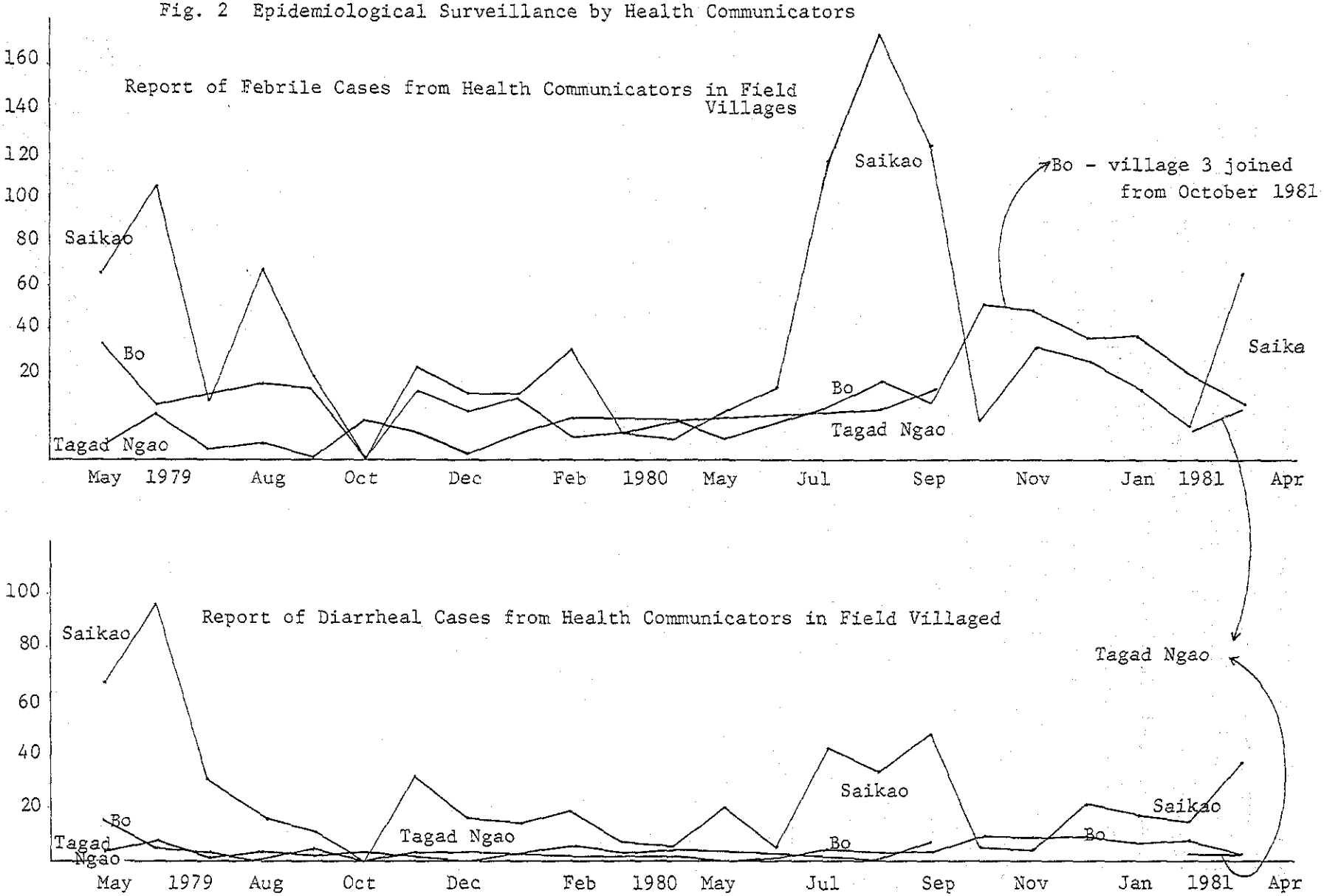


Table 4 Clinical Diagnosis made at the Medical Examination

Disease Category	Toongbencha		Tagad Ngao		Bo		Saikao	
	1#	2#	1	2	1	2	1	2
Respiratory Tract Infection	31.9	12.6	22.5	20.9	16.0	27.2	28.2	34.9
No Particular Disease	8.8	18.9	23.0	31.0	25.5	15.8	14.8	21.5
Joint, Bone, Muscle Disorder Neuralgia	13.6	21.4	19.2	19.4	20.3	14.0	7.5	4.3
Gastrointestinal Diseases	14.3	13.2	14.0	15.5	11.6	14.9	13.5	9.1
Malaria	16.3	8.2	0.9	0.8	4.3	4.4	13.5	7.7
Skin Diseases	2.7	3.1	8.9	2.3	4.0	5.3	4.5	2.4
Miscellaneous including diarrhea, anemia	12.4	12.6	11.5	10.1	18.3	18.6	17.7	20.1

#1 -- First Visit

#2 -- Second Visit

Number appeared on the table is percentage of each disease category to the whole visitors.

2. Laboratory findings

The most important findings in the village medical examination must be the laboratory findings. Those are scientific and objective data obtained from villagers directly. It would'nt be very easy for the ordinary mobile medical team to obtain this sort of scientific data.

Hemoglobin, hematocrit, saturation index and total protein value are shown in Table 5.

Table 5 Laboratory Findings obtained at the Medical Examination

Village		Hemoglobin g/100 ml	Hematocrit	Saturation Index	Total Protein g/100 ml
Toongbencha (control field)	1	11.4 ± 2.1	37.9 ± 5.2	0.85 ± 0.09	7.74 ± 0.63
	2	10.8 ± 1.9	37.9 ± 6.5	0.81 ± 0.09	7.85 ± 0.53
Tagad Ngao	1	12.5 ± 2.1	36.8 ± 5.0	0.06 ± 0.12	7.69 ± 0.55
	2	11.5 ± 2.3	39.5 ± 4.9	0.82 ± 0.09	7.69 ± 0.59
Bo	1	13.1 ± 2.4	38.0 ± 5.1	0.97 ± 0.11	8.10 ± 0.80
	2	12.4 ± 1.8	38.5 ± 4.8	0.91 ± 0.09	7.82 ± 0.60
Saikao	1	10.5 ± 1.8	36.5 ± 5.0	0.82 ± 0.09	7.47 ± 0.60
	2	10.6 ± 2.1	38.4 ± 4.9	0.79 ± 0.11	7.84 ± 0.49
Normal Range		12 - 16	36 - 48	0.1 - 1.1	6.0 - 8.0

It is almost incredible that there has hardly been any significant difference of the value between at the first and second survey and the value was quite characteristic in the respective village. For example, mean hemoglobin was somewhat lower in Toongbencha and Saikao and relatively higher in Bo. It can be said that generally there were so many anemic patients and hemoglobin level was not sufficient in any tambon, while serum protein seems to be satisfactory.

At the second visit, oil visitors were examined urinalysis (Ph, protein, glucose, ketone, bilirubin, blood, nitrite and urobilinogen). (Table 6) There were fairly big number of positive occult blood in urine and very few glycosuria. Bilirubinuria and abnormal urobilinogen were seen more frequently in Saikao. This must be an evidence of hepatic disturbance. However, the real cause was not necessarily clear.

Table 6 Results of Urinalysis Obtained at the Second Visit

Urinalysis	Toongbencha	Tagad Ngao	Bo	Saikao
Protein	18.5%	19.4%	13.0%	22.7%
Glucose	2.3	0.9	3.3	0
Ketones	0	0	1.0	0.7
Bilirubin	2.3	4.6	1.0	9.3
Blood	20.8	25.9	15.2	12.0
Nitrite	1.5	0	0	0
Urobilinogen	6.2	13.0	13.0	18.0

3. Parasitological survey

After the first examination was completed, pyrantel pamoate was planned to be given to whole villagers. Tablets and a cup of water are prepared and villagers are asked to take them in front of the team. The drug was given to 85.3% of whole villagers in tambon Saikao village 2 and 8 on 18 August 1980 and to 48.7% in tambon Tagad Ngao village 4 on 17 November 1980.

Parasitological findings obtained at the first and second medical examination are shown in Table 7.

Table 7 Parasitological Survey at the Medical Examination

Parasite	Toongbencha		Tagad Ngao		Bo		Saikao	
	1#	2#	1#	2#	1#	2#	1#	2#
Strongyloides stercolaris	4		4		1		1	6
Trichostrongylus orientalis		2	4	1	2	1		
Hook worm	51	40	74	12	22	34	35	47
Hook worm % positive	46.8	43.0	36.3	7.3	18.3	24.6	24.6	17.0
Enterobius vermicularis	1	1	1		1	1	1	
Ascaris lumbricoides		1			2			
Trichuris trichiura		1						
Opistorchis sp.						1		
Positive Cases	56	45	83	13	28	36	37	53
No. examined	109	93	204	164	120	138	142	277
% Positive	51.4	48.4	40.7	7.9	23.3	26.1	26.0	19.1

#1 -- First Visit

#2 -- Second visit

Apparently significant reduction of hook worm infestation rate was found in Tagad Ngao and Saikao. The infestation rate of parasite in villages where no treatment has not been done showed no significant difference between at the first and second visit.

Conclusion

a. Epidemilological Surveillance by Health Communicators

It would be an ideal situation that not only reporting diseases but also taking specimens from sick persons and giving simple medicine to them are taught to health communicators correctly. Furthermore they must be a good teachers of health education among villagers. However, village volunteers are mostly farmers and must work very hard. Health communicator is not a profession from which they can earn money. They will not be able to share more than 30 minutes a day for service. Too much load results in abandonment of their duty. So that this kind of plan should be scheduled step by step. Otherwise it will be faded sooner or later.

In the next step, at least they are taught to take fecal specimen from diarrheal patients and to send it to the health centre and to make blood film from febrile and shaking patients. This may be possible. But, the problem exists in whether the laboratory can do good deal of specimens sent from remote villages or not and in whether health officers or PCMO staffs can afford to take quick action inresponse to local requirement or not. Furthermore, as mentioned before, too much expectation and load to volunteers may kill their intention to help villagers. Therefore, at present status, health education to villagers by health communicators would be more essential and more practical in primary health care than helping laboratory examination.

b. Health Survey by Means of Village Medical Examination

The principle of the village medical examination is as follows :-

1. Medical examination including physical examination, hematological, biochemical, fecal examination and urinalysis are done and service of giving medicine, advice and some treatment is done to villagers.
2. The problems which become apparent at the medical examination are informed to the health officers and health communicators. Additional necessary treatment is indicated to the health officers and health education is given to villagers through health communicators.
3. Yearly medical examination is repeated to assess villagers' health situation in the same villages.
4. Hopefully health situation is expected to be improved with health education done by health officers and health communicators.

In reality the medical examination done twice in one year did confirm the characteristic health problems in each field and control village. It failed, however, to prove any definite evidence of improvement in villagers' health in one year's duration except for decreased parasite infestation rate in some villages where mass treatment was taken place.

At least it can be said that a method of assessing villagers' health situation was established. One year may be too short to improve long-existing villagers' health problems.

Efforts must be made vigorously to show health communicators how to improve villagers' health situation through direct talking, training course and "Village Medical News" which has been published monthly to inform important health problems and how to improve them.

March 31, 1981

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