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CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)

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## CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)\*

### 1. INTRODUCTION

The Caribbean Epidemiology Centre (CAREC) was established on January 1, 1975. It incorporated the Trinidad Regional Virus Laboratory which was transferred, complete with its premises and assets, from the University of the West Indies to the Pan American Health Organization (PAHO). The functions of CAREC were defined as:

#### A. Surveillance

To serve as a specialized technical resource in the field of communicable diseases under surveillance and to cooperate in the program being developed by governments.

To achieve the reduction of mortality and morbidity associated with communicable diseases in the area.

To act as a center for epidemiological surveillance for all countries in the Caribbean which are or were participating in or cooperating with the Centre.

To assist or advise governments on the development of effective surveillance.

To assist and advise governments by providing visiting staff expert in surveillance diagnosis and control of communicable disease.

#### B. Laboratories

To assess resources and needs of laboratory within the area and assist in their development.

To promote collaborative relations with laboratories which may serve the area.

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\*Prepared by Dr. Patrick J. S. Hamilton, Director, Caribbean Epidemiology Centre, Port of Spain, Trinidad.

To provide selective diagnostic laboratory services and facilities needed for surveillance.

To maintain facilities for the investigation of selected animal viruses.

C. Training

To collaborate closely with universities of the area, particularly the faculties of medicine and agriculture, the Commonwealth Caribbean Medical Research Council (CCMRC) and the Secretariat of the Caribbean Health Ministers' Conference (CHMC).

D. Research

To carry out research both in the Centre and in the field on disease problems important to the Caribbean.

To provide facilities for visiting workers.

To study virus diseases and their ecology.

## II. PROGRESS REPORT

(See Document RD 15/2-Report to the Director).

A. Organization of surveillance

The staff and buildings of the Trinidad Regional Virus Laboratory (TRVL) were taken over by PAHO on January 1, 1975, and an administrative staff structure established. During the first year of operation, the staff has been engaged in expanding the surveillance facilities and consolidating and reorienting the laboratory from mainly arbovirus research to a back-up facility for surveillance. The Surveillance Division has been established with one PAHO medical officer aided by one medical officer and a health advisor seconded by the Center for Disease Control (CDC), Atlanta. The Division publishes a monthly CAREC Surveillance Report (Annex 1), which carries a digest of communicable disease statistics from the Caribbean as well as articles on topics of particular significance to the area. Circulation of this Report is now over 1,000 copies per month and the number of participating territories has risen from 7 to over 20 including a number of Central American countries.

At the request of CAREC, the PAHO weekly communicable disease report has been modified to include gastroenteritis and malnutrition.

B. Field work

(1) Surveillance

Individual governments have been advised on the development of surveillance activities with emphasis on a pilot project in Grenada using medical auxiliaries, and on the development of new schedules for the notification of disease in Trinidad and Tobago, and Jamaica. Partly as a result of work by the Centre, the Government of Jamaica is introducing new notification legislation. The Centre is working closely with the CHMC Secretariat in the design of model legislation for disease notification for the area.

The epidemiologic and laboratory staff of the Centre have traveled regularly through the area and a program of scheduled visits has been instituted. In addition, requests for epidemic aid were acted on immediately and staff were always ready to move anywhere in the area.

In December 1975, CAREC organized an introductory workshop for surveillance in the Caribbean in which all but three Caribbean territories participated. It is intended that it will be an annual event initially supported by funds from CDC. An active training program in surveillance and laboratory techniques is being implemented with special emphasis on within-country training of medical auxiliaries.

In February and March 1975, the surveillance and laboratory facilities in the territories were surveyed. Detailed recommendations were discussed with Chief Medical Officers. CAREC is now supplying many items of equipment to upgrade laboratory and surveillance activities with funds from a special CDC grant to CARICOM. These items include calculators, typewriters, filing cabinets, and simple graphic material. CAREC has also provided simple emergency supplies.

The surveillance division has been involved in direct epidemiologic aid to territories in the investigation of outbreaks, such as typhoid fever in Grenada, parathion poisoning in Jamaica, lead poisoning in Barbados, fish poisoning in Bermuda, histoplasmosis in Belize, jaundice in Guyana, indigenous

malaria in Dominica, and glomerulonephritis in St. Vincent. It is gratifying to note an increasing number of requests from the territories; examples include evaluation of hospital staphylococcal sensitivity for Bahamas; importance of the poliomyelitis epidemic in the Dominican Republic for the British Virgin Islands; information on anthrax in Haiti for Turks and Caicos Islands, information on measles vaccination for Cayman Islands.

(2) Laboratories

Collaborative relationships have been established with the laboratories in contributing countries for the efficient transfer of specimens, which now presents many difficulties, and it is hoped that in 1976-1977, this will be established routinely. CAREC is actively cooperating with CDC, the U.K. Public Health Laboratory Service, the Veterans Hospital in Puerto Rico, the laboratories in Guyana, the Public Health Laboratories in Surinam and Curaçao, and further contacts are being developed with the laboratories of Central America.

In association with CDC, proficiency testing has been introduced into CAREC and the Trinidad Public Health Laboratory and will be introduced to other territories starting with Barbados.

In Laboratory test services, the Centre has been developing its expertise on a wide range particularly with reference to gastroenteritis, hepatitis, arbovirology, and serology.

CAREC is a WHO Virus Collaborating Centre and diagnostic facilities are available in influenza, yellow fever, dengue, leptospirosis, poliomyelitis, and rabies. A study of the antibody levels for poliomyelitis and selected immunizable diseases throughout the Caribbean has started in Trinidad and Tobago.

During the recent influenza outbreak, specimens were received from Antigua, Bahamas, Barbados, Bermuda, Curaçao, Dominica, Grenada, Guyana, St. Lucia, St. Kitts, and the Dominican Republic.

Identification of some arboviruses is being undertaken for Surinam and Curaçao.

The service and research facilities for rabies and hepatitis continue to be developed.

Joint task forces have been set up in Trinidad with veterinary authorities and a collaborative plan for the investigation of leptospirosis and rabies is now operating in Trinidad and Tobago and Grenada. Active surveillance for yellow fever is monitored by a multidisciplinary group representing human, veterinary, agricultural, and other interests. A multidisciplinary group on gastroenteritis including physicians, epidemiologists, microbiologists, nutritionists, veterinarians, public health inspectors, public health nurses, food and drug administrators, and environmental sanitation has met regularly and among other results has produced a laboratory manual. A detailed bacteriologic and virologic study of gastroenteritis in children admitted to hospitals, has been undertaken in Trinidad and Tobago.

### (3) Research

The Centre has been actively introducing new techniques particularly in quantitative parasitology, rabies, poliomyelitis, and hepatitis.

Current research carried out in association with the U.K. Medical Research Council (MRC) includes the investigation of rabies in mongooses, leptospirosis, filariasis, and "Kabowra" fly (in Guyana).

A unit from the Rockefeller University, New York, is collaborating with workers from MRC and Northwestern University, Chicago, to study streptococcal diseases.

The Centre has continued its collaboration with the University of the West Indies on the study of the role of scorpion venom in pancreatitis.

The Centre's role in noncommunicable diseases will be expanded with the introduction of a research project on ischemic heart disease to be carried out in association with MRC. The Centre is also cooperating with studies of cardiovascular disease in Barbados.

New studies on diabetic gangrene are proposed in association with a PAHO working group on diabetes in the Caribbean.

### III. IMPACT AND FUTURE WORK

By providing surveillance and laboratory facilities for the area, CAREC is raising the awareness of the need for surveillance and its application to health programs.

The general level of laboratory services for surveillance is being raised but will be seriously hampered until the appointment of a full-time bacteriologist.

A prompt diagnostic, advisory, and research facility is being built-up both in epidemiology and laboratory services. However, considerable efforts are still required to provide an adequate specimen transport system and awareness of the potential of the Centre among the doctors and laboratory staff of the territories.

The work of the Centre is very wide-ranging in its scope and CAREC Council and Scientific Advisory Committee meetings in April 1976 emphasized the need to consolidate rather than expand too fast (see Document RD 15/2). However, during its first year of work, the Centre has identified gastro-enteritis and food-borne diseases as major areas for laboratory and surveillance investigation.

Research and service are closely linked and there is a special need for the development of immunology and the creation of a post for an immunologist.

The Centre will keep a limited expertise in arbovirology, with particular reference to yellow fever and dengue. Surveillance antibody surveys have already started.

In response to a demand from the territories quantitative intestinal parasitologic studies will be carried out to assess (1) the importance of these parasites especially in malnutrition and (2) the effect of therapy. Strongyloides stercoralis presents a peculiar problem for Trinidad and external funds are being sought for a special study.

#### IV. CONCLUSION

CAREC is now in a position to consolidate its surveillance, laboratory, training, and research programs and while the facilities are modernized and a staff infrastructure created, there will be room for only limited relevant expansion. The Council has recommended to the Director of PAHO an expanded program and budget for 1976-1977 but success will depend on the proper implementation of this budget and the continued support of outside funds.

# CAREC SURVEILLANCE REPORT

ANNEX 1

Published by **CARIBBEAN EPIDEMIOLOGY CENTRE  
(CAREC)**

Pan American Health Organization.

*Pan American Sanitary Bureau, Regional Office of the  
World Health Organization*

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## INSECTICIDE POISONING<sup>1 2</sup>

The introduction of the chlorinated hydrocarbon insecticides in the 1940's revolutionised control programme for insects of public health and agricultural importance throughout the world. However these chemicals, of which the most familiar is DDT, are long-lasting in the environment. Their residual action, sometimes continuing for years, leads to accumulation in the food chains of fishes, birds and other forms of wild life. Rachel Carson in her well known book "Silent Spring" focussed public attention on this danger. It was also observed that the effectiveness of these insecticides was decreasing as generations of exposed insects developed resistance. The finding that food animals and man were also storing chlorinated hydrocarbon insecticides in their bodies increased the pressure to ban DDT and other related insecticides and promoted the introduction of the organophosphates in this decade. Organophosphate insecticides are (1) effective against insects resistant to the organochlorine compounds (2) are bio-degradable and do not contaminate the environment for prolonged periods (3) have less long lasting effects on non-target organisms. All of these compounds work as permanent inhibitors of the enzyme cholinesterase and present a considerable range of toxicity which for comparative purposes is measured in the amount of milligrams per kilogram of body weight of rats that produces a 50 per cent mortality (LD<sub>50</sub>) in laboratory tests. These insecticides can be absorbed through the skin as well as by the respiratory and gastrointestinal tracts. Rats of both sexes are equally susceptible to parathion up to 30 days of age, thereafter parathion activity is increased in the female.

Persons who have regularly taken barbiturates or phenothiazine derivatives seem especially susceptible as do those chronically exposed to these insecticides.

Carbamates contain nitrogen but differ from chlorinated hydrocarbons and organophosphate insecticides in their lack of chlorine and phosphorus. Most carbamates are contact insecticides lowering the

cholinesterase level and acting as nerve poisons in much the same way as organophosphate insecticides but the action on cholinesterase is reversible.

### DIAGNOSIS AND TREATMENT

Essential to the correct diagnosis of pesticide poisoning are

1. A high index of suspicion.
2. A history of opportunity for adequate exposure, compatible with time dose relationships.
3. Constant clinical manifestations.
4. Laboratory confirmation.

A chart has been provided as an insert to this issue which may serve as a ready reference to the diagnosis and treatment of insecticide poisoning.

There are no antidotes for poisoning by chlorinated hydrocarbons; however, antidotes of considerable effectiveness are available for use in poisoning by cholinesterase inhibitors especially the organophosphates. Atropine sulphate is a physiological antidote. It has no effect on the inhibited cholinesterase but blocks the action on acetylcholine on parasympathetic receptors alleviating bronchial spasm, reducing respiratory secretions, and alleviating miosis temporarily. It is contra-indicated in the cyanotic patient because of the possibility of inducing ventricular fibrillation. 2-PAM (Pralidoxime Chloride) is used as an antidote for the organophosphates (but not the carbamates or chlorinated hydrocarbons). It acts by reactivation of the inhibited cholinesterase and reaction with the organic phosphate molecule.



**TABLE 1. ORAL AND DERMAL TOXICITY OF SELECTED PUBLIC HEALTH INSECTICIDES**

Insecticide	Acute Oral Toxicity to Female Rats LD <sub>50</sub> (Mg/kg)	Acute Dermal Toxicity to Female Rats LD <sub>50</sub> (Mg/kg)
<b>HIGHLY TOXIC INSECTICIDES</b> – Acute oral toxicity to rats – 1–50 mg/kg		
ethyl parathion	3.6	6.8
dieldrin	46	60
<b>MODERATELY TOXIC INSECTICIDES</b> – Acute oral toxicity to rats – 50–500 mg/kg		
dichlorvos (DDVO, Vapona)	56	75
chlorpyrifos (Dursban)	82	202
propoxure (Baygon)	86	> 2400
lindane	91	900
Paris Green	100	2400
DDT	118	2510
fenthion (Baytex, Entex)	245	330
dimethoate (Cygon)	245	610
diazinon	285	455
chlordane	430	690
<b>LOW-ORDER TOXICITY INSECTICIDES</b> – Acute oral toxicity to rats – 500–500 mg/kg		
carbaryl (Sevin)	500	> 4000
trichlorfon (Dipterex)	560	2000
malathion	1000	> 4444
Mirex	> 3000	> 2000
<b>INSECTICIDES COMPARATIVELY FREE FROM DANGER</b> – Acute oral toxicity to rats – 5000+ mg/kg		
Temephos (Abate)	13,000	> 4000

**EDITORIAL NOTE**

*The development of new insecticides since the 1940's has contributed considerably to agricultural productivity in the Caribbean. It has however exposed the public to new risks for which adequate precautions are not always taken. Pesticides are often readily accessible to the general public and may be stored at home within easy reach of children.*

*The frequent use of insecticides as a suicidal agent is a further reflection of this easy access. Persons using insecticides professionally often do not wear protective clothing or may not be using protective clothing that has been provided. Smoking and eating while handling insecticides is a further risk.*

*Professional pest control and exterminating companies are on the increase and few countries*

*exercise any direct control in respect to either the insecticides being used or the competence of those applying these materials.*

*The recent outbreak of parathion poisoning in Jamaica during January 1976 which caused 17 deaths has been traced to bags of counter flour contaminated with parathion, an insecticide which the government of Jamaica has not permitted to be used in that country for over ten years. This flour has been identified as part of a shipment imported in December from a West European country and this serves to emphasise the importance of constant vigilance from source of a food product whether local or imported to consumer to avoid contamination with chemicals.*

*Extensive epidemiological investigation has eliminated any of the following practices as responsible for the Jamaican outbreak but it is opportune for countries to review their inspection and regulatory powers to ensure the following :*

1. *Control over the importation of all pesticides, including adequate labelling and packing.*
2. *Control of pesticides sold to the public.*
3. *Control of the storage and transportation of pesticides, e.g. not on the same vehicles with food items.*
4. *Licensing of pest control/exterminator companies, such licensing to evaluate competence and authorised use of pesticides, e.g. in food premises.*
5. *Ship inspection of food cargoes to ensure no contravention of international practices for the safe handling of pesticides and other poisons.*
6. *Control of off-loading of food cargoes, separate pallets and storage areas from pesticides and other poisons.*
7. *Control of storage of food in warehouses, retail shops to avoid cross contamination.*
8. *Control of the application of pesticides to ensure the wearing of adequate protective clothing.*
9. *Safe disposal of all "empty" pesticide containers.*
10. *Adequate antidote treatment facilities for pesticide in use.*

*Above all there is the need for a heightened public awareness of the care needed in handling these materials.*

## References

1. Abstracted from *Insecticides for the Control of Insects of Public Health Importance, 1974 DHEW Publication No (CDC) 76 - 8229*
2. Abstracted from *Diagnosis and Treatment of Poisoning by Pesticides; US Environmental Protection Agency.*
3. *Pesticide Poisoning remains a major problem; JAMA September 6 1971 Vol. 217 No. 10.*
4. *Parathion Poisoning and its treatment; JAMA, April 5, 1965, Vol. 192, pp. 49-50.*

## UPDATE ON INFLUENZA

Clinical material for influenza virus isolation and serology has been received from several territories. Influenza/A/Victoria has been isolated from 55 cases in Trinidad and 13 in St. Lucia. Strains of influenza from Barbados have been forwarded to the Influenza Center at CDC for further characterization while results are pending on specimens from St. Kitts, Antigua, Bermuda and Dominica. There were 5 seroconversions to Influenza A antigen among a group of paired acute and convalescent sera from Barbados.

There is no evidence of the further spread in the U.S.A. of A/Swine-like influenza reported in military recruits at Fort Dix, New Jersey.

In Trinidad surveillance for A/Swine influenza has included the collection of sera from swine handlers from a number of farms throughout the island. These will be examined for antibodies to a swine influenza - like strain A/Mayo Clinic/193/74. If others wish to make a similar study, CAREC can be contacted.

Specimen Collection: Please note that pharyngeal/nasal specimens for influenza isolation may be sent in the following transport media: tryptose phosphate broth with half per cent (0.5%) gelatine or veal infusion broth. The specimens should be kept cold, every effort being made to get them to the laboratory by the quickest route. Paired acute and convalescent serum samples should also be collected. When specimens are sent the laboratory should be informed of transport details.

## HISTOPLASMOSIS IN BELIZE

Histoplasmosis has not previously been reported as a

disease endemic to Belize. In June 1975, a 15 year old boy visiting in Corozal, Belize developed a febrile illness with upper respiratory symptoms, after crawling into an underground cavern, known to be bat-infested. He was diagnosed with laboratory confirmation (CDC Atlanta) as having histoplasmosis.

Histoplasmin skin test surveys were conducted in the village surrounding the cavern in Corozal and in an hospital surgical ward population in Belize City. In Corozal 79 persons were skin tested of whom 8 had positive reactions (10 mm or more of induration). There was no correlation between cave visiting and positive skin tests. Soil specimens from the cavern were negative for histoplasma. In the Belize City group 62 persons were skin tested with histoplasmin and the results are as follows :

	Had visited Cave at some time	Never in a cave	Total
Positive Skin Test	4	2	6
Negative Skin Test	3	53	56
Totals	7	55	62

The results suggest an association in this group of persons, between visiting a cave and a positive histoplasmin skin test, (Fisher's test,  $p < 0.01$ ). However, the small numbers as well as the method of selection of persons in this group must be considered before making a statistically valid interpretation.

Ongoing investigation includes the collection of bat organs and more soil specimens for histoplasma culture.

Histoplasmosis should be considered as a potential diagnosis in appropriate clinical situations in Belize.

Submitted by Dr. L. Pike, Dr. F. Quinones and Mr. F. Staines, Medical Department, Belize and CAREC staff.

Editorial comment: Bats, along with various species of birds, e.g. starlings and oil birds, frequently are infected with histoplasma. Visitors to caves, many of which are bat dwellings, are thus at increased risk of inhaling histoplasma which is present in bat droppings on the cave floors. This pattern of exposure and infection has been documented in other Caribbean and regional areas: Trinidad, Venezuela, Panama, Mexico and Florida.

**SPECIFIED NOTIFIABLE DISEASES BY CASE FOR INDICATED WEEK**

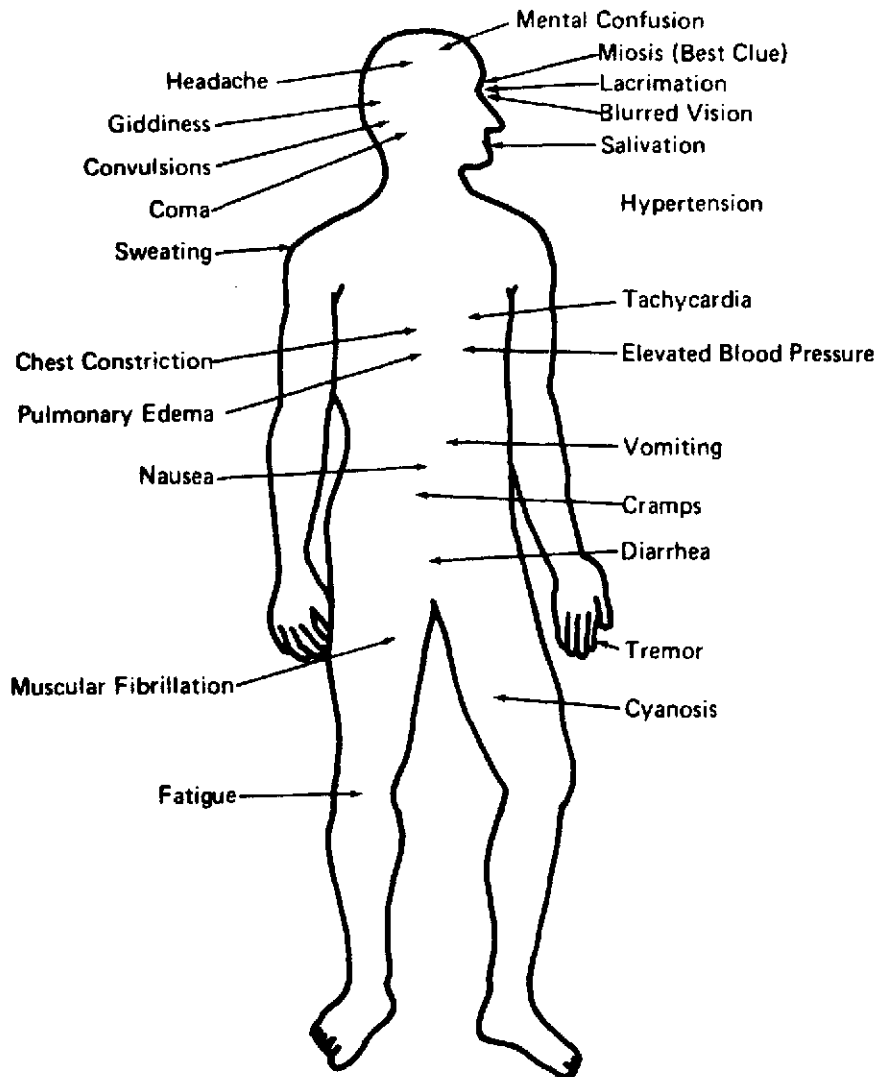
COUNTRY	Week ending	Week No.	Malnutrition 0-4 yrs.		Gastro-enteritis 0-4 yrs.		Diphtheria		Encephalitis		Enteric Fever		Infectious Hepatitis		Influenza		Measles		Meningococcal Infection		Tuberculosis All Forms	
			No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	Cum 1976	No.	C 19...
Antigua	Feb 28	9	—	1	22	77	—	—	—	—	—	1	—	1	108	319	1	2	—	—	—	—
Bahamas	Mar 13	10	—	—	60	105	—	—	—	—	—	—	9	81	261	2	9	—	—	—	—	7
Barbados	Feb 28	9	1	2	4	29	—	—	X	X	—	—	—	43	44	2	2	—	—	—	—	1
Belize	Mar 16	11	1	1	—	1	—	—	—	—	—	—	—	2	—	—	27	461	—	—	1	4
Bermuda	Mar 12	11	X	X	X	X	—	—	—	—	—	—	1	1	421	1757	—	—	—	—	—	1
British Virgin Is.	Feb 29	8	—	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Costa Rica	Feb 14	7	X	X	X	X	—	—	—	—	2	2	—	—	136	1001	4	65	—	—	—	—
Dominican Rep	Jan 31	4	X	X	3034	3034	23	23	—	—	101	101	105	105	5634	5634	153	153	—	—	—	—
El Salvador	Feb 21	8	X	X	X	X	—	—	X	X	3	65	—	—	1289	10221	13	101	X	X	—	—
Grenada	Feb 28	9	7	26	7	149	2	2	—	—	—	—	—	—	114	857	—	—	—	—	—	—
Guadeloupe	Feb 21	8	X	X	X	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
Guyana	Feb 14	7	—	51	36	272	—	—	—	—	15	57	5	40	105	818	44	137	—	—	4	21
Honduras	Feb 29	8	X	X	X	X	1	2	—	—	36	67	66	139	3791	7332	279	516	—	—	120	254
Jamaica	Feb 21	8	X	X	X	X	—	4	—	—	—	6	1	5	15	175	36	165	—	—	—	17
Martinique	Feb 21	8	X	X	X	X	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
St. Kitts & Nevis	Feb 14	7	2	30	14	134	—	—	—	—	—	—	—	—	1	3	73	345	—	—	—	—
St. Lucia	Jan 5	1	—	—	8	8	—	—	—	—	—	—	—	—	2	2	—	—	—	—	—	—
St. Vincent	Mar 13	11	1	61	12	222	X	X	X	X	X	1	4	17	117	3	20	X	X	4	6	
Trinidad & Tob	Mar 15	11	X	X	165	1925	—	2	—	6	—	4	6	11	784	2329	19	122	—	—	—	45
U'S. Virgin Is	Feb 28	9	—	*	—	*	—	—	—	—	—	—	—	1	—	*	—	—	—	—	—	—
Venezuela	Jan 31	4	X	X	—	—	13	27	—	—	—	1	4	—	—	—	391	1247	X	X	X	X
Dominica	Oct 25	43	X	X	13	349	—	—	—	—	—	14	—	15	—	6	—	1	—	2	—	9
Montserrat	Aug 30	35	—	—	3	50	—	—	—	—	—	—	—	—	—	36	—	—	—	—	—	—
Panama	Nov 29	48	X	X	X	X	—	—	—	—	—	6	—	—	409	17887	4	242	—	—	—	—

X : Not notifiable      - : No cases      \* : Not reported to CAREC      ... : No information  
 † As Used By Country

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 Any Comments on the CAREC SURVEILLANCE REPORT will be appreciated.

# MANIFESTATIONS OF ORGANOPHOSPHATE INSECTICIDE POISONING (Cholinesterase Inhibitors)



Format reproduced courtesy AMERICAN CYANAMID COMPANY

## PESTICIDE POISONING MAY MIMIC:

- BRAIN HEMORRHAGE
- HEAT EXHAUSTION
- HYPOGLYCEMIA
- PNEUMONIA OR OTHER SEVERE RESPIRATORY INFECTION
- HEAT STROKE
- GASTROENTERITIS
- ASTHMA

# EMERGENCY MEDICAL TREATMENT FOR ACUTE INSECTICIDE POISONING

ORGANOPHOSPHATES	CARBAMATES	CHLORINATED HYDROCARBONS
<p style="text-align: center;"><b>Irreversible Cholinesterase Inhibitors</b></p> <p>chlorpyrifos (Dursban) diazinon dichlorvos (Vapona, DDVP) dimethoate (Cygon) fenthion (Baytex, Entex) raben (Gardona) melathion methyl parathion parathion naled (Dibrom) ronnel (Korlan) trichlorfon (Dipterex)</p>	<p style="text-align: center;"><b>Reversible Cholinesterase Inhibitors</b></p> <p>carbaryl (Sevin)  damentan  lindan  propoxur (Baygon)</p>	<p style="text-align: center;"><b>CNS Depressant/Stimulant</b></p> <p>aldrin - BHC chlordane - DDT dieldrin heptachlor - lindane mirex toxaphene</p> <p>The exact mechanism of action of these chemicals is not known. In general they act on the central nervous system to stimulate or depress, varying by compound. Repeated doses may affect liver and kidney functions.</p>
SYMPTOMS OF POISONING		
<p>1. MILD - headache, dizziness, weakness, anxiety, miosis, impairment of visual acuity.</p> <p>2. MODERATE - nausea, salivation, lacrimation, abdominal cramps, vomiting, sweating, slow pulse, muscular tremors.</p> <p>3. SEVERE - diarrhea, pinpoint and non-reactive pupils, respiratory difficulty, pulmonary edema, cyanosis, loss of sphincter control, convulsions, coma, and death.</p>	<p>Constriction of pupils. Salivation. Profuse sweating. Lassitude Muscle incoordination. Nausea. Vomiting. Diarrhea. Epigastric pain. Tightness in chest.</p>	<p>(Twenty minutes to four hours)</p> <p>Nausea. Vomiting. Restlessness. Tremor. Apprehension. Convulsions. Coma. Respiratory failure. Death.</p> <p><b>DO NOT INDUCE EMESIS IF THE INGESTED POISON IS PRINCIPALLY A HYDROCARBON SOLVENT (e.g., Kerosene).</b></p>
THERAPY		
<ol style="list-style-type: none"> <li>Support respiration. Keep airways clear. Use artificial respiration with oxygen if indicated for cyanosis. Death from pesticide poisoning is usually due to respiratory failure.</li> <li>Decontamination as indicated. Remove contaminated clothing. Wash skin, hair and fingernails with soap and water. Sponge with alcohol. Cleanse eyes. If ingested lavage stomach with 5% sodium bicarbonate if not vomiting.</li> <li>Draw 5 ML, heparinized blood for cholinesterase determination. Save samples of first urine and first/early vomitus for possible laboratory analysis.</li> <li>Consult insecticide label under "ACTIVE INGREDIENTS" for specific chemicals involved.</li> <li>When mixtures of organophosphates and chlorinated hydrocarbons are involved (e.g. endrin-methyl parathion), give specific treatment for organophosphates first and indicated support therapy and decontamination.</li> </ol>		
ANTIDOTE	ANTIDOTES	TREATMENT
<ol style="list-style-type: none"> <li>Adults: After cyanosis is overcome, use <b>Atropine sulfate</b>, 2-4 mg. intravenously. Repeat doses at 5 to 10 minute intervals until signs of atropinization appear. Maintain for 24 hours or longer if necessary.</li> <li>Children: Atropine sulfate in proportion to body weight: app. 0.05 mg/kg.</li> <li>Support atropine treatment with <b>2-PAM</b> (Pralidoxime chloride) (Protopam Chloride, Ayerst).               <ol style="list-style-type: none"> <li>Adult Dose: 1 gm., slowly, intravenously.</li> <li>Infants: 0.25 gm., slowly, intravenously.</li> </ol> </li> </ol> <p><b>Note: Contraindicated are morphine, aminophylline, theophylline, phenothiazine tranquilizers and barbituates.</b></p>	<ol style="list-style-type: none"> <li>Adults: After cyanosis is overcome, use <b>Atropine sulfate</b>, 2-4 mg. intravenously. Repeat dose at 5 to 10 minute intervals until signs of atropinization appear. Maintain for 24 hours or longer if necessary.</li> <li>Children: Atropine sulfate in proportion to body weight approximately 0.05 mg/kg.</li> </ol> <p><b>Note: 2-PAM is contraindicated in carbamate insecticide poisoning. Also avoid morphine, aminophylline, theophylline, phenothiazine tranquilizers and barbituates.</b></p>	<ol style="list-style-type: none"> <li>Gastric lavage with 2-4 L. tap water. Catharsis with 30 gm. (10 oz.) sodium sulphate in one cup of water.</li> <li>Barbituates in appropriate dosages repeated as necessary for restlessness or convulsions.</li> <li><b>Avoid oils, oil laxatives and epinephrine (adrenalin). Do not give stimulants.</b></li> <li>Give calcium gluconate (10% in 10 ml. ampules) intravenously every four hours.</li> </ol>

Adapted from "Emergency Medical Treatment for Acute Poisoning", Disease Vector Ecology and Control Center, U.S. Naval Air Station, Jacksonville, Fla.

CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)  
SCIENTIFIC ADVISORY COMMITTEE

SECOND MEETING

13-14 April 1976  
Port of Spain, Trinidad

REPORT TO THE DIRECTOR

Ref: RD 15/2  
May 1976

PAN AMERICAN HEALTH ORGANIZATION  
Pan American Sanitary Bureau, Regional Office of the  
WORLD HEALTH ORGANIZATION  
Washington, D.C.

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AGENDA

CAREC SCIENTIFIC ADVISORY COMMITTEE

13-14 April 1976

Tuesday, 13 April

9:00 a.m.	Opening	Dr. C. E. Gordon Smith
	Welcome	Country Representative, Trinidad and Tobago
9:10	Director's Report	Dr. P. Hamilton

BRIEF REPORTS

9:30	Surveillance	Dr. P. Diggory
9:45	Training	Dr. P. Hamilton
10:00	Discussion	
10:15	Coffee	
10:30	Laboratory	Dr. M. C. Williams Dr. W. Swanston
11:00	Virology/Gastroenteritis	Ms. B. Hull
11:00	Entomology/Parasitology	Dr. E. Tikasingh
11:20	Discussion	

RESEARCH GROUPS

11:30	Rabies and leptospirosis	Dr. C. O. R. Everard
11:40	Filariasis in Trinidad	Dr. M. Nathan
11:50	Discussion	

12:00 noon	Cardiovascular disease	Dr. G. Miller
12:10 p.m.	Discussion	
13:00	Lunch at CAREC	
14:00	Visit of CAREC and discussions with staff of members of Scientific Advisory Committee	
16:00	Program for 1976/1977	Dr. P. Hamilton
18:00	Adjournment	

Wednesday, 14 April

8:30 a.m.	Discussion of laboratory development plan	
10:00	Coffee	
10:15	Continuation of discussion with staff	
12:30	Lunch at CAREC	
14:00	Recommendations	
16:00	Closure of meeting	
18:30	Reception at CAREC - Dr. & Mrs. P. Hamilton	

## CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)

Minutes of the Second Scientific Committee Meeting held at CAREC,  
Port of Spain, Trinidad, 13-14 April, 1976

### I. INTRODUCTION

The meeting was opened by the Chairman, Dr. C. E. Gordon Smith who welcomed the participants and observers making special mention of the new members. Dr. Kenneth L. Standard was appointed Rapporteur.

Dr. Guillermo Guevara, PAHO/WHO Country Representative, Trinidad and Tobago, welcomed the group on behalf of Dr. Héctor R. Acuña, Director, PAHO/WHO.

### II. DIRECTOR'S REPORT

Dr. Patrick J. S. Hamilton, Director of CAREC, presented the first annual report of the Centre (Annex 1). From the first of January, the Centre was transferred from the responsibility of the Department of Research Development and Coordination to that of the newly-formed Division of Disease Control, both within the Pan American Health Organization.

The basic plans for development were outlined in a special report of the Caribbean Epidemiology Centre and the Trinidad Public Health Laboratory (October 1975). Dr. Hamilton mentioned the problems of staffing and of lack of equipment and said that the next year will be one of consolidation.

Gratitude was expressed to: (a) the U.K. Medical Research Council (MRC) and staff for support in various ways, (Dr. S. G. Owen of MRC was requested to convey thanks to his Council); (b) the Rockefeller Foundation, New York, for their support, and (c) the Center for Disease Control (CDC), Atlanta, Georgia. (The grant from CDC came via the Caribbean Community Secretariat (CARICOM) and every territory in the Caribbean has benefited).

Expression of thanks for support during the year was also made to participating countries, especially to the Government of Trinidad and Tobago for their tremendous support, and to the local PAHO/WHO office.

The Chairman congratulated the Director on his report particularly on the quick action in instituting the trainee posts but expressed regret that a bacteriologist had not yet been appointed.

### III. PROPOSED PROGRAM FOR CAREC

The Director introduced the review of the 1975 Program and Proposed Program for 1976-77 (Annex 2).

The Committee received the Director's Report and the Program for 1976-77 presented under the following topics:

#### A. Surveillance (Dr. H. J. P. Diggory)

Notification of diseases was now more rapid, chiefly through cable and telephone. Telex facilities were not yet available at CAREC. The CAREC Surveillance Report (CSR) is published monthly. There has been an increase from the initial distribution of 500 copies to 1,000 copies. For special issues there has been a further increase (e.g., 1,500 copies with an article on malaria). The distribution includes ministry of health officials, members of the health team, including general practitioners and training institutions in over 20 participating countries. It is hoped in addition to produce soon special intermittent bulletins--EPI NOTES.

The Surveillance Unit has responded to requests for assistance in the investigations of conditions such as lead poisoning in Barbados, malaria in Dominica, parathion poisoning in Jamaica, histoplasmosis in Belize, typhoid fever in Grenada, and fish poisoning in Bermuda.

The Chief Medical Officer of Trinidad and Tobago reported that CAREC has been very helpful to the Ministry of Health of Trinidad and Tobago.

The Chief Medical Officer of Dominica drew attention to the problems of communication and to transport difficulties, especially from the smaller territories.

B. Training ( Dr. P. J. S. Hamilton)

The aims of CAREC were to improve techniques and services in surveillance and laboratories in the region, and to decentralize training as far as practical. There is collaboration with the PAHO/UNDP regional program of training for allied health professionals under the direction of Dr. Harold Drayton in Barbados. The centre has been closely associated both in 1975 and 1976 with the University of the West Indies (UWI) in epidemiology training for health personnel taking 1-year diploma courses in the Department of Social and Preventive Medicine. Plans are being developed for increased training facilities and further collaboration with UWI and the University of Guyana.

The Committee asked that special attention be given to the following five points:

1. Need for a central information service.
2. Education-reprint service.
3. Slide collection on various topics for loan to countries/territories.
4. Need for travelling staff conferences/seminars.
5. CAREC should be involved in training for surveillance in noncommunicable diseases.

It was noted that the PAHO/WHO Regional Library of Medicine and the Health Sciences (RLM) in São Paulo, Brazil, should provide teaching packages.

C. Laboratory (Dr. M. C. Williams, Dr. W. Swanston)

Special references were made to staff shortages, the increased safety and security of the Centre, the closer collaboration and communication between CAREC and the Trinidad Public Health Laboratory (TPHL); and the major problem of equipment maintenance.

It was pointed out that CAREC had an urgent need for a bacteriologist and that TPHL was giving valuable assistance in this field, while the work in virology was being shared between TPHL and CAREC.

A multidisciplinary group of health and allied professionals has met regularly and has produced a manual for the bacteriological study of gastroenteritis.

Two further problems were stressed in relation to TPHL: the inadequacy of its budget, and the rapid turnover of technical staff due to the exigencies of the Civil Service. There is an urgent need for the development of a more attractive career structure for technicians both at CAREC and throughout the Caribbean.

D. Virology/Gastroenteritis (Ms. B. Hull)

It was reported that the CAREC nurse had been an effective liaison between the doctors in Trinidad and CAREC. The feedback of information to doctors has improved their motivation.

It was suggested that there was an urgent need for one laboratory technologist/technician in each territory of the region to be designated a liaison officer between the local laboratory and CAREC. CAREC hopes to become more self-reliant and self-sufficient in producing laboratory materials.

E. Entomology/Parasitology (Dr. E. S. Tikasingh)

It was reported that the Government of Trinidad and Tobago had set up an Aedes aegypti task force involving local staff, PAHO/WHO, and CAREC. Work was also being done in several other territories, e.g., Dominica and Guyana. Though some work was being done on malaria, more attention needed to be paid to this disease.

The Committee noted that there was an urgent need for more technicians in parasitology and hoped that parasitology studies would soon be made in more countries.

F. Rabies and Leptospirosis (Dr. C. O. R. Everard)

The leptospirosis study project in three areas (urban and rural) in Trinidad was outlined.

The Rabies project was being continued in Grenada in association with the continuing dog and cattle vaccination program.

The Committee recognized the need for more studies of rabies in animals and for joint work between CAREC, the Ministry of Agriculture, and UWI's Department of Livestock Science at St. Augustine.

G. Filariasis in Trinidad (Dr. M. Nathan)

The work on Wuchereria bancrofti, Mansonella ozzardi, and Culex fatigans was reported. It was suggested that there was need to investigate the problem of susceptibility of various populations of C. fatigans; the availability of beds on Dr. Bartholomew's service in the Port of Spain Hospital for any clinical cases of filariasis was welcomed.

H. Cardiovascular Disease (Dr. G. Miller)

A research project on ischemic heart disease will be carried out with MRC funds. The purpose of the study was outlined and was welcomed by the Chief Medical Officer of Trinidad and Tobago and it was hoped that it would stimulate local doctors to do research.

\* \* \*

The Committee then divided into groups to discuss specific items (see Annex 3) of the program. Reports of the groups are presented in Annex 4.

IV. RECOMMENDATIONS OF THE SCIENTIFIC ADVISORY COMMITTEE

After the GENERAL RECOMMENDATIONS, para numbers refer to p. 18 et seq. of the "Review of 1975 Program and Proposed Program and Budget for 1976-1977".

*The Scientific Advisory Committee:*

A. GENERAL

1. Congratulated the Director and his staff on an excellent report of the past year's work. Recommends that the progress accomplished should be consolidated and that caution is necessary in widening CAREC's roles too quickly.

2. Greatly regretted that the bacteriologist post had not yet been filled and urged that this should be done with minimum delay.



3. Urged the Council to take up again, as a matter of urgency, the improvement of communications (Recommendation B.2) and arrangements for the transport of specimens between the territories and CAREC.

4. Was concerned about the problems of the maintenance of scientific equipment at CAREC and in laboratories throughout the territories and urges the Council to make more satisfactory arrangements without delay. PAHO should explore with governments, the possibility of using Project Hope personnel.

5. Examined and approved for submission to the Council the attached list of laboratory equipment (Annex 5) required for CAREC and for joint services with TPHL. Recommends to Council that all items are required and designates the following as high priority items which should be provided immediately: 1.1, 1.2, 1.7 (two temperature recorders), 1.9.0, 1.9.2 subitem (1), 1.10, 1.11, 1.12.1, 2.1.

6. Asked the Council to arrange without delay the negotiation of a more satisfactory career structure and conditions of service for laboratory technologists at CAREC (with PAHO) and throughout the area (with governments through the CHMC Secretariat) in order to improve their selection, recruitment, and retention.

7. Urged the Council to insure that the planned recruitment of four additional senior laboratory technologists is implemented and recommended an additional senior technologist post in parasitology as soon as possible.

8. Advocated improvement of library facilities as soon as possible and the development of a reprint service to the territories, in collaboration with RLM.

9. Urged PAHO to assist in the better exchange of reports between relevant WHO units throughout the world and CAREC.

10. Welcomed the continuing close collaboration between CAREC and TPHL and endorsed the special CDC report on future developments and further rationalization of the use of resources. It emphasized, however, the need for the separate identities of the two organizations to be maintained.

11. Recommended to the Council that the proposed physical developments under Phase 1 of the Report should be implemented without delay and that the Trinidad Government and CAREC should further examine the proposals under Phase 2 as soon as possible.

12. Urged CARICOM to examine the role of CAREC in holding and maintaining vaccine supplies for use in the territories.

13. Urged the Council to draw the attention of Ministers to the need for health monitoring in all development programs and to encourage early consultation with CAREC in specific cases.

#### B. SURVEILLANCE

1. Each outbreak investigation should be utilized for training of national health staff at all levels.

2. Outbreak investigation protocols and forms should be developed and distributed for use in all territories.

3. Telephone consultation should be encouraged. A much improved internal telephone system at CAREC is required.

4. The urgent need for telex facilities should be brought to the attention of the Trinidad and Tobago Government so that priority may be sought for CAREC's needs.

5. The Editor of the CAREC Surveillance Report (CSR) was congratulated on its success. The table of reported diseases should be revised so as to replace interchange of reports between countries. Letters to the Editor should be encouraged. Fortnightly publication should be undertaken when facilities permit. The publication of EPI-NOTES for special reports should be encouraged.

#### C. LABORATORIES

1. In the forthcoming year, particular emphasis should be put on training in mycobacteria and neisseria, and on laboratory management and maintenance, especially for the smaller islands.

2. Endorsed the view that further improvement is required in assistance with the problems of supervision, proficiency, safety, immunization of staff and maintenance of equipment.

3. Endorsed the need for advanced training for a small number of technicians from a limited number of territories with more advanced facilities.

4. Recommended that a technologist be designated as liaison officer in each territory under the auspices of the designated epidemiologist to supervise and arrange the collection and dispatch of specimens to CAREC with adequate supporting information.

5. Endorsed the excellent progress made in collaboration with other laboratories serving the area and advocated further development of collaboration with other PAHO centers.

6. In malaria, CAREC should identify outbreaks, provide training for technologists, advise and assist governments in planning and acquiring resources for control measures as part of the regional strategy.

7. In the field of parasitology, recommended that apparently low-prevalence diseases (e.g., cutaneous leishmaniasis) should be monitored throughout the area by local staff trained to do so. Similarly the risk of introduction of schistosomiasis to other islands should be monitored. CAREC should explore the possibility of measuring the susceptibility of snail populations by collaboration with the Rockefeller Unit in St. Lucia.

8. Information should be collected on the distribution of high prevalence parasitic diseases (particularly intestinal helminths) by training technologists in each territory to carry out surveys. Similar surveys could be made for filariasis, on which information is largely out of date. Coordinate Environmental Plan.

9. Facilities for the study of arthropod-borne parasitic diseases and their vectors should be improved. A parasitological technologist is urgently required (See Recommendations, General (7)).

10. The possibility should be examined of obtaining additional resources either from the territory concerned or from other sources for the study of problems affecting only single territories (e.g., *Culicoides* (sandfly) in Trinidad).

11. Priority in virological services which CAREC should provide include poliomyelitis vaccination status, yellow fever monitoring and vaccination, dengue and influenza surveillance, rabies diagnosis, the capability to advise and assist in rubella and hepatitis B diagnosis (particularly in relation to blood transfusion) and the diagnosis and surveillance of viral CNS infections.

12. Improved methods should be sought for the more effective transportation of specimens for virus isolation.

13. Recommended the continuation of the current program on rabies and the addition of further studies of wild species in Trinidad in collaboration with the Ministry of Agriculture, and the provision of suckling mouse inoculation as an additional diagnostic facility. The Trinidad Government should be approached for provision of the necessary laboratory technologist.

14. The possibility should be investigated of developing a joint facility for electron microscopy with UWI and other potential users in Trinidad.

15. Facilities for improved immunological services should be developed at CAREC as resources permit and assistance should be sought from the proposed Netherlands training program. Use should be made of PAHO's training centers in Brazil and Mexico.

16. The leptospirosis program should continue and the possibility examined of creating a typing laboratory in collaboration with CEPANZO--this would require an additional senior technologist post.

17. When its veterinarian is recruited, CAREC should be able to advise governments on centers to which specimens for exotic animal diseases can be sent for testing.

18. CAREC should assume a training and monitoring role in relation to major disease control programs (e.g., malaria, yellow fever, dengue).

19. Recommended that, with outside funds, preliminary steps should be taken by CAREC to assess the mycological needs of the area and to arrange an elementary course in mycology for technologists. Full use should be made of PAHO training and coordination resources in mycology.

D. TRAINING

1. Endorsed the further development of close collaboration with universities in the area. Final year medical students have already evinced considerable interest in associating their elective periods with CAREC, and this should be further encouraged.
2. Similarly, the involvement of CAREC staff in teaching for the diploma courses of UWI's Department of Social and Preventive Medicine, should continue and develop.
3. Opportunities should be taken to encourage appropriate higher degree students to work at CAREC when adequate supervision can be provided.
4. Endorsed the proposed program of training courses and workshops for 1976.
5. Recommended that training should emphasize the value of surveillance at all levels of development and evaluation of surveillance programs should become an important training element. The utilization of trained auxiliaries should be emphasized.
6. Emphasized the importance of audiovisual aids in all forms of training and advocated the development of an audiovisual aids unit at CAREC with the assistance of RLM as soon as possible. Assistance should also be sought from the Centro Latino Americano de Tecnologia Educativa para la Salud (CLATES) centers in Brazil and Mexico.
7. CAREC should develop training seminars in the territories with appropriate assistance from UWI, the Caribbean Food and Nutrition Institute (CFNI), and elsewhere, for training in epidemiology and surveillance and to promote interest and cooperation from doctors and other health staff in the territories.
8. Welcomed the multidisciplinary study of gastroenteritis organized by CAREC which resulted in the production of a training manual for laboratory technologists and recommended further activities of this sort.

E. RESEARCH

1. Endorsed the proposed research program. Attention was drawn to the need for veterinary collaboration in assessment of the significance and control of rotavirus infections.

2. Advocated the further development of research programs on non-communicable diseases with outside funds and stressed that the problem of gangrene in diabetes merited special attention.

F. COOPERATION

1. Staff exchanges with other relevant organizations in the area are advocated whenever circumstances permit.

2. When the veterinarian is recruited, a veterinary advisory role might be developed in relation to vaccination programs for domestic stock (especially rabies).

ANNEXES

CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)  
Port of Spain, Trinidad

DIRECTOR'S REPORT FOR 1975

to

CAREC SCIENTIFIC ADVISORY COMMITTEE

(April 1976)

PAN AMERICAN HEALTH ORGANIZATION  
Pan American Sanitary Bureau, Regional Office of the  
WORLD HEALTH ORGANIZATION  
Washington, D.C.



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## DIRECTOR'S REPORT FOR 1975 1/

### I. INTRODUCTION

At the request of the Caribbean Health Ministers' Conference (CHMC), the Caribbean Epidemiology Centre (CAREC) was established under the technical and administrative supervision of the Pan American Health Organization (PAHO), on 1 January 1975. It incorporated the Trinidad Regional Virus Laboratory (TRVL), whose last report was presented to the first meeting of the Council of CAREC in April 1975. That report was the last of a long series of detailed annual reports on the research and experimental work carried out at TRVL. The establishment of CAREC required the rapid completion of the change from the total arbovirus research programme of 1954-1968, to a Centre for Disease Surveillance, with the laboratory as a back-up facility for diagnostic services, training, and research.

The Centre is funded by PAHO, the Governments of Trinidad and Tobago, Antigua, Barbados, Bermuda, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts/Nevis/Anguilla, St. Vincent, St. Lucia, Turks and Caicos, and the Overseas Development Ministry of the United Kingdom. In addition, the Centre receives financial assistance from the Caribbean Community (CARICOM), through a grant from the Center for Disease Control (CDC), Atlanta.

During 1975, the Centre has concentrated its work on the Commonwealth Caribbean territories but in addition to the assistance provided to these territories, the Director has also consulted with Mexico, Guatemala, El Salvador, Honduras, Panama, Venezuela, Cuba, and Curaçao.

An introductory workshop on surveillance for epidemiologists from all the Caribbean countries was held in Port of Spain in December and addressed by the Director of PAHO, Dr. Héctor R. Acuña.

---

1/ Prepared by Dr. Patrick J. S. Hamilton, Director, Caribbean Epidemiology Centre, Port of Spain, Trinidad.

The workshop studied the problems of surveillance within and between the territories and put forward recommendations to improve reporting systems, utilisation of laboratories, and links with veterinary services. A similar meeting will be held in 1976.

The report of the first CAREC Council meeting clearly identified the main priorities for the Centre as communicable disease surveillance and the laboratory training and research facilities required to back such a programme. This report reflects that decision, but chronic and noncommunicable diseases have not been neglected.

During 1975, two PAHO sponsored working groups on diabetes met at CAREC. A short-term consultant visited Trinidad and Tobago, Barbados, and Jamaica, and advised on the development of epidemiological studies in cardiovascular diseases. An ad hoc Caribbean cardiovascular disease epidemiology group has been formed and detailed proposals for studies are being prepared for submission for outside funding. The nucleus for this at CAREC will be a research group under Dr. G. Miller, funded by the U.K. Medical Research Council (MRC), to study ischaemic heart disease in association with the Ministry of Health for Trinidad and Tobago.

CAREC, by its situation in Trinidad and close juxtaposition to the Trinidad Public Health Laboratory (TPHL), has developed a special and very close working relationship with the Government and people of Trinidad and Tobago.

The Centre, as part of PAHO infrastructure, works in close association with the PAHO Country Representatives in the area and is very grateful for their active support and cooperation, especially to the staff in the Trinidad office.

The programme for CAREC for 1975 was set out in the report to the Director of PAHO from the CAREC Scientific Advisory Committee and Council, which met at CAREC in April 1975.

The present report records the work done during 1975 in carrying out that programme in terms of surveillance, laboratories, training, and research.

## II. ADMINISTRATION

The administrative structure of the Centre, its relationship to the new system of organization within the Pan American Health Organization, and the association with the CHMC territories are shown diagrammatically in Figure 1. Figure 2 shows the structure of the Laboratory Division. During 1975, CAREC was under the technical direction of the Department of Research Development and Coordination. On 1 January 1976 the Centre was transferred to the newly formed Division of Disease Control.

A full list of staff is given in Appendix 1. All except one of the staff previously working at TRVL were reemployed at CAREC.

The administration of the Centre was greatly hampered until the appointment on 1 August 1975 of Mr. Arthur Maul as full-time Administrator. An administrative consultant was posted temporarily to CAREC from October to December 1974 and February to May 1975. Implementation of the full programme for CAREC was restricted by the budget for 1975, which had been drawn up in 1973 dollars and on the basis of the University of The West Indies (UWI) budget estimates. Because of political and financial uncertainty about the future of TRVL, the Laboratory was severely understaffed and only essential maintenance had been undertaken for some time. A further constraint was the very great backlog in laboratory supplies which will not be corrected fully until late 1976 because of the 1975 budgetary problems and the time required to deliver goods to Trinidad.

In addition to the Laboratory staff who came from UWI to CAREC, the Centre has also incorporated the MRC and the Rockefeller University

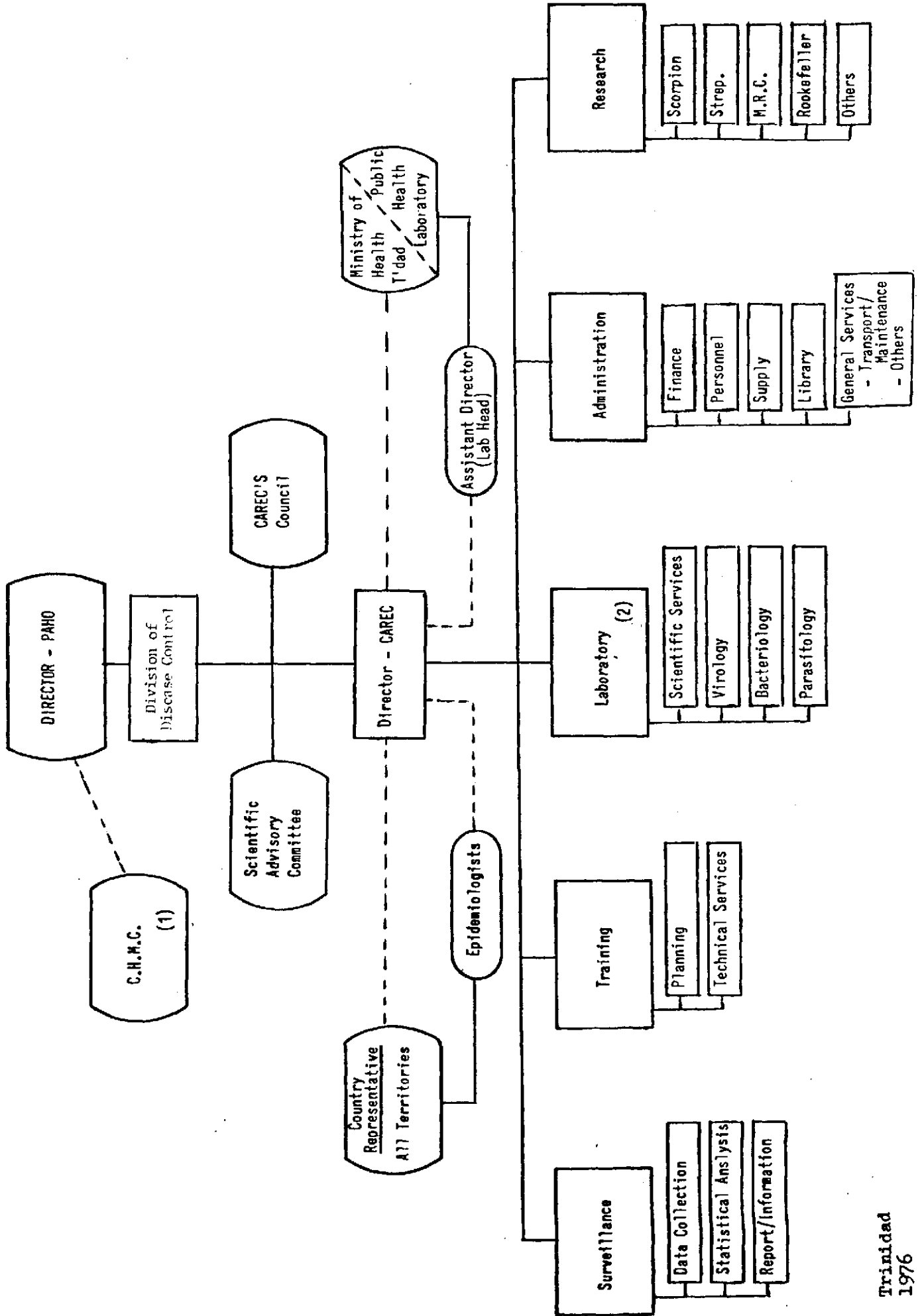
personnel who were working on research projects at TRVL. These groups will be integrated into CAREC during 1976.

The administrative structure of the Centre required a very close relationship with TPHL which is housed in the same building but whose staff are employees of the Government of Trinidad and Tobago, and have different terms of service to those under CAREC. In accordance with the bilateral agreement between PAHO and the Government of Trinidad and Tobago, the Director of TPHL, Dr. W. Swanston, was appointed Assistant Director of CAREC. During 1975, the association with TPHL has grown, not only on a personal basis, but also in the sharing of the work load and some facilities. (See under Laboratories). The Centre has been able to help with the procurement of essential supplies for TPHL and plans are proceeding for the centralization of stores and wash-up facilities for the two laboratories. A detailed study of the requirements for the laboratories and suggestions for immediate and long-term changes have been drawn up by a team kindly provided and funded by CDC, Atlanta, who visited CAREC for 2 weeks in October 1975. The plans will be presented for discussion to the Scientific Advisory Committee and Council in April 1976.

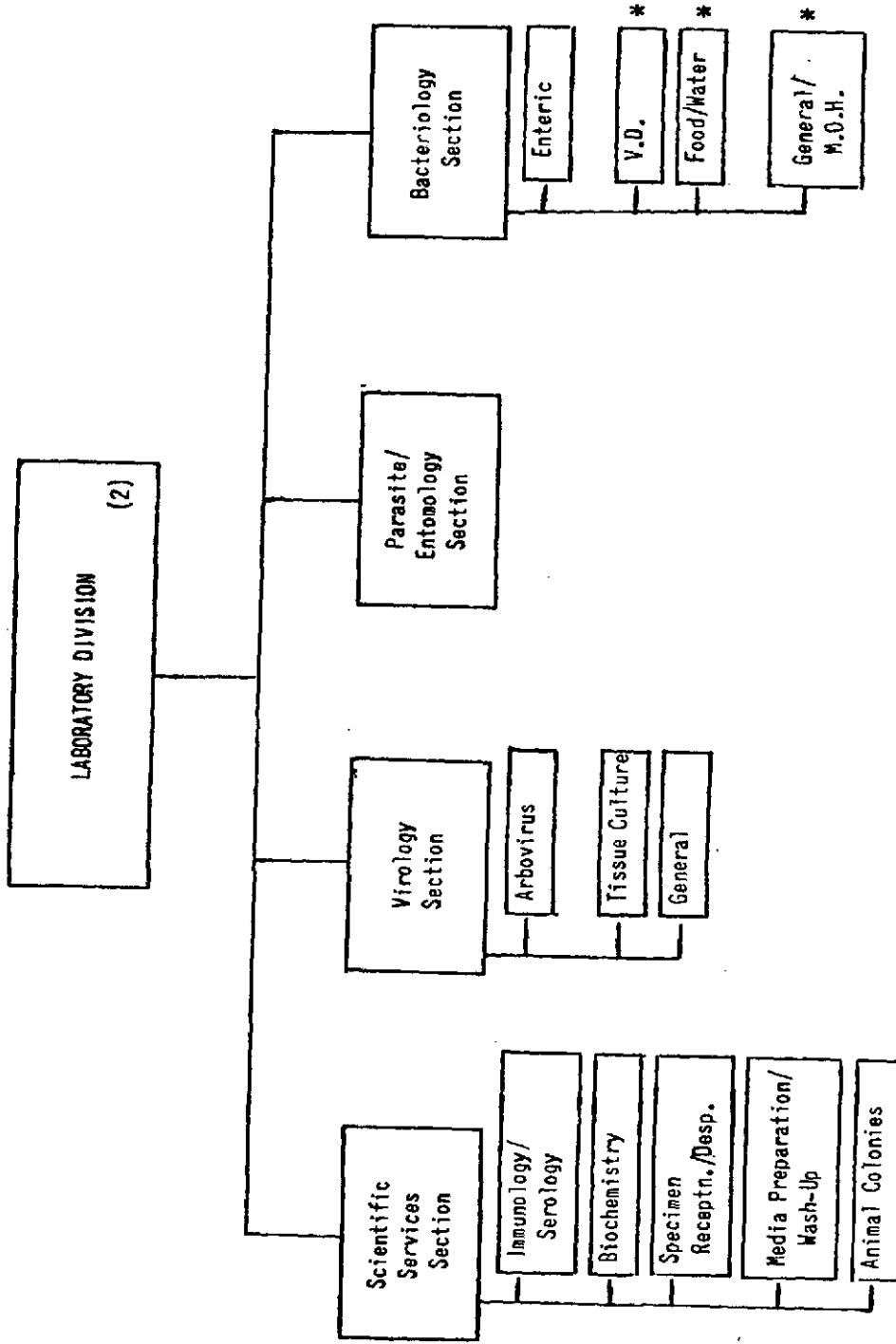
The problems have been eased considerably by the loyalty and enthusiasm of the staff and research workers who are to be congratulated on their response to the many changes and difficulties. In particular, the senior technical staff were called on to carry out many administrative duties and ad hoc work on supplies and equipment without the support of an adequate infrastructure. It is thanks to all grades working at the Centre that so much was achieved in developing the programme.

### III. SURVEILLANCE

The Surveillance Unit was put under the charge of Dr. Peter Diggory, who transferred from Jamaica on 1 April 1975. Mrs. Selma Afong was appointed







secretary in July, and Mr. Kenneth Latimer, Public Health Advisor, and Dr. Jeff Koplan, Epidemiologist, were seconded from CDC, during August and September, respectively. A preliminary assessment of the national surveillance systems in 16 countries of the English speaking Caribbean was undertaken by 2 special teams in February and March and this provided base-line information and guidelines for follow-up and assistance.

All 16 countries had designated a physician as epidemiologist and an introductory meeting was held for these at CAREC in May. This meeting provided the opportunity for a revision in basic epidemiologic principles and surveillance techniques. As a result of this meeting, a new abbreviated list for disease notification was drawn up and is being tested in the Caribbean territories. (See Appendix 2).

A CAREC Surveillance Report (CSR) incorporating the latest disease notifications available and articles of special interest to the area on communicable disease in particular, has been published monthly since March. By December, it included disease reports from 17 countries and the quality of these reports and the speed of their arrival improved every month.

CAREC worked closely with PAHO's Health Statistics Department in developing a new weekly reporting form to include gastroenteritis and malnutrition.

In-service training programmes in surveillance have been provided for health personnel which include physicians, nurses, public health nurses, statistical personnel and public health inspectors in Trinidad and Tobago, Jamaica, Belize and Grenada.

Grenada has introduced an entirely new surveillance system based on the weekly collection of information by district nurses from the clinics conducted by district medical officers and the daily reporting of hospital admissions to a new surveillance unit at the Health Ministry. A PAHO trained medical records officer was transferred from the Registrar General's

Office to establish the unit. This development will act as a model for the other less developed countries (LDC), and this system will be consolidated by the visits of CAREC staff and follow-up in-service workshops.

In the surveillance unit each of the epidemiologists is personally responsible for a number of the territories and for the development of the programmes in these territories.

In Trinidad there is a weekly meeting of the Surveillance Group, consisting of national and CAREC staff and the national weekly report on communicable disease has been improved. A manual of operation is being prepared for the surveillance unit.

An 8 month evening course in epidemiology for 28 public health inspectors and public health nurses has been arranged by UWI's Extra Mural Department with CAREC's help. The course participants have worked as teams in basic surveillance projects of national importance. Under a grant fellowship from the United Nations Development Program (UNDP), two further participants came from St. Kitts and St. Lucia. These two public health inspectors are receiving additional training through full-time attachment to the surveillance unit.

Many territories have utilized the resources of CAREC for ad-hoc advice and consultation: for example, (1) Belize, to evaluate histoplasmosis in Corozal; (2) Bahamas, to evaluate hospital sensitivity of staphylococci; (3) Bermuda, because of the outbreak of ciguatera poisoning; (4) Turks and Caicos Islands, for information on anthrax in Haiti; (5) British Virgin Islands, for information on poliomyelitis in the Dominican Republic, how to handle dengue specimens, and on how to treat syphilis patients with penicillin allergies; (6) Grenada, because of typhoid outbreak; (7) Barbados, because of lead in ceramics; (8) Guyana, for jaundice; (9) Caymen Islands, for information on design of reporting forms and on measles vaccination campaigns; and (10) Dominica, for malaria.

From 8 - 10 December, an introductory workshop for epidemiologists from every country in the Caribbean was held in Port of Spain, which was attended by 35 participants from 26 countries. The support for this workshop came from monies from the CDC grant to CARICOM. The participants discussed problems of surveillance and investigated ways of improving communication within and between countries. The recommendations and the names of the members are shown in Appendix 2. This workshop allowed an excellent opportunity for the CHMC territory epidemiologists to learn about the problems in Central America, and vice versa. The recommendations of the May meeting of epidemiologists were reviewed.

The Surveillance Unit has been responsible for arranging the provision of immediate needs to the surveillance units in the territories under the terms of the CDC contract. Specific requests for items such as calculators, filing cabinets, and graphic materials are being provided to Antigua, Belize, Dominica, Grenada, St. Lucia, St. Vincent, Trinidad and Tobago. The provision of these items has taken much longer than was expected, due in part to problems of supply but also to the speed of requests coming in from the territories.

#### IV. TRAINING

##### A. General

The CAREC training programme was based on the results of the February, March survey of the requirements of the territories for surveillance and laboratory services. That survey identified the needs for training at all levels in the health services and related fields. It was recognized that there was a general need to raise the level of expertise in epidemiology and to involve not only the designated epidemiologists and medical officers but also the medical auxiliaries and personnel in health statistics. Laboratory staff in the territories required training not only in special microbiological techniques but also in laboratory administration. It was also clear that those trained at the centre should be encouraged to teach in their own territories. To meet these needs the courses on specific subjects were organized and a start was made in running in-service workshops for surveillance within the territories.

Similar within country in-service training for laboratory staff was not started due to the severe staff constraints at CAREC and also the need to build up a cadre of trained technicians in the territories. A special effort was made to encourage and reinforce laboratory technicians by the provision of simple laboratory supplies and regular visits by epidemiologists. However, there remained a great shortage of pathologists, especially in the smaller territories, and a new and attractive career structure, both intellectually and financially, is required. Further, medical practitioners in the Caribbean are often unwilling to utilize laboratory services when they exist and very seldom is there adequate communication between the medical and laboratory staff. CAREC has started to improve this situation by raising the standards in the laboratory staff, monitoring the proficiency of those trained, providing adequate supplies, and by organizing within country workshops on communicable disease for hospital physicians, general practitioners, and laboratory staff. The programme, which commenced during 1975, will need to be developed in active collaboration with local and regional medical associations and auxiliary associations.

At the Centre, the laboratory division has developed an ongoing training programme for the technical staff at CAREC and TPHL. This was run jointly by the two laboratories. The aims are to review and revise basic techniques and to increase the flexibility of the technical staff many of whom had worked only with limited aspects of the TRVL arborvirus programme.

During 1975, the training programme was conducted by Dr. E. S. Tikasingh, all members of the professional and senior technical staff participated. In addition, the Centre was helped greatly by Dr. T. Hawkins from CDC, Dr. R. Muller, from the London School of Hygiene and Tropical Medicine, Department of Helminthology, and Dr. D. Lyman from the Department of Health, New York State.

Details of the workshops and courses run during the year are given below. All the training activities that involved participants from territories other than Trinidad, were funded from the CDC grant to CARICOM. Without the flexibility allowed by this grant it would have been impossible to carry out this training programme.

B. Training Facilities

A significant development in training facilities in 1975 was the creation of a training laboratory in a section of the existing building. In addition, the lecture hall was greatly improved by the installation of new lighting, purchase of new furniture, and the up-dating of visual aides.

Portable equipment has also been purchased for use by staff travelling in the territories and packaged courses were developed.

C. Workshops and Courses

1. Organizational Meeting of the CHMC Epidemiologists held from 12 to 17 May 1975.

The programme consisted of:

- a) A review of basic statistical principles;
- b) A review of epidemiological principles;
- c) Workshops on a plan for epidemiological disease surveillance and control in the Caribbean.

The meeting was attended by epidemiologists from 15 territories in the Caribbean. (Appendix 3).

2. Laboratory courses for technicians

- a) Enteric bacteriology : 13 - 17 October. The course organized in association with Dr. T. Hawkins, from CDC stressed recent advances in the field and emphasized the practical procedures that could be used by the territories. The opportunity was also taken to review the materials from isolation and identification of cholera.

- b) Parasitology : 20 - 24 October. The course was given in association with Dr. R. Muller, Senior Lecturer in Helminthology at the London School of Hygiene and Tropical Medicine. It covered the identification of the protozoa and helminths of importance in the Caribbean and emphasized quantitative techniques.

The two courses were attended by 29 technicians from 17 territories (Appendix 4). These two courses were run consecutively to conserve funds.

3. Diploma Course in Epidemiology for Public Health Inspectors and Public Health Nurses organized by UWI's Extra Mural Department and held from October 1975 to June 1976.

CAREC's staff were involved in the design and execution of the basic statistics and principles of epidemiology for an UWI extra-mural course for Public Health Inspectors of Trinidad and Tobago which commenced in October 1975 and continues twice per week. This course is training a basic cadre of public health inspectors and public health nurses in surveillance techniques. In addition to 25 public health inspectors from St. Lucia and 1 from St. Kitts are attending the course under UNDP funding. Those trained in 1975 will form a nucleus in their territories for further developments in surveillance by medical auxiliaries.

4. In-Service Training Courses

CAREC's staff also participated in courses held in the other territories for medical officers of health, public health inspectors, public health nurses, and statistical officers in Belize, Jamaica, Grenada, and Trinidad and Tobago.

5. Post-Graduate Training

In association with Dr. D. Lyman from the New York State Department of Health, CAREC gave a concentrated 1-week course in epidemiology to the students taking the Diploma in Community Health and the Diploma in Public Health at UWI.

6. Individual Training

During the year, two nationals from Guyana visited CAREC in conjunction with the surveillance programme: Dr. J. D. S. Paul, Microbiologist, Central Medical Laboratory visited from 26 October to 8 November for orientation in virological surveillance. Dr. Oscar Hamilton, Medical Officer attached to the Guyana Defense Force visited from 15 to 19 December for orientation on the proposed Guyana Defense Force/CAREC project on "surveillance of arbovirus and other microbiological infections in Guyanese military personnel.

V. LIBRARY

The library at TRVL was arranged to back up the arbovirus programme and very little had been added to it for a number of years. With funds from the CDC grant, a temporary librarian (Miss H. Henderson) was employed for 3 months in the summer to start assessing and rearranging it. Dr. Amador Neghme, former Director of the PAHO Regional Library of Medicine and the Health Sciences (RIM), visited the Centre and following his report, a full-time librarian will be appointed in 1976.



## VI. LABORATORIES

### A. General

Within the laboratory division much time was spent on reorientating the laboratory work to back-up the surveillance and training programme. The delay in appointing a bacteriologist seriously hampered the speed of development. Further, the need to increase supplies, define and implement improved safety, and the heavy demands of day-to-day maintenance for which there was inadequate staff, put a severe strain on the senior technical staff and the budget. Under these circumstances, introduction of new techniques was limited.

At the request of the Chief Medical Officer of Trinidad and Tobago, a joint multi-disciplinary working group on gastroenteritis was convened at CAREC. This group, which meets three times a year, includes paediatricians, pathologists, veterinarians, microbiologists, officials of the Ministry of Health, representatives of environmental sanitation and of the Food and Drug Administration.

Representatives from the seven veterinary and medical laboratories undertaking microbiological investigations have met on five occasions and prepared a simple manual with recommended procedures for the laboratory investigation of faecal specimens from patients with gastroenteritis. After the trial in Trinidad and Tobago, this will be available to other territories, if requested.

The laboratory continued its former role as a virus collaborating centre with the World Health Organization. It also stored and tested yellow fever vaccine for Trinidad and Tobago. Rabies vaccine was stored for Grenada. Limited supplies of rabies vaccine were held for emergencies and supplied to Guyana and Trinidad and Tobago.

Servicing of laboratory equipment and spare parts was a major problem throughout the year and highlighted the very serious deficiencies in this area throughout the Caribbean.

B. Cooperation with Trinidad Public Health Laboratory (TPHL)

Cooperation between TPHL and CAREC laboratories has developed rapidly in technology, safety, planning, in-service training, common use of animal facilities, and clerical services. Regular joint staff meetings have been held.

C. Safety

Increased safety in the laboratory was given a very high priority. A Safety Committee was appointed, met regularly, and developed a basic plan for safety at the Centre. Safety Officers were appointed to cover all activities and continue to meet each month with the Safety Coordinator to review and improve the safety standards. As safety is of equal importance to TPHL and CAREC, the two committees contain representatives from both laboratories. A grant was made by the British Government for safety and essential equipment and the first item of this equipment has arrived. Safety was also a major consideration in the plans for development drawn up by the visiting CDC team.

D. Proficiency Testing

With funds from CDC, a new training laboratory was built with facilities for 25 students. This has already proved invaluable for teaching technical staff from all the territories supporting the Centre.

VII. VIROLOGY

A. General

The main work of the laboratory on the CAREC side has been in virology which, during the year, has been closely coordinated with that at TPHL.

Mr. Drysdale at TPHL has carried out most of the work on respiratory viruses and rubella, while CAREC has concentrated its effort in the fields of gastroenteritis, arboviruses, investigation of jaundice, diseases of the central nervous system and other cases referred both from Trinidad and Tobago and the other territories. A most disappointing aspect of the work has been the slow response of other territories to refer material to CAREC. This is due mainly to the lack of an efficient system of transportation and to the lack of awareness and willingness to utilize the services by physicians throughout the Caribbean. This situation should be improved as the services available at CAREC become better known, by the regular visit of CAREC staff to all areas, and by the introduction of an efficient transport system.

A basic principle in the laboratory has been to link bacteriology, virology, and parasitology services and this was the main purpose of the gastroenteritis survey in St. Ann's Mental Hospital in Port of Spain, (see below), during which a senior technician from CAREC worked in the TPHL.

#### B. Service Virology

About 2,082 humans and 11 animals have been examined for the presence of viruses by inoculation of tissue cultures or mice and by the counterimmuno-electrophoresis (CIEOP) test for hepatitis B antigen. Complement fixation and haemagglutination inhibition tests were done on paired sera using antigens of common myxoviruses, picornaviruses, herpes and adenoviruses, and selected arboviruses.

Specimens were tested: (1) as part of the surveillance of certain diseases; (2) as a diagnostic service; and (3) as special projects.

The breakdown is as follows:

Service	No. Tested	No. Positive	% Positive
<u>SURVEILLANCE</u>			
Respiratory infections	295*	23	7.8
Pyrexia of unknown origin (PUO)	43	0	0.0
Jaundice	129	21	16.3
CNS disorders (meningitis, encephalitis, etc)	46	3	6.5
<u>DIAGNOSTIC VIROLOGY</u>			
Other cases referred (Trinidad)	147	16	10.9
Patients from other territories	46	3	6.5
CAREC staff	17	3	17.7
<u>SPECIAL PROJECTS</u>			
Gastroenteritis coordinated survey	1219	335	27.5
Survey of St. Ann's Mental Hospital	<u>140</u>	<u>54</u>	<u>38.6</u>
Total:	2082	458	22.0

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\*Joint CAREC/TPHL Programme

Respiratory infections:

These were investigated at CAREC from January to May after which the Trinidad Public Health Laboratory undertook the testing of specimens from these patients. Throat and nasal swabs were collected mainly from patients attending health offices in the north and south of Trinidad (85 percent) and the illness was generally not severe.

There was a small outbreak of influenza in March, caused by a strain closely related to influenza A/Port Chalmers: in October, three haemadsorbing agents were isolated from children with a mild respiratory infection and were forwarded to CDC for identification. Other isolates were adenoviruses, polioviruses, and herpesvirus hominis.

Pyrexia of unknown origin:

Cases occurred throughout the year and were located at health offices and at the Port of Spain General Hospital. Acute blood specimens were collected for virus isolation attempts in suckling mice, with negative results. Only four convalescent sera were received and there was no diagnostic serology.

This area of surveillance needs to be improved by: (1) greater effort at collecting paired sera for serology; (2) collection of other material in addition to blood; and (3) extension of the programme to other health offices and hospitals, particularly those in the south, and other territories.

Jaundice:

Patients with signs of jaundice were tested for the presence of: hepatitis B antigen, leptospiral antibodies, and in a few cases, organisms, and yellow fever or other arboviruses and group B arbovirus antibodies.

Twenty-one patients were positive for hepatitis B antigen by CIEOP. This test has been replaced by the direct haemagglutination method (Hepatest, Wellcome) which is reportedly more sensitive. One patient showed a diagnostic antibody increase in the Leptospira CFT and two were positive on culture.

Mouse inoculation tests were negative and arbovirus serology on 16 paired sera gave no diagnostic results.

These cases were warded at the General Hospital or referred by private practitioners.

Central Nervous System Disorders:

These were found mainly at the Port of Spain General Hospital and included meningitis, encephalitis, or suspect poliomyelitis.

There have been three virus isolates: an echo-virus type 9 and a reovirus from cerebrospinal fluid and an enterovirus possibly a coxsackievirus B from a rectal swab.

Of four paired sera tested, one gave a fourfold increase in antibody titer to herpesvirus in complement fixation test.

To improve surveillance of CNS disorders prompt requests from doctors should be received. Patients are often referred when bacteriological and other tests are negative. In addition, convalescent sera are required for retesting.

A greater effort was made to collect a full complement of specimens from each patient (lists of required specimens are posted on the wards) and arrangements have been made for the collection of autopsy material.

Other Diseases:

Requests were received for viral studies on patients with rubella (28), mumps (3), infections of the skin and mucous membranes (12), eye disease (12). In addition, there were 42 patients with ill-defined, undiagnosed ailments, and 50 healthy children tested as gastroenteritis controls.

On seven patients there was indication of recent rubella infection. One person suspected of having smallpox, had in fact herpes virus varicellae (electron microscope examination at CDC and light microscopy and egg inoculation at CAREC).

Viruses isolated were echo-, adeno- and polio, the latter from children sampled within 1 week of vaccination.

Patients investigated from territories other than Trinidad:

Requests were received from Guyana, Barbados, and Curaçao for virus isolation or serology on specimens from 46 patients.

From Guyana there were 18 children (over a period of 7 months) with symptoms of CNS disorders, i.e., inability to walk for short periods, and weakness and pain in the lower limbs. Acute serum specimens were received which yielded no viruses. Five stools and two throat swabs were cultured and two isolations of poliovirus type 1 and one of echo-virus type 8 were made. Oral poliovaccine had been given 2 weeks before sampling to one of the children.

One serum pair was received but there was no increase in antibody titer to neurotropic, respiratory or arbovirus antigens.

Also from Guyana, there were 24 sera from jaundiced persons, 3 of which were hepatitis B antigen positive.

Group B arbovirus serology was done on 17 paired sera submitted from suspected dengue cases in Curaçao. There were two serological conversions and one pair with high titers (1/320-1/1280) to the four group B antigens used (dengue 2, ilheus, yellow fever and St. Louis). Requests were received

for rubella HI titers on a few persons from Barbados.

Surveillance of CNS diseases, pyrexias, and jaundice in other territories is desirable (as well as investigation of outbreaks). There is need to develop routine shipping procedures and to provide suitable containers for transport of specimens for virus isolation and serology. A standard request form would ensure that all the necessary information is sent.

CAREC Staff:

Seventeen specimens were examined from members of CAREC staff suffering respiratory and other illnesses. Two strains of adenovirus and one coxsackie virus A10 were isolated, the latter from a case of pyrexia with diabetes.

Rabies and animal studies:

Eight animals were submitted to the laboratory for rabies virus isolation -- and one dog from St. Lucia, a mongoose and mouse from Trinidad, and a mongoose, two bats and a cow's brain from Grenada. Rabies virus was isolated from the mouse, which had been inoculated with animal material at the Trinidad Veterinary Laboratory. Sera from at-risk groups who have been immunized in Trinidad, Grenada, Belize, have been tested for RSNA by the Rapid Fluorescent Focus Inhibition Test (RFFIT).

C. Special Studies

Gastroenteritis Coordinated Survey:

For a number of years the pathology laboratories of the Port of Spain and San Fernando General Hospitals have offered a diagnostic bacteriology



and parasitology service to gastroenteritis patients warded at the hospitals.

From 1970-1974, TRVL (CAREC) cultured for enteric viruses faecal samples from a proportion of children with gastroenteritis warded at the Port of Spain General Hospital and from very few children at the San Fernando Hospital.

Outbreaks of disease have occurred, sometimes associated with an increase in isolation of a specific bacterial pathogen. There have also been sharp increases in the isolation of enteric viruses. There had, however, been no coordinated study using different disciplines on the same group of children.

Such a study was started this year and involved the following laboratories:

Port of Spain Pathology Division	: Bacteriology and Parasitology
San Fernando Pathology Division	: Bacteriology
Trinidad Public Health Laboratory	: Bacteriology and Virology
CAREC	: Virology

No attempt was made to change existing techniques in the laboratories.

More detailed information was collected than is normally given on the hospital request slips - i.e., presence of diarrhoea, vomiting, elevated temperature, respiratory infection, dehydration.

The following groups were included:

- a) Children with gastroenteritis at the Port of Spain, San Fernando, Arima, and Sangre Grande hospitals.
- b) Children with gastroenteritis attending the Sangre Grande, Arima, and Rio Claro Health Offices on specific days.

- c) Children seen by one private practitioner in Port of Spain, one in San Fernando and one in Arima.
- d) Healthy children from well baby clinics or day care centres.

The number of specimens received from some of these sources was limited by the collection and transportation arrangements which could be made, and the great majority of children investigated were patients at the two main hospitals.

Examination for parasites were done only on stool samples collected at the Port of Spain hospital.

A total of 1,219 children were included in the study, 502 (41.2 percent) from Port of Spain General Hospital, 581 (47.7 percent) from the San Fernando General Hospital, and the others from smaller hospitals, health offices, and private practitioners.

The age distribution of the patients was: under 1 year - 54.7 percent  
1-5 years - 34.8 percent; 6-18 years - 5.4 percent; 18 years and over  
1.9 percent; unknown - 3.2 percent.

All children had diarrhoea of more than 1 day's duration: 70 percent with vomiting, approximately 60 percent with elevated temperature, and 33 percent from some degree of dehydration.

Malnutrition was reported in 3-7 percent of the children and respiratory infection in 20-25 percent.

Results - Virology: Viruses were isolated from 27.5 percent of those treated. Isolates averaged 17.9 percent in the period January - June, and 36.5 percent in the later half of the year, when there was an increase in the

number of cases reported and examined (see Table 1). The viruses isolated were echovirus types 6, 13, 19, 22; adenovirus types 1, 2, 3, 9, 12, 31; Polio virus 1, 2, 3; coxsackie virus A-2, A-4, A-5, B-3, and reoviruses.

Adenoviruses were found more often in children with a respiratory infection in addition to gastroenteritis. Poliovirus were isolated frequently from babies who had received oral trivalent vaccine in the preceding week. All poliovirus isolations were reported to the health authorities for follow-up investigation.

The monthly percentage of specimens from which adeno- and polioviruses were isolated varied within narrow limits during the year, while the figures for echovirus isolations showed a sharp increase from June to November (see Figure 3a).

Bacteriology: Pathogenic bacteria (Salmonella, Shigella, and enteropathogenic E. Coli) were cultured from 20.6 percent of faecal specimens. There was no increase in isolation rate in the second half of the year as was apparent with the viral isolates. The organisms isolated were Salmonella derby from 14 percent of the specimens: S. poona (2.7 percent); S. agona, and S. typhimurium. Shigella sp. were cultured from four children and enteropathogenic E. Coli from eight.

Parasitology: Parasitological examination was done on faecal samples from children at the Port of Spain General Hospital. In a very few, Trichuris trichiura were seen.

LABORATORIES TABLE 1

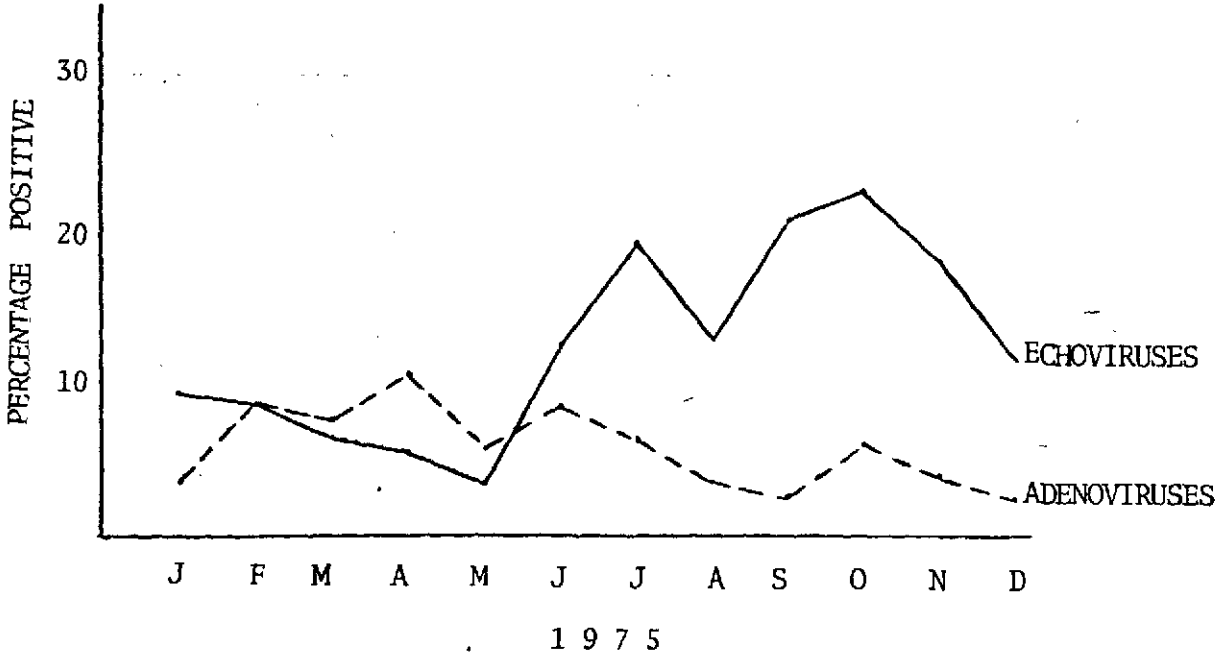
CAREC 1975 - MONTHLY DISTRIBUTION OF HUMAN CASES INVESTIGATED AND VIRUS ISOLATES.

Month	J		F		M		A		M		J		J		A		S		O		N		D		Total Tested	Total Positive (viruses Hb <sub>2</sub> O <sub>2</sub> )	%
	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P			
Gastroenteritis	88	115	66	135	88	24	10	25	142	115	38	51	149	133	50	42	1219	335	27.5								
Respiratory Infections	28	35	41	3	30	15*	34	48	20	25	4	3	20	12	4	295	23	7.8									
P.U.O.	6	14	6	0	4	2	1	3	0	3	2	6	47	0	0.0												
Jaundice	7	7	9	9	13	13	6	10	19	17	12	7	129	21	16.3												
C.N.S. Disorders	1	5	0	5	3	3	4	7	5	5	3	5	46	3	6.5												
Others	9	11	20	18	13	9	9	8	28	5	5	12	147	16	10.9												
Total Tested	139	187	142	170	151	138	196	191	221	188	84	76	1883	398	21.1												

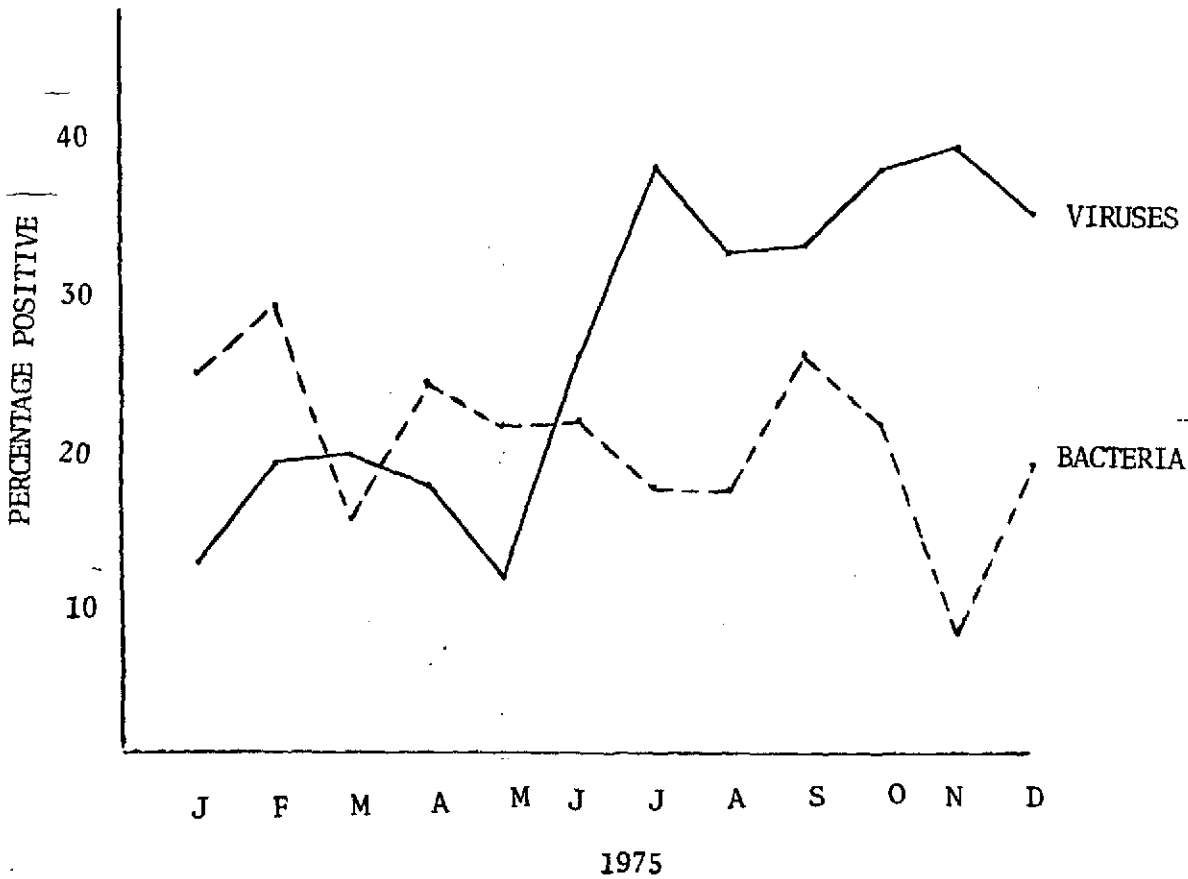
\* Respiratory virology June to December done by Trinidad Public Health Laboratory.

LABORATORIES FIGURE I

Ia RECOVERY OF ECHO AND ADENOVIRUSES FROM GASTROENTERITIS CASES



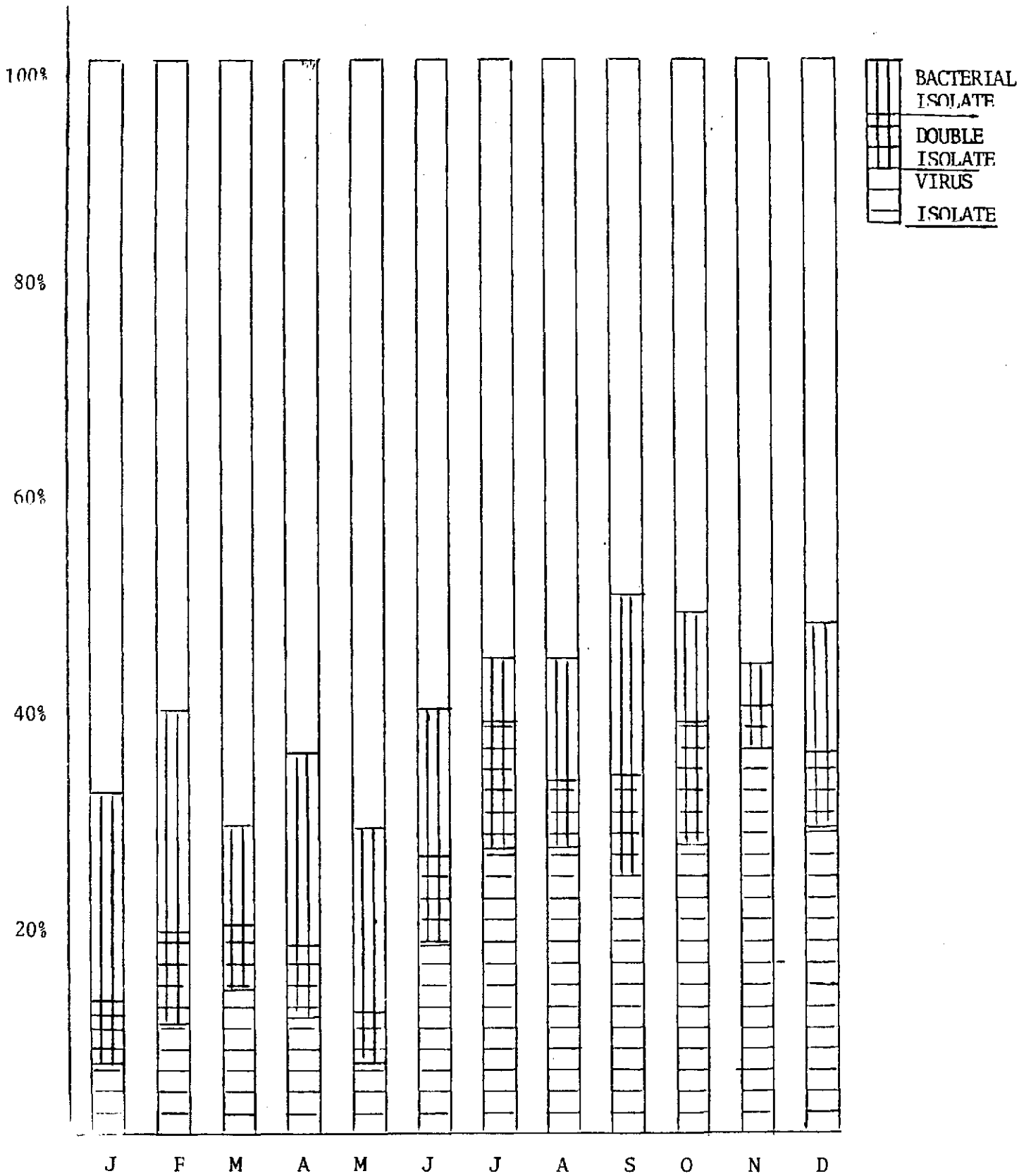
Ib ISOLATION OF PATHOGENIC BACTERIA AND VIRUSES FROM GASTROENTERITIS CASES



LABORATORIES FIGURE II

ISOLATION OF BACTERIAL AND/OR VIRAL AGENTS FROM GASTROENTERITIS

CASES 1975



1975

Total: The pattern of infection which emerged was one of low rates of salmonellosis and viral infection in the early part of the year with the bacterial isolates being slightly more frequent, and a high rate of viral infection in the second half of the year (see Figure 3 b).

In 4-12 percent of those tested, both viruses and pathogenic bacteria were found (Figure 4).

Correlation of particular organisms with age groups, locations, and clinical symptoms has not yet been completed.

Orbivirus Studies: The bacterial pathogens and enteric viruses isolated during the gastroenteritis survey accounted for a maximum of 50 percent of the cases examined in any month (Figure 2). There was therefore a large number of children from whom no agent was recovered. This is frequently reported in studies of this nature and in the past 3 years workers in different countries have used the electron microscope to demonstrate virus-like particles in the stool and duodenal mucosa which are present in the acute and not in the convalescent stage of the disease. These have been called "orbi" or "rota" viruses.

Stool samples from gastroenteritis patients were sent to Dr. Leslie Spence, Director of Virology, Department of Microbiology, University of Toronto, who examined them and reported the presence of "orbi" viruses, adenoviruses, and picornaviruses.

The occurrence of these in specimens taken from January to June 1975, is shown on Table 2.

Table 2. Viruses Detected By Electron Microscopy In Stools From Children With Gastroenteritis From January To June 1975

	January	February	March	April	May	June	Total
Number of specimens examined	5	41	11	27	35	36	155
Number orbiviruses	1	14	0	4	4	2	25
% orbiviruses	20.0	34.2	0.0	14.8	11.4	5.6	16.1
Number adenoviruses	0	4	0	1	2	0	7
Number picornaviruses	0	2	0	0	5	0	7

Specimens collected July to December are being examined.

Diarrhoea In A Closed Community:

The girl's ward of the St. Ann's Mental Hospital, Port of Spain houses 48 patients, aged 4-22 years, who are mentally retarded or ill and, in some cases, physically handicapped. The standard of hygiene is expectedly low and in addition to periodic outbreaks of illness, there is a chronic problem of diarrhoea on the ward. A study was begun in 1975 to investigate the occurrence of diarrhoea and the microbial agents or other factors which might be associated with it.

The objectives were: (1) to study the occurrence of diarrhoea and vomiting in the closed community of the girl's ward, St. Ann's Hospital over a period of 1 year; (2) to determine the pathogenic bacteria, parasites and viruses present in the stools of the patients during the period of study; (3) to investigate outbreaks of gastroenteritis in the ward with a view to determining the aetiologic agents; and (4) to determine, if possible, the route of introduction of new pathogens to the ward.

Records were kept of the occurrence of diarrhoea, vomiting, and elevated temperature. The standard of personal hygiene was noted. An assessment of the nutritional status was done by the Caribbean Food and Nutrition



Institute, using height, weight, and skin-fold thickness as indices. Haemoglobin levels were measured.

Three stool specimens from each patient, taken at weekly intervals, were examined for the presence of (a) enteric bacterial pathogens, using standard media; (b) faecal parasites, using direct examination and the TPHL formol ether concentration technique; (c) viruses, using tissue cultures and mice; (d) "rota" or "orbi" viruses using the electron microscope, by Dr. L. Spence, University of Toronto.

Results: During the first 30 weeks of the study there were on average 5.7 cases of diarrhoea per day (range 0-26). The children most severely affected were young, suffered some degree of malnutrition and were unable to take care of their personal hygiene. Salmonella group D. Shigella dysenteriae, flexner and boyd and enteropathogenic E. coli were cultured from the stools of 22 children (45 percent). Trichuris trichiura infestation was present in all but one child, Strongyloides stercoralis in 24 (50 percent) and Giardia lamblia, hookworm and ascarids in 10-17 percent. Adeno- echo- and coxsackieviruses were isolated from 64 percent of the patients (Table 3).

Shigella sp., E. coli, Strongyloides stercoralis, and Giardia lamblia were present most often in those with a high frequency of diarrhoea, while Salmonella hookworm and viruses did not show this association.

No orbi or rotaviruses were observed by electron microscopy.

Since the General Hospital kitchen supplies the girl's ward, the stools of 19 kitchen staff were examined. Ten of these were positive, yielding Shigella flexner and boyd; E. coli; Trichuris trichiura, hookworm ova; strongyloides stercoralis, and Giardia lamblia.

The project continues with attempts to reduce the prevalence of factors which may be contributing to the ill health of the patients. Dietary supplements are being used and the heavy helminth infestations are being treated with the drug mebendazole. The effect of this treatment is being measured quantitatively.

Table 3. Organisms Present In The Stools Of Patients On The Girls' Ward, St. Ann's Mental Hospital

Organism	Number of children positive	Approximate % positive
Salmonella	5	10
Shigella	6	13
<u>non-pathogenic E. Coli</u>	11	23
Adenoviruses	28	58
Echoviruses	3	6
Coxsackievirus A	1	2
Trichuris trichiura	47	98
<u>Strongyloides stercoralis</u>	24	50
<u>Giardia lamblia</u>	5	10
Hookworm	8	17
Ascaris	6	13
<u>Entamoeba coli</u>	33	69
<u>Chilomastix mesnali</u>	6	13
<u>Trichomonas hominis</u>	3	6

Outbreak of Typhoid on the girl's ward: In August 1975, there was an outbreak of typhoid fever on the ward with a total of seven cases. S. typhi was cultured from the blood of four and others had high "O" and "H" widal titers. The dates

of onset were distributed over a 6-week period and 2 patients died. Patients were barrier nursed within the ward and TAB vaccine was given to all patients and staff.

Table 4. Typhoid Outbreak On The Girls' Ward

Patient	Date of onset	<u>S. typhi</u> blood	Vaccination	<u>Serological Results</u>					
				<u>S. typhi</u> O	<u>S. typhi</u> H	Para O	A H	Para O	B H
YP 1	Aug 3	-	-	320	-	-	-	40	-
JAN 2	Aug 8	26 <sup>+</sup> /9	-	160	80	40	-	20	-
PI 3	Aug 17	-	-	160	80	-	-	20	-
JA 1	Aug 23	+	-	No Serology Died 19th September					
JV5	Sept 7	+	-	160	-	-	-	40	-
MG7	Sept 27	18 <sup>+</sup> /9	TAB4/9						
(Died Oct. 8)		-	11/9	160	640	-	40	40	-
J8	Sept 29		-	80	160	-	40	40	-

Yellow Fever Surveillance:

Yellow fever is present in neighbouring South American countries and there is danger of its reintroduction into Trinidad, where the necessary elements are present for the spread of jungle and urban yellow fever - monkeys and Haemagogus mosquitoes in forested areas, and Aedes aegypti mosquitoes in urban areas.

At the request of the Trinidad and Tobago Government a multidisciplinary yellow fever surveillance group was convened and met regularly at CAREC. The group reviewed the current situation and as a result of a working document presented to the Trinidad and Tobago Government a special task force on the Aedes aegypti programme was appointed. Dr. E. S. Tikasingh served on this task force which has reported to the Trinidad and Tobago Government and action is expected. In addition, surveillance for yellow fever (YF) has included

the search for dead monkeys, the control of the importation of monkeys, immunization of at-risk groups and a detailed study of jaundice patients through the island. A UWI student did a summer project on the history and present status of yellow fever vaccination in Trinidad and Tobago and a detailed report was prepared for the Government.

As part of this surveillance programme, a serological survey was conducted in 1975 to determine the immune status of a selected sample of primary schoolchildren. Twenty-eight schools were visited, 8 in heavily populated areas in or near Port of Spain and San Fernando, and 20 in rural areas on the east and south of the island. Three age groups were systematically sampled (i) 5-6 years, (in the first year of primary school), (ii) 8 years, and (iii) 11 years. Written parental consent was obtained and the dates of yellow fever immunization, as recorded on the immunization cards, were noted with the following results.

<u>Age Group</u>	<u>No. sampled</u>	<u>% response</u>	<u>% immunized</u>
5 years	231	54.6	22.5
8 years	286	66.2	50.7
11 years	287	65.7	54.7

Non responders were those not sampled for the following reasons:

- a) Illness or fear - 5.6 percent of those not sampled.
- b) Refusal of parental consent - 11.2 percent of those not sampled.
- c) Absence on the day of school - 26.2 percent of those not sampled.
- d) Disappearance of the consent visit form - 57.0 percent of those not sampled.

Sera were tested for antibodies to yellow fever and other group B arboviruses by the haemagglutination inhibition (HI) test with the following results:

	<u>5 years</u>	<u>8 years</u>	<u>11 years</u>
Immunized with YF antibody	14	38	30
Immunized with group B antibody	0	2	8
Immunized, HI negative (1/10)	39	105	119
No. recorded immunization with YF antibody	12	18	20
No. recorded immunization with group B antibody	0	4	9
No. recorded immunization, no HI antibody	166	119	101

The 50 children with YF antibody but without recorded immunization were followed up by visits to schools, health offices, and homes. Definite immunization dates were found for 35 children, in addition, 6 parents/guardians reported that YF vaccine had been given.

For 7 of the 9 children remaining in this group no definite history could be obtained but YF immunization had been carried out in the school and district in 1972 or 1973. This left two children, who lived in a small rural community near Oropouche at whose school YF immunization had been carried out in 1973 but each with a parent who said that their child had not been immunized. In a previous survey made in 1972, a child had been found in this community with YF antibodies and no history of YF immunization.

These findings bring out the difficulty that may arise in interpreting serological survey results and the importance of reliable individual YF immunization data.

Careful continuing surveillance for YF is clearly indicated for this community.

This study continues.

Poliomyelitis Antibody Study: Poliomyelitis continues to be an area of particular risk for the territories of the Caribbean and during the year a survey of antibody levels was completed for Barbados and serum was received from a joint study with MRC on 1,000 schoolchildren in Dominica. Sera collected for yellow fever surveillance in Trinidad will also be used to measure poliomyelitis antibodies. This work was delayed by difficulties with cell cultures, which occurred towards the end of the year.

#### VIII. PARASITOLOGY

Apart from a few ad hoc projects on a variety of parasites over the past several years, there has been no routine parasitological studies in human specimens. As a result, none of the junior technical staff has had adequate training in the wide field of parasitology. Thus, training was begun in 1975, and one of the staff received training in helminthology under Dr. R. Muller, London School of Hygiene and Tropical Medicine, and assisted him in a helminthological survey of schoolchildren, which was conducted by Dr. Muller in Dominica. In this survey, one thousand schoolchildren were studied, 250 from Portsmouth, and 750 from Roseau. A report is being prepared by Dr. Muller.

A 4-day course in parasitology was held at CAREC from 21-24 October 1975. The Parasitology Unit assisted and participated in this course.

During the studies on enzootic rodent leishmaniasis in Trinidad, two strains of Leishmania mexicana amazonensis were collected and maintained in NNN culture and hamsters at CAREC. However, in 1975, the two strains were sent to the Department of Protozoology of the London School of Hygiene and Tropical Medicine, where they will be held in the cryopreservation bank as stabilates and will be available to anyone wishing to do any further work on them. Details of these strains are as follows:

Strain 71-110, Ex Lutzomya flaviscutellata Mangabeira collected from castor oil traps, Vega de Oropouche, Trinidad, 20 January 1971.

Strain TRVL 13521, Ex tail lesion of Marmosa mitis chapmani (Allen) trapped at Aripo/Waller Field, Trinidad, 1 May 1973.

#### Diarrhoeal Diseases In A Closed Community

The Parasitology Unit participated in a collaborative study with the Virology Unit in a study of diarrhoeal diseases in a closed community. (See under Laboratories).

### IX. ENTOMOLOGY

Because of the reorganization of the Centre in 1975, very little field work was undertaken and a considerable amount of time was taken in cataloguing and analyzing the large insect collections at CAREC. For example, 157 species of mosquitoes have been recorded from Trinidad, of which 131 species are represented in the collections.

The following arthropod colonies were maintained for experimental work and for teaching purposes:

- Mosquitoes: Culex (M) portesi  
Culex fatigans
- Reduviidae: Panstrongylus geniculatus  
Eratyrus mycronatus
- Araneae: Tityus trinitatis

Some difficulties were experienced in maintaining a Culex portesi colony and the colony had to be reinforced with wild-caught specimens.

Both Venezuelan equine encephalitis (VEE) and eastern equine encephalitis (EEE) viruses have been isolated from Culex sp. No. 17, but this mosquito has never been specifically identified. During collections of Culex portesi, adult Culex sp. No. 17 were collected, brought to the laboratory, fed on mice, and held for egg production. The purpose is to obtain progeny rearings to allow specific identification. Sufficient rearings have now been obtained and these will be sent to a specialist for final identification.

Following Professor Nelson's visit in 1974 (See TRVL 1974 Annual Report), and the discovery of Wuchereria bancrofti at Blanchisseuse (Trinidad), Culex fatigans were collected from the houses of positive cases. These were held in the laboratory for a minimum of 7 days and then examined for infective filariae. Of 45 C. fatigans collected, 17 were positive, indicating that transmission was occurring in the area.

The Entomology Unit carried out a "holding operation" on the Kabowra Fly Project in Guyana in 1975. (See under Research).

## X. RESEARCH

### A. General

The TRVL was research oriented and previous annual reports from the laboratory centered on the research. During 1975 the role of the laboratory has become that of a surveillance centre. This change coincided with a reorientation of the research programme and with changes in the MRC staff. Thus much of the work of the laboratory was service and described under surveillance and laboratory. In March 1975, Dr. John Davies who had worked for many years on entomology for MRC left for a new post with the WHO



Onchocerciasis Programme in Africa. A replacement was not appointed until 1 January 1976.

Apart from the direct research associated with service activities, specific projects were carried out in: rabies; leptospirosis; Kabowra fly; streptococcal disease; scorpion venom; bat viruses; orbiviruses; and reduviid biology.

#### B. Rabies

The programme on mongoose rabies became a routine one of monitoring the prevalence of infection in mongooses and other veterinary animals. The results of the full research programme were set out in detail in the last annual report of TRVL. During the year, Dr. Everard successfully completed his Ph.D. thesis in London.

No rabies control programme has been implemented in Grenada during 1975 because of financial and logistic difficulties, but research and surveillance continued throughout the year on the island. Up to the end of October 1975, five people received postexposure rabies treatment following mongoose bites. So far, 20 mongooses attacking humans or livestock, and 4 of 622 (0.6 percent) trapped animals were diagnosed rabid by the FA test in the Grenada Rabies Laboratory. In addition to this, 12 mongooses were considered rabid on clinical signs. Laboratory diagnosed rabies in domestic animals involved five cows and one pig. Domestic animal/livestock vaccination was made available early in the year but was only utilised to a very small extent. Rabies serum neutralizing antibody studies on mongooses continued, and it has been found that mongooses respond with a high antibody titre to a single dose of ERA vaccine. Studies on the reinvasion of territory by mongooses, and population build-up after poisoning, have continued.

C. Leptospirosis

Dr. Everard maintained a small leptospirosis research mainly concerned with the identification and isolation of Leptospira from rodents in Grenada and in Trinidad. This effort is now being coordinated with and reoriented to tie in with the surveillance activities, and grant money is being sought from MRC to establish a proper leptospirosis programme. This new project will involve the physicians, the veterinary authorities, and the laboratory.

Attempts to isolate Leptospira from humans and rodents on Grenada commenced in late September. One isolate has been made so far from a peridomestic rat; this is probably the first record of culturing the live organism on the island.

D. Kabowra Fly

A pilot study by Dr. S. J. Davies and E. S. Tikasingh of the problem of the "black fly" or "Kabowra" fly, in the Rupununi district of Guyana has been underway for some time. Very high biting rates of up to 869 man bites per hour were noticed in the early rains. The full significance of the nuisance value of the flies to humans and livestock are well known, but the identification of a focus of onchocerciasis in Brazil possibly transmitted by the same specie of Simulium caught in Guyana has emphasized a new danger to health. A joint Guyana Government/MRC/PAHO/CAREC project on the entomological and ecological aspects of this problem began on 1 January 1976.

E. Streptococcal Disease

The Streptococcal Unit is research oriented (but performs a limited service to the Port of Spain General Hospital). It is funded by a grant from the American Heart Association and PAHO, administered by Dr. J. B. Zabriskie, of the Rockefeller University, New York. Over the past 2 years, the unit has

demonstrated that the lymphocytes of acute rheumatic fever patients had a highly abnormal cellular in-vitro response to locally isolated group A streptococcal antigens when compared to the lymphocytes of a group comprising individuals who had no history of streptococcal infections or its sequelae. It was also shown that this abnormal response was type specific, the lymphocytes of the rheumatic individual responding significantly to the Type 41 or "throat" strain but not to the Type 55 or "skin" strain which is associated with nephritis.

The fact that only 1 or 2 siblings in the same family of 6 to 10 developed rheumatic fever led to the idea that repeated environmental exposure to group A streptococci may not provide the whole answer but that these individuals were genetically predisposed to the disease. The question thus asked was, "Is there an immune response gene which is responsible for the susceptibility of the rheumatic individual to the disease?" Or, to put the question another way, "Is there an immune response gene which is responsible for the resistance to rheumatic fever in the siblings who have not expressed the disease?" To this end, a number of families in which there has been one or more individuals with well documented history of rheumatic fever are being studied and their histocompatibility antigens are being determined. Whether this study will show an increased or decreased frequency or any particular histocompatibility antigen is not possible at this time. This work is still in progress and will continue for much of 1976.

Another aspect which is being investigated is the possibility that the susceptibility or resistance to the rheumatic fever may be controlled by multiple genes including the HL-A genes. To this end, mixed lymphocyte culture tests have been conducted using the lymphocytes of the same families in which the HL-A study has been done. This aspect of the research will continue for much of 1976.

E. Scorpion Venom

The work on scorpion venom and pancreatitis was continued by Dr. Courteney Bartholomew and Dr. Barbara Hosein.

Experiments on the purification and characterization of the venom of Tityus trinitatis continued. High voltage electrophoresis was used to screen for a gastrin or caerulein-like peptide, but none was seen in the venom. The absence of such a gastrin analogue was confirmed by radioimmunoassay by Dr. Gregory of Liverpool.

The LD 50 of dried venom in mice was determined to be 16.5 mg/kg. The venom was shown to cause contraction of guinea pig ileum at concentrations as low as 150 ng/ml.

Both fresh and dried venom were separated on Sephadex G-50, and in each case the second major peak was found to cause contraction of guinea pig ileum. Separation of fresh venom by CM-cellulose produced three separate active peaks eluted at high pH.

Finally, fresh venom was found to stimulate secretion of amylase in guinea pig pancreas lobules in vitro.

The role of CAREC has been in the maintenance of the scorpion colony, and "milking" scorpions for venom. The main part of the work was carried out at the University of the West Indies, Mona, Kingston, Jamaica.

F. Bat Viruses

Dr. Jack Price's work on bat viruses was fully summarized in the 1974 Report on TRVL and was concluded in May 1975. The results are now being prepared for publication.

G. Biology Of Eratyrus Mucronatus

Studies on the biology of the reduviid bug, Eratyrus mucronatus (Hemiptera: Reduviidae), are being conducted by Carl Awong, a student for the M.Sc. degree, from the University of the West Indies. This study began in October 1974, using specimens caught in the Perseverance Cave, Maraval. These studies include life histories, feeding habits, growth rates, fecundity and death rates at normal and controlled temperatures and relative humidities.

XI. PUBLICATIONS

1. Everard, C. O. R. and H. E. Boos. Aspects of the ecology of Tupinambis nigropunctatus. Trin F Nat Club, pp. 16-21, 1975.
2. ----. Endoparasites of some amphibia, reptiles, and small mammals from Trinidad. Trin F Nat Club, pp. 72-79, 1975.
3. ----. The ecology of the mongoose, Herpestes auropunctatus, in Grenada and Trinidad, with special reference to its importance as a vector of disease. Ph.D. Thesis, University of London, 288 pages, 1975.
4. Spence, L., B. Hull, and M. C. Williams. The role of orbiviruses in acute gastroenteritis. Caribbean Med J 36: 22-26, 1975.
5. Tikasingh, E. S. Observations on Lutzomyia flaviscutellata (mang.) (Diptera: Psychodidae), a vector of enzootic rodent Leishmaniasis in Trinidad, West Indies. J Med Ent 12: 228-232, 1975.
6. ----. Diel activity of some Trinidadian mosquitoes as related to transmission of arboviruses. J Trin Field Nat Club, pp. 31-35, 1975.

CARIBBEAN EPIDEMIOLOGY CENTRE

Staff List 1975

DIRECTOR'S OFFICE

Director	Dr. P. J. S. Hamilton
Assistant Director (Director T.P.H.L.)	Dr. W. Swanston
Secretary	Mrs. S. Smith

ADMINISTRATION/COMMON

Administrator	Mr. A.B. Maul
Administrator Assistant	Ms. A. Carr
Clerical Assistant	Ms. D. Juteram
Clerk/Typist	Ms. G. Adams
Maintenance Officer	Mr. A. Pierre
Driver/Handyman	Mr. C. Sinanan
Driver/Handyman	Mr. L. Forbes
Handyman	Mr. D. Williams
"	Mr. E. Baptiste
"	Mr. D. Ramdharry
"	Mr. A. Asgaralli
Maid/Cleaner	Mrs. B. D'Abreu

LABORATORY

Scientist	Dr. M.C. Williams
Parasitologist	Dr. E.S. Tikasingh
Virologist	Mr. B.P. Hull
Laboratory Superintendent	Ms. C. Ali
Nurse	Ms. A. Camberbatch (resigned November)
Technicians	Ms. C. Agostini Mrs. V. Abraham (resigned July)
	Ms. C. Jordan
	Mr. S. Ali
	Mr. F. James
	Mr. R. Martinez
	Mr. M. Borde
Field Technician	Mr. A. Guerra
Laboratory Assistants	Mr. R. Bethelmy
	Mr. E. Corbin
	Mr. J. Khan
	Mr. K. Sheppard
	Mr. R. Gibbings

SURVEILLANCE

Epidemiologist  
Epidemiologist

Public Health Advisor

Secretary

Dr. H. P. Diggory  
Dr. J. Koplan  
(seconded from C.D.C.)  
Mr. K. Latimer  
(seconded from C.D.C.)  
Mrs. S. Afong

RESEARCH - MEDICAL RESEARCH COUNCIL (UK)

Scientists

Dr. C.O.R. Everard  
Dr. J.C. Davis  
to March 31  
Dr. J. Price  
to May 31

Chief Technician  
Typist/Clerk  
Technicians

Mr. N. Race  
Mr. J. Archbald  
Mr. J. Hingwan  
Mrs. L. Bhagwandeem  
Mr. L. Guerra  
Mr. A. Faria  
Mr. A. Asgaralli  
Mr. A. Alexander

Field Assistant  
Laboratory Assistant  
Handyman/Driver

RESEARCH - ROCKEFELLER UNIVERSITY

Immunologist  
Nurse  
Laboratory Assistant

Mr. H.F.M. Reid  
Mrs. G. Chan  
Mr. G. King



CARIBBEAN SURVEILLANCE WORKSHOP DECEMBER 8-10 1975

List of Participants

<u>Country</u>	<u>Name</u>
Antigua	Dr. A. Boyd
Bahamas	Dr. L. Charles
Barbados	Dr. V. Wells
Bermuda	Dr. B. Whalley
Caiman Is.	Dr. D. Vey
Costa Rica	Dr. L. Marranghello
Dominican Republic	Dr. M. Lebron
CDC/El Salvador	Dr. R. Feldman
PAHO/El Salvador	Dr. Rueda Bernal
French Guiana	Dr. J. P. Digoutte
Grenada	Dr. L. Comissiong
PAHO/Guatemala	Dr. A. Romero
INCAP/Guatemala	Dr. J. Urrutia
Guatemala	Dr. O. Zeissig
Guyana	Dr. D. Rawana
Haiti	Dr. F. Milord
Jamaica	Dr. S. Choudhuri
Martinique	Dr. S. Pilachon
Mexico	Dr. L. Farfan Terrazas
Montserrat	Dr. C. Wooding
Nicaragua	Dr. E. Montalvan
Panama	Dr. P. Galindo
PAHO	Dr. A. Lago Arroyo
Panama	Dr. O. Soto Cadenillas
CDC/Puerto Rico	Dr. B. Cline
St. Lucia	Dr. E. Bernez
St. Vincent	Dr. G. Cordice
Surinam	Dr. J. de Miranda
Tortola	Dr. P. Watson

<u>Country</u>	<u>Name</u>
Trinidad and Tobago	Dr. R. Doug Deen
Turks & Caicos Is.	Mr. I. Buchanan
CDC/Atlanta	Dr. P. Brachman
PAHO/Washington	Dr. K. Western
PAHO/ZI	Dr. E. Papp
Venezuela	Dr. R. Travieso

RECOMMENDATION OF CARIBBEAN SURVEILLANCE WORKSHOP

December 8-10 1975

Disease Reporting

1. The participants noting the special list adopted by the Ministers of Health of Central America and the experimental list being introduced in Jamaica in 1975, requiring partly immediate notification by telephone/telegraph and partly weekly reporting by individual case cards, asked CAREC to encourage the use of the Jamaica experimental list in one or two other Caribbean territories.
2. Recommended wider development of reporting by health personnel other than physicians and to make a study in those countries where experiments are in progress of symptom reporting. In addition, there should be continuous evaluation of any such system, particularly from the point of view of its effectiveness in contributing to disease control, rather than on completeness in reporting, since it is the trends in disease patterns that are of prime importance.
3. Recommended that reports should clearly indicate:
  - i) Whether diagnosis is based on clinical or laboratory information.
  - ii) Any change in the reporting system i.e. from clinical only to laboratory confirmation.

Laboratory Services

1. The participants recommended that there must be routine reporting by all laboratories including those in the private sector. A regular sample system should be established for this in each country.
2. Urgent reports from central and other laboratories should be phoned or cabled.

3. CAREC in collaboration with other "centres" should ensure the provision of suitable media, containers, and sample instructions for standard effective and safe specimen documentation, collection and transport.
4. Physicians should make every effort to obtain paired serum samples as these are usually essential for a definitive serological diagnosis particularly of a virus disease.
5. In the laboratory there should be continuous in-service training and workshops in Bacteriology, Parasitology and Serology linked with proficiency testing and quality control. The production and utilisation of locally produced media should be encouraged.
6. Peripheral health staff should have training in surveillance through national in-service workshops. CAREC should develop basic training materials for these activities.

#### Links with Veterinary Services

1. The participants recommended that consideration be given to a more general adoption of the system obtaining in several countries of integrating veterinary public health services within the Ministries of Health.
2. That a section on animal health should be included in the CSR at an early date.

#### Communication Within and Between Territories

1. The participants recommended that the publication of regular surveillance information bulletins for distribution to health service personnel, universities, other government departments, neighbouring countries CAREC and other regional organisations should be encouraged.
2. That the CAREC Surveillance Report should incorporate sections of general interest from these national bulletins.
3. That the utilisation of telephone, telegraph and telex reporting of diseases should be encouraged.

GENERAL

Participants found the Workshop a useful forum for the interchange of ideas and experiences and for personal contacts with other epidemiologists. It was agreed that there should be similar workshops if possible annually for critical analysis of progress, including pilot studies and to further improve regional and national co-ordination.

PARTICIPANTS IN CHMC EPIDEMIOLOGISTS ORGANIZATIONAL MEETING,  
12th - 17th MAY, 1975

<u>Countries</u>	<u>Participants</u>
Anguilla	Dr. M.R. Saunders
Antigua	Dr. A.I. Boyd
Bahamas	Dr. Cora Davis
Barbados	Dr. M. A. Byer
Belize	Dr. F. Quinones
Bermuda	Dr. R. Gourlay
British Virgin Islands	Dr. R. Thomas
Dominica	Dr. D. Shillingford
Grenada	Dr. L. M. Commissiong
Guyana	Dr. D. Rawana
Jamaica	Dr. S. Chondhuri
St. Kitts/Nevis	Dr. D. Kittle
St. Lucia	Dr. E. Bernez
St. Vincent	Dr. G. Cordice
Trinidad and Tobago	Dr. R. Doug Deen

RECOMMENDATIONS OF CHMC EPIDEMIOLOGISTS' WORKING GROUPS 12-17 MAY 1975

Three working groups met on the final day to review the Caribbean Epidemiology Centre Preliminary Survey of Surveillance Systems in the Caribbean and to make recommendations on the following:

- 1) Transport and communications;
- 2) Mobilization of resources;
- 3) What to notify (Disease and symptoms)

All three groups in general supported the recommendations of the survey and following group reports to the plenary session, there was agreement on the following additional recommendations:

I. Reporting of Diseases and Symptoms for Surveillance

- 1) Territories should continue their weekly and monthly international reporting to PAHO/WHO and copy these reports to CAREC.
- 2) For surveillance in the Caribbean reporting of diseases and syndroms should be adopted in accordance with the following table:

<u>Disease/Syndrome</u>	<u>Category Report</u>	
	<u>Internal</u>	<u>CAREC</u>
Malnutrition	C	C
Gastroenteritis (Under 4)	C	C
Food poisoning	A	C
<u>Dysenteries</u> (age group)	B	B
Cholera	A	A
Enteric Fever (Surgent typhoid)	B	C
<u>CNS Diseases</u>		
Meningitis	B	(B)C
Polio	B	(B)C
Encephalitis	B	(B)C
Malaria, Smallpox, Rabies	A	A
Diphtheria, Tetanus	B	C
TB	C	C
Hepatitis	C	C
Yellow Fever	A	A

<u>Disease/Syndrome</u>	<u>Category Report</u>	
	<u>Internal</u>	<u>Carec</u>
<u>Fever and Rash</u>	C	C
Rubella	B	C
Measles	B	C
Chicken Pox	C	C
Dengue	C	C
Haemorrhagic Fever	A	B
Influenza Syndrome	C	C

All outbreaks of diseases reported as category B.

- Internal Reporting - i.e. from the field to designated epidemiologist
- External Reporting - i.e. from the country designated epidemiologist organizations such as CAREC.
- a) immediate
  - b) within 24 hours
  - c) within one week
- 3) An accurate and standardized definition of these diseases should be prepared and agreed.
  - 4) Each country should implement a weekly reporting system to CAREC by Telex. Tuesday 4 p.m. will be deadline for the previous weeks report. Target list January, 1976.
  - 5) The CAREC Surveillance Report (CSR) can then replace the reports from Chief Medical Officers now sent to each other's countries since this information will be tabulated in the CSR and be part of the feed back service from CAREC.
  - 6) An evaluation of the current legislation regarding reporting and Communicable Disease Control should be completed and recommendations for further legislation proposed.
  - 7) CAREC should explore the involvement of the Spanish, French and Dutch speaking territories in the surveillance system. It was noted that it was intended to discuss this at a Pan Caribbean Meeting.



## II. Transport of Specimens:

- 1) Full support was given to developing a system of transporting specimens to CAREC through BWIA and LIAT. However, where there are good working arrangement for referral of specimens to other laboratories these should continue and CAREC should act as a clearing house for setting up other appropriate alternatives.
- 2) A suitable container is needed at low cost. CAREC should investigate this and provide costing information to the Governments, who will need to make budgetary provisions for transport and sample containers by 1977.
- 3) CAREC should issue a procedure for the collection and referral of specimens.

## III. Mobilization of Resources:

### A. Staff Preparation:

- 1) Multidisciplinary sessions should be arranged to further role identification and inter-dependence in the surveillance system, e.g. the role of the public health inspector and nurse should be identified to avoid duplication of effort.
- 2) Local education sessions should include field experience and there should be interchange of staff between territories for field experience for specific diseases.
- 3) There should be the utilization of the visit of CAREC staff for appropriate meetings with professional associations.
- 4) CAREC should have a supply of teaching materials available on loan, either directly or through the PAHO/WHO Offices of participating countries.

### B. Vaccine Supplies:

CAREC should monitor the availability of emergency vaccine supplies and stock some emergency biologicals.

C. Standardized forms:

CAREC should explore the use of standardized forms and the possibility of mass production.

D. Laboratory Services - Zoonotic Diseases:

Laboratory proposals should be developed in collaboration with existing and proposed veterinary programmes in the area to prevent needless duplication of services.

E. Utilization of Designated Epidemiologists:

- 1) The role of the epidemiologist in the larger territories should be a full-time one without the imposition of other responsibilities.
- 2) Contact between CAREC and the territories should be through the designated epidemiologist. Approval for this system should be sought by each epidemiologist.

## PARTICIPANTS FOR ENTERIC BACTERIOLOGY AND PARASITOLOGY

Courses 13th - 24th October, 1975

<u>Country</u>	<u>Participant</u>
Anguilla	Joseph Hodge
Antigua	Arthur Charles
Bahamas	Melbreth Charlton
Barbados	Diane Watkins
Barbados	Cyrene Gollop
Bermudas	Meredith Smith
Belize	Frederick Garcia
Caiman Islands	Rebeca Ebanks
Dominica*	Agustus Fadelle
Dominica**	Roderick Fortune
Grenada	Agatha Clarke
Guyana*	Shriram Harryram
Guyana**	Herbert George
Jamaica*	Flora Ho Sang
Jamaica**	June Robinson
Jamaica	Euchalee Mitchell
Montserrat	Bernice Antony
St. Lucia	Juliana Mitchell
St. Kitts	Carlton Daniel
St. Vincent	Walter Gumbs
Trinidad and Tobago*	Arthur Ayres
Trinidad and Tobago*	Mervyn Campbell
Trinidad and Tobago*	Rosemary Gonzalez
Trinidad and Tobago*	Ann Issac
Trinidad and Tobago**	Joseph Bissessan
Trinidad and Tobago*	Noel O'Neal
Trinidad and Tobago*	Motilal Sooknanan
Trinidad and Tobago**	Curtiss Noel
Turks and Caicos Islands	Herbert Been

\* Attended Enteric Bacteriology Course Only

\*\* Attended Parasitology Course Only

CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)

Port of Spain, Trinidad

REVIEW OF 1975 PROGRAM

AND

PROPOSED PROGRAM AND BUDGET FOR 1976-1977

April 1976

PAN AMERICAN HEALTH ORGANIZATION

Pan American Sanitary Bureau, Regional Office of the

WORLD HEALTH ORGANIZATION

Washington, D.C.

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CARIBBEAN EPIDEMIOLOGY CENTRE (CAREC)

Port of Spain, Trinidad

PROGRAM AND BUDGET OF THE CARIBBEAN EPIDEMIOLOGY CENTRE  
FOR 1976 AND THE PROPOSED ESTIMATES FOR 76/77

I. INTRODUCTION

The importance of introducing an adequate surveillance system for communicable and non-communicable diseases in the Caribbean was recognised in the Resolution 19 of the Fifth Meeting of Caribbean Health Ministers Conference (CHMC) held in Dominica in February 1973. Following this, PAHO made an assessment of the needs of the area and as a result of Resolution 14 of the Sixth Meeting of the Caribbean Health Ministers Conference in Nassau in June 1974, a Surveillance Centre incorporating the Trinidad Regional Virus Laboratory (TRVL) was established in Trinidad under the direction of PAHO on 1 January 1975. The first meeting of the Council of CAREC took place in Trinidad on 17 April 1975 and reported to the Director of PAHO in Document RD 14/5 of 1975. The background and history of the establishment of the Centre are contained in Document RD 14/5 of 1975.

Following the establishment of the Centre, a full survey of the facilities for Surveillance and the back-up laboratory facilities within the Territories of the Caribbean Health Ministers Conference was carried out and this Report was presented to the first meeting of the Scientific Advisory Committee and the Council and is reproduced in Documents RD 14 and RD 15 of 1975.

The control of communicable disease and the human resources required for it demanded good information to be available and the World Health

Assembly has identified disease surveillance as a major priority. Currently, communicable disease presents the major problem for the less developed countries but with the development of a better standard of living, the non-communicable and chronic diseases such as Diabetes, Hypertension, Sickle cell Disease and Cancer are becoming increasingly important. In addition, developments in business and tourism, coupled with the speed of international travel, make the danger of imported disease an increasing hazard. Specific events such as the proposed Black Arts Festival in Nigeria and the opening of new air routes present special problems.

The Territories of the Caribbean are naturally anxious about these problems and the Centre was established to help measure and combat them. National Health Authorities have developed to varying degrees their Surveillance Programs and it is the purpose of the Centre to encourage and further these and to coordinate their efforts. The Caribbean Epidemiology Centre's priorities are set out in the multi-lateral agreement between PAHO and the Territories under which it was set up. These are:

- 1) Surveillance and the development of Surveillance activities in communicable and non-communicable disease.
- 2) The development and up-grading of the Laboratory facilities in the Territories.
- 3) Development of Training Programs for those engaged in Surveillance and Laboratories.

- 4) Development of appropriate Research Programs pertinent to the needs of the area.

The first Program for the Centre was presented by the Director of CAREC to the Scientific Advisory Committee and Council in April 1975 and endorsed by them. The actions of the Centre on these recommendations of the Council, the Program for 1976-1977 and the Budget for the year 1977, are set out below. The work of the Centre during 1975 is summarised in the Director's Report to the Scientific Advisory Committee.

These documents will form the basis for discussions at the CAREC Scientific Advisory Committee and Council Meetings in Port of Spain in April 1976.

II. FOLLOW-UP ON RESOLUTIONS ADOPTED AT THE FIRST COUNCIL  
MEETING OF CARIBBEAN EPIDEMIOLOGY CENTRE - TRINIDAD &  
TOBAGO, 17 APRIL, 1975

Recommendation 1:

The Council noted that satisfactory forward budgeting can only be based on the principle that the present estimates are stated in 1973 dollars and must be updated annually to take account of inflation. The Council recommended that the originally agreed staffing and budget must be implemented, taking account of rising costs, in order to carry out the Program.



Action

The Budget for 1976 was upgraded according to the recommendation by an additional input of \$127,000 (PAHO) and the recommendation of Caribbean Health Ministers Conference of a 20 percent increase in the individual country contributions.

Recommendation 2:

The Council also recommended that the following budgetary amendments be made:

- a) The post of statistician be moved to 1976.
- b) The post of veterinarian be moved to 1977.
- c) A medical bacteriologist be recruited immediately and bridging funds sought to cover the period until the start of the 1976 budget, if necessary.
- d) Suitable supporting staff be provided for the bacteriologist and statistician.
- e) The basic infrastructure at CAREC be urgently strengthened.
- f) Budgetary provision be made for one new medical training post in 1976, 1977, 1978 and one non-medical post in 1976, in view of the urgent need for counterpart training posts.

Action

In accordance with the Council's recommendation, the post of statistician has been advertised in February 1976 and the post of veterinarian incorporated in the budget for 1977. Owing to the financial state of PAHO, the medical bacteriologist was not recruited in 1975, but the post has now been advertised, and the Budget for 1976 makes provision for suitable supporting staff for the bacteriologist and statistician. The basic infrastructure at CAREC was not fully strengthened in 1975, but provision has been made for this in 1976 and the

supporting staff originally budgeted for in 1977 are being brought forward to 1976 to create a Laboratory resource with the ability to meet the demands of the Surveillance Program. Provision has been made in the 1976 Budget for one new West Indian medical trainee and one non-medical trainee. These posts have been advertised and are being filled.

Recommendation 3:

The Council noted that the tax-exemption status of local employees in Trinidad was not clear, but recommended that no budgetary provision for this item be made at present. A special appropriation should be made if the need arises.

Action

PAHO has established tax exemption for the local employees.

Recommendation 4:

The Council noted that no provision was made in the original budget for salary revisions due to severe inflation, and recommended that any demands arising from such salary revisions be the subject of a special application.

Action

Provision for inflationary trends have been made in the 1976 budget and further adjustment may be required in 1977.

Recommendation 5:

The Council recommended that the Director of PAHO should appoint

temporary consultants to advise on the library and laboratory reorganization, the cost to be found from PAHO's general funds.

Action

A Temporary Consultant paid from PAHO's general funds was appointed to advise on the library which also received the visit of Dr. Amador Neghme, former Director of PAHO Regional Library of Medicine and the Health Sciences (RLM). His report strongly recommended the appointment of a librarian and suitable budgetary provision. Consequently, the post for librarian has been included in the 1976 estimates and has been filled. Further, thanks to a grant from the Center for Disease Control Budget, a temporary librarian was taken on in the summer of 1975 and started the required reorganization of the Library.

Recommendation 6:

The Council noted that additional capital equipment is very urgently required both for safety and service in the laboratory to institute the basic Program and recommended that these demands merit a special grant from PAHO or failing that, that the Director should be empowered to seek external funds. Endorsed the list (Annex lll) of essential equipment suggested by the Director, subject to its approval by Professor R. E. O. Williams and Dr. C. E. Gordon Smith.

Action

A grant was made by the Overseas Development Ministry, London, for the purchase of the safety and service equipment as recommended in the previous report and passed by Professor R. E. O. Williams and Dr. C. E. Gordon Smith. This equipment is now arriving.

Recommendation 7:

The Council noted that the 10 percent annual increase in funds for common services allowed for in the budget could do no more than permit limited increased activities within the agreed Program, but that it is totally inadequate to take account of inflation. The Council further noted that the University of the West Indies was adding over 40 percent to its common services budget over 1973. It recommended that an increase of 40 percent must be added for the 1976 common services budget to bring them up to 1976 prices.

Action

The Budget has been amended accordingly and the implications for 1976/1977 will be presented to the Council.

Recommendation 8:

The Council noted that structural alterations would be required at CAREC and recommended that funds be provided following the study by the short-term consultants (See Recommendation 5).

Action

The physical structure and requirements of CAREC and the Trinidad Public Health Laboratory were reviewed as requested by a team of short-term consultants, kindly provided by the Center for Disease Control, Atlanta. Their report will be ready in mid-March and available for consideration by the Council.

Recommendation 9:

The Council noted that the cost of the meetings of the current

Scientific Advisory Committee and Council of CAREC had to be met from the working budget of CAREC and strongly recommended that the Director of PAHO should find funds at least to cover the whole cost of the Council.

Action

Special provision for the Scientific Advisory Committee and Council has been made in the 1976 Budget from the new funds allocated by PAHO.

Recommendation 10:

The Council endorsed the recommendations of the Scientific Advisory Committee and emphasized the special importance of a) and b) below:

- a) The participating Governments should take urgent measures to facilitate the rapid exchange of surveillance information including Telex facilities in Government departments to enable Caribbean surveillance reports to be prepared for distribution within the region.
- b) That Governments be asked to provide Telex facilities and air-line transportation for laboratory specimens either free of charge or at low cost.

Action

In implementing the recommendations of the Scientific Advisory Committee, the following should be reported:

- a) Participating Governments have greatly increased the facilities for transmitting surveillance information, but owing to the lack of Telex facilities in Trinidad and delay in their development, it has not been possible to implement a telex reporting system to CAREC.

- b) Owing to problems with the local airlines and the slow development for laboratory specimen carriage, very little progress has been made in the introduction of an efficient system for the transport of specimens.

Recommendation 11:

The Council endorsed the report of Dr. Western on the present status in the Caribbean of:

- A. Surveillance; and
- B. Microbiological Laboratories.

Action

Further to the report on surveillance facilities, the following action has been taken:

- A. SURVEILLANCE
  - 1. CAREC has organized an annual meeting for designated epidemiologists of the CHMC and also for the whole Caribbean area and similar ones are projected for 1976.
  - 2. Ad hoc workshops on Epidemiology and Surveillance have been held in Jamaica, Trinidad and Tobago, Belize, Turks and Caicos, Grenada and are projected for other Territories.
  - 3. CAREC staff are visiting regularly all Territories and each Epidemiologist at CAREC has a designated number of Territories for which he is responsible.
  - 4. CAREC staff have advised on the compilation of a number of National Health Reports, but this area could be expanded.
  - 5. CAREC staff have assisted the Epidemiologists in the updating of legislation in Jamaica and are working closely with the CARICOM Secretariat in advising all

Territories on redrafting their legislation for notification of disease.

6. The CAREC Surveillance Report (CSR) has appeared monthly but considerable problems have occurred in its publication and it is unlikely that it will be able to be produced more than once a fortnight, without considerable increases in cost and staff.
7. Simple equipment such as hand calculators, manuals, typewriters, filing cabinets, etc. have been provided to Trinidad and Tobago, Belize and requests from other Territories are being processed. The provision of this equipment has taken more time than was originally anticipated, but should be expedited by the renegotiation of administration of the CDC loan.
8. Improvement of Programs by the Epidemiologists in larger Territories has already been referred to and these have involved the training of public health nurses and public health inspectors.
9. CAREC has assisted in the investigation of specific epidemic situations, especially flour poisoning with parathion in Jamaica, lead poisoning in Barbados, typhoid in Grenada, gastroenteritis in Trinidad and Tobago and "yellow eye" in Guyana.
10. CAREC worked in close association with the CDC Toxicology Unit particularly in Jamaica and Barbados.
11. Sentinel physician systems have been introduced in Jamaica and are being experimented with in Grenada and a number of other Territories.
12. Incorporation of hospital discharge information in the Surveillance System is now proceeding with the help of the PAHO Health Statistics Advisors.
13. CAREC in association with other agencies is involved in the education of medical students and others at the University of the West Indies.

B. LABORATORIES

In terms of the recommendations on Laboratories, CAREC has taken action as follows:

1. Visits by the Microbiologist have been hindered by the lack of the appointment of a Bacteriologist to CAREC. More visits are scheduled for 1976.
2. Considerable progress has been made in terms of laboratory safety and some simplification of laboratory technology. However, serious deficiencies still exist in the problems of transport, shipping and handling of specimens and proficiency testing is so far only carried out in Trinidad and Tobago, Barbados, the Bahamas and Jamaica. Laboratory administration and management will be the subject of a workshop during 1976.
3. Back-up staff has been provided as indicated under SURVEILLANCE and the Centre is developing back-up laboratory service for the diagnosis of more exotic conditions.
4. Emphasis at the Centre has been concentrated on the investigation as suggested on the agents causing gastroenteritis and enteric diseases and a special course was run on these.
5. Mycobacteria (tuberculosis, leprosy and the atypicals) will be the subject of a course in June 1976.
6. The microbiology of immunisable diseases is receiving particular attention and a survey of the anti-body levels for poliomyelitis is underway throughout the Caribbean. This is based on a random sample of children age 5-9 and will also allow for studies of other anti-body levels, e.g. measles, hepatitis, etc.
7. Streptococci are being studied in depth by two research teams at the Centre and in San Fernando, Trinidad, and links for further studies have been established with Barbados, Dominica and Cuba.
8. Neisseria organisms will be studied at a special course to be run in September 1976.
9. CAREC has given high priority to the capability in the following areas:
  - a) Serological typing of important species of enteric organisms.



- b) The maintenance of field survey and identification of yellow fever, dengue and encephalitis viruses and agents associated with arbovirus diseases, and to this end has introduced a series of new insect cell lines for easier identification of viruses.
- c) Influenza virus identification has continued in association with the Trinidad Public Health Laboratory.
- d) Polio virus isolation and identification have continued but differentiation of wild and vaccine strains awaits the arrival of new equipment.
- e) Diagnosis of Hepatitis is being carried out using an haemagglutination inhibition test on a limited scale.
- f) Identification of rabies by mouse inoculation and immuno fluorescence continues in association with the Medical Research Council.

Further Recommendations of S.A.C.

TRAINING

- a) Both at CAREC and in the territories, the early development of a flexible career and training system for technicians is urgent to permit the recruitment and retainment of the necessary staff of quality.
- b) The Committee stressed the need for urgent action by PAHO and the Caribbean territories to provide posts and training for counterparts to expatriate personnel at CAREC. Consideration should be given to the recruitment of non-medical bacteriologists who were having difficulty in obtaining positions in Government service. Medical students should be encouraged to

consider careers in epidemiology and microbiology.

Action

- a) A flexible career training system for technicians will be introduced during 1976. A detailed program of in-service training for technicians has already commenced at CAREC for the laboratory staff. One of the technicians, Miss Agostini, will be going to France for a four-month scholarship at the Institut Pasteur to learn new techniques.
- b) Technical staff at CAREC are now being trained so that they are not limited to a single set of techniques which will introduce much greater flexibility. However, it will also be necessary to introduce a different grading structure and this has budgetary implications.
- c) CAREC has created a trainee post for a medical microbiologist/epidemiologist and another for a non-medical microbiologist in 1976 and two further posts are projected for 1977 and 1978. A particular effort has been made to encourage the medical students at UWI to do electives at CAREC or in association with CAREC. It was not possible during 1975 to carry out this program as the students had already selected their topics by the end of 1974. At least ten students have shown an interest and will be doing projects either at or with CAREC staff in Antigua, Montserrat, Barbados, Guyana and Trinidad and Tobago.

LABORATORY

- a) There was a need to rationalise the utilisation of space and staff at CAREC and the Trinidad Public Health Laboratory to ensure the efficient operation of both laboratories.
- b) Funds should be found to renovate CAREC's laboratory and make it safe. Suitable equipment must be purchased.

Action

- a) The staff at CAREC and the Trinidad Public Health Laboratory (TPHL) have been working very closely together during the year. CAREC's staff have helped with the bacteriology in TPHL and TPHL has been carrying out work on respiratory viruses for CAREC.

The CDC Advisory Team has drawn up plans for rationalisation of central stores and wash-up facilities for the two laboratories which should be implemented during 1976.

A monthly meeting of all the staff of both laboratories is held to discuss the on-going program of the Centre and the Public Health Laboratory.

- b) Following consideration of the CDC report on the organization of the Centre, negotiations are proceeding with the Government of Trinidad and Tobago for the re-organization. PAHO provided funds for the repairing of the roof of CAREC. Safety equipment and essential equipment for maintenance and implementation of the program are now in order. During 1976, the general safety of the laboratory should become far more satisfactory.

RESEARCH

- a) Further links with veterinary work in the area were to be encouraged.
- b) Involvement of CAREC in the water supply project in Belize could provide a very useful basis for planning and evaluation of water supplies in the territories.
- c) Visiting research workers should not only provide their own research funds, but should make allowance in their budgets for travelling, overhead and

any other expenses that might arise during their visit. To accommodate visitors, some remodelling of the laboratory would be necessary and funds should be provided for this.

- d) CAREC should make studies on non-communicable as well as communicable diseases. Such studies should be initiated with external funds.

Action

- a) The Centre has joined with the veterinary authorities and Ministry of Agriculture and the Ministry of Health in a regular joint meeting to review cooperation in the veterinary field in Trinidad and Tobago with particular reference to Rabies, Leptospirosis and Salmonellosis. In addition, the veterinarians have been closely associated with the program of Gastroenteritis developed by the Centre and TPHL. Increasing cooperation with the veterinary authorities in the other territories particularly with leptospirosis in Barbados. New proposals have been put forward for studies on Rabies and Leptospirosis in Grenada. The new MRC Research Program in Leptospirosis will require very close cooperation with the Veterinary Services.

CAREC has worked very closely with the PAHO Veterinary Advisors and greatly appreciates their help pending the appointment of a veterinarian in 1977.

A preliminary investigation of equine encephalitis in association with the veterinary authorities in Guyana, is underway.

- b) Owing to the withdrawal of PAHO from this project, CAREC was unable to participate. However, preliminary approaches have been made for further studies in St. Lucia, Guyana, and other territories and these will be discussed in more detail at the Water Conference to be held under PAHO auspices in Trinidad during 1976.
- c) Care has been taken in putting forward grant proposals where appropriate for inclusion of travel, overheads and other expenses in the budgets. Visitors are currently

accepted at the laboratory when space permits and their programs are pertinent but the pressure for space has built up and priorities will need to be examined more carefully in the future.

The remodelling of the laboratory proposed by CDC will release some space for visitors and the training laboratory also provides space for short-term visitors.

- d) A project for the study of Ischaemic Heart Disease commenced under M R C funding on 1 April 1976. Dr. Neville Byam will be the local counterpart and the Trinidad and Tobago Government has agreed to second a medical officer to work with Dr. Miller, the project Director, and in addition are making available part-time services of a biochemist at the National Nutrition Unit.

CAREC has hosted two meetings to discuss future work in Diabetes in the area and it is hoped that resulting from these definite proposals will be put forward for funding for research in the very important area of Diabetes in Trinidad and Tobago, Dominica, Barbados and Jamaica.

#### GENERAL

- a) Quality control programs for the laboratories must be developed. Assistance with these programs should be obtained from CDC and the British Public Health Laboratory Service.
- b) The Committee noted that the resources of the laboratory at CAREC were virological. The need to strengthen the laboratory's activities to permit studies in other fields especially bacteriology and parasitology, was stressed. This would necessitate re-equipping and remodelling the laboratory. The introduction of these disciplines would call for additional

supporting staff and safety measures.

- c) PAHO should be asked to fund temporary advisors and short-term consultants to facilitate the program, making maximum use of available expertise in the Caribbean. Consultants are required to assist in the redevelopment of the library and of the laboratories at CAREC.

Action

- a) CAREC has introduced quality control and proficiency testing into its own program. Considerable problems were encountered with the transport of specimens from CDC and further introductions of testing are planned in Barbados and the Bahamas shortly. It will be a high priority for the new bacteriologist to develop simple proficiency testing for the territories in bacteriology and parasitology.
- b) Some progress has been made in adapting the laboratory to its new role in bacteriology and parasitology and further advances will be made with the appointment of the bacteriologist. Provision is made in the 1976 program for the necessary strengthening of the supporting staff.
- c) This aspect has already been dealt with under previous items.

MEETINGS OF THE SCIENTIFIC ADVISORY COMMITTEE

Future meetings of CAREC's SAC should be structured so that members spend three days at CAREC receiving scientific communications from the staff, visiting the laboratories, having informal detailed discussions of the work with the staff and ending with the formal meeting.

Action

The meeting for 1976 has been structured to allow for two days of meetings, one of which would be taken up with presentations by CAREC staff. It is hoped that members of the SAC will arrive early and be able to have one day just reviewing the laboratory before the formal meetings.

III.       ACTIVITIES OF THE CARIBBEAN EPIDEMIOLOGY CENTRE  
          DURING 1975-1976 AND PROPOSED PROGRAM FOR 1976-1977

The activities of the Centre were carried out according to the aims and functions as stated in the multilateral agreement for the operation of the Trinidad Regional Virus Laboratory. These are set out below with the achievements of 1975 and the proposals for 1976-1977 (Shown in Script Type).

A.       SURVEILLANCE

Aims and Functions: 1.

To serve as a specialised technical resource, particularly in the field of communicable diseases and their surveillance and to cooperate in the programmes being developed by the Governments.

Program

During 1975, the basic Surveillance Unit developed and provided an increasing service to the participating countries.

1. Presentation of the CAREC Surveillance Report monthly which now has a circulation of over 1,000 copies per month.
2. Technical assistance is provided by the Centre's epidemiologists who visit all countries regularly two-to-three times in the year.
3. Specific requests have been answered for the investigation of outbreaks of typhoid in Grenada, flour poisoning with parathion in Jamaica, fish poisoning in Bermuda, etc.

4. Specific request for information have been answered from Belize, Jamaica, Bahamas, Bermuda, British Virgin Islands, Turks and Caicos, Dominica, Barbados, St. Lucia, Grenada, Guyana and Trinidad and Tobago.
5. Owing to the lack of a bacteriologist at the Centre, all bacteriology has been undertaken at the Trinidad Public Health Laboratory, but as mentioned earlier, a disappointing program of referral has taken place.

*During 1976, it is proposed that these Programs will be developed, extended, and that the CAREC Surveillance Report will be published every two weeks and circulation raised to 1,500. If the problems are not too large, the Report may be translated into Spanish.*

*A particular request for evaluation of parasitology will be followed up by detailed surveys in the lesser developed countries, starting with St. Lucia, St. Vincent, and Antigua.*

Aims and Functions: 2.

To achieve the reduction of mortality and morbidity associated with communicable diseases in the area.

Program

CAREC has proceeded with the development of simplified procedures for surveillance in order to measure mortality and morbidity and pilot schemes in Grenada and Jamaica are beginning to show promise. At the same time, the general standard of laboratory services is being raised but a major obstacle exists in the awareness and utilisation of services by medical practitioners throughout the area. A wide variation still exists in the quality and quantity of notification, but already there is evidence of an improvement.

*The regular meeting of epidemiologists will continue in 1976 and 1977 will further improve awareness. Detailed help with improved and simplified notification is proceeding with CARICOM and the pilot study is to take place in Jamaica, Grenada, Turks and Caicos, and Trinidad and Tobago.*



*More cooperation with hospital statistics will take place and staff will promote health as part of general development in association with UNDP and other agencies.*

Aims and Functions: 3.

To act as a centre for epidemiological surveillance for all countries in the Caribbean, which are or will be participating in, or cooperating with the Centre.

Program

Cooperation and exchange of information continues with regular visits by CAREC staff to CHMC countries. In addition, the director has visited Cuba, Mexico, Guatemala, El Salvador, Honduras, Panama, Curaçao and Venezuela and liaison is being built up with all the territories of the Caribbean area. The introductory Caribbean surveillance workshop was held in Port of Spain on 8 - 10 December 1975 and was attended by representatives of all countries of the Caribbean, except for Colombia, Honduras, and Cuba.

*A Pan Caribbean workshop is projected for 1976 and 1977, using CDC funds. Visitors from all territories will be encouraged. Careful evaluation of the surveillance program and associated MCH will be undertaken. An immunisation evaluation meeting is planned with Danida Funds.*

*The quality and quantity of information reaching the Centre has expanded rapidly throughout the year and the Centre has now been invited by PAHO, Washington, to help monitor the statistics coming into PAHO. The compilation and analysis of notifications is currently on a mutual basis, but with the build-up of information, this will become more inefficient and following the appointment of a Statistician and staff in 1976, computerisation will be introduced. The improvement in these facilities will lead to better reporting and to far more immediate feedback in 1976-1977.*

Aims and Functions: 4.

To assist and advise Governments in the development of effective surveillance.

In keeping with the recommendations of the last Council and the findings of the Survey of facilities, CAREC has provided simple material to overcome diseases.

A series of local training courses has been carried out in Belize, Jamaica, Grenada and Trinidad and Tobago and are now projected in Turks and Caicos, Bahamas, Bermuda, and other territories.

*These workshops, which will be extended in 1976-1977 as in-service training and involve not only Medical Officers of Health but also laboratory staff, nurses, public Health nurses- public health inspectors and statistical clerks. It is hoped that following seed work by Centre staff, the local epidemiologist will be able to carry on. A pilot scheme of parish and county workshops will start in early 1976 in Jamaica and Trinidad.*

Aims and Functions: 5.

To assist and advise Governments by providing visiting staff expert in the surveillance, diagnosis and control of communicable diseases.

CAREC has provided visiting staff to a number of territories in the Caribbean during the year, and made specific recommendations in association with the Governments, e.g., on investigation and follow-up of parathion poisoning in Jamaica and investigation of malaria in Dominica, in association with the Zone Advisor on malaria and the aedes aegypti Program in Trinidad & Tobago.

*The Centre will take every opportunity to respond to specific demands as it has done during 1975 and specific funds are set aside for this in the budget.*

B. LABORATORIES

Aims and Functions: 1.

To assess the resources and needs of laboratories within the area and assist in their development.

Program:

A full report on the assessment of laboratories was presented to the last Council meeting. The detailed recommendations have been discussed and simple items of equipment provided where requested by the Chief Medical Officer. However, problems of supervision, proficiency, safety, immunisation of staff, supplies of essential materials and reporting systems all require further improvement. The training needs are now well understood.

*Particular emphasis will be put in the forthcoming year on training in mycobacteria and Neisseria as well as the very real problems of laboratory management, particularly in the smaller islands.*

*Laboratories are still not using the back-up facilities of CAREC and further work is required on the problems of transport of specimens and utilisation of referral facilities. Detailed assistance to the laboratories by CAREC staff is proposed for 1976 when technical and scientific staff will visit a number of Territories for periods of 1-2 weeks to work with the local staff. This program did not get underway in 1975 owing to the severe shortage of staff at the Centre itself and the need to put the CAREC laboratory in order.*

*The proficiency testing of laboratory staff following training courses will be increased and this will be a major responsibility for the bacteriological and parasitological services at CAREC.*

*There is a problem with the cost of transport of specimens which needs to be tackled by all Health Ministers. Initially, this can be covered by CAREC, but by 1977 it is hoped that each territory will make budgetary provision to cover its own costs.*

*CAREC had identified a need for advanced training for a small number of technicians from a limited number of territories with more advanced facilities, and the first advanced course will be run in September 1976 in immuno-fluorescent techniques.*

Aims and Functions: 2.

To promote collaborative relations with laboratories which may serve the area.

Program:

The contact with the laboratories are being strengthened by regular courses at CAREC and the introduction of within country courses.

*A particular effort will be made in 1976 to increase the collaboration between the Medical Officers and the laboratory staff.*

*This laboratory has been collaborating very closely in many fields with the Center for Disease Control, Atlanta, the Veterans Administration Hospital in San Juan, Puerto Rico, the Public Health Laboratory Service, in Colindale, England, and the University of Toronto, and contact is now advanced with Surinam and Curacao. In addition, direct links are being established with the Institut Pasteur in Guyane and Guadeloupe and the French Government has generously offered a training fellowship to a member of the Centre staff to train at the Institut Pasteur in Paris for 4 months during 1976.*

*Further contacts will now be made within the division of Disease Control at PAHO, i.e., with AFTOSA, CEPANZO, and the other PAHO Centres, as well as the Gorgas Laboratory in Panama. The CAREC laboratory superintendent recently attended a course on automation in Mexico and visited laboratories in Jamaica, Belize, El Salvador, Panama, and Curacao. These contacts will be extended during 1976. Dr. Swanston will visit the Puerto Rico Veterans Laboratory under a PAHO fellowship, and Mrs. Medina, from the same laboratory, will teach the mycobacteria course.*

Aims and Functions: 3.

To provide selected diagnostic laboratory services and facilities needed for surveillance.

The facilities developed have been listed under the implementation of recommendation, but during 1975, it was only possible to carry out a holding operation on the diagnostic and isolation techniques for yellow fever, dengue, leptospirosis, poliomyelitis, rabies, influenza, and enteric organisms including cholera.

*With the development of a suitable staff infrastructure during 1976, it should be possible to extend and introduce new methods particularly micromethods.*

*The Scientific Advisory Committee will be asked to advise on the development of immunology, electron microscopy and mycology during 1976-1977.*

Aims and Functions: 4.

To maintain facilities for the investigation of selected animal viruses.

The coordinating committee with the veterinarians in Trinidad has met regularly.

*Joint projects are now being developed for the study of rabies and leptospirosis to be funded externally by the Medical Research Council. Further, the potential for investigation of other viruses will be maintained both by identification in Trinidad and also in association with other territories, e.g., the Government of Surinam requested investigation of encephalitis and Guama group viruses.*

C. TRAINING

Aims and Functions: 1.

To collaborate closely with universities of the area, particularly the faculties of medicine and agriculture, the Commonwealth Caribbean Medical Research Council (CCMRC), and the Secretariat of the Caribbean Health Ministers Conference (CHMC).

*Following the Council's recommendation endorsed by CHMC, CAREC has provided one medical trainee post and one non-medical trainee post for 1976, 1977, and 1978, and a particular effort has been made to encourage medical students to carry out electives in association with CAREC.*

*With the introduction into the UWI medical curriculum of the community health clerkship in the eastern Caribbean, it is hoped that this will be expanded.*

*The close links already existing with the University of the West Indies are being strengthened. In addition, the Centre will be providing core course teaching for the Diploma of Community Health (DCH) in the Department of Social and Preventive Medicine, Mona, Jamaica. The Centre will participate in the undergraduate teaching of epidemiology and microbiology in Trinidad. Medical and biological students will be encouraged to do electives at the Centre and in the territories under supervision from the Centre.*

Aims and Functions: 2.

To provide training in epidemiological surveillance and laboratory diagnosis, and their field application for personnel at various levels in health and other related services.

*Training course for all levels of medical personnel have been planned (Annex 1). Some of these courses will have external instructors. Courses will be held throughout the Caribbean and not only at CAREC itself.*

*Details of the courses proposed for 1976 are given in the Appendix to this Report. Special efforts to follow up course participants will be made and help given in encouraging both medical and laboratory staff to run in-service training programs. Teaching materials and visual aids will be provided.*

*The importance of training requires that CAREC strengthens its training facility.*

*Proposals for the development of a suitable training structure in association with UWI and other institutes will be put forward to the Council and Scientific Advisory Committee in April 1976.*

D. RESEARCH

Aims and Functions: 1

To carry our research both in the Centre and in field on disease problems important to the Caribbean.

During 1975, the CAREC research program was centered on establishing a base line in surveillance in communicable disease. Specific studies were carried out in gastroenteritis, hepatitis, poliomyelitis, rabies, leptospirosis, yellow eye disease, scorpion venom, kabowra fly in Guyana and orbiviruses in Trinidad.

The research work has been summarised in the annual report of the Centre.

*During 1976-1977, specific proposals to the medical research council have resulted in studies on filariasis in North Trinidad, which commenced under Dr. Nathan on January 1976; ischaemic heart disease in Trinidad, which commenced on April 1976; continuation and expansion of programs in leptospirosis and rabies with Dr. Everard in Trinidad and Grenada; extension of a kabowra fly project in Guyana under Dr. Tikasingh. Hepatitis in patients and in the community in Trinidad and orbivirus studies in association with Dr. Spence in Toronto on selected populations throughout the Caribbean will continue and expand.*

*A new emphasis will be placed on the epidemiologic evaluation of surveillance and MCH programs and the development of special techniques for this. A start to this will be made at the Danida meeting to be held later in the year.*

*Although CAREC had to withdraw from the Belize project on the assessment of provision of new water supplies on health, it is hoped to introduce similar projects in St. Lucia and Guyana.*

*Utilising the public health inspectors and public health nurses as well as medical students, the Centre will promote research into the disease problems revealed by surveillance in the smaller territories in particular.*

Proposals are being drafted for diabetes studies in association with the Caribbean diabetic study group. The noncommunicable disease program will be strengthened by the secondment of a Medical Officer to it by the Trinidad and Tobago government and, in association with Dr. Neville Byam, the participation of a fully trained biochemist.

Joint research with the veterinary authorities would be increased in leptospirosis and rabies and commenced in the encephalitides.

It is hoped to coordinate the Centre's program more closely with the other centres of PAHO, especially, CFNI, INCAP, AFTOSA, as well as with the UWI and the other laboratories in the area.

Additional field studies in parasitology among school children will be undertaken starting in St. Lucia, St. Vincent and Antigua and a continuing low intensity research program on arbovirology will be maintained in Trinidad and Guyana.

During 1976-1977 it is intended to establish a number of base line populations for longitudinal studies. Possibilities for this exists in Trinidad, Barbados, Jamaica, and Belize.

Aims and Functions: 2.

To provide facilities for visiting workers.

CAREC has continued to provide facilities for visiting workers from UWF, MRC, and the Rockefeller University in New York. All these workers participate fully in all functions of the Centre including teaching, and routine duties. Additional visiting workers are being encouraged to participate and to provide full funding.

This will be encouraged further in 1976-1977 but space constraints may limit the amount of work that can be done under this heading.

Aims and Functions: 3.

To study virus diseases and their ecology.



Studies in the enteroviruses, poliomyelitis, rabies, and the arboviruses have continued during 1975.

*These studies will be continued and particularly the problem of reinfestation of mongoose rabies in Grenada. The role of the enteroviruses in gastroenteritis in different parts of the Caribbean will be studied in detail.*

*The different island communities present an interesting possibility for the study of the ecology and transmission of viral agents in gastroenteritis.*

*The study of hepatitis will continue and tests for hepatitis A will be introduced when available. This raises the whole problem of the need for electron microscopy which will be an item for discussion by the scientific advisory committee.*

E. COOPERATION WITH OTHER CENTRES

CAREC has established very close relations with the Public Health Laboratory in Trinidad, the Caribbean Community Secretariat, the University of the West Indies, the University of Guyana, the Caribbean Food and Nutrition Institute, the Centre for Disease Control, Atlanta, the Public Health Laboratory Service, Colindale, England, the U.K. Medical Research Council, the veterinary laboratories in Trinidad and in Barbados, the Veterans Administration Hospital in Puerto Rico, the Laboratories of Curaçao and Surinam, the Institut Pasteur in Paris, and the French territories. In addition the Centre is seeking to cooperate very fully in the new PAHO structure and to build its surveillance and research facilities on the principle of very close cooperation with all those working in PAHO and other health-related programs particularly in nutrition, veterinary medicine, maternal and child health, health statistics, hospital records, and the surveillance programs for all the territories and centres.

#### IV. BUDGET PROPOSAL FOR 1976-1977

The CAREC provisional budget which was drawn up in 1974 on 1973 prices and approved by CHMC, was incorporated in the Multilateral Agreement. It was, however, realised at the Council meeting in 1975 that the budget was unrealistic for the operation of the program. Consequently the Director of PAHO added an additional \$104,000 to the agreed PAHO contribution and a further \$23,000 to account for the inflation which had taken place between drawing up of the budget and the implementation. The Director recommended the program of the Centre to the CHMC and requested a 20 percent increase in the contributions from the territories. The CHMC accepted this recommendation and endorsed the program for CAREC. Thus, the Ministers recommended to their Governments a 20 percent increase in the contribution of the territories to CAREC for 1976. This increase has been incorporated in the budget. A full review of the budget has taken place and is shown as a budget estimate for 1977 under the headings of the divisions of service and work (Annex I). The 1976 budget approved by the Directing Council on the recommendation of the Executive Committee of PAHO is shown in Annex 2. The total sum is \$586,615. Annex 3 shows a budget comparison for 1976 and 1977. It should be noted that a large part of the increase is taking account of the increase in staff salaries. However, the development of the program also has implications for requirements in supplies, equipment, and maintenance.

In addition, the CDC grant fund through CARICOM will cease to be available after August 1977. As a result considerable extra provision has to be made through the general budget for fellowships and seminars.

The basic staff costing has been increased largely due to two factors.

1. In order to make the laboratory facility viable, the staff at the lower levels originally proposed for 1977 had to be brought forward to 1976.
2. In keeping with the labour situation in Trinidad, a 45 percent increase in salaries had to be budgeted over the 3 year period 1976-1978. This may prove to be too little.

The budget is set out in detail in the Annexes for each division. Annex 4 shows the budget funding for 1976 and 1977. It will be noted that PAHO has committed a 121.5% increase over the Multilateral Agreement and the territories have agreed to a 20 percent increase in their contribution for 1976. In order to take account of inflation, the budget of the countries will need to be increased and the figures are shown for an increase of 30 percent. The 30 percent increase on the agreed figures in the Multilateral Agreement would take care of the inflationary trend plus a small contribution to the increased program for 1977.

The implications for individual territories will be discussed at the Council meeting. It should also be noted, however, that the Centre is dependent on CDC, Atlanta, for one epidemiologist and for one senior health advisor, who are not only funded as to salary but also for travel and accommodation. In addition, the U.K. Medical Research Council provides a chief technician and pays not only his salary but also his living and travel expenses. Full commitment for these posts will therefore be required from 1977. In addition, the budgeting of PAHO using mid-point professional costs

raises severe problems for the program budgets of 1977, 1978, 1979, and 1980 and the implications of this budgeting will require discussion by the Council.

In considering the budget it is necessary to emphasise that the first-year's work at the Centre has shown just how expensive the provision of this type of service is, particularly in virology, and emphasised the very important contribution that the other agencies and research workers make to the Centre's work. The period 1976 to late 1977 will be one of consolidation and strengthening in-depth rather than trying to spread the resources, already limited too thinly, over a wide range of topics. Thus apart from the inclusion of a veterinarian in 1977, no additional professional posts have been proposed for the coming budget period. However, dependent upon the success of the program and the demand from the territories, the development of training, for example, and specialist facilities in mycology and noncommunicable disease will call not only for new staff, but also for further accommodation.

The problem of capital equipment will also require discussion as the plans for reorganization suggested by the CDC team being discussed with the Government will have implications for the CAREC/PAHO budget input. In addition to the building alterations, there will also be requirement for new incinerator facilities and a proper stand-by generator costing approximately US\$50,000. This will require special funding raised through PAHO or in association with the Trinidad & Tobago Government. Additional possible funding may be found on a regional basis from such organizations as CIDA and this should be explored following the discussions with the Council.

PROPOSED CAREC TRAINING COURSES/WORKSHOPS  
FOR 1976

DATE	TITLE	LOCATION	FACULTY	SUGGESTED PARTICIPANTS
January to June	Epidemiology for Public Health Inspectors	CAREC Port of Spain	CAREC Staff	Public Health Inspectors
24-28 May	CHMC Epidemiologists Workshop	CAREC Port of Spain	CAREC Staff	CHMC Epidemiologists
3-7 May	Streptococci	Streptococcal Laboratory San Fernando	Dr. Maxted Dr. Mayon-White	Selected Laboratory Technicians
May/June/July August	Field Officers Course in Surveillance	Jamaica, Belize, Trinidad and Tobago, Grenada Turks and Caicos other Territories	CAREC Staff	Medical Officers Public Health Inspectors, Public Health Nurses in Territories
June/July	Mycobacteria Laboratory Management	CAREC Port of Spain	Mrs. Medina	Laboratory Technicians
June/July	Advanced Laboratory Techniques	CAREC Port of Spain	CAREC Staff	Selected Laboratory Technicians
June/July	Virology Course	Surinam	Dr. Williams	Medical Students
6-10 September	Neisseria/Syphilis Revision of Enterics	U.W.I. Jamaica	CDC Package Course	Laboratory Technicians
October/November	Caribbean Epidemiologists' Workshop	To be decided	Visiting and CAREC Staff	Caribbean Epidemiologists Centre Laboratory Directors
July/September to be arranged	Gastroenteritis Workshop	CAREC Port of Spain	To be decided	To be decided

CARIBBEAN EPIDEMIOLOGY CENTRE

1977 BUDGET ESTIMATE

DIRECTOR'S OFFICE

	<u>Cost</u>	<u>% of Total</u>
<u>Personal Services and Allowances</u>		
- International Staff	US\$ 43,245	64.5
- Local Staff (1)	7,300	11.0
<u>Duty Travel</u>	8,000	12.0
<u>Seminars and Meetings</u>		
- Council	2,750	4.0
- Scientific Advisory Committee	5,500	8.0
<u>Entertainment</u>	<u>315</u>	<u>0.5</u>
	<u>US\$67,110</u>	<u>100.0</u>

CARIBBEAN EPIDEMIOLOGY CENTRE

1977 BUDGET ESTIMATE

ADMINISTRATIVE AND COMMON SERVICES

	<u>Cost</u>	<u>% of Total</u>
<u>Personal Services and Allowances</u>		
- International Staff	US\$ 26,250	16.0
- Local Staff (17)	70,125	43.0
<u>Duty Travel</u>	3,000	2.0
<u>Utilities</u>		
- Water	1,100	0.7
- Electricity	7,700	4.5
- Phones	6,600	4.0
<u>Postage/Cables</u>	1,650	1.0
<u>Supplies and Equipment</u>	39,085	24.0
<u>Insurances</u>		
- Vehicles	825	0.5
- Building and High Press Vessels	1,100	0.7
<u>New Vehicle</u>	<u>6,000</u>	<u>3.6</u>
TOTAL	<u>US\$ 163,435</u>	<u>100.0</u>

CARIBBEAN EPIDEMIOLOGY CENTRE1977 BUDGET ESTIMATELABORATORY

	<u>Cost</u>	<u>% of Total</u>
<u>Personal Services and Allowances</u>		
- International Staff	US\$ 148,100	41.0
- Local Staff (24)	129,930	36.0
<u>Duty Travel</u>		
- CAREC Staff	3,000	1.0
- Regional Advisers (STC)	7,700	2.0
<u>Short Fellowships</u>	6,780	2.0
<u>Supplies and Equipment</u>	<u>64,550</u>	<u>18.0</u>
TOTAL	US\$ <u>360,060</u>	<u>100.0</u>



CARIBBEAN EPIDEMIOLOGY CENTRE

1977 BUDGET ESTIMATE

SURVEILLANCE

	<u>Cost</u>	<u>% of Total</u>
<u>Personal Services and Allowances</u>		
- International Staff	US\$ 74,080	42.2
- Local Staff	24,795	14.0
<u>Duty Travel</u>		
- CAREC Staff	6,000	3.5
- Regional Advisers (STC)	14,000	8.0
<u>Seminars</u>		
- Cardiovascular	15,000	8.6
- Diabetes	15,000	8.6
<u>Short Fellowships</u>	22,600	13.0
<u>Supplies and Equipment</u>	950	0.5
<u>Disasters</u>	<u>2,750</u>	<u>1.6</u>
	<u>175,175</u>	<u>100.0</u>

CARIBBEAN EPIDEMIOLOGY CENTRE1977 BUDGET ESTIMATE

	<u>Director</u>	<u>Administrative/ Common</u>	<u>Laboratory</u>	<u>Surveillance</u>	<u>Total</u>	<u>%</u>
Personal Services and Allowances						
- International Staff	US\$ 43,245	26,250	148,100	74,080	291,675	38.0
- Local Staff	7,300	70,125	129,930	24,795	232,150	30.2
Duty Travel - CAREC Staff	8,000	3,000	3,000	6,000	20,000	2.6
- Regional Advisers	-	-	7,700	14,000	21,700	3.6
Short Fellowships	-	-	6,780	22,600	29,380	4.0
Seminars and Meetings	8,250	-	-	32,750	41,000	5.4
Utilities (Water/Electricity/Phones)	-	15,400	-	-	15,400	2.0
Postage/Cables	-	1,650	-	-	1,650	0.2
Supplies and Equipment	-	39,085	64,550	950	104,585	13.6
Assets - New Vehicle	-	6,000	-	-	6,000	0.8
Insurances - Vehicles	-	825	-	-	825	0.1
- Building/High Pressure Vessels	-	1,100	-	-	1,100	0.1
Entertainment	315	-	-	-	315	-
TOTALS	67,110	163,435	360,060	175,175	765,780	100.0
%	9.0	21.0	47.0	23.0	100.0	%

CARIBBEAN EPIDEMIOLOGY CENTRE1976 - BUDGET

	<u>Director</u>	<u>Administrative/ Common</u>	<u>Laboratory</u>	<u>Surveillance</u>	<u>Total</u>	<u>%</u>
<u>Heads of Expenditure</u>						
Personal Services and Allowances						
- International Staff	US\$ 41,880	25,000	131,810	41,880	240,570	41.0
- Local Staff	5,675	66,675	124,415	2,675	199,440	34.0
Duty Travel						
- CAREC Staff	4,000	3,000	3,000	4,000	14,000	2.4
- Advisers	-	-	7,000	-	7,000	1.2
Short Fellowships	-	-	4,120	4,120	8,240	1.4
Seminars and Meetings	7,500	-	-	16,500	24,000	4.0
Utilities (Water/Electricity/ Phones)	-	13,950	-	-	13,950	2.4
Postage/Cables	-	1,500	-	-	1,500	0.3
Supplies and Equipment	-	26,685	48,380	800	75,865	13.0
Assets - New Vehicles	-	-	-	-	-	-
Insurances						
- Vehicles	-	750	-	-	750	.1
- Building/High Pressure Vessels	-	1,000	-	-	1,000	.2
Entertainment	<u>300</u>	-	-	-	<u>300</u>	-
TOTAL US\$	<u>59,355</u>	<u>138,560</u>	<u>318,725</u>	<u>69,975</u>	<u>586,615</u>	<u>100.0</u>
%	10.0	24.0	54.0	12.0	100.0	

CARIBBEAN EPIDEMIOLOGY CENTRE

BUDGET COMPARISON

1976/1977

DESCRIPTION	%	1976 Amount	%	1977 Amount	Increase/ (Decrease)
Personal Services/Allows					
- International Staff	41.0	240,570	38.0	291,675	51,105
- Local Staff	34.0	199,440	30.2	232,150	32,710
Duty Travel					
- CAREC's Staff	2.4	14,000	2.6	20,000	6,000
- Regional Advisers	1.2	7,000	3.0	21,700	14,700
Fellowships	1.4	8,240	4.0	29,380	21,140
Seminars/Meetings	4.0	24,000	5.4	41,000	17,000
Utilities	2.4	13,950	2.0	15,400	1,450
Postages/Cable	0.3	1,500	0.2	1,650	150
Supplies/Equipment	13.0	75,865	13.6	104,585	28,720
Assets - New Vehicle	-	-	0.8	6,000	6,000
Insurances	.3	1,750	0.2	1,925	175
Entertainment	-	300	-	315	15
TOTALS	100.0	586,615	100.0	765,780	179,165
Increase over 1976					30.5%



ANNEX 3

CARIBBEAN EPIDEMIOLOGY CENTRE

SCIENTIFIC ADVISORY COMMITTEE (SAC)

Proposed Discussion Groups  
Tuesday 13 April 1976

14:00 - 16:00 Hours

<u>TOPIC</u>	<u>SAC MEMBERS</u>	<u>CAREC STAFF</u>
1. Surveillance	Dr. L. Comissiong Dr. S. Wray	Dr. P. Diggory
2. Training	Dr. K. Standard	Mr. K. Latimer
3. Virology	Dr. S. King Dr. L. Spence Dr. C.E. Gordon Smith	Ms. B. Hull Dr. M. C. Williams
4. Entomology/Parasitology	Dr. Z. Brener	Dr. E. Tikasingh Dr. M. Nathan
5. Rabies & Leptospirosis	Dr. E. Holman Williams Dr. P. Acha	Dr. C.O.R. Everard
6. Cardiovascular Diseases	Dr. E. Quamina Dr. G. Grell Dr. C. Bartholomew	Dr. G. Miller
7. Laboratory Development	Dr. L. Spence	Dr. M. C. Williams Dr. W. Swanston Dr. P. Hamilton

ANNEX 4

SCIENTIFIC ADVISORY COMMITTEE

REPORTS OF THE GROUPS

1. SURVEILLANCE

Dr. P. Brachman  
Dr. L. Comissiong

Dr. P. Diggory  
Dr. S. Wray

The program of work for 1976 and 1977 was distributed to the group and reviewed. It met with general approval and it was noted that surveillance activities are progressing at a steady rate in part dictated by the individualistic methods and support within each country.

The development of the Trinidad Surveillance System, the pilot study conducted in Grenada, and the approaches so far in other countries were compared and it was agreed that CAREC should undertake an evaluation of these methods. It was stressed that it was important to recognize that reporting will never be totally exact or complete but the data reported should represent trends for establishing prevention programs.

2. TRAINING

Mr. K. Latimer

Dr. K. Standard

A. Problem Area

This group centered its discussion primarily around the training of health professionals for surveillance within the territories.

The lack of response to epidemiological work by District Medical Officers (DMO's) in certain territories was discussed in some detail.

The reasons attributed to this lack of response were:

- a) low motivation
- b) communication breakdown i.e. maybe no feedback from CAREC to DMO's.
- c) heavy involvement in private practice.

Several suggestions aimed at improving items (a) and (b) emerged: they centered on training problems aimed at increasing motivation and improving communication.

B. Seminars in the Territories

CAREC staff should organize seminars in the various territories with the specific objective of increasing the level of interest of doctors and other health personnel in epidemiology. As well as imparting information, seminars are likely to be most effective if they are structured around topics of special significance to the territory concerned e.g., leptospirosis in Grenada or jaundice in Guyana.

C. Improve Communication

DMO's and other health professionals appeared to get little feedback from their reports. This would necessarily result in a lack of interest in surveillance. There was general agreement that communication will improve between CAREC and health workers in the field once the librarian is functioning. This will not, however, obviate the need for personal contact between CAREC staff and health workers in the field.

Other recommendations to stimulate interest are:

- a) Visits by CAREC staff to individual doctors in the countries/ territories.
- b) CAREC and UWI should consider arranging refresher courses in epidemiology for physicians especially in the LDC's.
- c) Medical auxiliary must receive training in epidemiology, both in-service and as part of their basic course.

D. CAREC Training UWI Students

Several final year medical students (UWI) have expressed interest in doing electives in surveillance and epidemiology. These will be supervised by CAREC staff and UWI teachers. This should be encouraged and extended.



It was suggested that final year students doing their 5 week clerkships in Community Medicine should be exposed to the epidemiological work of CAREC. Surveillance and epidemiology would be stressed. It was agreed that medical students doing community medicine would benefit immensely from a teaching association with CAREC. With the establishment of second clinical year teaching of medical students, the Centre will be involved with the teaching of these students. No doubt the opportunity will be taken to teach epidemiological methods.

E. Visual Aids

The importance of visual aids in any training program cannot be overemphasized. The Centre is therefore, strongly advised to establish an audio-visual aid unit and facilities for printing. CAREC should consult with RLM which has a large library of audio-visual aids. Staff will require to be trained and suitable equipment purchased.

F. Caribbean Surveillance Report

UWI Medical Faculty members could contribute to this monthly report, perhaps under headings such as "Current Therapy". Such contributions might help doctors to keep in touch with developments in medicine.

### 3. VIROLOGY

Ms. B. Hull	Dr. L. Spence
Dr. S. King	Dr. M. C. Williams
Dr. C. E. Gordon Smith	

Present activities: Virus surveillance comprises the greater proportion of the laboratory investigations now undertaken at CAREC (Ref: Director's Report 1975, p. 13) and shared between CAREC and the TPHL staff with common services. Broadly, TPHL investigates respiratory virus and rubella infections. The CAREC staff deal with rabies, yellow fever, and other arbovirus infections, picorna-viruses and hepatitis B surveillance.

#### RECOMMENDATIONS:

A. Surveillance

Priority should be given to those viral infections which are preventable.

Gastroenteritis is still responsible for too high a proportion of deaths in young children in the Caribbean. A bacterial etiology can be defined in only about 25 percent of cases. Rotaviruses may play a significant role in the undiagnosed 75 percent. However, because the investigation still requires electromicroscopy and because only an experimental calf virus vaccine is currently available, it was agreed that the research in collaboration with Dr. Spence should continue but that routine surveillance of rotaviruses could not be undertaken meantime. The surveillance priorities were:

1. Poliomyelitis: assessing immune status of the Caribbean populations.
2. Yellow fever: continued surveillance of immunity status and ready availability of rapid diagnostic facilities especially with the situation in Trinidad where A. aegypti indices are high. CAREC should investigate the efficacy of current YF vaccine programs.
3. Dengue fever: warrants surveillance for the same reasons, wherever A. aegypti is common --probably by repeated serologic sampling of a highrisk population.
4. P.U.O.: Instead of the present opportunistic investigation of P.U.O.'s and jaundice cases, often retrospectively, it is recommended that pyrexial illnesses could be better monitored by focusing on prospective studies in a suitable population of children.
5. Influenza: continued surveillance was warranted. Egg rather than tissue culture isolation was stressed.
6. Rabies: continued specific antibody assay techniques should be available at CAREC for those persons at risk in rabies-endemic areas. Rapid diagnostic facilities for cases should also be available.
7. Rubella: is periodically responsible for high fetal morbidity in the Caribbean and as it is preventable, deserves priority concern. CAREC should be able to advise Ministries of Health in the islands on the relative costs of either vaccinating all females post partum or of determining and vaccinating only those without antibody. In most islands, susceptibility to rubella is so high at child-bearing age that vaccination without preliminary antibody testing might be justified.
8. Hepatitis B: surveillance in blood banking units must be encouraged. CAREC should offer training in hepatitis B diagnosis.

9. Viral Encephalitis: ongoing surveillance is necessary.

B. Research

This should depend on the interests of the virologist. It is recommended that the role of rotaviruses in infant gastroenteritis should continue to be explored in selected cases of acute gastroenteritis. This study might be extended to include a collaborative investigation of zeovirus-like etiology in calf diarrhea.

C. Requirements

1. Equipment:

(a) At least one (1) subzero storage unit - Revco or dry ice

(b) One (1) refrigerated centrifuge

2. Uniform shipping procedures

To facilitate surveillance, rapid shipping must be available with easy customs and IATA clearance. Attention should be given to improving virus transport by e.g., adding African green monkey cells to transport media.

DEVELOPMENTS

A. Electron Microscopy (EM)

Rather than to foresee the development of electron microscopy at CAREC, exploration should begin of the possible development of a single center to serve all potential areas in Trinidad and perhaps situated at UWI.

B. Immunology

As soon as resources permit, facilities should be created for an immunology diagnostic service, training and production of immunology reagents. Meantime, immunological techniques should be progressively extended e.g., employing IFA and other techniques in the diagnosis of bacterial and parasitic diseases as well as in some autoimmune disease entities. Professional posts in immunology will be required by 1978.

## 4. ENTOMOLOGY/PARASITOLOGY

Dr. Z. Brener  
Dr. M. Nathan

Dr. E. Tikasingh

1. It is important to monitor the prevalence of apparently low-prevalence parasitic diseases and those diseases of which vectors are known to occur. For example, in Trinidad, susceptible vectors and naturally infected wild reservoirs of Cutaneous leishmaniasis have been reported but only a single human case detected. Cases of Cutaneous leishmaniasis are at present occurring in Guyana as a consequence of ecological changes. Wherever the infection is known to be present, local staff should be trained to keep it under surveillance.

Schistosomiasis illustrates another type of problem. Biomphalaria glabrata, highly susceptible to infection with Schistosoma mansoni was collected in 1967 in Antigua (Paraense, personal communication and report to PAHO). This snail represents a potential risk of introduction of schistosomiasis which is already endemic in St. Lucia and Guadeloupe.

2. There is a need for surveys to provide basic information on the distribution of parasitic diseases likely to be of high prevalence, such as the intestinal helminths and protozoa. As CAREC itself has not the resources for such a task, surveys should be carried out by territory-based technicians previously trained at CAREC. Local staff should similarly be encouraged to undertake more specific surveys such as collecting blood samples for the identification of microfilariae: filariasis prevalence rates are out of date in most Caribbean territories. Elementary knowledge on geographical distribution and dispersion of some parasites could be obtained by trained people and involve CAREC staff in supervision and follow-up.

3. Improved facilities are required for the study of arthropod-borne parasitic diseases and their vectors.

The rediscovery of Wuchereria bancrofti in Trinidad and its occurrence in blood samples collected in surveys performed for Mansonella ozzardi emphasized the need for the evaluation of the real importance of filariasis in Trinidad by wide surveys. Old reports of M. ozzardi in Dominica and St. Vincent should be reconfirmed and surveys in other territories expanded in order to have a better idea of the distribution of both filariasis in the Caribbean area.

## ENTOMOLOGY

Entomology at CAREC is at present committed to a number of problems: study of host-parasite relationship in Culex fatigans infected with W. bancrofti; Culex spp. and transmission of equine encephalitis; role of Culicoides as vector of M. ozzardi; control of Culicoides in Trinidad area; importance of Simulium as a potential vector of Onchocerca in Guyana; susceptibility of Anopheles darlingi to insecticides in Guyana. Besides, prospects are that CAREC may be involved in malaria control in Guyana.

As a consequence of this work and possible expansion of parasitology programs, there is a strong and urgent need for senior technician for this year and a further technician for 1977.

Some programs such as the control of Culicoides in Trinidad should receive support from local funds.

## 5. RABIES AND LEPTOSPIROSIS

Dr. P. Acha

Dr. E. Holman Williams

Dr. C. O. R. Everard

## RABIES

The rabies work envisaged will take place in Grenada, in mongooses, and in Trinidad, in vampire and other bats. The Grenada aspect, which follows on studies in estimating the mongoose population and rabies prevalence, will monitor the build-up of mongooses and rabies in areas cleared previously by poisoning; protection of the mongoose by naturally and artificially acquired immunity will also be assessed. This valuable research proposal was supported strongly in the light of its importance to Grenada and several other Caribbean territories which are or could be in a similar situation. Methods of actively immunizing mongooses should be pursued further, in view of the ability of the mongoose to survive eradication campaigns by poisoning. The Trinidad aspect will entail a survey in vampire and associated bats particularly for evidence of serum neutralizing antibody (rapid fluorescent focus inhibition test), as a measure and forecast of rabies activity. Virus isolation in suckling mice is highly desirable as an additional procedure.

## LEPTOSPIROSIS

The leptospirosis program will study the prevalence of infections in selected human groups and role of infected animals in human and other cases in certain areas of Grenada and Trinidad. Previous work has led to the detection of Leptospira, antibodies, or both in man and animals, in these territories. Having regard to the leptospirosis situation in the region, CAREC should, with the assistance of CEPANZO, establish a typing laboratory. A senior technician would be needed for such a facility. Given certain guarantees, on the part of CAREC, aimed at excluding exotic animal diseases, the Ministry of Agriculture, Trinidad and Tobago, would agree to CAREC's role as a reference center.

Finally, it was noted that both research programs complement studies being undertaken by Grenada and Trinidad, and felt that every effort should be made to avoid any relocation of the laboratories allocated within CAREC, once the work commenced.

## 6. CARDIOVASCULAR DISEASES

Dr. C. Bartholomew  
Dr. G. Grell

Dr. G. Miller  
Dr. E. Quamina

The continued success of CAREC as a Surveillance Center for the region will depend upon the degree to which the unit develops to meet the specific health problems as they evolve. Noncommunicable diseases are now of major significance: hypertension, cardiovascular diseases, and diabetes have been identified as being the leading causes of morbidity and mortality in adults in the Caribbean.

A community survey for coronary heart diseases in Trinidad and Tobago by Dr. George Miller has commenced. It will investigate a mixed population (East, Indians and Negroes) in a defined area (St. James) to evaluate the risk factors related to coronary heart disease and, in particular, to elucidate the relatively high incidence in the East Indian population. Specific attention will be focused upon the relationship of coronary heart disease to high density lipoprotein levels (HDL).

The project will: (a) initiate CAREC's surveillance role in non-communicable diseases; (b) train local personnel in the methodology of research into the epidemiology of the chronic noninfectious diseases; (c) provide avenues for utilization of skills and facilities of highly trained local research personnel who have acquired expertise beyond the capacity of their present routine posts and improve their job satisfaction; and (d) include a brief evaluation of the problems of alcoholism, its social and ethnic relationships, and perhaps, its possible influence on the genesis of coronary heart disease.

Although a nutritional study has not yet been incorporated, there is a strong need to do so, in order to separate dietary factors from ethnic and socio-economics aspects. Dr. Neville Byam should be encouraged to provide the necessary help with this facet of the project.

#### 7. LABORATORY DEVELOPMENT

Dr. L. Spence  
Dr. W. Swanston

Dr. M.C. Williams

1. A special report on the development of the Caribbean Epidemiology Center (CAREC) and the Trinidad Public Health Laboratory (TPHL) by Facilities Planning Consultant, Program Consultant and Safety Consultant from CDC, Atlanta, was discussed in detail and the conclusions incorporated in the Recommendations. Copies of the Report are available from the Director of CAREC.
2. The urgent capital equipment needs for the laboratory were reviewed in detail and specific priorities were identified. The list of equipment discussed is shown in Annex 5. Detailed costing was not available to the Committee.

## ANNEX 5

### CAPITAL LABORATORY EQUIPMENT

#### 1.0 Services

##### 1.1 Emergency Generator

A decision is needed on the output capacity required to maintain proper basic facilities.

##### 1.2 Autoclaves

###### 1.2.1 Planning needs are:

Moderate security block	1 unit
T.B. laboratory	1 unit
Animal cages	1 unit
'clean' sterilization	2 units

1.2.2 The present two electrical autoclaves, which are planned for 'dirty' sterilization, are costly and difficult to maintain and repair. They are frequently out of service and it is unlikely they will be adequate for future needs particularly with the considerable expansion of bacteriology which is envisaged. The installation of a steam plant would eliminate most of the service problems.

##### 1.3 Steam plant

A decision is needed.

##### 1.4 Incinerator

We have at present a crematorium for animals which is unsuitable for the disposal of general waste. The Centre needs an incinerator on site for the disposal of all its laboratory waste.

##### 1.5 Liquid Nitrogen Plant

1.5.1 Liquid nitrogen is at present available from Liquid Carbonics Limited at a cost of the order of US\$1.20 per litre. This supply has in the past failed. The Centre will require liquid nitrogen and could also be a source of emergency supplies for veterinary and medical needs in



Trinidad. A liquid nitrogen plant should be installed at the Centre with an output of 400 litres per month.

Liquid nitrogen will be needed at the Centre for the storage of cells and agents and as a back up for freezer breakdown.

1.5.2	Liquid nitrogen refrigerators needed are:	US\$
	1 cell culture 1 available	-
	1 Serum survey C.V.S. research 1 on order	-
	2 Agents 1 available.	?
	6 Deep freezers back up units	?

#### 1.6 Freeze Drying Facilities

1	Edwards centrifuge freeze dryer E Fo3	5,000.00
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#### 1.7 Temperature Recorders

The Centre has no suitable temperature recorders for the following equipment:

2	hot rooms	
2	cold rooms	
6	Revcos	
10 units	500.00 ea.	5,000.00

#### 1.8 Electron Microscope

It has been recommended that the Centre have an electron microscope.

#### 1.9 Training Laboratory

1.9.1 The Centre now has an excellent training laboratory with 22 Olympus compound microscopes. It lacks the following basic equipment:

2	large incubators	1,060.00 ea.	2,120.00
2	water baths	430.00 ea.	860.00
2	bench centrifuges	1,500.00 ea.	3,000.00
1	balance		1,500.00
1	pH meter		450.00

1.9.2 As the Centre will be giving advanced training to selected students the training laboratory should have:

1	refrigerated centrifuge	7,000.00
5	F A microscopes	

This could be done by: US\$

- 1) equipping two existing microscopes  
with F.A. attachments 1,800.00 ea. 3,600.00
- 2) buying three additional F.A.  
microscopes 5,500.00 ea. 16,500.00

1.10 Media Preparation (new section)

- 1 incubator 1,060.00
- 1 large water baths 860.00
- 1 refrigerator 750.00
- 1 lamina flow cabinet 2,160.00
- 1 inspissator 500.00

balances, pH meters, stills, stirrers etc. are available.

1.11 Central Wash-up and Sterile Supply (reorganized)

- 1 large deioniser on order
- 2 Sterilizing ovens 1 available 800.00
- 2 Drying ovens 1 available 400.00
- 4 Brushing machines 3 on order 200.00
- 40 Stainless steel pans 10 available 1,800.00
- 4 cabinets 4 75.00 ea. 300.00
- 1 ultrasonic cleaning bath 175.00

1.12 Laboratory Animals

It is anticipated that the only mammals maintained routinely at the Centre will be mice. Modern racks and autoclavable plastic cages will be needed. Replacement will be in two stages:

- 1.12.1 Moderate security unit infected animals  
10 racks with cages, covers, feeders, etc. 1,000.00 ea. 10,000.00
- 1.12.2 Breeding colony  
36 racks with cages, covers, feeders, etc. 1,000.00 ea. 36,000.00

2.0 Departments

2.1 CAREC Bacteriology (new section)

- 2 incubators one on order 1 1,060.00 ea. 1,060.00
- 1 FA microscope one on order -

US\$

1 compound microscope			3,000.00
4 water baths	2 in order	430.00 ea.	860.00
1 centrifuge	1 in TPHL		-
1 safety inoculation cabinet	1 in order		-
1 large refrigerator			1,000.00

2.2.0 Virology2.2.1 Cell Cultures

1 refrigerator	1 available		
2 inverted microscopes	1 available	2,900.00 ea.	2,900.00
2 lamina flow cabinets	1 available	2,160.00 ea.	2,160.00
1 walk in incubator	1 available		-
2 incubators	1 on order	1,060.00 ea.	1,060.00
1 magnetic stirrer	1 available		-
1 bench centrifuge	1 on order		-
1 water bath	1 on order		-

2.2.2 Isolation: cell systems

3 inverted microscopes	1 available 1 on order		2,900.00
1 refrigerated centrifuge (safety features)	1 on order		-
2 downflow safety cabinets	2 on order		-
2 large incubators	1 available		-
1 CO <sub>2</sub> incubator	1 available		-

2.2.3 Animal Inoculation See moderate security unit 2.3.02.3 Moderate Security Unit

2.3.1 <u>Consists of:</u>	1 clean room		
	1 decontamination room, autoclave see 1.2.1		
	2 animal rooms, racks etc. see 1.12.1		
	4 laboratories.		

2.3.2 Laboratory 1: Hepatitis

1 downflow safety cabinet	1 on order		-
1 refrigerated centrifuge (safety features)	1 on order		-
1 water bath			430.00
1 RIA scintillation counting equipment			

US\$

2.3.3 Laboratory 2: rabies antibody testing (RFFIT)

1 downflow safety cabinet	1 on order	-
1 FA microscope	1 available	-
1 CO <sub>2</sub> incubator	1 available	-
1 Revco	1 available	-
1 water bath		430.00
1 refrigerator	1 available	-

2.3.4 Laboratories 2 and 3: arbovirus, rabies, leptospirosis

1 safety unoculation cabinet, Porton type		2,500.00
1 downflow safety cabinet		5,000.00
1 refrigerated centrifuge (Sorvall)	1 available	-
1 safety inoculation cabinet	1 on order	-
3 incubators	1 available 2,600.00 ea.	1,200.00
1 inverted microscope		2,900.00
1 water bath		430.00
1 compound microscope (dark field)		3,000.00

2.4 Serology

1 downflow safety cabinet		5,000.00
1 large safety inoculation cabinet		2,000.00
2 inverted microscopes	1 on order 2,900.00	2,900.00
1 refrigerated centrifuge	1 available	-
2 incubators	1 available 600.00 ea.	600.00
1 refrigerator	1 available	-
1 freezer	1 available	-

2.5 Immunology

2.5.1 The equipment required for this department depends on the development policy for this section.

2.5.2 The following major equipment is available:

refrigerated centrifuge  
 bench centrifuge  
 ultracentrifuge Spinco Model  
 Compound microscope

US\$

fraction collector  
 UV - visible light spectrophotometer  
 refrigerator  
 freezer - 20<sup>0</sup> C  
 rotary evaporator  
 micro Kjeldahl apparatus  
 fume cupboard  
 high voltage electro-phoresis apparatus  
 cell harvester (Rockefeller University)  
 Scintillation counting equipment (Rockefeller University)

#### 2.6 Parasitology and Entomology

3 stereo microscopes	3 available		
3 compound microscope	2 available	3,000.00 ea.	3,000.00
1 incubator		600.00 ea.	600.00
1 enviromental cabinet	1 available		-
1 water bath		430.00 ea.	430.00
1 bench centrifuge	1 on order		-