

Tropical Disease Research Activities

This appendix is a brief profile of tropical medicine research support, concentrating primarily on activities with which the United States is involved, either through direct research activities or by block contributions, but also containing several examples of other supporting organizations. Table B-1, at the end of this appendix, summarizes the tropical medicine research funding levels of the organizations covered. This discussion should not be regarded as a comprehensive review. For example, many U.S. universities maintain tropical biomedical research programs. In addition, most developed and some developing countries have national agencies or institutes which in some way fund tropical disease research. These are not covered. For more detail on the range of support for tropical medicine research, see the General Accounting Office report on Gorgas, to be completed in August 1983.

Multinational Programs

The United Nations Development Program/World Bank/World Health Organization Special Programme for Research and Training in Tropical Disease (TDR) has targetted six specific diseases for biomedical research: malaria, schistosomiasis, filariasis, African and American trypanosomiasis, leishmaniasis, and leprosy. Essentially a grant institution, TDR also funds projects on vector biology and control, biomedical sciences, epidemiology, and social and economic research (126). Of the more than **\$30** million spent by TDR in 1981, approximately \$5.6 million went to research activities in the Americas (77). Total U.S. contributions to the TDR in 1982 were more than **\$5** million, approximately 22 percent of all TDR fundings (105).

The Pan American Health Organization (PAHO), regional office of the World Health Organization, sponsored 131 research projects during 1980-81 for a total of \$5.2 million. Direct monetary contributions from PAHO/WHO comprised 32 percent of that sum, the remainder coming from the 30 institutions, international organizations, agencies, and governments that collaborate with PAHO. Research efforts were primarily directed towards the diarrheal diseases, a reflection of the Special Programme for the Control of Diarrheal Disease. PAHO-funded programs also researched other infectious diseases, parasitic diseases, foot and mouth diseases and vesicular stomatitis, zoonoses, nutrition, and other areas (77). In 1982-83, U.S. contributions to PAHO of \$57.1 million constituted 61.3 percent of the organization's funding (18).

PAHO maintains nine centers, including the Caribbean Epidemiology Center (CAREC) located in Port-of-Spain, Trinidad, the Institute of Nutrition of Central America and Panama (INCAP) in Guatemala City, the Caribbean Food and Nutrition Institute in Kingston, Jamaica, and the Pan American Center for Research and Training in Leprosy and Tropical Diseases, in Caracas, Venezuela (76), PAHO provides scientists and researchers to each of the centers, and with the exceptions of INCAP, which is semi-independent, and CAREC, which receives moneys from **19 different** countries and institutions, the centers are primarily PAHO-funded. It is important to note that the centers are by no means exclusively devoted to research. CAREC, for example, provides extensive training, epidemiological surveillance, and laboratory services for much of the English-speaking Caribbean (100).

United States Agencies

The majority of **Agency for International Development (AID) funding for tropical diseases research comes from its Office of Health. In fiscal year 1982** the office allotted \$5.8 million for research in malaria immunology and vaccine development, \$5 million to the TDR, and **\$1.9** million as part of the core support for the International Center for Diarrheal Diseases Research/Bangladesh. The AID Africa Bureau spent approximately \$1.3 million on the biomedical research components of three projects—onchocerciasis control, combatting communicable childhood diseases, and schistosomiasis activities in the Cameroons and the Sudan. The remainder of AID's tropical diseases activities, some \$1 million, was channeled through the Office of the Science Advisor for collaborative research between U.S. universities and developing countries. All AID funding may be considered "extramural," with moneys given out on a competitive basis to universities, profit, and nonprofit institutions (79).

Nearly all tropical diseases research at the **National Institutes of Health (NIH) is carried out at the National Institute of Allergy and Infectious Diseases (NIAID). NIAID spent more than \$9.5** million in fiscal year 1982 for research on trypanosomiasis, schistosomiasis, leishmaniasis, malaria, filariasis, and leprosy. The General Tropical Medicine Program spent **\$7.7** million for research involving virology, bacteriology, vector pathogens, and other disciplines; NIAID's General Parasitology Program expended an additional \$3.5 million. The NIAID International Collaboration in Infectious

Diseases Research (ICIDR) Program allies institutions in tropical countries with universities in the United States for joint research on specific diseases. The ICIDR fiscal year 1982 budget was **\$2.2** million. Another **\$800,000** was directed towards NIAID Tropical Research Units (112). Approximately \$9.5 million of the NIAID's Tropical Medicine Program expenditures went towards intramural research, including salaries and administrative costs. Extramural research accounted for the remaining \$25 million, awarded to institutions around the world on a competitive grant basis. The NIAID Tropical Medicine and fiscal year 1982 total came to \$34.8 million.

Also within NIH, the **Fogarty International Center** administers the appropriation of the Gorgas Memorial Institute (as the core support for the Gorgas Memorial Laboratory).

The **Department of Defense (DOD)** is active in areas of research into diseases which pose a threat to American troops stationed in tropical regions. Activities within DOD are coordinated by the Medical Research and Development Commands of the Army and Navy. Within the Army, tropical disease research is managed by the Research Area Manager for Military Disease Hazards; the Infectious Diseases Program Manager oversees the Navy's activities. In fiscal year 1983, DOD expenditures are estimated at \$31.2 million, more than half of which (\$17.6 million) was directed towards "basic" research (2).

The Walter Reed Army Institute of Research is the center for most of the Army's tropical disease activities. In the Navy, the Naval Medical Research Institute is the major U.S.-based center for tropical diseases research. Infectious diseases research includes a wide range of tropical diseases. The Army's anti-malarial drug development program and the Navy's vaccine effort are part of the Department's emphasis on malaria. In addition, the United States Army maintains tropical medicine research units in Brasilia, Kenya, Malaysia, and Thailand. The Naval Medical Research Units are located in Manila, Jakarta, Lima, and Cairo. In fiscal year 1983 DOD funding for these overseas units came to \$9.7 million. The department's overall tropical disease program total of **\$31.2** million does not include salary or housing expenses for military personnel, which fall into other areas of DOD obligations; however civilian salaries, local employees, maintenance, and supplies do come out of tropical disease program budgets.

The **Centers for Disease Control (CDC)** (of the U.S. Public Health Service) does not have an autonomous tropical disease program, but conducts tropical disease research primarily through its Center for Infectious Diseases and its Parasitology Division. CDC also

serves as a worldwide resource center and is frequently called on by tropical countries to provide emergency assistance. The Medical Entomology Research and Training Unit in Guatemala is funded by CDC. In fiscal year 1983, total CDC tropical diseases research funding, including salaries, administration, and other costs, came to an estimated \$5.5 million (53).

Other Institutions

The following are a few examples of non-U. S. Government supporters of tropical medicine research and related activities.

Through its Tropical Diseases Research Program, the Edna McConnell Clark Foundation funds a variety of research projects in both developed and developing countries. Primarily concerned with schistosomiasis, the foundation's program awarded approximately \$2.5 million for more than **60** competitive grants during fiscal year **1982**, and accounted for 18 percent of all Clark Foundation activity (27).

The Great Neglected Diseases of Mankind (GNO), a major component of the Rockefeller Foundation Health Sciences Program, examines vaccine and drug development, improvement of diagnostic testing, and appropriate targeting of therapy. The GND Network currently maintains 14 units at institutions around the world. These units, primarily universities, carry out research projects concentrating on malaria, schistosomiasis, and diarrheal diseases; furthermore, in 1982 the units trained a total of **84** researchers from developed and developing countries. The GND program cost came to \$1.9 million in 1982 (90).

The **International Development Research Centre (IDRC)**, an Ottawa-based public corporation created by the Canadian Parliament, disbursed approximately \$4.9 million Canadian on tropical medical research grants to institutions in **1982** from its Health Sciences Division. The grants went for projects ranging from sexually transmitted diseases to malnutrition to leprosy. The division also provided additional funding for some health care delivery and water supply and sanitation projects in tropical countries. Along with its four other divisions, IDRC issued \$36.5 million in grants during **1982** (56).

In London, a portion of the profits from the Burroughs-Wellcome pharmaceutical company go to the **Wellcome Trust**. During 1980-82, the Trust distributed 3.6 million pounds Sterling (roughly \$6 million U. S., approximately 15 percent of the Trust's total allocations) for research and fellowships for investigation into cerebral malaria, schistosomiasis, leishmaniasis, rabies, and other tropical medicine concerns. About 30 percent of these funds were used to help run

the Trust's Tropical Units in India, Brazil, Thailand, Kenya, and Jamaica. Approximately 20 percent of the allocations were used for special lectures and fellowships with the remaining 80 percent awarded to researchers and research institutions around the world on an individual project basis (122). In addition, the

Burroughs Wellcome Fund, an entirely separate entity supported by profits from the U.S. branch of the company, awarded \$406,000 in support of molecular parasitology research in fiscal year 1982. This sum represented 18 percent of the Fund's awarded grants during that period (80).

Table B-1.—A Profile of Funding for Tropical Medical Research

Organization	Millions of dollars	Year	Reference
World Health Organization:			
Special Programme for Research and Training in Tropical Diseases (TDR)	23.832	81	102
Pan American Health Organization	5.2	80-81	77
Agency for International Development	15.0	FY82	79
National Institutes of Health:			
NIAID	34.856	FY82	111, 112
Fogarty International Center	1.8	FY83	114
Department of Defense	31.246	FY83	2
Centers for Disease Control	5.5	FY83	53
Edna McConnell Clark Foundation	2.573	82	27
Great Neglected Diseases Program	1.9	82	89
International Development Research Centre	4.2 ^a	82	56
Burroughs-Wellcome	6.6 ^b	80-82	80, 122

^aApproximately equal to 4.9 million Canadian dollars.

^bApproximately equal to \$600,000 U.S. plus 3.6 million pounds Sterling.

NOTE: The definitions of tropical diseases and tropical disease research activity used in compiling these data are not uniform. For example, CDC totals include activity in research which is not covered by the Department of Defense. TDR/WHO totals are for research and development and research capability strengthening only. The DOD data are only restricted to those diseases which are of concern to American troops stationed in tropical countries. As part of the Department of State, AID contributes funds for tropical disease research to both the TDR/WHO and the PAHO; these funds then lose their "American" label. In addition, more than \$1 million was given by AID to NIAID. Only 32 percent of PAHO activities came directly from PAHO/WHO, the remainder coming from matching contributions from local governments.