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Malaria Situation in the Americas, 1982

The population of the Region of the Americas increased from 400.5 million inhabitants in 1960 to 635.8 million in 1982. In the area originally considered malarious,[1] the population grew from 143.6 to 245.3 million. From 1965 to 1982, the proportion of the population in said area (in relation to the regional total) fluctuated between 32 and 38 per cent, with a rising trend.

An analysis of population growth in the Region, in accordance with the phases of the malaria eradication program,[2] shows that the greatest increase occurs in maintenance-phase areas, where transmission has been interrupted since 1965.

It was estimated that in 1982, 118.3 million inhabitants lived in a maintenance-phase area of 4.1 million km², while the consolidation-phase area had 62.0 million inhabitants in 2 million km². The highest number of blood samples (69 per cent of 8.6 million) were collected in the attack-phase area which had 64.9 million inhabitants in 9.5 million km². A total of 95 per cent of the positive samples (with plasmodia) were concentrated in this area.

The number of positive samples collected throughout the year—708.928 (8.1 per cent)—was the largest since 1958, and a considerable increase was noted in the number of positive tests in nonmalarious areas of maintenance and consolidation. Although the number of samples collected between 1965 and 1982 remained constant at around 9 million, the morbidity rate increased from 164.9 to 286.2 per 100,000 inhabitants. Table 1 presents the cases registered from 1979 to 1982: the highest number was found in attack-phase areas, where one-third of the 662,000 were *Plasmodium falciparum* cases. Among the maintenance-phase areas, only the Dominican Republic registered a greater number of *P. falciparum* cases.

[1] "Originally malarious area: area in which there is transmission of malaria or in which there has been transmission in the last four years. It is said also of areas where transmission has been interrupted in appearance or in fact, without the eradication of the disease having been demonstrated." *Terminology of Malaria and of Malaria Eradication*, Geneva, WHO, 1963.

[2] Preparatory, attack, consolidation, and maintenance.

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In 1982 the total investment in malaria programs in the Americas rose to US$126,605,118 which represents a reduction of US$15,900,438 (11.2 per cent) compared with the amount invested by all the countries in 1981.

At meetings of the Governing Bodies of PAHO, the health authorities of the Region have reiterated their

Table 1. Malaria cases registered in the Americas, 1979-1982.

Group	Population 1982 in originally malarious areas (*in thousands*)	Cases registered			
		1979	1980	1981	1982
Group I					
12 countries or territories in which malaria eradication has been certified[a]	75,829[b]	1,162	2,249	1,599	972
Group II					
Subgroup A					
Argentina	3,584	936	341	323	567
Costa Rica	677	307	376	168	110
French Guiana	73	604	831	769	1,143
Panama	1,882	316	310	340	334
Paraguay	2,824	116	140	73	66
Subtotal A	9,040	2,279	1,998	1,673	2,220
Subgroup B					
Belize	163	1,391	1,529	2,041	3,868
Guyana	824	2,294	3,202	2,065	1,700
Dominican Republic	5,610	3,080	4,780	3,596	4,654
Subtotal B	6,597	6,765	9,511	7,702	10,222
Subtotal Group II	15,637	9,044	11,509	9,375	12,442
Group III					
Brazil	53,483	144,215	169,871	197,149	221,939
Ecuador	5,331	8,207	8,748	12,745	14,633
Mexico	39,352	20,983	25,734	42,104	49,993
Suriname	281	903	4,445	2,479	2,805
Venezuela	10,956	4,705	3,901	3,377	4,217
Subtotal	109,403	179,013	212,699	257,854	293,587
Group IV					
Bolivia	2,087	14,712	16,619	9,774	6,699
Colombia	17,590	60,957	57,346	60,972	78,601
El Salvador	4,558	75,657	95,835	93,187	86,202
Guatemala	2,905	69,039	62,657	67,994	77,375
Haiti	4,642	41,252	53,478	46,703	65,354
Honduras	3,628	25,297	43,009	49,377	57,482
Nicaragua	2,852	18,418	25,465	17,434	15,601
Peru	6,176	17,127	14,982	14,812	14,613[c]
Subtotal	44,438	322,459	369,391	360,253	401,927
Total	245,307	511,678	595,848	629,081	708,928

[a] Cuba, Chile, Dominica, Grenada, Guadeloupe, Jamaica, Martinique, Puerto Rico, Saint Lucia, Trinidad and Tobago, United States of America, and Virgin Islands (USA).

[b] Some population figures refer to 1981.

[c] Information up to September.

concern about the malaria situation, and have approved several resolutions in this respect. In 1978 the XX Pan American Sanitary Conference reaffirmed that eradication of the disease was the objective of the malaria program in the Region. The following year, the III Meeting of Directors of National Malaria Eradication Services in the Americas was held in Mexico for the purpose of examining the progress and strategy of the program and preparing a document that would set the bases for the formulation of a hemispheric plan of action against malaria in the Americas. In its 1979 and 1980 meetings, the PAHO Directing Council examined the program and requested that the Member Governments and the Organization reformulate their national plans for malaria eradication in order to: adapt them to the specific situation of each country; give maximum priority to the financing and execution of those plans; explore all possible sources of financing for the support of antimalarial activities on a national and hemispheric scale; and strengthen the program for personnel training and field research.

The Member Governments and the Organization have continued to make efforts to fulfill these resolutions by: preparing national plans to combat the disease; carrying out one planning seminar for training malaria personnel and another on the epidemiology of malaria produced by *P. falciparum* and its resistance to drugs; and expanding research activities in immunology, chemotherapy, entomology, epidemiology, and antivectoral campaigns.

In 1982 all the countries of the Region reported to PAHO on the status of their programs, classifying the malarious areas according to the program phase in which they found themselves. Although the definition of "phases" is not strictly followed, the classification still serves as a general frame of reference for the status of the programs vis-à-vis the goal of eradication.

At the III Meeting already mentioned, the 34 political units of the Region were classified in four groups according to the progress made, the magnitude of the problems, and the availability of resources from malaria-control programs (Figure 1). These groups are described below:

Group I. Includes Chile, Cuba, Dominica, Grenada, Guadeloupe, Jamaica, Martinique, Puerto Rico, Saint Lucia, Trinidad and Tobago, United States of America, and the Virgin Islands (USA) with 75,829,000 inhabitants, or 30.9 per cent of the total population of the originally malarious area. Surveillance activities in this group indicate that the transmission of malaria has not been reestablished. Although there were 972 cases registered in 1982, *P. falciparum* does not represent a problem in the Region because all the registered infections were imported.

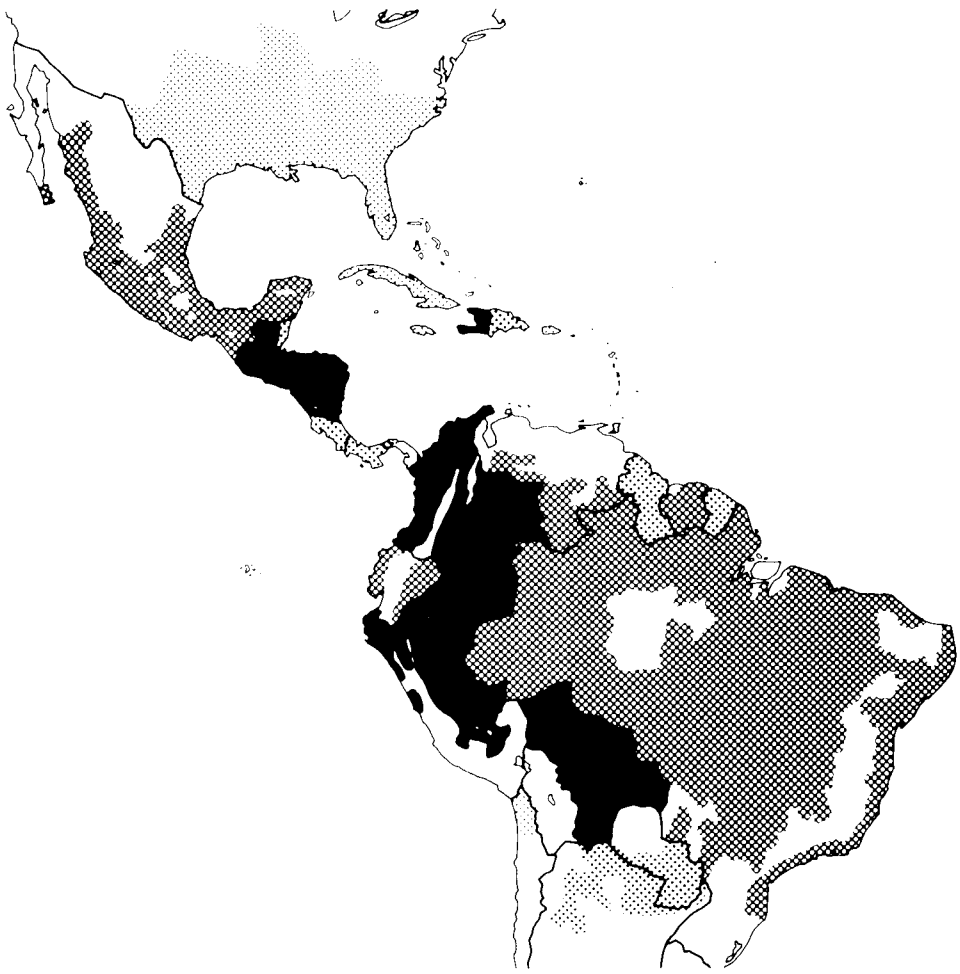
Group II. Includes Argentina, Belize, Costa Rica, Dominican Republic, French Guiana, Guyana, Panama, and Paraguay with 15,637,000 inhabitants, or 6.4 per cent of the total population of the orginally malarious area. Transmission was interrupted or reduced to insignificant levels in each country; however, due to the importation of cases from neighboring countries, a surveillance system has been maintained to prevent its return. In some instances, the foci of residual or imported cases were eliminated; in others the return of transmission could not be stopped, thus losing the ground gained in previous years. Group II is divided into two subgroups which reflect the current situation:

Subgroup A. Argentina, Costa Rica, Panama, and Paraguay have been able to maintain a favorable situation since 1979. Although malaria cases continued to be imported, transmission has not been reestablished. Despite reported cases of local transmission, the risk of infection was eliminated effectively in said countries without leaving residual foci. In French Guiana the number of registered cases increased from 769 in 1981 to 1,143 in 1982, for the most part due to migrations of external origin and to the movement of workers coming from malarious areas.

Subgroup B. Includes Belize, Dominican Republic, and Guyana, where the situation has deteriorated since 1979 due to the return of malaria transmission in many areas where it had been interrupted. The situation in Belize is related to population movement, and insufficiency of human and financial resources, and to the health structure, factors which interfere with achieving effective control. Guyana reported a smaller number of cases, but it should be noted that surveillance activities decreased in intensity due to insufficient means of transportation and personnel. In the Dominican Republic an increase was observed in the number of cases and there was a greater dispersion of foci, caused mainly by the migration of workers coming from malarious areas and to insufficient surveillance and control activities.

Group III. This group includes Brazil, Ecuador, Mexico, Suriname, and Venezuela, with 109,403,000 inhabitants (44.6 per cent of the total) in the originally malarious area. Since 1979 transmission has increased in attack-phase areas, but there has been no significant change in those areas in the consolidation or maintenance phases. In Brazil a pronounced increase of cases was observed, due to epidemic outbreaks in the Amazon region areas where colonization is intense. There was a rise in the number of cases registered in Mexico and Ecuador, with the Province of Esmeraldas in the latter registering the highest number of cases. The situation in Venezuela has been maintained without significant progress in the last four years. Suriname continued to

Figure 1. Status of malaria eradication programs in the Americas, by group of countries, 1982.



GROUP:

I. Cuba, Chile, Dominica, Grenada, Guadeloupe, Jamaica, Martinique, Saint Lucia, Trinidad and Tobago, United States of America (including Puerto Rico and Virgin Islands).

II. Argentina, Belize, Costa Rica, Dominican Republic, French Guiana, Guayana, Panama, Paraguay.

III. Brazil, Ecuador, Mexico, Suriname, Venezuela.

IV. Bolivia, Colombia, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Peru.

experience operational problems with mobile equipment in the interior of the country, and frequent interruptions of antimalarial activities; in view of this, the health authorities resolved to transfer responsibility for operations to the medical mission in the interior, whose satisfactory network of health services has made it possible to continue field activities.

The lack of progress in the countries of Group III may be attributed to intense migratory movements (Suriname), the precarious dwellings used in colonized areas (Brazil, Ecuador, Mexico), the resistance of *P. falciparum* to chloroquine (Brazil, Ecuador), the resistance of the vector to DDT in some areas (Mexico), and exophily of the vector (Venezuela). In addition to the

problems mentioned, labor issues frequently arise which hinder the normal development of operations. *P. falciparum* infections represent a serious problem in Brazil and in some areas of Ecuador and Suriname.

Group IV. Composed of Bolivia, Colombia, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, and Peru, this group has a population of 44,462,000 inhabitants (18.1 per cent of the total population of the originally malarious area). In 1982 there were 401,927 registered malaria cases (56.3 per cent of the total for the Americas). During the 1960s every country of this group made considerable advances in its malaria control program. With the exception of Haiti, each had areas that at one time or another were in the consolidation or maintenance phase. However, that situation deteriorated at the end of the 1960s and at the beginning of the 1970s with the onset of such serious technical, economic, and administrative problems that said countries—except Bolivia and Nicaragua which intensified operations—lost practically everything they had achieved.

The principal problems facing the program in the Region are summarized below:

Technical Problems

The physiological resistance of *Anopheles albimanus* to available insecticides has been the principal obstacle in El Salvador, Guatemala, Haiti, Honduras, and Nicaragua. On the Pacific coast of four Central American countries, the vector is resistant to almost all the insecticides recommended for the malaria program. Lacking this most effective and economic method, these countries have had to resort to more burdensome and less effective control measures such as the application of larvicides, operations to reduce breeding sites, and collective distribution of medications. These measures have resulted in the limited protection of certain population groups, or temporary relief in epidemic situations, but not in significant changes in the overall malaria situation. In some areas of Haiti, the vector is resistant to DDT.

There have also been reports of *A. albimanus* resistance to DDT in Panama (Canal Zone and the Region of San Blás) and in Costa Rica (Pacific coast), but this does not constitute an important problem because transmission had already been interrupted through applications of propoxur and distribution of antimalarial medications. In the northwest border region of the Dominican Republic (Dajabón), an increase in *A. albimanus* resistance to DDT has also been observed. This did not cause any difficulty before, because the area was practically malaria-free. However, in recent years transmission has increased, presaging a serious threat to the future. In the southern states of Mexico along the Balsas River, the *Anopheles pseudopunctipennis* vector has become resistant to DDT. The susceptibility tests carried out in those states have revealed that average mortality is a great deal higher with clorphoxim and propoxur than with malathion and fenitrothion.

The resistant behavior (evasive behavior) of *Anopheles nuñeztovari* to DDT in western Venezuela and eastern Colombia continues to pose the problem of transmission persistence. It is recommended that tests be carried out with insecticides that have some fumigant effect, in accordance with a well conceived research proposal.

The resistance of *P. falciparum* to the 4-aminoquinolines is a serious obstacle in certain areas of South America, especially in Colombia and Brazil. However, this will not constitute an insurmountable problem in the malaria eradication program because some substitute products are still available—such as associations of inhibitors of dehydro-folin-reductase and the quinolinomethanols—whose efficacy depends on the vector's continued susceptibility and response to the spraying of dwellings with residual insecticides.

These data underscore the importance for the program to establish a surveillance network to monitor the susceptibility of the parasites to antimalarial drugs, and of revising the therapeutic schedules used, so as to diminish the selective pressure of resistant strains and to obtain the best possible results through the action of the program. The same is applicable regarding the vectors and their reaction to insecticides.

Problems Related to Socioeconomic Development

Socioeconomic development projects are promoted throughout the Hemisphere, and many of these are geographically located in highly receptive areas. The arrival of migrants and workers who settle in precarious conditions in recently cleared areas, tends to bring serious outbreaks of malaria. Indeed, many areas or places where malaria is highly endemic today were still uninhabited 10 or 15 years ago. This phenomenon is very common in Brazil and Colombia. Outbreak prevention is not always possible because the malaria service is not informed of the settlements on a timely basis and, furthermore, because the allocations of necessary funds are insufficient, inopportune, or nonexistent.

Problems Related to Sociopolitical Aspects and Human Behavior

These problems have been making execution of the programs increasingly difficult in recent years. They

resist quantitative expression and in many countries constitute important factors in reducing the operating and supervisory capacity. As a consequence, they have led to improper coverage and a worsening of the quality of operations. In some countries, insufficient remuneration leads to the loss of professional personnel, particularly those who are well trained.

The complete report on the malaria program situation in the Americas, prepared for discussion during the IV Meeting of Directors of the National Malaria Eradication Services in the Americas (Brasília, 11-15 July 1983) can be obtained from the Tropical Diseases Program, PAHO, 525 Twenty-third Street, N.W., Washington, D.C. 20037.

(*Source*: Tropical Diseases, Health Programs Development, PAHO.)

Diseases Subject to the International Health Regulations

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas up to 31 October 1983.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague
		Cases	Deaths	Cases
BOLIVIA	—	*11*	*11*	*21*
Beni	—	1	1	—
Cochabamba	—	7	7	—
La Paz	—	3	3	21
BRAZIL	—	5	5	*58*
Bahía	—	—	—	8
Ceará	—	—	—	50
Pará	—	2	2	—
Rondônia	—	3	3	—
CANADA	*1*	—	—	—
Ottawa	1[a]	—	—	—
COLOMBIA	—	*1*	*1*	—
Santander	—	1	1	—
ECUADOR	—	5	*1*	*65*[b]
Chimborazo	—	1	1	65
Pastaza	—	4	—	—
PERU	—	*25*	*24*	—
Huanuco	—	1	1	—
Junín	—	4	4	—
Madre de Dios	—	4	4	—
San Martín	—	16	15	—
UNITED STATES	*1*	—	—	*39*
Arizona	—	—	—	9
California	—	—	—	1
New Jersey	1[a]	—	—	—
New Mexico	—	—	—	27
Oregon	—	—	—	1
Utah	—	—	—	1

[a]Imported.
[b]Of the total number of cases, 64 occurred before 9 April 1983.

Acquired Immune Deficiency Syndrome (AIDS): An Update

In a recent issue of the *Epidemiological Bulletin* (Vol.4, No.2, 1983), PAHO published epidemiological data on the acquired immune deficiency syndrome (AIDS) situation in the United States of America. Current U.S. Public Health Service recommendations for reducing the risk of transmission and preventing spread were included. This article contains additional epidemiological information and summarizes the discussions held at a meeting on AIDS convened at PAHO in August 1983.

During the meeting, participants agreed that AIDS cases be assigned to a country according to residence, and not on the basis of where the disease may have been acquired. Using travel histories and a probable incubation period of 18-24 months, countries may wish to attempt to identify indigenous cases and imported cases.

In the Region of the Americas, three countries (Canada, Haiti, and the United States) are experiencing indigenous transmission. Table 1 presents currently known AIDS cases by country of residence. These data must be interpreted with considerable caution, since systematic surveillance and reporting have not been initiated in many countries. These cases include both confirmed and suspected cases based on the U.S. Centers for Disease Control (CDC) case definition criteria or an adaptation of that criteria.

In most countries, the number of AIDS cases is very small. When complete information is available, nearly all cases occur in homosexual men with a history of having traveled to high incidence areas in the United States, especially New York City. More detailed information is available from cases in Canada, Haiti, and the United States.

Among the 33 cases in Canada, 29 are male and four are female. A total of 17 patients are homosexual men and 12 are heterosexual men and women (nine and three, respectively). Sexual preference is unknown in three cases, and one is a child. As of 1 August 1983, 20 patients (18 men and two women) have died.

Table 2 summarizes available information from Haiti. Of the 157 confirmed and suspected cases, 114 are male and 43 are female. Approximately 14 per cent have been identified to date as homosexuals with a history of travel to the United States. Based on preliminary data, AIDS in Haiti appears to be slightly different in that patients are more likely to present gastrointestinal rather than respiratory symptoms; there is a greater proportion of women (27.3 per cent); and among the opportunistic infections, disseminated tuberculosis is quite common (37.1 per cent). The case-fatality ratio in Haiti approaches 100 per cent two years after the diagnosis.

In the United States, cases continue to occur at a rate of 7-8 new cases reported per day. Figure 1 depicts the epidemic curve; with the exception of the third quarter of 1981 which includes the backlog of cases identified at the beginning of CDC surveillance, the remaining points form a straight line, reflecting the epidemic's exponential growth. The number of reported cases is doubling every six months. The overall case-fatality ratio is approximately 42 per cent, but two-thirds of the cases diagnosed more than one year ago have died. Table 3 summarizes the fatality ratio by primary disease. A high proportion of patients with opportunistic infections and *Pneumocystis carinii* pneumonia have died, in comparison to patients with Kaposi's sarcoma. Almost half the cases continue to occur in New York City (40.2 per cent) at a rate of 110.7 cases per one million population, compared to a rate of 4.1 cases per one million population elsewhere in the United States, excluding New York, San Francisco, Miami, Newark, and Los Angeles.

Several risk factors have been identified and are summarized in Table 4. Of the 355 patients who cannot

Table 1. Acquired immune deficiency syndrome (AIDS) cases and deaths by country of residence through 1 August 1983.

Country	No. of cases	No. of deaths
United States of America	1,972	759
Haiti	157	—
Canada	33	20
Brazil	8	5
Argentina	6	3
Mexico	4	1
Jamaica	2	—
Suriname	1	1
Trinidad and Tobago	1	1

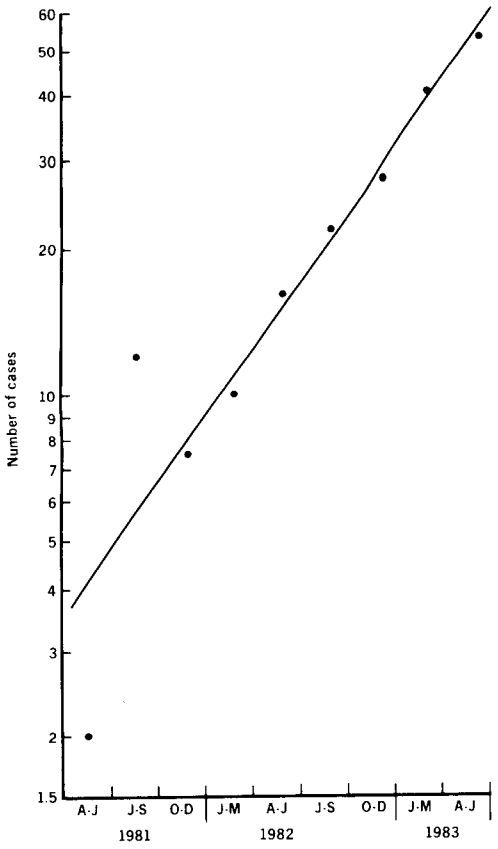
— No reported information.

Table 2. Cases of AIDS in Haiti by primary disease.[a]

Primary disease	No. of cases
Opportunistic infections	137
Kaposi's sarcoma	16
Both	1
Unknown	3
Total	157

[a] Ministry of Public Health and Population, Haiti.

Figure 1. Number of AIDS cases reported quarterly through June 1983.



be classified in one of the clearly defined risk categories, approximately 24 received blood transfusions in the past 10-37 months and 20 are female heterosexual partners of persons having one or more of the known risk factors. Approximately 45 per cent are foreign born persons residing in the United States; of these, the majority are from Haiti.

PAHO, the U.S. National Institutes of Health (National Institute of Allergy and Infectious Diseases), the CDC, and the Canadian Laboratory Centre for Disease Control cosponsored a meeting on AIDS at PAHO, 8-9 August 1983. It was one of a series of international meetings planned in various countries by the Regional Offices of WHO in preparation for a global meeting on AIDS in November 1983 in Geneva.

The purpose of the meeting was to bring together scientists and public health workers from 12 countries of the Americas to exchange information on the occurrence of AIDS and stimulate increased surveillance of the disease. The meeting was divided into five major sessions: epidemiology of AIDS in the Americas; recognition of AIDS, (including clinical and laboratory aspects); immunology and etiology; risk reduction and prevention; and surveillance recommendations.

Table 3. Cases and deaths due to AIDS in the United States, by primary disease through 19 October 1983.[a]

Primary disease	No. of cases	Percentage of total	No. of deaths	Case-fatality ratio (%)
Kaposi's sarcoma	665	26.5	146	21.9
Pneumocystis carinii pneumonia	1,282	51.0	599	46.7
Both	180	7.2	107	59.4
Other opportunistic infections	386	15.3	196	50.8
Total	2,513	100.0	1,048	41.7

[a] AIDS Unit. U.S. Centers for Disease Control (CDC), Atlanta, Georgia.

Table 4. Number and percentage distribution of AIDS cases in the United States, by sex and known risk categories.[a]

Category	Male		Female		Total	
	Cases	Total (%)	Cases	Total (%)	Cases	Total (%)
Homosexual/ bisexual men	1,805	83.7	0	0	1,805	80.4
Heterosexual intravenous drug users	337	15.6	87	100.0	424	18.9
Hemophiliacs	16	0.7	0	0	16	0.7
Total	2,158	100.0	87	100.0	2,245	100.0

[a] AIDS Unit. U.S. Centers for Disease Control (CDC), Atlanta, Georgia.

Surveillance is clearly incomplete; international reporting is voluntary; and case definitions are variable due to limited laboratory capacity in many countries. Thus, the epidemiological data must be interpreted with extreme caution. Consideration should be given to the use of 1-5 year survival tables rather than case-fatality ratios to measure the severity of this syndrome. The information base is changing and is therefore unstable. Apparent risk factors identified today may be replaced quickly by others as new studies are carried out in varied socioeconomic settings. In the absence of a known etiology and more complete knowledge of the epidemiology of AIDS, additional studies of its natural history are required to elucidate risk factors and point the way for basic research.

The diagnosis of AIDS is further complicated when the case occurs in a country with a disease pattern dominated by infectious illnesses. Differentiation of an opportunistic infection from background infection, such as disseminated tuberculosis, diarrhea due to cryptosporidiosis, etc., is made even more difficult when

laboratory capacities are limited. Careful attention must be given to case definition and the use of "suspicious", "unconfirmed", and/or "probable" categories of AIDS should be considered. AIDS remains a clinical diagnosis by exclusion of other possible reasons for a given infection. Regardless of criteria selected for case definition, there will be problems of overdiagnosis, underdiagnosis, and misdiagnosis. Some of the clinical and laboratory findings have been summarized below:

Prodrome

- lasts 2-8 months
- fever
- night sweats and chills
- lymphadenopathy
- diarrhea and weight loss > 10 per cent of body weight
- fatigue, apathy, depression

Clinical Disease

- symptoms and signs are related to the final disease (Kaposi's sarcoma and/or opportunistic infection) which develops
- associated nonspecific immunosuppression as measured by:
  - leukopenia with absolute lymphopenia
  - depletion of OKT4 "helper" cells
  - decreased OKT4/OKT8 helper-suppressor ratio
  - anergy in vitro and in vivo
  - increased circulating immune complexes
  - polyclonal hypergammaglobulinemia
  - increased interferon levels

To be classified as an AIDS related complex (ARC) case, a patient must present at least two of each of the following clinical and laboratory criteria:

Clinical	*Laboratory*
1. Fever > 3 months	1. Lymphopenia, leukopenia, anemia, thrombocytopenia
2. Weight loss > 10 per cent body weight	2. Hypergammaglobulinemia
3. Lymphadenopathy > 3 months	3. Anergy
4. Diarrhea	4. Decreased OKT4 helper cells
5. Fatigue	5. Decreased OKT4/OKT8 helper-suppressor ratio
6. Night sweats	6. Decreased lymphocyte blastogenesis

Most accumulated evidence suggests an infectious etiology by an agent which targets specific cellular subsets of the cellular immune system. Transmission by intimate contact (perhaps sexual) involving mucosal surfaces, by parenteral spread through blood products, and by use of nonsterile needles, is likely. Airborne spread appears unlikely. No treatment to date has been successful in restoring immune competence including bone marrow transplantation, adoptive transfer of lymphocytes, and immunological enhancement with adjuvants, interleukin-2, or interferon.

Recommendations for risk reduction and disease prevention are based solely on epidemiological considerations related to sexual behavior and possible exposure to blood or blood products. In addition, it is known that transmission may occur when the patient is asymptomatic. There is presently no evidence of AIDS transmission to hospital personnel from contact with AIDS patients or clinical specimens; however, it appears prudent for hospital personnel to use the same precautions as those used for patients with hepatitis B virus infection in which blood and body fluids possibly contaminated with blood are considered infective. CDC has prepared guidelines of precautions advised for personnel providing care to AIDS patients as well as for laboratory staff.

CDC's Case Definition

The definition of AIDS cases is complicated by the lack of an identified causal agent and a specific laboratory test for the agent or some associated characteristic of the agent. AIDS is recognized through its complications. No single clinical or laboratory criteria are sufficiently specific to identify cases. There are no means available to detect subclinical cases, healthy carriers, or recovered patients.

Nevertheless, CDC has developed a case definition based on a combination of clinical and laboratory findings. For the limited purposes of epidemiological surveillance, CDC defines a case of acquired immune deficiency syndrome (AIDS) as a person who has had:

I) a reliably diagnosed disease that is strongly suggestive of an underlying cellular immune deficiency, but who, at the same time, has had:

II) no known underlying cause of cellular immune deficiency nor any other cause of reduced resistance reported to be associated with that disease.

This general case definition may be made more explicit by specifying:

I) the particular diseases considered strongly suggestive of cellular immune deficiency; and

II) the known causes of cellular immune deficiency, or other causes of reduced resistance reported to be associated with particular diseases.

Each category is further defined below:

I. Diseases Strongly Suggestive of Underlying Cellular Immune Deficiency:

These are listed below in five etiological categories: a) protozoal and helminthic; b) fungal; c) bacterial; d) viral; and e) cancer. Within each category, the diseases are listed in alphabetical order. "Disseminated infection" refers to involvement of liver, bone marrow, or multiple organs, not simply involvement of lungs and multiple lymph nodes. The required diagnostic methods with positive results are shown in parentheses.

A) Protozoal and Helminthic Infections:

1. Cryptosporidiosis, intestinal, causing diarrhea for over one month, (on histology or stool microscopy);
2. *Pneumocystis carinii* pneumonia, (on histology, or microscopy of a "touch" preparation or bronchial washings);
3. Strongyloidosis, causing pneumonia, central nervous system infection, or disseminated infection, (on histology);
4. Toxoplasmosis, causing pneumonia or central nervous system infection, (on histology or microscopy of a "touch" preparation).

B) Fungal Infections:

1. Aspergillosis, causing central nervous system or disseminated infection, (on culture or histology);
2. Candidiasis, causing esophagitis, (on histology, or microscopy of a "wet" preparation from the esophagus, or endoscopic findings of white plaques on an erythematous mucosal base);
3. Coccidioidomycosis, causing disseminated or central nervous system infection, (on culture or histology);
4. Cryptococcosis, causing pulmonary, central nervous system, or disseminated infection, (on culture, antigen detection, histology, or India ink preparation of cerebrospinal fluid);
5. Histoplasmosis, causing disseminated or central nervous system infection, (on culture or histology).

C) Bacterial Infections:

1. "atypical" mycobacteriosis (species other than *Mycobacterium tuberculosis* or *M. leprae*), causing disseminated infection, (on culture);
2. Nocardiosis, (on culture or histology).

D) Viral Infections:

1. Cytomegalovirus, causing pulmonary, gastrointestinal tract, or central nervous system infection, (on histology);
2. Herpes simplex virus, causing chronic mucocutaneous infection with ulcers persisting more than one month, or pulmonary, gastrointestinal tract, or disseminated infection, (on culture, histology, or cytology);
3. Progressive multifocal leukoencephalopathy (presumed to be caused by Papovavirus), (on histology).

E) Cancer:

1. Kaposi's sarcoma, (on histology);
2. Lymphoma limited to the brain, (on histology).

II. Known Causes of Reduced Resistance:

Known causes of reduced resistance to diseases suggestive of immune deficiency are listed in the left column, while the diseases that may be attributable to these causes (rather than to the immune deficiency of AIDS) are listed on the right:

Known Causes of Reduced Resistance	*Diseases Possibly Attributable to the Known Causes of Reduced Resistance*
1. Systemic corticosteroid or other immunosuppressive or cytotoxic therapy	1. Any infection that began during or within one month after such therapy, if the therapy began before signs or symptoms specific for the infected anatomic sites (e.g., dyspnea for pneumonia, headache for encephalitis, diarrhea for colitis); or cancer diagnosed during or within one month after *more than four months* of such therapy (begun before signs or symptoms specific for the anatomic sites of the cancer).
2. Widely spread cancer of lymphoid or histiocytic tissue, such as lymphoma, Hodgkin's disease, lymphocytic leukemia, or multiple myeloma; (this does not include cancer that is entirely localized to one site, such as primary lymphoma of the brain)	2. Any other cancer or infection, regardless of whether diagnosed before or after (because a lymphoma may have been present before, even if diagnosed after)

3. Age 60 years or older at diagnosis	3. Kaposi's sarcoma
4. Age under 28 days (neonatal) at diagnosis	4. Toxoplasmosis, cytomegalovirus, or herpes simplex virus infections
5. An immune deficiency atypical of AIDS, such as one involving hypogammaglobulinemia; or an immune deficiency of which the cause appears to be a genetic or developmental defect (e.g., thymic dysplasia)	5. Any infection or cancer diagnosed before or during such immune deficiency

Basic surveillance principles, including careful case definition, case reporting, and data analysis can be applied to AIDS surveillance. In the absence of any intervention, the goal of surveillance must be the identification of patients for further epidemiological and biological study. Case definition must take into consideration the level of laboratory capability.

PAHO's Epidemiology Unit at Headquarters will act as a clearinghouse to collect voluntary data on the occurrence of cases in the Region.

(*Source*: Epidemiology Unit, Health Programs Development, PAHO.)

Surveillance of the Leading Causes of Premature Death

Because death is inevitable, the goal of public health is not to reduce the total number of deaths, but rather to increase the number of years that a person is active and healthy. Thus, the years of potential life lost due to a particular cause is a more useful index for public health practitioners than is the total number of deaths due to that cause. In March 1982 the U.S. Centers for Disease Control introduced a new table in its *Morbidity and Mortality Weekly Report* (Vol. 32(18):243): "Table V. Potential years of life lost, deaths, and death rates, by cause of death, and estimated number of physician contacts by principal diagnosis" (*1*) (Table 1). The table was designed to provide the reader information on the relative importance and magnitude of certain health issues. In the past, the importance of specific health problems has often been gauged by the number of deaths attributed to each. The new table was developed to emphasize the concept that the age of those who die from a particular problem is also an important determinant of the public health significance of that problem. Thus, a condition that causes a number of deaths among predominantly young people may have a higher priority for prevention than one which causes the same number of deaths among a generally elderly population.

The relative importance of causes of death changes dramatically when viewed in terms of potential years of life lost prematurely (before age 65). For example, in 1981 heart disease, cancer, and cerebrovascular disease accounted for 67.7 per cent of all deaths in the United States; motor vehicle and other accidents, suicide, and homicide accounted for 7.8 per cent (*2*). However, for the same year, motor vehicle and other accidents, suicide, and homicide accounted for 40.4 per cent of the total years of life lost prematurely; heart disease, cancer, and cerebrovascular disease accounted for 37.6 per cent (*3*).

The age-specific nature of health problems in the United States was addressed in 1979 in *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* (*4*). This report established priority areas for preventing morbidity and mortality by life stages in the United States; these included:

Infants:	low birth weight, birth defects, injuries at birth, sudden infant death syndrome, and accidents;
Children:	learning disorders, mental retardation, child abuse and neglect, nutrition, and accidents;
Adolescents and young adults:	motor vehicle and other accidents, suicide, homicide, sexually transmissible diseases, teenage pregnancy, alcohol and drug misuse, and mental health;
Adults:	heart disease, malignant neoplasms, cerebrovascular disease, pneumonia and influenza, diabetes mellitus, and cirrhosis.

Cuadro 1. Número de años de vida potencial perdidos, defunciones y tasas de mortalidad por causa, y número estimado de consultas con médicos, según el diagnóstico principal, Estados Unidos de América.*

Causa de morbilidad o mortalidad (CIE. Novena Revisión, 1975)	Años de vida potencial perdidos antes de los 65 años por personas fallecidas en 1981[1]	Mortalidad estimada diciembre de 1982		Número estimado de consultas con médicos, diciembre de 1982[4]
		Número[2]	Tasa anual por 100.000 habitantes[3]	
Todas las causas (Total)	9.879.590	176.590	894.3	84.512.000
Accidentes y efectos adversos (E800-E807,E810-E825, E826-E949)	2.587.140	7.940	40.2	4.238.000
Tumores malignos (140-208)	1.821.900	38.170	193.3	1.537.000
Enfermedades del corazón (390-398, 402, 404-429)	1.621.290	67.380	341.2	4.924.000
Suicidio y homicidio (E950-E978)	1.403.560	4.560	23.1	—
Enfermedad cerebrovascular (430-438)	275.000	14.100	71.4	724.000
Cirrosis y otras enfermedades crónicas del hígado (571)	267.350	2.410	12.2	107.000
Neumonía e influenza[5] (480-487)	123.420	4.640	23.5	1.101.000
Enfermedad pulmonar obstructiva crónica y afecciones afines (490-496)	116.280	5.270	26.7	1.648.000
Diabetes mellitus (250)	105.960	3.160	16.0	2.212.000
Atención prenatal[6]				2.195.000
Mortalidad infantil[6]		3.600	11.4 por 1.000 nacidos vivos	

*Reproducido de *Morbidity and Mortality Weekly Report* 32(18):243, 1982. Cuadro V.

[1]El número de años de vida potencial perdidos por personas que al morir tenían entre 1 y 65 años se obtiene multiplicando el número de defunciones en cada categoría de edad—según su notificación por el Centro Nacional de Estadísticas de Salud, *Monthly Vital Statistics Report* (MVSR), Vol. 30, No. 13, 20 de diciembre de 1982—por la diferencia entre 65 años y la edad en el punto medio de cada categoría. Como indicador de la mortalidad, "el número de años de vida potencial perdidos" subestima la importancia de las enfermedades que contribuyen a la defunción sin ser la causa básica.

[2]Los Centros para el Control de Enfermedades estiman el número de defunciones multiplicando las tasas anuales de mortalidad estimadas (MVSR, Vol. 32, No. 1, 18 de abril de 1983, págs. 8-9) por la cifra provisional de población de los Estados Unidos para ese mes (MVSR, Vol. 31, No. 12, 14 de marzo de 1983, pág. 1) y dividiendo ese resultado por el número de días en el mes expresado como proporción del número de días del año.

[3]El Centro Nacional de Estadísticas de Salud estima las tasas anuales de mortalidad (MVSR, Vol.32, No.1, 18 de abril de 1983, págs. 8-9), empleando la causa básica de defunción de una muestra sistemática del 10% de los certificados de defunción recibidos durante el mes en las oficinas de registro civil estatales y la cifra provisional de la población de los estados incluidos en la muestra de ese mes.

[4]IMS America *National Disease and Therapeutic Index* (NDTI), Monthly Report, diciembre de 1982, Sección III. La estimación incluye el número de visitas a consultorios, hospitales y sanatorios y el número de llamadas telefónicas motivadas por cada afección, y se basa en una muestra aleatoria estratificada de médicos con consultorios (2.100), que registran todas las consultas de pacientes particulares durante dos días consecutivos de cada trimestre.

[5]En la actualidad, no se dispone de datos sobre las "enfermedades infecciosas y sus secuelas" como causa de defunción ni sobre las visitas a médicos, tal como en otras categorías de código múltiple (por ejemplo, "tumores malignos").

[6]En el cuadro se incluyen la "atención prenatal" (NDTI) y la "mortalidad infantil" (MVSR, Vol. 31, No. 12, 14 de marzo de 1983, pág. 1) porque el "número de años de vida potencial perdidos" no refleja las defunciones de los niños < 1 año.

cambia marcadamente si se la enfoca en términos del número de años de vida potencial perdidos prematuramente (antes de los 65 años). Por ejemplo, en 1981, las enfermedades del corazón, el cáncer y la enfermedad cerebrovascular, fueron responsables del 67,7% de todas las defunciones en los Estados Unidos de América y los

efforts by administrators in the public and private sectors to promote a safer, healthier environment. In conjunction with this philosophy, "Table V" (our Table 1) informs the reader about health areas that offer the greatest potential for improvement.

Specifically, the index used in the table is an estimate of the number of years of potential life lost before age 65 for persons 1-65 years of age at the time of death. The estimates are derived yearly by multiplying the annual number of deaths in each age category by the difference between 65 years and the median age of death in each category. CDC chose to use the terminal age of 65 years because if deaths of persons older than 65 years are included, greater weight is given to natural causes of death, and premature and preventable causes of death become less distinct. Infant deaths are excluded because the leading causes of infant mortality in the United States are conditions specific to the perinatal period (e.g., birth asphyxia, respiratory distress syndrome) whose preventability has not been well demostrated. It was believed these deaths of low preventability would contribute a disproportionately large share of years of potential life lost. In an effort not to exclude or underrepresent these deaths in this table, a separate measure provides the reader with the monthly infant mortality rate.

The concept of years of potential life lost was rapidly and enthusiastically embraced by public health practitioners; however, the method used to estimate this number has been a source of controversy: the main problem lies in the choice of years of life to be included in the analysis. Several proposed alternatives for estimating the "normal" terminal year of complete life include: 1) an arbitrary terminal year, e.g., 70; 2) current life expectancy at birth; and 3) current life expectancy at the age of premature death. A measurement of life expectancy at the age of premature death with the cause of death partially or completely eliminated in the calculation of life expectancy, reflects the cause-specific reduction in mortality risks. This provides the best estimate of the potential gain in life years that could result from disease control. However, because of the complexity of this estimate, CDC chose to use an arbitrary terminal age for surveillance purposes.

In addition to years of potential life lost, the table also shows the monthly mortality rate and a measure of morbidity for each of the leading causes of premature death. The measure of morbidity is based on a random sample of contacts with office-based physicians in the continental United States.

As with all data summaries, complexity and detail are sacrificed, and subtle issues may be obscured. Therefore, the table is usually accompanied by an article presenting a more detailed analysis of a particular health issue, including health-status indicators, risk-factor prevalence, and other factors affecting public health.

The new table presents measures of morbidity and mortality to emphasize the impact some preventable problems have on public health. The table's development and publication reflects CDC's increased responsibility to promote action that reduces unnecessary morbidity and premature mortality.

References

(*1*) Introduction to Table V: Premature deaths, monthly mortality, and monthly physician contacts—United States. *MMWR* 31:109-110, 1982.

(*2*) National Center for Health Statistics. *Monthly Vital Statistics Report* 31(6), 1982.

(*3*) Premature Death—United States. *MMWR* 32:188-189. 1983.

(*4*) *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention.* Washington, D.C., U.S. Department of Health and Human Services, Public Health Service, Office of the Assistant Secretary for Health and Surgeon General. Publication No. 79-55071, 1979.

(*5*) PAHO. Mortality in children 1-4 years of age in the Americas. *Epidemiological Bulletin* 4(2):1-4, 1983.

(*Source*: Division of Surveillance and Epidemiologic Studies, Epidemiology Program Office, U.S. Centers for Disease Control, Atlanta, Georgia.)

Editorial Comments

This article is an excellent example of the need to adopt new points of view and use new methods in the process of identifying health priorities. The development—in Latin America and the Caribbean—of a similar methodology, or perhaps the adaptation of that used by the CDC, will bring new elements to bear on the evaluation of the importance of current health problems and on the establishment of programs to reduce early or unnecessary mortality and morbidity.

Evaluation of the *Salmonella typhi* Ty 21a Vaccine in Chile

The strain Ty 21a of *Salmonella typhi* has been proven safe and effective in preventing typhoid fever when administered live and orally. In Egypt, three doses of 10^9 germs administered in gelatin capsules after ingesting 1 g of sodium bicarbonate continued to protect 96 per cent of the children in the third year of follow-up.

A more practical formulation of the vaccine consists of enteric capsules, which do not require the prior administration of bicarbonate. Studies on the immunogenicity of the vaccine, evaluated using the elevation of IgG and IgM antibodies, demonstrated that there was no significant difference between the two preparations.

Based on these studies, a decision was made in Chile to evaluate the effectiveness of the vaccine in enteric capsules and the protection achieved by one and two doses of the vaccine. In June 1982 vaccinations were given to 91,954 schoolchildren from the northern area of Santiago, distributing them at random in three groups, and administering (in a double blind system) one dose of vaccine, two doses of vaccine, and placebos. The group of schoolchildren was submitted to close epidemiological surveillance in order to bacteriologically detect and confirm typhoid fever cases.

Preliminary Results

The vaccine was tolerated well by the schoolchildren. As of 30 June 1983 (a year after the vaccination) 259 verified cases of typhoid fever appeared in the group of schoolchildren from the northern area of Santiago. Of these, 109 occurred among the nonvaccinated children. The distribution of cases in the three studies was 67 in the group that received placebo, 52 in the group that received one dose of vaccine, and 31 in the group with two doses of vaccine (Table 1).

Table 1. Preliminary results of vaccination with the *Salmonella typhi* strain Ty 21a in the northern area of Santiago, Chile, up to 30 June 1983.

Study groups	Population	No. of cases	Rate per 100,000 population
Placebo	31,475	67	212.9
1 dose vaccine	32,286	52	161.1
2 dose vaccine	27,258	31	113.7

These results indicate an effectiveness of 24.3 per cent with one dose of vaccine and 46.6 per cent with two doses. Due to this rather unsatisfactory outcome, there is currently under way in the area west of Santiago a new field trial using three doses of the vaccine in enteric capsules and gelatin capsules, and administering bicarbonate in two schedules that are differentiated by the interval between the doses (1, 3, and 5 days, and 1, 21, and 42 days). This test aims at elucidating whether the unsatisfactory result is due to the low number of doses, the enteric formulation, or the high incidence of typhoid fever.

(*Source*: Report prepared by Drs. M.M. Levine, R. E. Black, and M. L. Clements, Center for the Development of Vaccines, University of Maryland, USA; Dr. Catterine Ferreccio, Coordinating Epidemiologist for the Oral Typhoid Vaccine Campaign, Chile; and Drs. A. Schuster, H. Rodríguez, J. M. Borgoño, and I. Prenzel, Typhoid Fever Commission of Chile, Ministry of Public Health, Chile).

Support for Research Projects on Diarrheal Diseases in 1984

In 1984 funds will be available though PAHO for operational, field-oriented health services research in diarrheal disease control, directed toward solving problems which emerge in the implementation of national primary health care programs. This type of research is conducted in support of national diarrheal disease control activities and is aimed at developing more effective ways of implementing control strategies.

The research is being coordinated by a Regional Scientific Working Group (SWG) composed of public health officials and scientists who are experts in the area of diarrheal disease control. This Group has outlined certain broad priorities for research within the Region of the Americas, which include:

- nutritional consequences of acute diarrhea and nutritional benefits associated with oral rehydration therapy;
- investigation of different approaches for delivery of oral rehydration therapy at the village (community) and family levels;
- evaluation of different methods for preparing and packaging oral rehydration salts (ORS);
- causes and control of chronic diarrhea;
- studies to determine optimal ways of promoting breastfeeding and preparation of safe, locally available weaning foods;
- studies of traditional beliefs and practices regarding diarrheal disease, and evaluation of health education approaches to modify those that are harmful; and,
- investigation of the most effective methods of environmental intervention to reduce the transmission of diarrheal disease agents, including methods of enlisting community participation.

Applicants should first send a one- or two-page letter outlining the proposed project to: Maternal and Child Health, Pan American Health Organization, 525 Twenty-third Street, N.W., Washington, D.C., 20037, USA. A standard application form will then be forwarded if the project is considered to fall within program priorities.

Decisions on the funding of research proposals are the responsibility of the Steering Committee of the Regional Scientific Working Group, which meets twice a year. To be considered by the Steering Committee in 1984, applications should reach PAHO by *3 February 1984* or *13 July 1984*.

The program also supports biomedical (applied) research to improve and develop new tools (such as vaccines and drugs) for the prevention and treatment of diarrheal diseases. Persons interested in this type of research should write to: Program Manager, CDD Program, 1211 Geneva 27, Switzerland.

Reports on Meetings and Seminars

PAHO Advisory Committee on Medical Research

The Twenty-second Meeting of the PAHO Advisory Committee on Medical Research (ACMR) was held in Mexico City 7-9 July 1983. The first topic of discussion was health services research in the context of primary health care requirements. It was agreed that services should be organized in groups of programs; health services research should respond to this organizational requirement and define ways of changing services so that this orientation is promoted and strengthened. Reports on the growth and development of health services research in Colombia and Mexico were presented. The Committee recommended that PAHO collect and organize the pertinent information on the subject and give special attention to research on drug use in the health services.

The Committee focused closely on the WHO Collaborating Centers in the Region. The process of designating centers and the criteria followed were outlined. The criteria used include the institution's scientific standing in terms of quality of work and leadership, and its stability and ability to contribute to WHO program activities. There are currently 167 WHO Collaborating Centers in 13 countries of the Region, 54 of which are located in Latin America and the Caribbean. The centers are oriented toward all of PAHO's main program areas. Training activities of the Centers are a major contribution to program development in the Region. The Committee felt that new Centers were needed to conduct research in tropical diseases, molecular biology, immunology, and environmental health, and recommended that efforts be made to increase the number of centers in Latin America. Truly operational networks of active collaborating centers should also be established.

PAHO presented to the Committee an outline of its research policy, giving the background of the Organization's involvement in research, the conceptual framework for the current policy, and the mechanisms for implementing said policy. PAHO's research policy was stated thus: "to promote the identification of the gaps in knowledge which impede the solution of national health problems and to cooperate with the countries of the Americas in carrying out in a coordinated manner the research necessary to fill those gaps."

The types of research to be supported and the priorities will result from discussions between the technical programs at PAHO and national health researchers. However, research will, in general, fall into those cate-

gories described in the Plan of Action to implement the Regional Strategies for health for all by the year 2000. Support will be given to biomedical, operational, social, and epidemiological research and no distinction will be entertained between basic and applied research. The policy document quotes the first meeting of the Committee in this respect: "all genuine good quality research is fundamental if it contributes to the more complete understanding of the multifaceted aspects of complex problems. This is particularly so when dealing with man who is the central object of its concern. Fundamental science is not distinguished by the use of mathematical, physical, or chemical methods per se, but by the relevance of the research to an intellectually and practically satisfactory solution of the problem at hand." The PAHO Secretariat will have a major responsibility in implementing the research policy; two important instruments to be used in this regard are the Research Grants program and the Program for Institutional Development. The ACMR is the body which will keep the policy under constant review.

The Research Grants program will be used essentially for cooperating with national investigators in studying priority problems. PAHO's technical programs will be intimately involved in developing research, thus giving the Organization an active rather than passive role in research promotion. Institutional development will be promoted with the idea of strengthening national centers and creating links among them. The policy document also outlined the system of handling the research grants, the background and functioning of the ACMR, and the criteria by which its members are selected and appointed.

The Committee discussed the policy and noted the problems which rendered research in Latin America increasingly difficult. Some of these problems were declining library standards, difficulty in replacing equipment, and the erosion of investigators' salaries. The Committee recommended a study of these factors and said that the gravity of the situation should be brought to the governments' attention.

It also discussed the relationship between migration and health, beginning with global research needs in the area of general population movements as related to health. Specific attention was given to malaria and other relevant problems occurring in Latin America. PAHO convened a working group which produced a common research protocol to be used in six countries of the Region. The Committee supported this kind of multidisciplinary research and encouraged PAHO to pay attention to the urgent problem of the refugee camps in Chiapas, Mexico.

PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION
525 Twenty-third Street, N.W.
Washington, D.C. 20037, U.S.A.