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Human Rabies in the Americas, 1970-1979

According to a report published recently by the Pan American Zoonoses Center (CEPANZO), in the 1970-1979 period, 2,796 human cases of rabies were reported in the Region of the Americas (Table 1).

During that period, there were no major changes in the human rabies situation in the Region. The small variations that were recorded, such as the reduced number of cases reported in 1972 and particularly in 1973, were due to control activities in severely affected areas in some countries. However, failure to continue these activities contributed to a new rise in reported cases which peaked in 1978. In addition to an actual increase in the number of cases, the rise may be explained in terms of better surveillance, and the extension of control to new areas in some countries; most probably, however, it was the result of a combination of all these factors. It is to be noted that Belize, Canada, Costa Rica, and Grenada have not reported any cases in man since 1971, Chile since 1972, Panama since 1973, and Cuba, since 1976.

In each year covered by the report, the number of cases reported was higher in children than in adults, with 57.3 per cent of those specifying an age occurring in children under 14. This fact, like the predominance of cases in males, may be explained by the greater likelihood that these groups came into contact with domestic animals, both in the workplace and during their leisure hours.

In 95 per cent of the cases reported, the principal means of entry of the virus was a bite. The location, number, and severity of the bites do not permit distinctions to be drawn as to their relative importance in the incidence of cases, although they might be significant in directing treatment in future exposures. The shortest incubation periods were observed in persons bitten on the head and neck. Two cases in Brazil registered the minimum and maximum periods of two and 613 days respectively.

In most countries, urban cases exceeded those in rural localities, despite the fact that the major control activities were carried out in urban areas. The problem requires more detailed analysis, since 50 per cent of the reports did not indicate the place of residence and very possibly many cases in rural areas went unreported because of the shortage of medical care. Large conurbations, particularly

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those with significant fringe conglomerates (shantytowns or slum areas), are conducive to the spread of the disease because people live in close proximity to cats and dogs. Some socioeconomic, hygienic, and cultural factors also play an important role in this risk.

For individuals properly vaccinated with the number of doses prescribed by each country's health regulations, factors such as the type of exposure, the amount and strength given, individual susceptibility, possible immunogenic difference between the operative strain and the vaccine strain, and the use of high-quality sera must be taken into account. Nevertheless, it is doubtful that these factors alone were responsible for the high number of reported cases. Also, it is interesting that in the majority the incubation period was short ($\leq$30 days).

Since 1971, the annual total of cases with post-vaccination neurological complications has been between seven and 16, with an average of 11 cases per year. Between 1970 and 1979, 131 cases were reported with post-vaccination complications. Interestingly, the vaccine used most frequently in the Americas is the suckling mouse brain vaccine.

Of the 2,600,000 persons who started antirabies treatment, 30 per cent received the full course. Interruption of the treatment noted in the remainder may have been due to various causes, ranging from medical prescription and lack of vaccine and sera, to the abandonment of treatment for no apparent reason.

The high percentage of cases on which only a clinical diagnosis was performed was due basically to deficiencies in the surveillance mechanisms and to poor coordination between public health and medical care services. Although this has improved, much still remains to be done in the various countries.

Dogs continue to be the major source of transmission of rabies to man, followed in descending order of importance by cats and wild animals. The few cases reported in Canada and the United States originated in wild animals. Some countries have ecosystems in which bats are major transmitters of the disease. Two cases occurred from inhaling aerosols containing rabies virus, two originated from bovines, and three were caused by rats; there were also two unusual cases related to cornea transplants.

Although rabies is not one of the major causes of mortality in man, the number of cases could undoubtedly be reduced considerably, and even eliminated completely in those caused by cats and dogs, if available technology were used to control rabies in these species. The persis-

Table 1. Human cases of rabies, by country and year, Region of the Americas, 1970-1979.[a]

Country	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	Total
Argentina	11	2	2	12	7	7	18	8	9	3	79
Belize	3	–	–	–	–	–	–	–	–	–	3
Bolivia	1	–	1	6	6	3	1	2	10	6	36
Brazil	111	116	92	77	112	106	99	140	139	148	1,140
Canada	1	–	–	–	–	–	–	1	–	–	2
Chile	–	1	1	–	–	–	–	–	–	–	2
Colombia	32	34	20	15	8	3	1	5	10	7	135
Costa Rica	1	–	–	–	–	–	–	–	–	–	1
Cuba	1	4	1	2	2	2	1	–	–	–	13
Dominican Republic	6	1	3	4	2	7	3	4	1	–	31
Ecuador	19	20	19	24	23	24	13	23	19	25	209
El Salvador	6	3	9	4	15	15	12	12	10	11	99
Grenada	1	–	–	–	–	–	–	–	–	–	1
Guatemala	1	–	3	5	9	2	1	4	5	10	40
Haiti	–	4	–	–	–	–	4	1	6	–	15
Honduras	3	2	5	8	12	9	14	10	–	–	63
Mexico	65	73	67	44	79	81	61	34	84	59	647
Nicaragua	1	2	3	2	5	1	1	3	3	1	22
Panama	–	1	–	1	–	–	–	–	–	–	2
Paraguay	3	2	6	2	4	2	2	1	1	1	24
Peru	11	12	5	12	21	21	21	9	12	17	141
United States of America	2	2	2	1	–	3	2	–	2	3	17
Venezuela	13	7	4	6	5	8	5	6	9	11	74
Total	292	288	243	225	310	294	259	263	320	302	2,796

[a]According to data reported to CEPANZO.

tence of the disease is not, therefore, due to a lack of tools to eliminate it, but to the failure to decide to use them. It should be stressed that research now underway will help reduce the time and expense required to achieve this goal.

Replies by countries to surveys conducted by CEPANZO in 1971 and 1977 indicate that, while the disease continued to occur with the same or greater intensity, vaccine production for human use remained at approximately the same level. It is important to stress again that the control of this zoonosis in man depends on the extent to which there is a reduction in the number of cases in epidemiologically important animal species that transmit the disease.

(*Source:* Pan American Zoonoses Center, *Special Publication No. 3,* 1981.)

Acute Respiratory Disease (Atypical Pneumonia) in Spain

On 4 May 1981 the Spanish health authorities and the Ministry of Health were notified of the hospitalization of six brothers who for three days had shown signs of an acute syndrome of unknown etiology. Of these patients, all residents of Torrejón de Ardoz, 20 km from Madrid, one was pronounced dead on arrival at the medical center. The same day, two of three siblings of a neighboring family experienced an onset of similar symptomatology. All cases were diagnosed as "atypical pneumonia" based on distinctive radiologic characteristics and respiratory symptoms.

By 8 July 1981 there was a total of 10,179 hospitalized cases with 65 deaths, 41 of which were in Madrid and 24 in the provinces. Most affected were the north central and northwestern provinces, particularly Palencia, Valladolid, and León. Only sporadic cases occurred in the southern and coastal provinces and the islands. Eleven cases were reported in Portugal and these had been in Madrid previously.

Clinically, the disease was characterized by symptoms of interstitial pneumonia (confirmed by x-ray), fever, marked, progressive eosinophilia (about 8 days after the onset) and, in many cases, cutaneous symptomatology, in particular pruritus. A large majority of cases was in the 15-55 age group with only a few under four and over 65. In general, most patients lived in suburban or rural areas and belonged to the lower-middle economic stratum. Relapses with neurologic symptoms were also observed.

Initially, epidemiological investigations seemed to indicate an infection with *Mycoplasma pneumoniae,* which was isolated in a number of samples from pathological material, but they also pointed to viral pneumonia since various viruses, mainly the adenovirus, were isolated at the same time. However, lack of transmission, lack of coherent laboratory findings, a typical occurrence in families, age distribution of the cases, and the use of a particular oil as the only common factor, directed attention to the possibility of a toxic factor.

The clinical and epidemiological investigation revealed the use of an adulterated edible oil sold without authorization. The oil was distributed by two small companies in Alcorcón and Badaján near Madrid and sold from house to house by unathorized dealers as "olive oil" in five-liter unlabeled and unsealed plastic containers. Subsequent investigations showed that the cheap, denaturalized oil (colza-oil) was imported for industrial use by a company in San Sebastián and was "de-denaturalized," or regenerated by subsequent buyers in order to sell it as edible oil. This oil was then mixed with soy and olive oil. It seems that this practice had been going on for years without reports of adverse effects. Apparently, either the de-denaturalizing or the mixing processes were deficient in a large consignment (approximately 110 tons) of oil, which is thought to have given rise to the outbreak of intoxication that started in early May and continued

throughout June. The operation was illegal for three reasons since the sale of open, non-sealed, unregistered, unlabeled oil, was prohibited in Spain in 1979, as was any adulteration of oil and manipulation of industrial oil.[1]

When the fraud was discovered, the stock of adulterated oil, some 150,000 liters, was confiscated, and the Association of Olive Oil Producers, although not involved in the fraud, volunteered to exchange all illicit oil for controlled, good quality olive oil. In spite of this and the radio, press, and television campaign, new cases, though declining in numbers, were still occurring (about 50 a day) because some people did not believe oil to be the cause and did not want to discard the reserves they had bought, or because the press, radio, or television had not reached them. Those responsible for the adulteration have been arrested and legal action has been initiated.

The toxic contaminants found in painstaking analyses were different aromatic amines (aniline, acetanilide, erucic acid, and quinoline), but these do not fully explain the respiratory symptomatology. Additional investigation was directed to cyclic hydrocarbons (toluene and benzene) which also did not provide a satisfactory explanation. The present hypothesis is a contamination with short chain hydrocarbons (a molecule similar to gasoline) which could explain the elimination of toxic substance via the respiratory route. The gas chromatography testing of many thousands of samples and various experiments on animals are still in process. The exact nature of the contamination and the physiopathologic mechanisms are as yet unexplained.

In the majority of cases, an infectious etiology seems to have been ruled out by Spanish and other collaborating foreign laboratories (Centers for Disease Control, CDC, Atlanta, Georgia, U.S.A.), although some clinicians still maintain that an infectious agent cannot be completely discarded. In the present situation it is possible that, among the cases of acute pneumopathy, a number of respiratory infections of varied etiology might have been included.

[1]Spain consumes 400,000 tons of olive oil of guaranteed quality a year, which is controlled by the industry of oil-producing associations and sold with registration in sealed containers.

As a result of public dissemination of these findings and actions taken to restrict consumption of the oil by the population, a gradual decrease in the numbers of new cases has occurred. The decrease in registration of new cases since these measures were started confirms that the contaminated oil is a principal factor in this epidemic; however, there are still several clinical and etiological factors in need of further research and clarification. Furthermore, the clinical variability and evolution suggest the need to establish a follow-up program of similar nature to those established in other collective toxic accidents.

(*Source:* Division of Communicable Diseases, WHO Regional Office for Europe.)

Editorial Comment:

This outbreak demonstrates several important points. The epidemic is an example of a chemically induced, toxic illness which masqueraded initially as infectious disease. Without careful epidemiological investigation supported by adequate laboratory resources, this illness might have been dismissed as an atypical viral syndrome.

It is important to note that the incriminated oil is not, per se the cause of the epidemic. Rather it is a combination of factors, some of which remain to be explained. Apparently, the custom of "de-denaturalizing" the oil was well established for years without known adverse effects. However, the technology for this process failed. This failure, perhaps coupled with other unknown factors and the inadequate monitoring of legal controls for the sale of oil, led to the epidemic.

Epidemiologists and public health officials must remain alert to possible adverse health effects of chemical wastes and toxic products produced by modern technology. Although many countries have developed laws for the control of toxic wastes, strict monitoring and enforcement may be difficult to carry out effectively. Epidemiological surveillance and clinical suspicion are essential to detect any adverse effects.

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 December 1981.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague cases
		Cases	Deaths	
BOLIVIA	–	*96*	*24*	*21*
Beni	–	3	2	–
Cochabamba	–	6	5	–
Chuquisaca	–	2	1	–
La Paz	–	11	7	*21*
Santa Cruz	–	74	9	–
BRAZIL	–	*20*	*18*	*58*
Amapá	–	1	–	–
Ceará	–	–	–	58
Goiás	–	3	3	–
Mato Grosso	–	6	6	–
Mato Grosso Sul	–	2	2	–
Pará	–	5	4	–
Roraima	–	3	3	–
COLOMBIA	–	*6*	*6*	–
Meta	–	4	4	–
Putumayo	–	1	1	–
Vichada	–	1	1	–
ECUADOR	–	–	–	*8*
Chimborazo	–	–	–	8
PERU	–	*98*	*47*	*27*
Ayacucho	–	1	–	–
Cuzco	–	85	39	–
Junín	–	4	4	–
Loreto	–	1	1	–
Madre de Dios	–	1	1	–
Pasco	–	1	1	–
Piura	–	–	–	27
San Martín	–	4	1	–
UNITED STATES	*21*[a]	–	–	*13*
Arizona	–	–	–	3
California	–	–	–	1[c]
Colorado	–	–	–	1
Guam	1	–	–	–
Hawaii	1[b]	–	–	–
New Mexico	–	–	–	6
Oregon	–	–	–	1
Texas	2	–	–	–
Utah	–	–	–	1

[a] 17 cases associated with an outbreak on an offshore oil rig in the Gulf of Mexico (see p. 6).
– None.
[b] Imported case.
[c] Unconfirmed.

Cholera Outbreak on an Offshore Oil Rig in the Gulf of Mexico, Texas

Specimens of toxigenic *Vibrio cholerae* 0-group 1, biotype El Tor, serotype Inaba, were isolated in Louisiana from the stool of a 23-year-old man suffering from diarrhea. He became ill on 20 September 1981, five days after he began a seven-day tour on an offshore oil rig in the Intracoastal Waterway in Jefferson County, south of Port Arthur, Texas. He had the following symptoms: severe watery diarrhea with nausea, vomiting, abdominal cramps, and faintness; on 28 September he finally consulted a physician who had a stool specimen taken for culture.

Because the oil rig is owned and operated by a Louisiana firm employing mainly state residents, a cooperative investigation was undertaken by the Texas and Louisiana State Health Departments. Furthermore, three employees who lived with their families either in Mississippi or Alabama were investigated by their respective health departments. Interviews with permanent oil rig employees revealed that another 10 of the 13 persons on the oil rig the week the patient worked there had experienced in many cases severe diarrheal illness, beginning on 22 or 23 September. Moreover, eight of 43 service personnel who visited the site for varying periods in the latter half of September stated that they suffered diarrhea during that time. None of the 16 who lived on the oil rig the week preceding or following the one in which the index patient became ill were affected. Although none of the rectal swab cultures obtained in early and mid-October from all workers (except the initial patient) yielded *V. cholerae,* 16 additional *V. cholerae 01* infections (one asymptomatic) were identified by assays for vibriocidal and antitoxic antibodies in serum specimens from these workers. None of the Moore swabs[1] placed two weeks after the outbreak in the sewage tank, drinking-water reservoir, and canal water surrounding the oil rig yielded *V. cholerae 01.*

The source of infection for the index case is unknown. The investigation established that between 20 and 21 September, an inadvertent contamination of undetermined duration occurred between the oil rig's canal-water system used for drilling and the system for unchlorinated water used for drinking. A raw-sewage discharge pipe was close to the intake port for the drill-water system, and it appears likely that the drinking water was contaminated by drilling water and sewage containing *V. cholerae 01* shed by the index patient. Drinking water and the beverages and food prepared with it may have served as vehicles of transmission for the *V. cholerae* that caused the 22-23 September outbreak. Presence on the oil rig on 21 September is highly associated with having diarrhea on subsequent days.

Stool cultures and serum specimens from family members of the workers with cholera have not yielded any evidence of *V. cholerae* infection.

The 17 *V. cholerae 01* infections represent the largest outbreak of cholera in the United States in this century. From 1911 to 1973, no cases were registered as having contracted the disease in this country (other than a few laboratory-acquired cases). In 1973 a single case was found in Port Lavaca, Texas.[2] Eleven infections caused by eating inadequately cooked crabs were found in Louisiana in 1978.[3] Two more cases were identified in May and June 1981 in Texas near the area where the current outbreak occurred.[4] The strains from all the cases are basically the same, which suggests that toxigenic *V. cholerae 01* may have persisted for eight years along the Gulf of Mexico coast.

Of the 31 infections of toxigenic *V. cholerae 01* occurring since 1973, 26 were discovered through public health investigations and surveillance systems, and would probably have escaped identification without such specific activities. Although cholera epidemics are not likely to occur in the United States because of high sanitation and hygiene standards, occasional, sporadic cases without further transmission can be expected. In addition, outbreaks such as this one may occur when breaks in food or drinking-water sanitation take place.

(Source: Morbidity and Mortality Weekly Report 30:589-590, 1981.)

[1]Barrett, T. J., P. A. Blake, G. K. Morris, N. D. Puhr, H. B. Bradford, and J. G. Wells. Use of Moore swabs for isolating *Vibrio cholerae* from sewage. *J Clin Microbiol* 11:385-388, 1980.

[2]Weissman, J. B., W. E. DeWitt, J. Thompson, et al. A case of cholera in Texas, 1973. *Am J Epidemiol* 100:487-498, 1974.

[3]Blake, P. A., D. T. Allegra, J. D. Snyder, et al. Cholera—a possible endemic focus in the United States. *N Engl J Med* 302:305-309, 1980.

[4]Centers for Disease Control. Cholera—Texas. *MMWR* 30:389-390, 1981.

Program for Dengue Elimination and *Aedes aegypti* Eradication in Cuba

Epidemiology

Dengue was first confirmed in Cuba in 1943,[1] although it possibly caused an epidemic registered in 1902. In 1977, serotype 1 was introduced into eastern Cuba and rapidly spread throughout the country. During the epidemic, which lasted until 1978, 553,132 cases were notified. However, it was estimated that for every clinical case there were 10 subclinical or inapparent ones, which represents an epidemic of no less than 5 million cases.[2] From 1978 to May 1981 only sporadic cases were reported. However, in 1981, serologically different cases began to occur and were subsequently identified as dengue serotype 2. The number of registered cases[3] from 1977 to 1980 was:

Year	*Number of cases*
1977	477,440
1978	75,692
1979	1,497
1980	169

Table 1 presents the cases notified weekly and daily average of cases during the epidemic which took place from 9 June to 10 October 1981.[4] A total of 344,203 cases were recorded with 158 deaths (101 in children under 15 years). The epidemic peaked on 6 July with 11,721 cases; the last of these was reported on 10 October and the epidemic was declared over on 19 November. The 158 deaths were caused by dengue hemorrhagic fever (dengue shock syndrome), believed to have been produced by dengue 2 following shortly after the dengue 1 infections. A total of 116,143 cases (almost 34 per cent) were hospitalized. The morbidity rate for persons 15 years or older was 28.6 per 1,000 population; for those between 5 and 14 it was 25.8 per 1,000; for children between 1 and 4 it was 24.5 per 1,000; and for those under 1 it was 24.1 per 1,000. It should be noted that these fairly stable morbidity rates apply to variable population groups and, therefore, the lowest crude rate actually applies to the highest incidence of the disease (24.1 per 1,000 for infants under one year). Figure 1 shows the distribution of cases notified per day.

Table 1. Dengue morbidity by week from 9 June to 10 October 1981.

Week	Total cases	Average per day
9-15 June	9,711	1,387
16-22 June	25,713	3,673
23-29 June	40,315	5,739
30 June-6 July	68,801	9,829
7-13 July	51,136	7,304
14-20 July	35,452	5,084
21-27 July	24,183	3,454
28 July-3 August	23,975	3,424
4-10 August	18,331	2,619
11-17 August	11,757	1,680
18-24 August	5,592	799
25-31 August	2,350	336
1-7 September	741	106
8-14 September	202	29
15-21 September	24	3
22-30 September	40	6
1-10 October	12	1.2

Aedes aegypti Campaign

Preparatory phase: A review of the control operations carried out in the 1977-1978 epidemic shows a combination of emergency measures such as ultralow volume aerial spraying of insecticide and ground thermal fog applications, plus routine larviciding and reduction of foci.[5] Because of the reduced number of sporadic dengue cases and the need to attend to other priority health problems, the *A. aegypti* premises index gradually rose after 1978. A team of consultants from the Pan American Health Organization evaluated the vector control program in 1980 and made a number of recommendations for its improvement. Unfortunately, many of these were just being initiated when the 1981 epidemic broke out. The estimated average *A. aegypti* premises index was 35 before any emergency control measures were put into effect.

[1] Más, P., et al. Dengue fever in Cuba in 1977: Some laboratory aspects. In *Dengue in the Caribbean, 1977.* PAHO Scientific Publication 375, 1979, pp. 40-43.

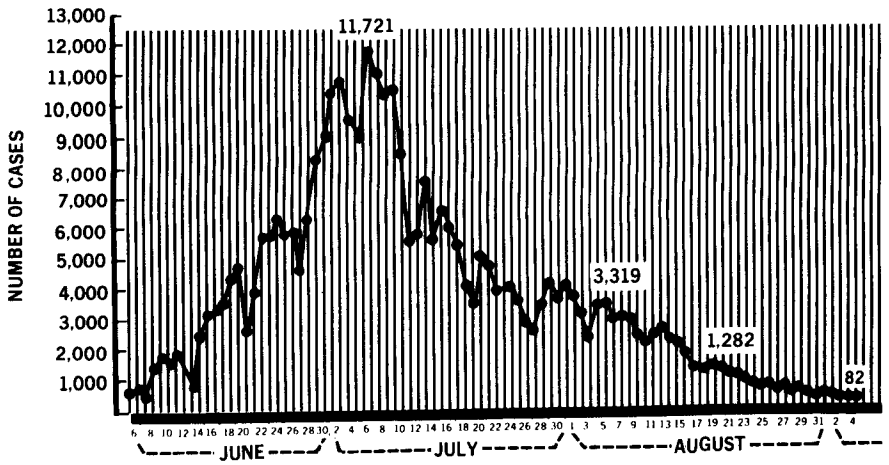
[2] Rodríguez Hernández, J. Unpublished document.

[3] National Department of Epidemiology, Ministry of Public Health, Cuba.

[4] *Granma*, 17C277, 19 November 1981, 3rd edition.

[5] Molinert, H. T., et al. *A. aegypti* control activities during the dengue fever epidemic in Cuba, 1977-1978. In *Dengue in the Caribbean, 1977.* PAHO Scientific Publication 375, 1979, pp. 107-108.

Figure 1. Dengue cases notified per day, Cuba, 1981.



As soon as dengue activity was identified, the vector control program began to take measures similar to those used in 1977-1978. With the available equipment, staff began ultralow volume ground fogging and thermal adulticidal malathion applications, as well as larviciding (temephos), and reduction of breeding sources. Simultaneously, aerial ultralow volume applications of malathion were begun over densely populated areas reaching to four applications in 10-day cycles. Aerial applications continued beyond 6 July, when the maximum number of cases was registered. The active control program undoubtedly had a decisive role in the subsequent sharp decline of cases. However, at that time, no widespread entomological evaluations were made and aerial treatments were confined to urban areas despite the spread of the epidemic to other sections.

As a result of the experience of the 1977-1978 and 1981 epidemic, a decision was made to eliminate dengue and eradicate *A. aegypti* mosquito from Cuba—a noteworthy move, since there had been a slowdown in the eradication and control campaigns.[6] The situation became more serious because the motivation for mosquito control had decreased and new obstacles were present.

Cuban authorities studied the problems of lack of discipline, dedication, motivation, and the vectors' resistance to insecticides, and the cost; they also examined the historic solutions to these problems and outlined a program which used information from other successful programs. Among others, they decided to:

1. Undertake an intensive attack program using every available resource to reduce the chance of resistance to insecticides, reduce long-term expenditures, and minimize community apathy.
2. Declare the dengue situation a national emergency and allow Civil Defense to mobilize their resources during the attack phase. This provided the necessary staff and discipline to meet goals set for this phase and gave the Government time to recruit and train personnel for a newly created *A. aegypti* eradication campaign of the Ministry of Public Health.
3. Stock insecticides in sufficient quantities and equipment to develop the attack and consolidation phases.
4. Adopt a flexible program that could easily be changed as needed.
5. Cover the entire country simultaneously and utilize public support.

Intensive Attack Phase: The plan was to end the attack phase against *A. aegypti* in less than two months.[7] On 26 July the announcement of the attack phase was made, the actual campaign began on 3 August, and finished on 30 September within the established time goal. The following measures were taken:

1. 100 per cent house coverage with temephos (1 per cent sand granules) at doses of 1 ppm (focal application) and fenthion 40 per cent wettable powder (perifocal application).
2. 100 per cent coverage of the interior of the premises using motorized backpack mist blowers with 95 per cent deodorized malathion at 7-day cycles.
3. Street spraying with ultralow volume malathion or thermal fog in all cities at a 7-10 day cycle.
4. Activating Law 27 on sanitation which authorizes vector and *A. aegypti* campaign staff to issue legal summons to those not having eliminated breeding sites.
5. Initiating a health education campaign and special clean-up days.
6. Establishing special teams of evaluators (acting independantly from the *A. aegypti* inspectors), who made their rounds a few days after the inspectors in order to note missed treatments,

[6]Groot, H. *Aedes aegypti*: A sword of Damocles over tropical America. *Bulletin of the Pan American Health Organization* 15(3):267-270, 1981.

[7]Giglioli, M. E. C. *Aedes aegypti* programs in the Caribbean and emergency measures against the dengue pandemic of 1977-1978: A critical review. In *Dengue in the Caribbean, 1977.* PAHO Scientific Publication 375, 1979, pp. 133-152.

containers where temephos had been removed, and violations of Law 27. They also were instrumental in providing health education.

During this phase, between 13,000 and 15,000 members of the Civil Defense, vector control, and *A. aegypti* campaign, as well as a number of temporary staff transferred from other industrial and governmental agencies, served the campaign in some capacity. In addition, students and other individuals served as volunteers in clean-up and other activities. This phase was coordinated by municipal and provincial Civil Defense staff working closely with staff from the department of vector control, the *A. aegypti* campaign, hospitals, and polyclinics.

The equipment for the intensive attack phase was available for the consolidation phase and included 215 ground vehicle-mounted ultralow volume foggers, 3,961 portable mist blowers, 4,407 hand compression spray pumps, and 307 vehicles. The average amount of malathion used per premise by a portable mist blower treatment was 35 ml; the average for the ground-operated ultralow volume fogging equipment was 500 ml/ha (125 ml/minute operation).

Figure 1 shows that on 3 August, the day the intensive attack began, 3,319 cases of dengue were reported, while after 15 September, an average of only three to six cases were reported per day. By the end of August, the provincial averages for the *A. aegypti* premises index ranged between 0.6 and 0.0 for a national average of 0.2. By the end of this phase the national average was 0.09.

Consolidation Phase: Begun on 1 October 1981 when all activities of eradication were transferred to the *A. aegypti* campaign, the staff comprised 13 persons at the national level (including an entomologist) and 6,676 persons at the provincial and municipal levels.

This phase is expected to last one year. It consists in the application of focal and perifocal treatments until the mosquito has been eliminated.

There is evidence, however, that the current 8-week cycles will be sufficiently effective to eradicate *A. aegypti* from most of the country. If this happens, the 4-week cycles will be used only in risk and infested areas. Throughout most of the country, activities will be limited to surveillance tasks. However, both inspectors and evaluators will carry temephos in case positive sources of *A. aegypti* are found. Special surveillance and treatments are planned for the rainy season.

To reduce the possibility of resistance to the organophosphate insecticides—malathion, fenthion, and temephos—the following measures will be taken: inspectors will be equipped with a sharp pick to puncture metal containers; chiefs of brigades and higher-ranking staff will enforce Law 27 more strictly; breeding source reduction campaigns, a major factor in a national rodent control program, will indirectly reduce potential breeding sources; and biological control by fish may be used in some water containers.

In January 1982, all campaign personnel will be given ovitraps similar to those used for surveillance in Panama. About 6,000 of them will be placed at or near staff members' homes and will be checked every seven days for evidence of mosquito breeding.

When a breeding source is discovered by staff inspecting houses or ovitraps, an intensive attack against *A. aegypti* will start in a 300 to 500 meter radius of the source. This new attack will include focal and perifocal treatments, intradomiciliary aerosol mist and extradomiciliary ultralow volume insecticide applications. There will also be breeding source reduction and health education campaigns with weekly evaluations until the area is negative. At that time the monthly visits will begin.

On 15 November, the national *A. aegypti* premises index was 0.03. Summaries of all campaign activities are made and circulated weekly to all provincial and municipal campaign staff.

Commentary on the Campaign

The following aspects of the campaign are noteworthy:

Use of communication media and health education. The Cuban experience illustrates the importance of these factors in any vector control program.

Staff training. A television course was offered for all levels of training and seminars on the campaign and its evaluation were given to senior-level municipal and provincial staff and epidemiologists. Seminars for supervisors and biologists were also offered at the National Institute of Hygiene. These seminars provided program information to train brigade chiefs, inspectors, and evaluators for field operations. At the same time, an apprentice system was developed to train newly recruited staff and individuals transferred to the campaign for the emergency. Manuals were prepared and directive memoranda issued when activities changed. International staff supplied by PAHO gave technical courses to campaign chiefs from the provinces and to graduate biologists.

Supervision. One of the most important aspects of the program is the determination of areas of competence which permit effective functioning. The national and supervisory staff at all levels serve as field eradication workers and are highly mobile, personally responding to reports of new breeding sources.

Eradication. Eradication is not complete, but certain factors must be emphasized. The intensive approach to eradication and coverage of the entire country from the outset reduces the chance of transferring positive containers from one area to another and, in the long run, reduces the overall cost of the program. The continuous use of mosquito population controls, although initially costly, will probably prove to be the cheapest method. Furthermore this approach reduces the possibility of insecticide resis-

tance and provides an alternative plan should resistance occur.

The consolidation phase includes a nation-wide system of ovitraps and house inspections for resting adults. As a result, larvicidal operations are actually increasing during this phase and monthly evaluation cycles cover 100 per cent of the houses.

This plan has benefitted from expert advice gained from other successful programs within the Americas.

Even if eradication is achieved, *A. aegypti* will undoubtedly be re-introduced as it has in many other countries. To reduce this possibility, the experience in Panama is being used to prepare a nation-wide maintenance phase and strong surveillance of seaports and airports.

Evaluation of the Campaign

This program represents one of the most intensive attacks ever waged against a vector. The strength of the approach was a result of the Government's move to make the program both a national and an individual priority and encourage the attitude that eradication is not only possible but attainable. The motivation of the staff is maintained because the program is short, gives results, and keeps everyone up to date with weekly progress reports. Each reduction of the *A. aegypti* premises index generates a sense of pride at the municipal and provincial level and encourages a spirit of competition to be the first to report and maintain a negative index.

(*Source: Aedes aegypti* Eradication Program, Parasitic Diseases and Vector Control Unit, Division of Disease Prevention and Control, PAHO, with assistance from staff from the *Aedes aegypti* Campaign, Ministry of Public Health, Cuba.)

Primary Health Care and Development of Services in Urban Areas

It is estimated that in the next 20 years the population of Latin America and the Caribbean will reach 610 million people, 76 per cent of whom will be living in urban areas. The massive urbanization of the population has and will continue to generate enormous needs in structural terms of environment, housing, jobs, and recreation, as well as basic sanitation services, drinking water, energy supplies, education, and personal health services.

In order to meet these needs, a more balanced distribution of resources and opportunities will be required, based on an urban development strategy that pays particular attention to underprivileged population groups, the vast majority of whom are migrants from rural areas. A fundamental component of that strategy is the appropriate development of health services and their participation in the formulation and implementation of the corresponding policies.

A Regional Technical Consultation Meeting on Primary Health Care and Development of Services in Urban Areas was held at PAHO Headquarters in Washington, D.C., on 16-20 November 1981. It was attended by technical experts from eight countries of the Region, representatives from various international organizations, and staff from the PAHO Headquarters and from different country programs.

The purpose of the meeting was to: (a) examine the health problems resulting from the urbanization process in Latin America, and review approaches to a solution, relating it particularly to primary health care strategy; (b) identify lines of action geared to the context of the goals and Plan of Action adopted to carry out the regional strategies of health for all by the year 2000; and (c) pinpoint areas needing technical cooperation, including the identification of aspects requiring epidemiological and operations research.

Because of the great complexity of the urbanization process and its manifold repercussions on the health of the population, this initial review of specific situations in metropolitan areas represents merely a first look at the general picture. It should in fact be the beginning of an active process for the analysis and design of ways of using, in urban situations, strategies adopted by the countries for achieving the goal of health for all by the year 2000 and, particularly, of using all the various aspects of primary health care: universal coverage, intersectoral relations, community participation, etc.

The meeting considered studies conducted in 1981 by national groups with PAHO support in Bogotá, Buenos Aires, Caracas, Lima, Mexico City, Rio de Janeiro, and São Paulo. These activities are part of the action designed

to obtain a better understanding of health situations resulting from the changes in the geographic distribution of the population.

The discussions revealed the influence of socioeconomic, cultural, and political factors on the urbanization process in the various countries. The demographic growth of the large Latin American cities has occurred at different rates, depending on the country. Migration is initially characterized by the movement of the population to less complex rural-urban areas, and later becomes more acute as the result of the combination of high fertility rates and decreased mortality.

In countries where the urbanization process began more recently, intermediate-size cities have grown, and the development potential of those cities might be one way of solving the serious situation posed by the large metropolitan areas.

The strength of the forces behind these migrations means that the instruments or mechanisms available to control them have been insufficient. However, the possibility exists that the population can be stabilized and distributed more evenly by means of appropriate urban planning and development policies.

Large Latin American cities experience a combination of two factors: morbidity and mortality. In addition to communicable diseases, there are degenerative and chronic diseases, accidents and violence, mental illness (chiefly alcoholism and drug addiction), and the illnesses caused by the adverse effects of environmental pollution. The needs generated by this epidemiological pattern are so diverse that any solution exceeds the bounds of mere sectoral action.

On the other hand, primary care is more complex in urban than in rural areas and requires different approaches. The importance of multisectoral action to achieve comprehensive solutions should be stressed, and this requires coordinating prevention and health care recuperative activities with those related to sanitation, housing, nutrition, and education. Primary care must therefore be developed not only by the health sector, but by all sectors. The health sector has a double responsibility: it must organize its own programs and at the same time encourage the decision-making levels to undertake joint, coherent action.

Development of primary health care requires an overall modification of the health services in terms of administration, allocation of resources, and personnel training, as well as a change in the attitudes of both the population as a whole, the sector itself, and those at decision-making levels. The areas identified for research include: (a) epidemiological analysis of the pathologies in large cities and their conditioning factors; (b) study of the correlation of variables in determining the vulnerability of population groups; (c) examination of the interaction between the various components of the environment and their effect on the health of the urban population; (d) study of administration and health services delivery models in terms of damage, risk, and vulnerability; and (e) development of criteria for determining the appropriate technology for primary care.

The meeting's principal recommendations were:

- Promotion and strengthening by the health sector of intersectoral integration in the preparation of development plans and programs.
- Coordination of action between the country's representative urban centers to generate joint plans and present them to the national planning and decision-making agencies.
- Search for a comprehensive geographic solution to plan coordination of the various services in metropolitan areas by means of a regional organization that would act in each case under the jurisdiction of the country concerned, with central metropolitan direction and decentralization of operations at the local level.
- Incorporation of primary care into existing health services in large cities, and recognition by the countries of the role of hospitals in primary care in the cities.
- Strengthening of the coordination between the various public health entities and social security, in terms of information, operations human resources, and material resources.
- Development of health programs and operational systems based on appropriate systematic epidemiological analyses, supported by an information system to permit evaluation of the work and the monitoring of developments in the health of the communities (i.e., using an epidemiological surveillance approach).
- Development of a distribution policy to allocate resources at the national level, thus ensuring a better balance between urban and rural areas.
- Training of health personnel by the various educational institutions in line with the sector's needs and the characteristics of the "job profile," along with development of continuing education parallel with the development and orientation of the services.
- Conducting analyses at the national level of problems and solutions in intermediate cities, similar to those done at the regional level.
- Training of personnel needed to develop the physical resources of the health sector in terms of planning, architecture, equipment, and maintenance.
- Holding regional-level technical meetings over a five-year period, for in-depth study of specific topics (such as: emergency services systems, environmental control, definition of priority actions for primary care, methodology for programming and management control, and community participation).

Finally, a number of suggestions were made at the meeting as to the direction that technical cooperation in this field should take within the general framework of the Plan of Action approved for achieving the goal of health for all by the year 2000.

(*Source:* Medical Care Systems Development Program, Health Care Delivery Unit, Division of Comprehensive Health Services, PAHO.)

Trends of Some Public Health Indicators in Chile, 1971-1980

The health policy of the Government of Chile is focused basically on services to individuals and environmental action. The health sector—which has been reorganized to help accomplish its objectives more efficiently—includes the Ministry of Health, a system of 27 health services, and other agencies that, because of their specific function, answer to the Ministry. Eighty per cent of the population (estimated at around 11 million) comes under the National Health Services System.[1]

Some biodemographic indicators show the development of public health in the country during the 1971-1980 period (Table 1).

In 1980, the birth rate was 22.8 per 1,000 population, which represents an increase over 1978 and 1979 (22.1). On the other hand, the death rate (6.6 per 1,000 population) showed a decline over previous years. As a result of these two factors, the increase in the vegetative growth of the population was 1.62 per cent.

In 1980 the total number of deaths of those under one year of age was 8,072, which reduced the rate per 1,000 live births to 31.9 (36.6 per 1,000 in 1979). This decrease was also noted in mortality among infants under 28 days and in late infant mortality, and was due mainly to the reduction in the principal causes of death in children under one year: diarrhea and bronchopneumonia. Mortality in infants under 28 days for the first time exceeded the death rate in the following 11 months.

For the last two years, the maternal death rate has remained at 0.73 per 1,000 live births, mainly because abortion-related deaths rose from 0.24 in 1979 to 0.28 per 1,000 live births in 1980. However, an overall decline was noted in maternal deaths, and is directly related to the increase in professional deliveries.

The changes noted in the biodemographic indicators examined also modify the relative importance of the principal causes of deaths (Table 2). In effect, as the easily controllable causes, generally occurring in younger groups, are overcome, the causes of death characteristic of older age groups remain high or change at a slower rate.

Cardiovascular diseases, which went from fifth to first place as a major cause of death in the last 40 years, remained at the top of the list in 1980, with an annual rise of more than 1,000 deaths as compared with 1979; these figures represent 24.8 per cent and 26.6 per cent of the total in those two years.

In the same period, cancer rose from eighth to second place, growing slightly worse between 1979 when it caused 15.4 per cent of all deaths. Accidents and other violent deaths, which did not appear among the 10 principal causes 40 years ago, continued to multiply until they

[1] *Estrategias de salud de Chile hasta el año 2000.* Office of Communications and Public Relations, Ministry of Health, Chile, 1981.

Table 1. Biodemographic indicators, Chile, 1971-1980.

Biodemographic indicators	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Birth rate[a]	28.7	28.7	28.1	26.7	25.2	23.9	22.8	22.1	22.1	22.8
Gross mortality rate[a]	8.7	9.1	8.4	7.8	7.3	7.7	7.0	6.7	6.8	6.6
Infant mortality rate[b]	70.5	71.1	65.2	63.3	55.4	54.0	47.5	38.7	36.6	31.9
<28 days[b]	28.3	29.0	26.9	25.8	24.8	23.6	20.9	18.5	18.3	16.4
Late infancy[b]	42.2	42.1	38.3	37.5	30.6	30.4	26.6	20.2	18.4	15.5
Mortality rate, 1-4 years[b]	3.15	3.02	2.66	2.80	2.32	2.27	1.85	1.61	1.51	1.25
Maternal mortality rate[b]	1.42	1.63	1.32	1.22	1.31	1.15	1.02	0.92	0.73	0.73
Percentage of professional deliveries	83.6	85.0	85.1	86.4	87.4	88.5	90.0	89.6	90.4	90.5
Total population	9,533,989	9,697,448	9,860,611	10,026,069	10,196,423	10,371,939	10,550,886	10,732,863	10,917,485	11,104,293

[a] Per 1,000 population.
[b] Per 1,000 live births.

Table 2. Principal causes of death, by group, Chile, 1976-1980.

Causes of death, by group	1976		1977		1978		1979		1980	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total	79,389	100.0	73,541	100.0	72,321	100.0	74,178	100.0	73,711	100.0
Diseases of circulatory system (390-459)	16,753	21.1	16,348	22.2	17,498	24.2	18,374	24.8	19,625	26.6
Malignant tumors (140-208)	10,706	13.5	10,566	14.4	10,563	14.6	11,237	15.1	11,321	15.4
Traumas and poisonings (800-999)	7,347	9,3	7,871	10.7	8,184	11.3	8,198	11.0	8,739	11.9
Undefined morbid signs, symptoms, and conditions (780-799)	7,846	9.9	7,446	10.1	7,953	11.0	8,087	10.9	7,455	10.1
Diseases of the respiratory system (460-519)	12,445	15.7	8,085	11.0	7,042	9.7	7,549	10.2	7,033	9.5
Diseases of the digestive system (520-579)	5,441	6.9	5,730	7.8	6,213	8.6	5,930	8.0	5,736	7.8
Certain infections arising in the perinatal period (760-779)	4,701	5.9	4,263	5.8	2,957	4.1	2,883	3.9	3,176	4.3
Infectious and parasitic diseases (001-009, 020-139)	4,096	5.1	3,827	5.2	2,811	3.9	2,672	3.6	2,078	2.8
Diseases of the endocrine glands, nutritional and metabolic diseases, and problems of immunity (240-279)	2,246	2.8	1,953	2.7	1,986	2.7	2,060	2.8	1,874	2.5
Diseases of the genito-urinary system (580-629)	1,708	2.2	1,709	2.3	1,593	2.2	1,763	2.4	1,702	2.3
Others	6,100	7.6	5,743	7.8	5,521	7.7	5,425	7.3	4,972	6.8

Note: The figures in brackets correspond to categories in the Ninth Revision of the International Classification of Diseases.

became the third major cause, exceeding 1979 figures by almost 7 per cent, to account for 11.9 per cent of all deaths.

On the other hand, deaths due to early infant diseases continued to decline, as did those resulting from infectious and parasitic diseases, falling from second to eighth place, with 2,078 deaths (2.8 per cent of the total).

Tuberculosis, which caused almost 13,000 deaths a year four decades ago (at a rate of 260 per 1,000 population), disappeared from the list of the 10 major causes, with only 1,355 deaths in 1980.

The changes mentioned above reflect the efforts made in disease control, which in addition to reducing the total number of deaths have also altered the age composition of the population. For example, as a result of the increase in older age groups, the causes of death characteristic of those groups also rose. Accidents, though a cause in which improvements can be made, are the one exception since they increase constantly among the young and middle-aged, influenced as they are by the transformation of an agrarian society into an industrial one and by the displacement of rural populations to urban areas.

(*Source: Boletín de Vigilancia Epidemiológica,* Vol. VII, Nos. 5 and 6, May-June 1981, Ministry of Health, Chile.)

Reports of Meetings and Courses

First World Congress on Sexually Transmitted Diseases

The Congress was held in San Juan, Puerto Rico, from 15-20 November 1981, with the participation of over 14,000 persons from 50 countries. The Congress was sponsored by WHO, PAHO, the National Institutes of Health/National Institute of Allergy and Infectious Diseases (USA), the Centers for Disease Control (USA), the International Union Against the Venereal Diseases and the Treponematoses, the Latin American Union Against Venereal Diseases, the U.S. Public Health Service, the International Planned Parenthood Federation, the American Venereal Association, the American Social Health Association, and the Department of Health/Medical Sciences Campus of the University of Puerto Rico.

Included in the extensive agenda were topics such as research, new advances in clinical matters, epidemiology, control and education, and legal-ethical problems associated with sexually transmitted diseases (STD). In addition there were training workshops for some of the participants.

The research program consisted of three major symposia on pathogenic mechanisms of bacterial STD, viral STD, and vaccines against these diseases. A number of papers were presented on gonorrhea, chlamydia, syphilis, herpesvirus, cytomegalovirus, and other STD. The presentation of new clinical developments featured the treatment of STD during pregnancy and the adverse results of pregnancies associated with these diseases. Several workshops examined the available clinical information, epidemiological data, and the planning and administration of disease control. Among the legal and ethical issues in STD, panels debated its relation to prostitution, women, and children. A special report addressed the epidemiological relationship between Kaposi's sarcoma and homosexual activity.[1]

The executive committee recommended unanimously that a second world congress on STD be organized in 1985 or 1986.

Further information on these diseases can be obtained from the Division of Disease Prevention and Control, PAHO.

[1]See *Morbidity and Mortality Weekly Report* 30:305-308 and 33:409-410, 1981.

First Global Conference on Traffic Accidents in Developing Countries

The Conference, held at El Centro Médico in Mexico City on 9-13 November 1981, was sponsored by the Mexican Government, WHO, and PAHO. Among the 150 delegates from 45 countries were representatives from the departments of transportation, police, justice, education and health, as well as experts in safety, traumatology, and the epidemiology of traffic accidents.

For several decades, traffic accidents have been a cause of serious concern to the governments of industrialized countries because of the staggering losses related to health, family, and the economy. In the United States, for example, motor vehicle injuries are second only to cancer in their economic burden which exceeds US$20 billion annually. Some of the economic consequences suffered from accidents include: the cost of death, injury, and suffering; the cost of the burden placed on health and other services (emergency care, hospitalization, rehabilitation, etc.); and others such as the loss of available skilled manpower, the additional call on foreign exchange, and the loss of the vehicle as capital.

Throughout the world, deaths from traffic accidents approach 300,000 annually and the number of injuries exceeds 10 million. In many developing countries, these accidents are, second to communicable diseases, among the principal causes of morbidity and mortality.

The purpose of the Conference was to promote awareness among governments of the public health consequences of road traffic accidents, define the scope and nature of the problem specific to individual nations and regions, and encourage the implementation of countermeasures to reduce accidents and their consequences.

Among the topics discussed were: modification of behavior to ensure road safety (including abuse of alcohol and drugs); environmental aspects (such as vehicle and road safety); information systems (related to accident data and health statistics); introduction and enforcement of appropriate legislation; education and training in traffic safety including protection of the individual (the driver, the passenger, the pedestrian) and vehicle maintenance; the role of public health authorities; the organization and management of traffic safety systems; and research, development, and application of proper policies in this field.

It was felt that the United Nations should designate an "International Year of the Traffic Accident" to fulfill these objectives.

Proceedings of the Conference will be published by WHO in late 1982.

Management Training Courses in Diarrheal Disease Control Programs

Two training courses for managers of national diarrheal diseases control programs have recently been held in the Region. The first, attended by participants from 10 Latin American countries, took place from 26-31 October 1981 in Tegucigalpa, Honduras. The second was held in Georgetown, Guyana, from 7-13 December, with representatives from 12 countries from the English-speaking Caribbean.

Recently developed by experts from both WHO and the Centers for Disease Control (USA), the courses consist of seven modules which consider specific managerial aspects of planning, implementing, and evaluating national diarrheal disease control programs within the framework of existing primary health care systems.

The course uses a modern methodology in which participants work independently in small groups, receive constant evaluation from course instructors, and participate in general discussions.

Although the course is directed to diarrheal disease control program managers at the central level, the methodology and much of the content can easily be adapted to train managers of other primary health care programs such as nutrition, sanitation, or acute respiratory diseases. Another course aimed at mid-level managers is now being developed and will be available to support national-level training efforts in the near future.

Similar courses are planned in 1982 for the Andean and Southern Cone countries.

Once they have participated in the course, countries can call on the PAHO Diarrheal Disease Prevention and Control Program for further technical assistance in the area of research, and in program planning, promotional strategies, training, and program evaluation.

For more information contact: Regional Adviser on Enteric Diseases, PAHO, 525 23rd St. N.W., Washington, D.C. 20037.

Short Course on Vector Control

A course in Spanish on Comprehensive Vector Control will be held in July and August 1982 at the Center for Public Health Research and Continuing Education of the University of South Carolina (USA). Lecture classes and laboratory and field studies will last six weeks. Subsequently, two weeks (optional but highly recommended) will be devoted to field observation of vector control programs in operation in South Carolina, Florida, and Georgia.

The course—aimed at malaria or other vector control program directors, professional technical personnel, and operations managers—is expected to provide the information and field experience necessary to effectively manage these programs, emphasizing the control of malaria, yellow fever, dengue, and hemorrhagic fever mosquito vectors. Among the topics discussed will be taxonomy, biology, vector competence, susceptibility to pesticides, and methodology for epidemiological evaluation and surveillance, and the ecology of medically significant arthropods. The most recent vector control methods, maintenance of equipment, and program administration will also be presented in addition to the human factor in clinical symptoms and chemotherapy.

Applications should be submitted to the Division of Human Resources and Research, PAHO, before 1 May. Between 10 and 20 students will be accepted and should have at least a Bachelor's or other advanced university degree. The cost of enrollment is US$1,000; additional expenses include US$200 for study trips, US$45 daily for room and board, and US$100 for the use of laboratory and field equipment. The Center will award a certificate of attendance and credit may be obtained as part of the Continuing Education Program.

Graduate Program in Epidemiology

The 17th Graduate Summer Session in Epidemiology—sponsored by the Epidemiology Section of the American Public Health Association, the Association of Teachers of Preventive Medicine, and the American College of Preventive Medicine—will be offered by the Division of Epidemiology, School of Public Health and the Department of Conferences, Continuing Education and Extension, University of Minnesota, Minneapolis from 20 June to 10 July.

The session offers two basic courses in the fundamentals of epidemiology and biostatistics, epidemiology of communicable diseases, hospital epidemiology and infection control, epidemiology of cancer, epidemiology of cardiovascular diseases, environmental epidemiology, diseases due to drugs and other therapies, occupational epidemiology, epidemiology of alcoholism, and analysis of quantitative data in epidemiology. Classes are structured to allow students interested in communicable diseases, environmental epidemiology, occupational epidemiology, and the epidemiology of cancer to enroll in a package of courses on these topics.

Tuition will be US$500. Applications and a US$50 deposit should be received before 1 May. For further information contact: Dr. Leonard M. Schuman, Director, Graduate Summer Session in Epidemiology, University of Minnesota School of Public Health, 1-117HSUA, 515 Delaware St., SE. Minneapolis, Minnesota 55455.

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.