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Yellow Fever in the Americas, 1981-1982

Five countries in the Americas reported cases of jungle yellow fever between 1981 and 1982 (Bolivia, Brazil, Colombia, Ecuador, and Peru). A total of 368 cases was notified during this period, constituting a slightly higher incidence than was observed in the preceeding two years (324). Bolivia and Peru accounted for 84.8 per cent (312) of the cases in 1981-1982, whereas Brazil notified 12.5 per cent (46), Colombia reported 2.2 per cent (8), and only two cases were detected in Ecuador. During 1981 there was an epidemic in Rincón del Tigre, a locality of Sandoval Province in the Department of Santa Cruz, Bolivia, which accounted for about 50 per cent of the cases notified by Bolivia that year.

Table 1 presents cases and deaths for each year by country and major political division. There was a total of 183 deaths reported during the biennium and, with a single exception, all survivors were reported from Bolivia and Peru. In Rincón del Tigre the case fatality ratio was about 10 per cent, although diagnosis of the outbreak was retrospective and based mainly on clinical grounds. It should be noted that Brazil reports only confirmed yellow fever cases, whereas Bolivia reports all suspected cases in an endemic area. This variation in case reporting criteria constrains major analysis regarding case fatality ratios.

Figure 1 shows the areas in which endemic yellow fever cases were recorded in the Americas for 1981 and 1982. With the exception of the 1981 outbreak in Rincón del Tigre, all cases reported in 1981 and 1982 occurred in known endemic areas of the disease. However, the last confirmed outbreak of yellow fever to occur in the Andrés Ibáñez Province of the Department of Santa Cruz, Bolivia, was in the late 1940s which illustrates the virus' potential to reappear after long intervals of quiescence. The 1980-1981 outbreak which involved the States of Goiás, Mato Grosso, and Mato Grosso do Sul, on the other hand, demonstrates that the cyclical appearance of the virus continues to occur in central and western Brazil. The first confirmed outbreak in the State of Goiás was in 1935 and was followed

IN THIS ISSUE...

Table 1. Yellow fever in the Americas, 1981 and 1982: reported cases and deaths.[1]

Country and administrative subdivision	1981 Cases	1981 Deaths	1982 Cases	1982 Deaths
Bolivia	102	29	95	35
Beni	3	2	1	—
Cochabamba	6	3	3	—
La Paz	10	7	3	3
Santa Cruz	83	17	88	32
Brazil	22	21	24	24
Goiás	3	3	—	—
Maranhão	—	—	5	5
Mato Grosso	5	5	2	2
Mato Grosso do Sul	5	5	12	12
Pará	5	4	3	3
Rondônia	1	1	—	—
Roraima	3	3	2	2
Colombia	7	7	1	1
Caquetá	1	1	—	—
Cundinamarca	—	—	1	1
Meta	4	4	—	—
Putumayo	1	1	—	—
Vichada	1	1	—	—
Ecuador	2	2	—	—
Napo	2	2	—	—
Peru	98	47	17	17
Ayacucho	1	—	1	1
Cuzco	85	39	—	—
Junín	4	4	—	—
Loreto	1	1	6	6
Madre de Dios	1	1	—	—
Pasco	1	1	—	—
San Martín	5	1	9	9
Ucayali	—	—	1	1

[1]Provisional data.

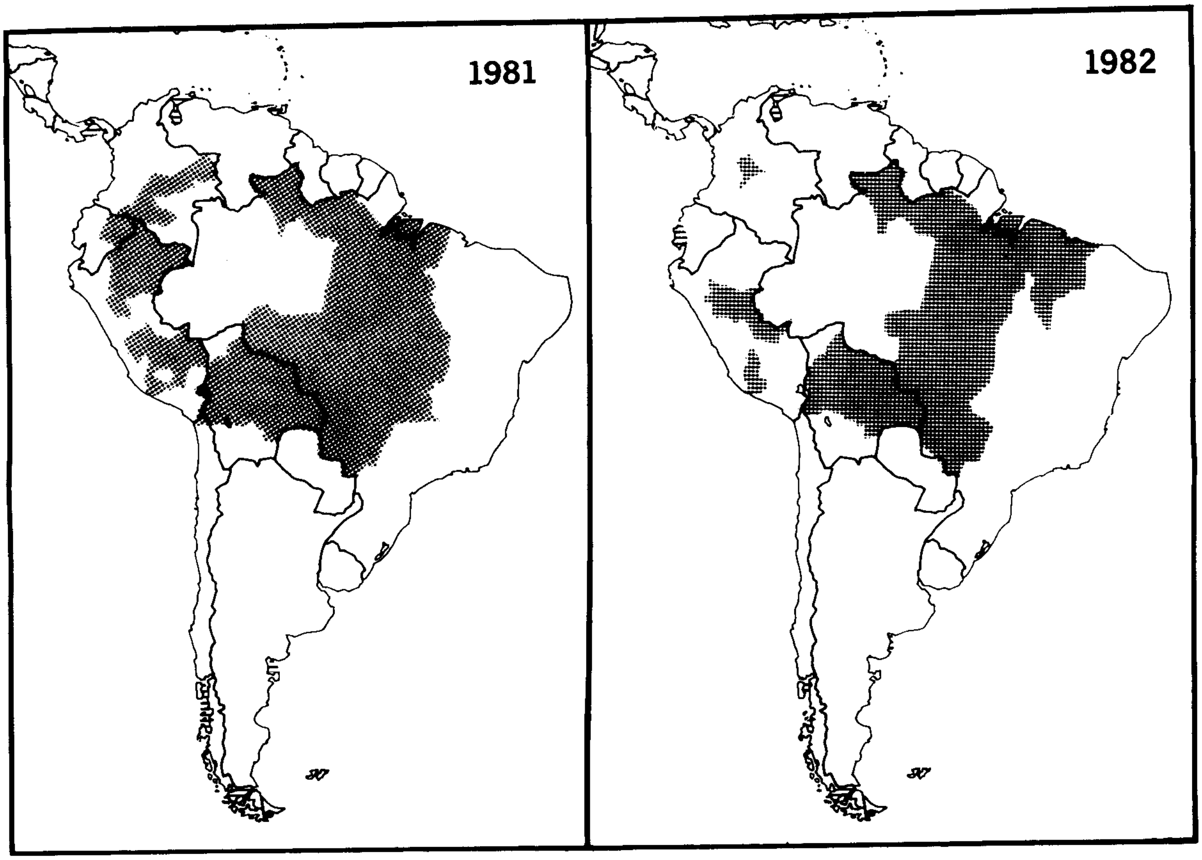
by others occurring at intervals of five to nine years. The assumption is that these epidemics reflect virus excursions from the enzootic areas of the Amazon Region. There has nevertheless been a decline in the incidence of the disease which is the result, in part, of the intensification of vaccination programs throughout endemic areas, although it must be recognized that surveillance may not be adequate in remote areas. In Brazil, for example, about three million vaccines are administered annually (3,300,000 in 1981), utilizing the 17D vaccine produced by the Oswaldo Cruz Foundation in Rio de Janeiro.

The monthly distribution of cases in the biennium (Figure 2) clearly indicates that the highest number of cases occurs in the first half of the year, peaking in March. This is probably due to the higher densities of *Haemagogus* mosquitoes (the main jungle yellow fever vectors in the Americas) during the rainy season. It is conceivable, however, that the outbreaks observed during the first months of the year may be associated with increased rural and forest labor practices carried out by susceptible populations in areas where yellow fever is enzootic.

Sex and age distribution were known only for 347 cases. As seen in Table 2, males outnumbered females by a large proportion. The table also shows that a majority of the cases (79.3 per cent) were between 15 and 34 years of age. No cases were recorded in those under one year of age and except for one, all cases occurring in the 1-4 age group were documented in the Rincón del Tigre region during the 1981 epidemic. On the other hand, all Brazilian cases were over 15 years of age. This age and sex distribution of patients is consistent with patterns of jungle (transmitted) diseases. No cases of urban yellow fever have been documented in the Americas for the past four decades in spite of the fact that several jungle cases have been hospitalized in *Aedes aegypti* infested towns during this period.

Since resistance of *A. aegypti* to malathion and temephos has not yet been identified in the Americas, use of

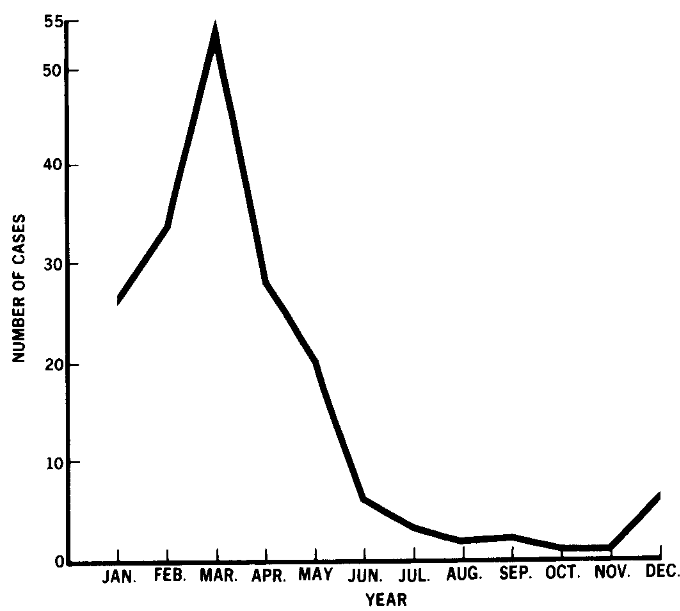
Figure 1. Yellow fever in the Americas: endemic areas, 1981-1982.



these insecticides can be continued. However, monitoring for resistance must be increased due to the fact that both are organophosphates and have been extensively used for several years.

In view of the persistence, expansion, and reinfestation of yellow fever infected areas and in the wake of the first outbreak of dengue hemorrhagic fever (DHF) which occurred in Cuba in 1981, PAHO has recently convened several technical meetings to examine the problem. PAHO and the countries have taken action to follow the recommendations emanating from these meetings. Included among the recommendations are the improvement of surveillance activities at the country level through the updating and distribution of the PAHO *Guidelines for the Surveillance, Prevention, and Control of Yellow Fever*[1] and the WHO *Guide for Diagnosis, Treatment and Control of Dengue Hemorrhagic* Fever (2nd edition),[2] as well as the strengthening

Figure 2. Yellow fever in the Americas: average number of cases per month, 1981-1982.



[1] PAHO Scientific Publication 410. Washington, D.C., 1981.

[2] Technical Advisory Committee on Dengue Hemorrhagic Fever for the South East Asian and Western Pacific Regions, WHO, 1980.

Table 2. Yellow fever in the Americas: cases by age and sex, 1981-1982.[1]

Age	Sex		Total	
	Male	Female	No.	%
0-11 months	0	0	0	0
1-4 years	3	4	7	2.0
5-14 years	21	14	35	10.1
15-24 years	141	30	171	49.3
25-34 years	62	13	75	21.6
35-44 years	33	4	37	10.7
45-54 years	9	4	13	3.7
55 years	6	3	9	2.6
Total	275	72	347	100.0

[1] Provisional data.

of direct cooperation with affected countries. Measures have been taken to ensure that the collection and maintenance of representative strains of yellow fever virus is handled at a single institution, the WHO Collaborating Center at Yale University in New Haven, Connecticut. PAHO has continued to encourage and support ecological studies on yellow fever in areas such as Brazil and Trinidad where outbreaks occur periodically, and to determine whether the virus persists in these areas during interepidemic periods. Furthermore, PAHO continues to take steps to strengthen its role in the eradication of *A. aegypti* in the Americas through continually updating inventories of personnel, equipment, and insecticides, and assisting in field and laboratory research.

At the regional level, work has continued to ensure the prompt dissemination of information to member countries on the occurrence and distribution of any suspected and/or confirmed cases of yellow fever and DHF.

The participants of the Meeting of the Technical Group on *Aedes aegypti*, Dengue, and Yellow Fever (Mérida, Yucatán, Mexico, June 1982) also recommended increasing 17D vaccine production in Brazil and Colombia in order to meet rising demands; PAHO is helping these countries modernize their production methods and seeks funds from international agencies to support the development of a 17D vaccine in cell cultures.

The XXI Pan American Sanitary Conference, held in October 1982, resolved (Resolution XXVIII) to maintain the present policy for the eradication of *A. aegypti* from the Hemisphere. The Conference recommended to the Governments of the countries and territories still infested by the vector that they take appropriate measures to remove the financial and administrative difficulties that may be hindering the progress of their programs, and that they give such priority as is necessary to the allocation of funds, personnel, and materials for the completion of those programs. It was also agreed that the countries and territories that have succeeded in eradicating the vector should step up their surveillance efforts with a view to early detection and elimination, and that those which have suffered reinfestation should take all steps necessary toward eradication. The Conference recommended that countries still infested give the necessary priority to the implementation of measures which prevent exportation of the vector to other countries, at least increasing surveillance and control efforts based on epidemiological knowledge of local situations.

Considering that *A. aegypti* eradication will not be accomplished by all the countries of the Region in the short run, the Conference recommended that each Government draw up an emergency plan to inventory resources available in neighboring countries and a plan of operations for implementation in the event of fresh dengue epidemics or the urbanization of yellow fever.

It was agreed that countries should assist each other either directly or through PAHO by means of bilateral loans and grants and the provision of equipment and materials, and with technical advisory services to vector eradication programs.

The Conference requested that the Director take all the appropriate measures to promote and support national, subregional, and regional activities as specified in the areas of action for the eradication of the urban yellow fever vector, as well as all the necessary steps to enable PAHO to coordinate, identify, and allocate resources in the event of an emergency caused by a dengue hemorrhagic fever epidemic in any country of the Hemisphere.

Finally, the Conference recommended to the Director that all the appropriate measures be taken to intensify and accelerate the Hemisphere-wide campaign for the eradication of *A. aegypti*, including the search for extrabudgetary funds, so that the goal of elimination of the vector may be attained as quickly as possible.

(*Source:* Epidemiological Surveillance and Viral and Rickettsial Diseases, Division of Disease Prevention and Control, PAHO.)

International Health Regulations

A report on the functioning of the International Health Regulations (IHR) for the period 1 January to 31 December 1981 has been prepared by the World Health Organization (WHO) in accordance with the provisions of Article 13, paragraph 2 of the IHR. It was published in the *Weekly Epidemiological Record* (Vol. 57, No. 48, 1982) in agreement with Member States of WHO and the members of the panel on International Surveillance of Communicable Diseases. The report is based on information from national health administrations concerning diseases subject to the IHR and those under international surveillance. The following excerpt includes key portions of the report.

There were reports from 94 countries for the period 1 January to 31 December 1981, compared with 70 in 1980. Although not specifically indicated as a difficulty by any country, the reluctance to notify the presence of a communicable disease situation promptly and completely to the extent that it is known is the most significant problem in the administration of the IHR.

Another understandable cause for nonreporting is the fear of losing tourist trade. Paradoxically, a failure to report disease often has a worse effect, since the traveller prefers to be told a disease exists and how he can protect himself. If the traveller is in doubt whether a disease is present or not, particularly if the media give undue prominence to the situation, his tendency not to travel is greater. If WHO is officially informed promptly it can provide objective clarification to those concerned (including the media) and can help prevent the introduction of excessive measures or have them withdrawn so that the flow of tourists can be maintained with minimum interference.

The overall situation based on the reports received for 1981 is that fewer complaints are made concerning vaccination certificate requirements. With respect to smallpox vaccination certificates there has been considerable improvement since the last report, but there are still two sources of difficulty which require continued attention. First, the procedure adopted at some points of entry, particularly airports, is not consistent with the requirements of national health administrations as notified to WHO. And second, an even greater source of difficulty is that many embassies, consulates, high commissions, and so forth continue to provide information which is quite often contradictory to that furnished WHO by national health administrations. An effort is being made to resolve all instances of conflicting information with respect to vaccination certificate requirements; those situations involving smallpox certificates are considered extremely urgent and serious.

It is known that cholera vaccination will not prevent the introduction of the disease into any country. In addition, the IHR were amended in 1973 so that a cholera vaccination certificate may no longer be required of any traveller. One country has estimated the population at risk as being the number of returning nationals on commercial air carriers from Asia, Africa, or Oceania. On this basis, the chance of contracting cholera appears to be in the order of one case per 500,000 returning travellers.

Still more needs to be done in an organized and continuing manner by national health administrations to advise travellers of the health risks when visiting other countries. This task should be approached in an imaginative way since it involves the medical profession, tourist agencies, shipping companies, airline operators, the media, and other bodies associated with the travelling public. The booklet *Vaccination Certificate Requirements for International Travel and Health Advice to Travellers* (Geneva, World Health Organization, 1983) is intended to guide national health administrations in producing material in the language and format which will have the greatest impact on the public for which they are responsible.

(*Source: Weekly Epidemiological Record* 57 (48), 1982.)

Diseases Subject to the International Health Regulations

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas up to 28 February 1983.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague cases[a]
		Cases	Deaths	
BOLIVIA	—	2	2	25
Cochabamba	—	2	2	—
La Paz	—	—	—	25

[a]*Note:* Since the publication of the last issue of the *Epidemiological Bulletin* in 1982, Brazil notified an additional 25 plague cases (2 in the State of Bahía and 23 in the State of Ceará), for a total of 85 cases in 1982. The United States reported an additional case in Arizona, for a total of 19 plague cases notified in 1982. Also, Bolivia notified 23 additional cases in the Department of La Paz, for a total of 24 plague cases in 1982.

Typhoid Fever in Chile

Typhoid fever stands out among Chile's health problems because of its high morbidity rates, its tendency to increase, and the difficulties encountered in controlling it. While the death rate has fallen considerably (from 12.8 per 100,000 in the 1940s to only 0.7 per 100,000 in 1980), the drop is due almost exclusively to the advances made in therapeutic treatment, which reduced the case fatality ratio from 10 per cent or more to less than 1 per cent. Neither sanitation, control of foodstuffs, health education, nor the limited parenteral vaccination of high-risk groups have had any significant impact on morbidity rates which—to the contrary—are showing a disturbing increase. In the last four years the numbers of reported cases were: 11,533, 13,114, 10,760, and

Table 1. Typhoid and paratyphoid fever in Chile, 1960-1980.

Years	Number		Rates per 100,000 population		Case fatality ratio
	Cases	Deaths	Morbidity	Mortality	
1960	4,548	198	59.6	2.6	4.3
1961	4,618	184	59.2	2.4	4.0
1962	3,873	235	47.9	2.9	6.0
1963	4,185	197	50.9	2.4	4.7
1964	4,732	181	56.0	2.1	3.8
1965	5,598	198	64.8	2.3	3.5
1966	4,576	149	51.5	1.7	3.2
1967	4,536	134	49.8	1.5	2.9
1968	7,091	84	75.8	0.9	1.9
1969	5,358	83	46.0	0.9	1.5
1970	5,344	71	57.0	0.8	1.3
1971	4,784	76	50.1	0.8	1.6
1972	4,527	58	46.6	0.6	1.3
1973	3,688	56	37.3	0.6	1.5
1974	4,665	60	46.2	0.6	1.3
1975	6,110	76	59.6	0.7	1.2
1976	6,180	76	59.1	0.7	1.2
1977	11,533	120	108.2	1.1	1.0
1978	13,114	106	120.8	1.0	0.8
1979	10,760	84	99.8	0.8	0.8
1980	10,872	74	97.9	0.7	0.7

10,872, respectively—double the numbers observed each year up to 1976, when there were fewer than 6,200 (Table 1).

The morbidity figures equal or exceed those in countries of lesser socioeconomic and cultural development. Moreover, Chile averages the lowest annual temperature in Latin America, a fact which should favor control of a disease that has a clear relationship to climatic conditions, as seen from its seasonal distribution (Figure 1). The highest case frequency occurs during the summer months, when there is little rainfall.

Another important characteristic of typhoid fever is its distribution by age groups, with a large concentration of cases occurring between school-age years and the 25-29 age group. Table 2 shows the number of cases and deaths by age group, and shows that 75.5 per cent of all cases occur in those under 25 years of age.

The high morbidity in Metropolitan Santiago is an outstanding feature: 62.8 per cent of all cases (6,827) occurred there in 1980. This is inversely related to the population distribution, since the Metropolitan Area has only a little more than one third the entire population.

These apparent paradoxes can be explained by the fundamental role that carriers play in the transmission of the disease, whether by the short route (direct hand-to-mouth, or hand-to-food-to-mouth contagion),

Figure 1. Monthly distribution of cases of typhoid fever, Chile, 1980.

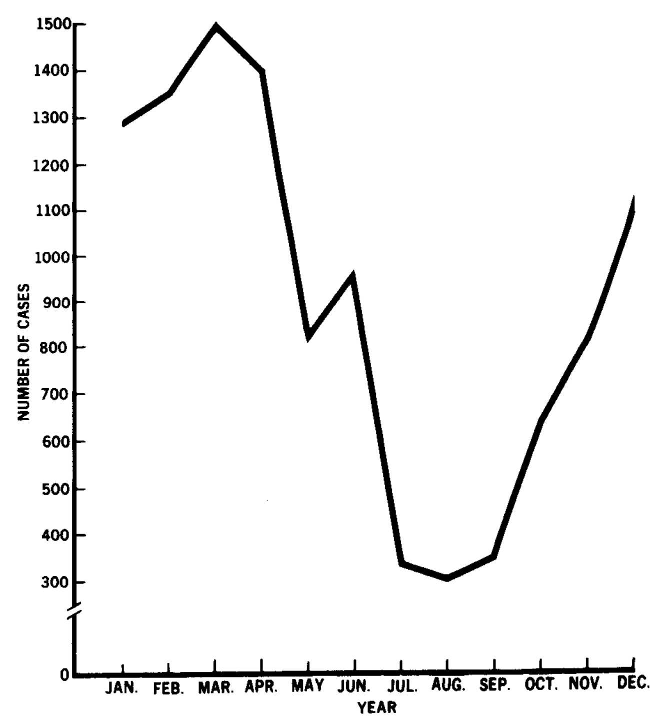


Table 2. Typhoid and paratyphoid fevers: cases, deaths, and case fatality ratio by age groups, Chile, 1974-1980.

Age groups	Cases	Deaths	Case fatality ratio
1-4 years	4,094	31	0.8
5-9 years	11,016	18	0.2
10-14 years	13,515	39	0.3
15-19 years	10,501	79	0.8
20-24 years	8,186	66	0.8
25-44 years	11,841	193	1.6
+ 45 years	3,397	170	5.0

which appears to be the most frequent, or by the long route (excreta-water courses-irrigation of fruits and vegetables or adulteration of milk with contaminated water).

A number of studies have shown that chronic vesicular processes, including cholelithiasis, are favorable to the occurrence of typhoid cases and to the indefinite persistence of the chronic carrier state. In Chile the incidence of this pathology is high in adults, particularly females, which makes this group an important source of typhoid fever infection.

The fact that these sources of infection are widespread limits the potential for successful control through proper disposal of excreta or other sanitation methods. The greatest hope is therefore that the immunizing agents currently being tested can overcome the limitations of the vaccines presently in use.

(*Source:* Ristori, C. Epidemiología de la fiebre tifoidea en Chile. *Boletín de Vigilancia Epidemiológica* 8 (9-10), September-October 1981, Ministry of Public Health, Chile.)

Editorial Comment

A collaborative project entitled "Studies for the control of endemic typhoid fever in Chile" was begun in 1982 by the Ministry of Public Health of Chile, the Vaccine Preparation Center of the School of Medicine of the University of Maryland, the Walter Reed Research Institute, PAHO, and WHO. The project includes a practical testing of the Ty21a oral vaccine in enteric-coated capsule form, which began in May 1982.

The test was conducted in the northern section of Santiago, with some 85,000 children and adults aged 6-20, chosen at random to receive each week either two doses of vaccine, one dose of vaccine and one placebo, or two placebos. The observations made during the period the vaccines were administered showed that the enteric-coated capsule is a very convenient form, since almost all the children took it without difficulty; only 1-2 per cent of the youngest (6-8 years) had some problem swallowing it.

Strict epidemiological and bacteriologic surveillance is maintained in the 13 health centers and in the Children's Hospital in the northern sector of the city, where most of the children go to the dispensaries of the National Health Service. It is to be hoped that this surveillance can continue for three years.

To detect cases, at least two blood cultures and one marrow culture will be done for all suspected cases admitted to the Children's Hospital, as is the practice at that center. Duodenal fluid from some children will be cultured by the capsule-in-series method. A blood culture will be done on all suspected cases coming to any of the 13 health centers. Those showing *Salmonella typhi* in the blood, marrow, or duodenal fluid will be considered confirmed cases.

This practical test will reveal first whether the enteric-coated capsule is a suitable method for getting viable vaccine microorganisms into the small intestine, and second, whether one dose of vaccine is sufficient in endemic areas, or whether two doses are more effective.

Occupational Diseases: a Public Health Problem

The indicators traditionally used to determine occupational health conditions include occupational accidents and diseases. Accidents are an abrupt upset of the agent-host-environment balance, are easily identifiable inasmuch as the casual nexus can be clearly established, and can produce varying degrees of injury, including death. Occupational diseases, on the other hand, involve a slower, more insidious destabilization of the agent-host-environment relationship resulting from the nature or conditions of the job.

Because of their medical, social, and legal importance, occupational diseases have been the subject of international regulation since 1925, in conventions and recommendations adopted by governments through the International Labor Organization (ILO). The first international regulatory instrument (Convention Number 18, 1925) recognized only three occupational diseases: lead poisoning, mercury poisoning, and anthrax.

The two events which resulted in the inclusion of other diseases in international regulations, included the development of industrial technology which created new health risks for workers and the promotion of a greater social awareness. The most recent revision is the 1980 amendment of Convention Number 121, 1964, which recognizes as occupational diseases those that derive from exposure to dangerous substances or conditions inherent in certain professional or occupational processes and activities.[1]

In addition to the diseases which are directly caused by occupational activities (described in Table 1), there are those that result from the particular conditions under which the job is performed but which are not contemplated in the laws or administrative regulations of most countries. Epidemiological morbidity and mortality studies of many common diseases show an uneven distribution among the various occupations: this very extensive group includes stress, mental illness, infectious, psychosomatic, and respiratory diseases, allergies, and lower back pain syndromes, among others.

In order to determine the extent of the problem, a large number of countries of the Region have adopted the practice of conducting industrial hygiene surveys as a first stage in organizing occupational health programs. One of the pioneers of industrial hygiene in the Americas was J.J. Bloomfied, an engineer who, during the 1950s, inspired qualitative industrial hygiene surveys in Peru, Chile, Bolivia, Paraguay, Mexico, Brazil, and elsewhere.

A preliminary industrial hygiene survey was conducted in the city of São Paulo, Brazil between 1953 and 1955 by the Industrial Social Service. The findings showed that 20.3 per cent of all industrial workers in the city were exposed to agents producing occupational dermatosis; 7.3 per cent to organic solvents; 5.5 per cent to free silica dust; and 5.4 per cent to lead. The survey revealed more than 35 agents or groups of agents causing occupational diseases.

In 1959 another survey on industrial hygiene problems in the State of Rio de Janeiro, conducted by P.M. Gondim and M. Latge, showed that 25.6 per cent of all industrial workers in that State were exposed to organic dust; 15.6 per cent high temperatures; 10.7 per cent to silica dust; and 10.5 per cent to toxic gases and fumes.

The difficulties encountered in making an accurate assessment of the magnitude of the problem of occupational diseases can be synthesized into two groups of principal factors. The first includes factors related to the inadequacy or lack of information. This is due on the one hand to the fact that frequently, those affected by occupational diseases do not know about them and therefore do not recognize them as such and on the other, to the fact that employers try to avoid the penalties that negligence on their premises might bring them. Occupational accidents go unreported when workers do not have access to social security services,[2] and even when they are reported, it is sometimes for accounting purposes or to grant the temporary or permanent disability benefits to which workers are entitled, without analizing the information to gain knowledge on the epidemiological characteristics of occupational diseases.

Furthermore, the fragmentary information is a consequence of the partial registrations which result from the multiplicity of institutions involved and the lack of adequate coordination at the institutional and program levels.

The combination of these problems translates into a lack of data on the distribution of the at-risk workforce in each branch of economic activity, the distribution of

[1] ILO. *Amended List of Occupational Diseases, annexed to the Employment Injury Benefits Convention, 1964 (Number 121).* International Labour Conference, 66th Session, 1980. Report VII (b). Geneva.

[2] International Social Security Association (AISS). *Informe sobre enfermedades profesionales—Aspectos administrativos, aspectos medicos, aspectos estadísticos.* (Report presented to the XV General Assembly, Washington, D.C. 1964). Mexico, AISS, 1966.

Table 1. List of internationally regulated occupational diseases, ILO Convention 121, 1964, amended 1980.

Occupational Diseases
1. Pneumoconioses caused by sclerogenic mineral dust (silicosis, anthraco-silicosis, asbestosis) and silico-tuberculosis, provided that silicosis is an essential factor in causing the resultant incapacity or death.
2. Bronchopulmonary diseases caused by hard-metal dust.
3. Bronchopulmonary diseases caused by cotton dust (byssinosis), or flax, hemp, or sisal dust.
4. Occupational asthma caused by sensitizing agents or irritants both recognized in this regard and inherent in the work process.
5. Extrinsic allergic alveolitis and its sequelae caused by the inhalation of organic dusts, as prescribed by national legislation.
6. Diseases caused by beryllium or its toxic compounds.
7. Diseases caused by cadmium or its toxic compounds. ds.
8. Diseases caused by phosphorous or its toxic compounds.
9. Diseases caused by chromium or its toxic compounds.
10. Diseases caused by manganese or its toxic compounds.
11. Diseases caused by arsenic or its toxic compounds.
12. Diseases caused by mercury or its toxic compounds.
13. Diseases caused by lead or its toxic compounds.
14. Diseases caused by fluorine or its toxic compounds.
15. Diseases caused by carbon disulfide.
16. Diseases caused by the toxic halogen derivatives of aliphatic or aromatic hydrocarbons.
17. Diseases caused by benzene or its toxic homologues.
18. Diseases caused by toxic nitro- and amino-derivatives of benzene or its homologues.
19. Diseases caused by nitroglycerin or other nitric acid esters.
20. Diseases caused by alcohols, glycols, or ketones.
21. Diseases caused by asphyxiants: carbon monoxide, hydrogen cyanide or its toxic derivatives, hydrogen sulfide.
22. Hearing impairment caused by noise.
23. Diseases caused by vibration (disorders of muscles, tendons, bones, joints, peripheral blood vessels, or peripheral nerves).
24. Diseases caused by work in compressed air.
25. Diseases caused by ionizing radiations.
26. Skin diseases caused by physical, chemical, or biological agents not included under other items.
27. Primary epitheliomatous cancer of the skin caused by tar, pitch, bitumen, mineral oil, anthracene, or the compounds, products, or residues of these substances.
28. Lung cancer or mesotheliomas caused by asbestos.
29. Infectious or parasitic diseases contracted in an occupation where there is a particular risk of contamination.
a) Health or laboratory work.
b) Veterinary work.
c) Work handling animals, animal carcasses, parts of such carcasses, or merchandise which may have been contaminated by animals, animal carcasses, or parts of such carcasses.
d) Other work carrying a particular risk of contamination.

workers exposed to specific risks according to the characteristics and size of the industry, and the type and volume of toxic products used in industry.

The second group includes factors related to diagnosis. Given the insidious nature of occupational diseases, identification—particularly early detection—is generally difficult. This is aggravated by the presence of nonspecific signs and symptoms which lead to the masking or superimposing of diseases of occupational origin by others whose etiology is not work-related. Difficulties frequently arise with confirming the diagnosis of suspected or recognized occupational diseases, particularly when this depends on toxicology laboratories. The lack of clinical, laboratory, administrative, and legal criteria and standards also makes proper case diagnosis difficult. Despite the obvious progress made in this field, medical education in the Region has placed little emphasis on the work-health relationship. Lastly, it should be pointed out that workers' ignorance of the risks to which they are exposed is a factor that hinders early diagnosis of cases.

Cited below are some studies, surveys, and research on specific occupational groups, which may indicate the seriousness of the problem in the Americas.

According to data presented at the Regional Seminar on Silicosis (La Paz, Bolivia, 1967), the prevalence of the disease in Bolivia, Chile, and Peru amounted to a total of 5,200 cases (largely among miners). More recent data from Bolivia indicate that of 28,760 miners studied, 22.1 per cent had silicosis, which was often aggravated by tuberculosis.[3] According to an epidemiological study based on patients in tuberculosis hospitals in southeastern Brazil done by R. Mendes in 1978, it was estimated that there were 30,000 cases of silicosis in the country.

A study of the silicosis situation in Venezuela conducted in 1981 found a prevalence of 14 per cent among quarry workers, 8 per cent in pottery and porcelain workers, 15 per cent in glassworks, and 20 per cent in gold mines.

As regards other pneumoconioses, there is a mounting risk of asbestosis, since asbestos extraction in some countries and the manufacture of asbestos products in others is on the increase, due in part to the asbestos control measures imposed in the more developed areas of the world.

The importance of the problem of occupational deafness lies in its high incidence in most branches of industry, and the fact that it produces permanent disability in many exposed workers. One of the most recent of the numerous studies conducted in the Region was done in 1978 in a metalworking industry in Greater São Paulo, Brazil. It produced some important findings, and by extrapolating the data, it can be estimated that there are 40,000 cases of occupational deafness among metalworkers in São Paulo.

Another preliminary study of industrial dermatoses done in São Paulo in 1955 revealed that of 2,138 workers examined, 221 were suffering from skin disease, and that 73 of the cases were of occupational origin (33 per cent of all diseases or 3.5 per cent of all workers examined). Considering that a cross-sectional survey is done at a fixed point in time and that there are frequent relapses, it can be estimated that the observed 3.5 per cent prevalence might turn into an incidence of approximately 10 per cent.

As regards the effects of chromium, E.R. Gomes, in his classic 1972 study on electroplating workers in the State of São Paulo, demonstrated perforation of the nasal septum in 24 per cent of workers examined; 38.4 per cent of the workers had ulceration of the septum. Overall, more than 50 per cent of the workers had lesions of the nasal septum. More than 50 per cent of those working with hot chromium acid had coughs and expectoration; more than 60 per cent had intense nasal itching; more than 60 per cent had rhinorrhea, and 30 per cent had frequent epistaxis.

Occupational diseases are a priority public health problem because of their high morbidity, the high incidence of serious cases, and the fact that they affect people at a productive age and produce serious social and economic consequences for which effective control and prevention measures are available. This means that there is a need for the authorities to intervene and take responsibility for organizing coordinated activities to control the problem. This might be done via an interinstitutional commission that would advise on policy formulation, obtaining a diagnosis of the situation, the setting of objectives, and prioritizing and timing them. Such a commission should also participate in the formulation of a multisectorial action plan coordinated with the national health plan and with the overall economic development plans.

The specific activities that should be looked at when considering the problems of occupational diseases include:

- Updating the lists of occupational diseases in accordance with conditions in each country.
- Teaching the clinical and epidemiological aspects of occupational diseases, prevention, and control in health personnel training programs.
- Establishing or developing epidemiological surveillance activities at the industry level thus enabling a coordinated, adequate analysis to be made of the status

[3] Guerra, E.G. *Silicosis en los trabajadores mineros de Bolivia.* La Paz, National Social Security Bureau, Department of Hygiene and Industrial Safety, 1967.

of and trends in occupational diseases. This surveillance system should be closely related to institutions responsible for inspecting and controlling the work environment.

- Establishing or activating laboratories to support the surveillance of occupational risks. This includes "biologic surveillance" (by means of specific blood, urine, and sputum tests, etc.), and "environmental surveillance," with quantitative assessments of the environmental risks likely to produce occupational diseases (gases, fumes, dust, noise, heat, etc.) These assessments, of the worker and of the environment, enable the degree of exposure to particular risks to be quantified and compared with "permissible limits" or "maximum permissible concentrations" as established by the countries or proposed by international agencies.[4]

- As regards research, priority should be given to epidemiological studies that evaluate the magnitude and characteristics of the health problems of workers in the various branches of industry. Priority should also be given to developing appropriate technology for early diagnosis of occupational diseases and environmental surveillance.

It is necessary to point out the importance of having workers participate in occupational diseases prevention programs. Participation can be achieved through representative trade union organizations, and through direct action by workers and their delegates. Notable progress has been made in recent years in some countries of the Region: representative workers' organizations participate at the local or national level; in certain instances, trade union organizations are represented in institutions, agencies, or committees that deal with occupational health questions; in others, the issue is looked at during the course of collective bargaining. In almost all countries of the Region, labor laws require joint worker-management committees on occupational hygiene and health in industries and businesses, and at times, for committees to improve working conditions; these committees are responsible for examining the problems, making suggestions, and evaluating the effects of the measures adopted. If workers' cooperation is to be successful, they must have information, training, and the means for study and research. The worker, both as an element of pressure, and through the educational component, can make a real contribution toward achieving the goals of occupational health.

[4] WHO. *Environmental and Health Monitoring in Occupational Health.* Report of a WHO Expert Committee. Technical Report Series, 535. Geneva, 1973.

Since the 1960s, PAHO's activities in the field of occupational diseases have included organizing or sponsoring meetings and seminars on the state of occupational health in Latin America and the Caribbean, on the silicosis problem in the Region, on programming in occupational health, and, recently, on epidemiological methodology applied to environmental and occupational problems. The Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS) in Lima and the Pan American Center for Human Ecology and Health (ECO) in Mexico have aided some countries in developing occupational health institutes, have advised others on specific problems, and have collaborated in diagnosing problems and in organizing control programs. The development of bibliographic information has been furthered by the translation into Spanish of *Occupational Diseases—A Guide to their Recognition* (WHO) and, recently, with the *Criterios de Salud Ambiental* series and other texts prepared by ECO. Currently, PAHO's basic strategic approach in the field of worker's health (in consonance with the ILO) is to include occupational health activities in the network of health services.

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(*Source:* Occupational Health Program, Division of Environmental Health Protection, PAHO.)

Prevalence Study of Bancroftian Filiariasis in Puerto Limón, Costa Rica[1]

Puerto Limón, the major port on Costa Rica's Atlantic coast, is an endemic focus of bancroftian filariasis. The precence of the disease in this area is due mainly to the 1871 immigration of Jamaican blacks who came to work on construction of the railway between Puerto Limón and San José.

Information about the endemic area of this human parasitosis was not very precise, even though it had been the subject of studies by Butts in 1947, Lieske in 1954, and Brenes in 1979. In 1976 the Department of Malaria of the Ministry of Health of Costa Rica began a study of the prevalence of the disease, the findings of which are summarized below.

The eight sectors of the city were studied by random sampling. Of 4,021 persons examined (14 per cent of the population) using the Knott technique (1 ml of blood), 78 or 2 per cent had patent parasitemia—a rate of 2.4 per 1,000 population. The parasitemia varied according to age group, with the 1-9 year old cohort showing the lowest rate of infection (0.2 per cent); the 10-19 and the 40-49 age groups showed the highest incidences (3.7 per cent and 2.7 per cent, respectively). According to the distribution by sex, the rate of infection was higher in males (2.4 per cent) than in females (1.4 per cent); as regards race, whites had an infection rate of 0.8 per cent and blacks 5.4 per cent.

Later, 938 volunteers from various sectors of the city were examined and 16 (1.7 per cent) showed patent parasitemia. Also examined were 1,196 persons living in "positive blocks" (where carriers had been detected by random sampling), and 39 (3.3 per cent) were found to have filaremia.

In order to study the periodicity of *Wuchereria bancrofti*, observations were made for 24 consecutive hours on 17 cases of microfilaremia. This investigation showed the nocturnal periodicity of *W. bancrofti* in Puerto Limón, inasmuch as the microfilariae are observed as of 18:00 hours. Between 21:00 and 05:00 hours, there are high levels of parasitemia: the highest values are obtained at 01:00 hours, but there is a complete absence of parasitemia during the rest of the day.

For 30-minute periods between 07:00 and 09:00 hours, there was an intradomiciliary sweep for mosquitoes, in order to determine the index of natural infection in the various stages of larva development. After the captured mosquitoes had been classified, their wings and feet were removed, and the head, thorax, and abdomen dissected in saline solution; they were then microscopically examined to determine the larval stages of filaria.

A total of 3,101 *Culex pipiens fatigans* mosquitoes were caught in 140 houses in the urban area, giving a domiciliary index of 98 per cent. Of 2,714 *C.p. fatigans*

[1]Conducted by Francisco Paniagua, Chief, Microbiology Section, Department of Malaria, Ministry of Health, San José, Costa Rica.

females dissected, 162 (6.0 per cent) were infested with first and second stage larvae, and only 2 showed third stage larvae.

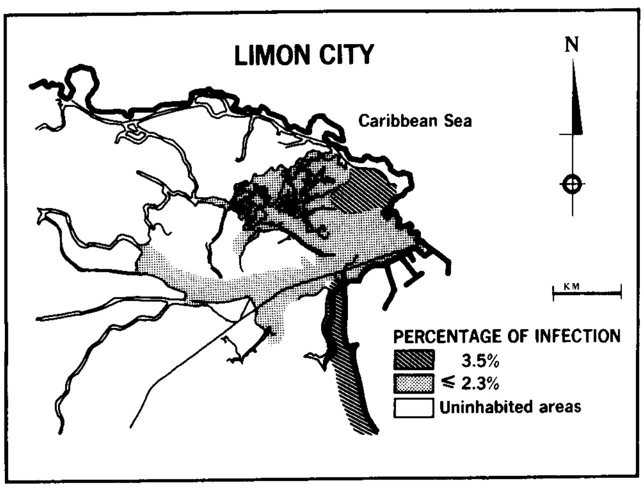
Precipitin tests were performed on 754 female mosquitoes in order to determine their source of food. It was observed that 643 (85 per cent) reacted to human antiserum, while the remaining 111 reacted to antisera of various domestic animals.

Once the study had been completed in the city of Puerto Limón, the attempt was made to see how far the filarial infections extended into the rest of Limón Province. A group of 13 rural towns in the vicinity of Limón were investigated between and 1979 and 1980. These towns had a total population of 12,576 inhabitants, 3,438 (27 per cent) of whom were examined. Only 3 cases (0.1 per cent), all of whom came from Limón, showed microfilaremia.

In the same 13 towns, 936 female *C.p. fatigans* from 186 houses were dissected, but none showed larval stages of filaria.

The absence in rural areas of microfilaremia cases and of mosquitoes infected with larval stages of filaria suggests that the problem of bancroftian filariasis in Costa Rica is limited to the urban area of Puerto Limón, where two sectors (Roosevelt and Cieneguita) showed a frequency of 3.5 per cent, while in the rest of the city it was less than 2.3 per cent (Figure 1).

Figure 1. Percentage of bancroftian filariasis infection in urban areas of Puerto Limón, Costa Rica.



Future control measures should be guided by the information obtained as a result of this research. However, other work needs to be done, such as assessing the validity of serodiagnostic tests and their usefulness as epidemiological means in low transmission areas such as Puerto Limón. Longitudinal studies are also necessary to evaluate the measures applied to combat the vector and the parasite, and those directed at improving the environment.

(*Source: Semana Epidemiológica* 10 (25), 1983. Division of Epidemiology, Ministry of Health, San José, Costa Rica.)

Editorial Comment

Human filariasis is an infection caused by various species of nematodes and transmitted through bites of various species of mosquitoes. There are hundreds of species of filariae in the world, but only seven cause infection in humans: *Wuchereria bancrofti, Brugia Malayi, Onchocerca volvulus, Loa loa, Dipetalonema perstans, Dipetalonema streptocerca,* and *Mansonella ozzardi*.

The species found in the Americas are: *W. bancrofti*, agent of lymphatic filariasis; *O. volvulus*, the cause of oncocercosis; *D. perstans*, similar to the one found in Africa; and *M. ozzardi*, found only in the Americas. A new species has recently been described in Venezuela: the *Microfilaria bolivarensis*.

Bancroftian filariasis is found in the Region in localized endemic foci, particularly in the coastal areas of Costa Rica (Puerto Limón), Colombia, Venezuela, Guyana, Suriname, French Guiana, and Brasil, and in the Caribbean islands. In the absence of clinical manifestations, the disease may go unnoticed, or may evolve into adenolymphangitis and elephantiasis of the legs and scrotum.

The study done in Costa Rica is a contribution to understanding the infection in that country. However, epidemiological studies are needed to determine the real frequency of filariasis in the Americas, which is so far unknown, due in part to the lack of a standardized methodology for collecting pertinent information. Measures for controlling the infection are based primarily on mass administration of diethylcarbamazine. Actions to combat the principal vector, *Culex pipiens fatigans*, are not always effective because of the rapidity with which the mosquito develops resistance to insecticides and because of the difficulties involved in wiping out the breeding grounds of larvae.

Reports on Meetings and Seminars

Meeting on Migrations and Tropical Diseases

A meeting was held at PAHO headquarters in Washington, D.C. from 6-10 December 1982 on the topic of migrations and health. It was attended by guests from Belize, Brazil, Colombia, Dominican Republic, Haiti, and Nicaragua. Its purpose was to prepare a joint research project on a number of tropical diseases and their relationship to migration.

It is well-known that the last few decades have seen great rural-rural and rural-urban migratory flows in Latin America and the Caribbean. In 1980 this rural-urban flow resulted in a concentration of the population in urban areas of Latin America (64.7 per cent of the total population) and the Caribbean (51.2 per cent). This generation of large migratory flows appears to have caused major changes in the epidemiological profiles of malaria, schistosomiasis, leishmaniasis, Chagas' disease, and others.

The meeting examined the magnitude of the problem, discussed the theoretical framework of migration and tropical diseases, proposed specific research hypotheses, and outlined the overall design of a comparative study among participating countries.

In the process of identifying variables, the form of production was selected as the major independent variable, measured by indicators such as the type of economic production, land ownership, extent of land exploitation, number of paid workers, level of mechanization, use of insecticides, monetary value of the production, and circulation of money.

The migratory process—the intervening variable—was identified as having two principal characteristics: (a) *general* characteristics, measured by the size of the migratory movements and their characteristics in space and time; and (b) *individual* characteristics of the migrants (sex, age, occupation, culture).

The environment was treated as a dependent variable, and was divided into macroenvironment and microenvironment. The former was defined as those chief ecological conditions present in the migratory process, including the organization of housing and climatologic and geographic conditions. Measurement of the microenvironmental conditions included the type of housing, its protection, and the presence of animals and breeding-grounds for vectors around the housing units. Finally, tropical diseases (particularly malaria) were treated as dependent variables, and the traditional epidemiological and operational indicators were included in their measurement.

There was discussion of some financing alternatives related to the WHO Special Program for Research and Training in Tropical Diseases and to the Canadian Government.

Calendar of Courses and Meetings

Injury Prevention in Developing Countries

This international course sponsored by WHO will be conducted by the Johns Hopkins University School of Hygiene and Public Health from 5 to 17 June 1983 in Baltimore, Maryland.

The aim of the course is to present, in a structured fashion, the modern concepts of injury control and effective techniques for reducing the incidence of injuries with a view to promoting injury control in developing countries.

Enrollment is limited to 30 participants who must be fluent in English.

Johns Hopkins Graduate Summer Program in Epidemiology

The School of Hygiene and Public Health will sponsor this first annual graduate program to be held 20 June through 9 July 1983.

Courses will include introductions to epidemiology, biostatistics, and computing; advanced methods in epidemiology, cancer, cardiovascular, occupational, and infectious disease epidemiology; and design and conduct of clinical trials. Proficiency in the English language is essential.

For more information, please contact: Department of

Epidemiology, 615 North Wolfe Street, Baltimore, Maryland 21205.

International Conference on Oral Rehydration Therapy

Sponsored by the U.S. Agency for International Development (USAID) with the cooperation of WHO, UNICEF, and the International Center for Diarrheal Disease Research/Bangladesh, this major international conference will be held at the Shoreham Hotel in Washington, D.C., 7-10 June 1983. Its purpose is to increase professional and lay awareness of the value of oral rehydration therapy (ORT), a simple, inexpensive method of reducing infant mortality from diarrheal disease in the developing world.

A Technical Advisory Committee composed of representatives from the sponsoring agencies and outside consultants has selected the following topics for the plenary and panel discussions: diarrheal diseases—a world problem; country development and diarrheal diseases; scientific and technical basis of ORT and its worldwide application; practical considerations in management of diarrheal disease in homes, health services, hospitals, and health centers; program experiences with ORT throughout the developing world; implementation of programs, policy, planning, logistics, training, education, supervision, and evaluation; program achievements and constraints; and directions for future research.

World experts in ORT from developed and developing countries are expected to participate. The conference will be an open meeting conducted in French, English, and Spanish; registration is required. For further information please contact: ICORT Conference Staff, United States Agency for International Development, Room 3534 New State, Washington, D.C. 20523.

XI International Congress for Tropical Medicine and Malaria

The Congress will be held in Calgary, Alberta, Canada from 16 to 22 September 1984. The program will include plenary sessions, symposia, workshops, and free communication sessions on topics such as: malaria and other parasitic and infectious diseases of the tropics, nutrition and health in the tropics, and health care services for tropical communities.

For more information, please contact: Secretariat XI ICTMM, Conference Office, The University of Calgary, Calgary, Alberta, Canada T2N IN4.

University of Minnesota Graduate Summer Session in Epidemiology

The University of Minnesota School of Public Health will present this 18th graduate session from 19 June to 9 July 1983.

Courses will include fundamentals of epidemiology and biostatistics, epidemiology of infectious diseases, surveillance and control of communicable diseases, hospital epidemiology and infection control, epidemiology of cancer, epidemiology of cardiovascular diseases, advanced statistics in epidemiology, occupational epidemiology, epidemiology of injuries, and environmental epidemiology.

Proficiency in the English language is essential. For more information, contact: Director, Graduate Summer Session in Epidemiology, University of Minnesota School of Public Health, 515 Delaware Street, S.E., Minneapolis, Minnesota 55455.

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