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Epidemiological Practice in the Health Services Systems

The role and the practice of epidemiology have been widely debated in many national and international forums, noteworthy among which are the seminar organized by the Pan American Sanitary Bureau in Buenos Aires, Argentina, in 1983 and, more recently, the XIV Conference of the Latin American and Caribbean Association of Public Health Education (ALAESP), held in 1987 in Taxco, Mexico, in which professionals in the field of epidemiology from almost all the countries of the Region participated. Although since then significant efforts have been made in many countries to revise the conceptual scope and strengthen the practice of epidemiology at different levels and in different areas of the health system, this process--necessarily slow--is far from finished and it requires periodic follow-up in light of the challenge that the health situation in the countries of the Region presents to their health systems, the role that in this context corresponds to epidemiology and the characteristics of the epidemiological practice in the countries, its limitations, and prospects.

The Challenge

The population of the Region, especially in Latin America, continues to grow, although at a lower rate; it is estimated that it will reach 528 million by the year 2000. This population continues to be predominantly young, but a progressively growing proportion is over 65 years of age. Although very slow, these changes in the age structure can imply substantial increases in the absolute number of those of advanced age, resulting in an overload of the services.

IN THIS ISSUE ...

- Epidemiological Practice in the Health Services Systems
- Vector-Transmitted Diseases in Central America, Belize and Panama
- Epidemiological Activities in the Countries
- Publications
- AIDS Surveillance in the Americas
- Diseases Subject to the International Health Regulations

In addition, there is an ever-increasing concentration of population in dense urban settlements and growing pressure on the urban infrastructure and the social services. The housing shortage has led to urban overcrowding of large sectors of the population, whose segregation from the formal economy has produced what has been called "urban marginality." These marginal communities, which have very limited access to services for health and well-being, constitute a significant portion of the inhabitants of many of the large cities of Latin America.

In the last 35 years there has been a considerable reduction in mortality in all the subregions of the continent. This reduction began at very different levels and these differences, although attenuated, have persisted up to the present time. The Latin American countries have gained 15 years in life expectancy at birth, which was 51.8 years in the period 1950-1955. An average increase of approximately two years per five-year period yielded a current average value of 66.6 years, with values in the countries ranging from 53 to 75 years. The non-Latin Caribbean has made advances similar to those in Latin America, with the difference that already in 1950-1955 the population of the latter had approximately 5 more years of life, reflecting the different sociohistorical evolution of these two subregions. In North America the average life expectancy at birth was already 69 years four decades ago; it has reached 76.6 years in the period of 1985-1990.

Despite the progress achieved, available estimates indicate that extraordinary efforts will be required to attain the goal of health for all, which proposes that by the year 2000 life expectancy at birth will be 70 years in 80% of the countries of the Region. It is noteworthy that in 15 of the 20 Latin American countries studied the average five-year increase in life expectancy is smaller in the period from 1970- 1975 to 1985-1990 than in the 20 previous years and the same occurred in the countries of the Caribbean, although at another level. In Canada and the United States, on the other hand, in spite of the low level of mortality already achieved in both countries, this increase, although smaller in absolute terms, is greater in the most recent period.

If the current trends continue, the countries of Latin America, considered as a group, will not achieve the life expectancy currently enjoyed by the developed countries of the Americas, even by the year 2025. Eleven countries, representing 53% of the population, will not reach the goal by the year 2000; two of them will only achieve an average life expectancy of 60 years by that date and will not attain the goal even 40 years later. In at least nine other countries this indicator will be below 70 years, in four of them due to slower progress in reducing the mortality observed in recent years. Only two Latin American countries have achieved such significant increases that, if their current trends continue to the year 2000, they will then have a life expectancy at birth that is not only higher than the goal of 70 years, but is very similar to that projected for the most developed countries of the continent for the same year.

The analysis of mortality by age group shows that low life expectancy is a reflection of high death rates for all age groups, especially at the extremes. As life expectancy increases, the reduction of mortality will benefit all ages, but the greatest gains will be registered in children under 5. For this age, when the risk of dying is reduced from 40 to only 4 per thousand--a reduction of 90% from the initial level, life expectancy is increased from 50 to 75 years. However, analysis of the specific rates by age shows only a part of the problem, since the distribution of deaths by age depends both on the age structure of the population and on the rates themselves; a particular rate can correspond to a very different number of deaths, depending on the size of the population of that age.

Intimately linked to the foregoing is the structure of mortality according to cause: in countries with high mortality and young populations, mortality of children under 5 and, in particular, infant mortality continue to constitute a significant problem. At the same time, communicable diseases continue to predominate in these countries; they can represent up to almost half of the deaths at all ages. In this type of country the combined deaths from diseases of the circulatory system and tumors do not reach 10%, but they rise to almost 75% in the most developed countries, where these causes are concentrated among the older population. At the same time, deaths from external causes are acquiring an ever-increasing importance, especially in adults where they represent between 30% and 60%, but in some countries they already represent an excessively high proportion in those under 15 years of age.

The contrasts in mortality among population groups within a single country have even more relevance than the differences among countries. A majority of the Latin American population, formed by the socioeconomic groups with a low standard of living, clearly experiences excessive mortalities in all age groups for most of the problems, especially for those that already should have

been overcome. In all the countries, including the most developed, there are marked geographical differences in mortality, morbidity, and accessibility to basic health services, and those differences are even more marked among the different social groups.

Many of the successes achieved in reducing mortality are not a reflection of a generalized, sustained improvement in the living conditions of most of the population, such as occurred in the developed countries in the period of the so-called "first epidemiological revolution." In the developing countries these successes can be attributed in part to technological progress in the prevention and treatment of some diseases, and to the efforts to make them accessible to growing sectors of the population, thus favoring health over the other living conditions. However, the persistence of mortality due to avoidable or treatable diseases indicates the inability of society to extend these advances to the entire population. To all this must be added the recrudescence of endemic infectious and parasitic diseases, which are related to changes in the patterns of development and population mobility in Latin America, and the emergence of new epidemics, such as AIDS and violence, which are increasingly related to poverty and other serious social disorders.

In past decades the countries of the Region exerted great effort to develop the infrastructure of the health services, particularly medical care. Latin America and the Caribbean have approximately one million hospital beds, more than 65,000 units for outpatient care, and a work force estimated at 2.6 million persons. However, it has been estimated that more than 130 million people do not have regular access to basic health services, and to this figure will be added 100 million new inhabitants through estimated population growth between 1990 and the year 2000. It will therefore be necessary to develop the capacity to provide care to 230 million more people, in addition to those that now have access to those services, and, along with better medical care, to ensure the necessary emphasis on the activities of health protection and promotion.

The process of transforming the health systems in accordance with the priority needs of the different groups in the population requires enormous political will and major efforts in the ideological, technical, and administrative areas. It should constitute a continuous social movement, in which there will be progressive definition--in the political, economic, and cultural context of each country--of the organizational modalities, the forms of financing, and the strategies and plans of the health services systems, as well as the forms of articulation with the rest of the institutions in the sectors of social well-being and with the economy and society in general. Therefore the countries have committed their political will to the decentralization of these systems of services through the strategy of strengthening local health systems, as a part of the more general reforms in the nations, of increasing democracy and participation, and of strengthening the civil society, all of which, to a greater or lesser degree, are taking place in most of the countries.

All of the above poses the challenge to public health to explore further the knowledge and explanations of the different health profiles and to combine the actions of diverse institutions and sectors in order to deal more effectively with the varied, complex health problems and the processes of biological, ecological, psychological, cultural, and socioeconomic order through which the objective conditions of existence determine those problems. The complexity of these determinations also requires complex responses, comprehensive and intersectoral in character, and makes it necessary to structure services and programs capable of having an impact both at the level of individuals, subject to specific risk factors, and at the level of social groups that share living conditions deleterious to health. It has become increasingly evident that there is a need for mobilizing many types of resources within the health sector--in education, water supply, production and distribution of food, in the labor sector, and in many others-- to form a strategy of comprehensive care, oriented towards the priority problems of each sector of the population, while at the same time developing mechanisms for the growing participation of the organized population in the planning and management of such actions.

The Role of Epidemiology

In the system of services the central mission of epidemiology is the production of the knowledge that makes it possible to explore the explanation of the health-disease processes in order to facilitate decision-making at the level of the formulation of health policies, the organization of the system, and the interventions destined to solve specific problems. Consequently, research in epidemiology, the essence of its practice, should be oriented toward the identification, description, and interpretation of the processes that determine the frequency and distribution of the health problems at the individual and collective levels. Thus, upon facilitating a critical vision of the health situa-

tion, epidemiology will contribute to vitalizing the setting of priorities with respect to population groups and the determinants of their problems, and to the selection of strategies of intervention and the evaluation of their impact.

The theoretical reconstruction of the processes of determination of the health profiles of population groups is aimed at the identification of laws and general principles and of the set of processes mediating between the objective conditions of existence and the health problems that constitute the immediate cause. The description and the explanation are acts of knowledge, acts of research. The decisions with respect to the utilization of that knowledge for the transformation of the health situation constitute political acts that not only involve such knowledge but, in addition, the governability of the system, the managerial capability, and the technical and financial resources and the extent of power available, in the framework of the projects and interests of the various social actors. Thus the production of knowledge of the health situation and its determinants should be articulated closely with the decision-making on priorities and allocation of resources. It is critical that this involve the health team as a whole and that it constitute a permanent systematic activity to evaluate and reorient decisions.

In accordance with these concepts and based on the international meetings at Buenos Aires and Taxco, there has been a broad general consensus on the identification of four large fields of action in epidemiology in the systems of services:

a) studies of the *health situation* in different population groups, and its determinants and trends;
b) *epidemiological surveillance* of diseases and other health problems;
c) *causal and explanatory research* on priority health problems, and
d) *evaluation* of the impact on health of the services and other actions directed toward individuals, the environment and living conditions, and the evaluation of technology with respect to its safety and impact.

The studies of the health situation cannot remain restricted to the enumeration of the principal categories of mortality and morbidity, with some demographic indicators. They constitute the process of identification and explanation of priority problems in relation to their transformation. Therefore, they should be oriented to the systematic evaluation of the health problems and their determining processes with a view to adopting the decisions and actions necessary for reducing the risks of disease and death. The population is not homogeneous and the health priority problems can vary considerably from one group to another, as an expression of the objective conditions of their existence and of the biological, ecological, psychological, cultural, and socioeconomic processes that characterize them and have their expression at the individual, family, and collective levels.

These needs constitute decision-making problems in public health to the extent that they are perceived and understood by a social actor in whose collective conscience they are organized, ranked, and explained, and become a mobilizing force. Thus the identification of priority problemsin addition to the technical procedures of the health workers requires the utilization of methods and techniques that permit and promote the participation of the different sectors of the population and make it possible to capture and to understand the underlying subjectivity in the prioritization of those problems, that motivates the action of different social actors.

The process of decentralization and transformation of the health systems has contributed to increasing awareness of the need for methods and procedures that can be utilized with small groups and, in general, at levels of observation and analysis at which registration and other traditional techniques have limitations with respect to the type, quantity, and quality of the information. The utilization of registration, surveys, and participatory techniques should be combined and, in addition, the capacity to interpret the information obtained with both quantitative and qualitative techniques should be enhanced.

In addition, the idea that the appraisal of the health situation necessarily requires the accumulation and processing of a great quantity of information should be discarded. The trend toward pursuing the subject to exhaustion is frequently translated into limited utilization of such evaluations. Experience demonstrates that it can be much more useful for decision-makers to have analyses based on a limited number of indicators of high relevance to the question in hand, selected with good theoretical justification, whose information is reliable, and whose sensitivity, specificity, and predictive power can be evaluated with the epidemiological techniques that today are within the reach of most of the services at the local, regional, and national levels. These indicators will be much more useful as they respond more closely to the purposes of the analysis

and to the space available for decision-making in the different areas of the health system.

Epidemiological surveillance should be closely linked to the function of the control of disease and risks, and, in particular, to the response capacity of the services. It has to be a basic function of all the services and programs at the local, regional, and national levels, and the active search of the necessary information should be promoted. However, surveillance cannot be limited to collection and, at the national level, to the processing of the information produced by the local services; the accumulation of data that does not produce satisfactory responses contributes to the deterioration of the quality of the information and of surveillance itself, with the consequent loss of its perceived value. In order to facilitate those responses the techniques of surveillance should be adapted to the epidemiological characteristics of the problem, and to the conditions, needs, and capacity of response of each country and health system, in the local health systems in particular.

It is indispensable to improve the capacity for the early detection of acute situations, in which a concentration in time and space or an unusual number of cases or symptoms is observed or suspected, and to adapt the services to ensure the capacity for research and immediate response that such emergencies require. At the same time, surveillance should continue to be extended to problems such as chronic diseases, accidents and violent acts, the improper use of drugs, and others that, although not necessarily requiring an immediate population-wide response, do require medical services of growing complexity. In general, the procedures of surveillance are not adequate for the detection of situations of this nature, and it will be necessary to define the data necessary and the most appropriate mechanisms for their collection, processing, and analysis. At the same time it will be necessary to promote the habit of periodically evaluating the magnitude and trends of this type of problem in the services, and the effectiveness of the control measures adopted, in order to facilitate the formulation of progressively more efficient and timely interventions.

Evaluation of the impact of health actions is another basic field of epidemiology in the services, even more important when resources are scarce. Many of the technologies, strategies, and modalities of response developed and utilized successfully in a specific country or at a particular moment, do not have the same impact in another context. Indeed, their uncritical incorporation can be translated into high costs and low effectiveness and efficiency, committing resources that could be more useful for other options.

The potential impact of health actions is limited by the frequency and the behavior of the problem that is to be modified, by the degree of its dependency on the factors on which intervention is planned, by the prevalence of these risk factors and processes, and by the directional effectiveness of the strategies and techniques used. Between this potential impact and the impact really obtained, administrative processes that are pertinent to the availability of resources and their efficient utilization intervene.

All action has a cost in resources of personnel, time, finances, and power; its application should necessarily be evaluated in relation to the social costs and benefits in comparison with other strategies and modalities of intervention. The epidemiological techniques developed to evaluate the relative risk, the attributable risk, and the potential impact of the actions, in combination with the knowledge of the health situation and of the changes produced in it, are still not sufficiently utilized for this purpose, despite their demonstrated potential. Their systematic incorporation should contribute to facilitating management in the health services, especially considering the limited availability of resources and the varied and complex range of options that can be established for the execution of the comprehensive intersectoral programs that are designed to confront priority health problems in the different groups of the population.

Epidemiological Practice in the Countries: Limitations and Prospects

The conclusions reached at the meetings in Buenos Aires and Taxco served as an incentive for many countries of the Region to hold national meetings for the purpose of reviewing current and prospective epidemiological practice, formulating recommendations for their expansion and strengthening, and reviewing the implications of the foregoing for the production of knowledge and for training in the area of epidemiology. In several countries national commissions of epidemiology have been formed to provide follow-up for the resolutions of these national meetings, with special attention to the needs of local health systems. In other countries this task remained the responsibility of scientific or professional organizations or of the Ministry of Health itself. The conclusions and recommendations of those meetings have contributed to the preparation of plans of action for the strengthening of the practice of

epidemiology and have reinforced the commitment with recommendations formulated at the regional meetings.

The general consensus on the purposes and fields of action of epidemiological practice in the services and the efforts carried out by the countries to develop it have made it possible to identify some of the principal determinants of the limitations stemming from the general context, the system of services, and the educational and research institutions.

The social framework of each country constitutes a determinant of the degree of development of the scientific community and of the degree of strength and legitimacy of its institutions, as well as of the value assigned to the scientific and technical knowledge as the basis of the decisions. In addition, it is translated into the greater or lesser availability of resources for research. In light of this type of contextual limitation it becomes necessary to strengthen the development of the scientific community and of the mechanisms of validation and legitimation of knowledge. The promotion of areas of scientific discussion and the development of mechanisms for review and arbitration and for dissemination are eminently necessary.

In addition, in most of the countries of the Region the health systems have severe limitations on coverage and quality. In addition to caring for very limited sectors of the population, the services are basically oriented to responding to spontaneous demand; they carry out actions geared to attacking a single causal process predominantly at the individual and curative levels, often with unnecessarily complex technologies. Thus they constitute isolated responses to the health problems and usually have limited impact on the health-disease profile, with increasing operational costs.

In recent years, within the framework of the crisis there has been an increasing trend toward contingency management and toward prioritizing the allocation of resources for what is immediate and urgent rather than for actions that may require more time to mature but yield better fruits in the longer term. In the health sector strong pressures for the privatization of the health services have arisen, based on criticisms of the limited effectiveness and efficiency of the public services, and there has been an accentuation of the tendency to concentrate the resources on attention to spontaneous individual demand, with progressive weakening of the efforts to transform the health profiles and their determinants. These trends contribute to the strengthening of the predominantly treatment-oriented, institutionalized nature of the services, but now on the basis of their organization as private, profit-making entities in the hope of greater internal administrative efficiency. In this context it will be necessary for the official sector to redouble its concern for the effectiveness of the actions and, even more so, for their integration within the sector and across sectors and for their equity.

The study and control of specific diseases have made it possible, in some cases, to impact their behavior significantly and to reduce their frequency and the risk of dying, but--although indisputably beneficial and necessary--this approach through individual diseases has shown itself to be insufficient to obtain the overall appraisal of the health situation that would be necessary to transform the services in accordance with the needs of the priority human groups. In turn, the weakness of the development of programs and services oriented toward the modification of the health profile is translated into a low value being placed on the practice of research for priority problems of different population groups, and favors the emphasis of the study of quick interventions, specific for a particular problem or an urgent situation. The little research that is aimed at a more comprehensive approach tends to be marginal, without the participation of the health services.

In the services there is little experience in the utilization of techniques of research and of management that include the organized participation of the population and even less with respect to multidisciplinary, multi-institutional, and intersectoral projects. This is translated into limited capacity for this type of research and a degree of lack of confidence in its potentialities and, in some cases, in clear rejection of or resistance to its utilization. The processes of decentralization and transformation of the health systems will require a significant effort to adapt the definition and production of the information to be utilized to those ends, in order to strengthen the mechanisms that ensure its coverage and quality, as well as to increase the capacity to utilize more participatory methods and techniques of collection, processing, analysis, and interpretation of information on health problems.

Another obstacle is derived from a limited capacity to plan and program that is translated into a marked trend toward improvisation and impermanence, and contributes very little to the development of the creative spirit, essential for good public health practice. As a result, many professionals have become simple executors of decisions adopted outside their areas of influence, and limit themselves to a

passive waiting for instructions from higher administrative levels to the detriment of an inquiring attitude and active surveillance of the health problems. To transform these dynamics in order to recover a better balance among the technical and scientific activities and the necessary administrative work requires an enormous effort, not only from the epidemiologists but from the entire health team, and it will be necessary to raise the level of awareness of all of these professionals, including the authorities at the different levels of the system.

The nonexistence, in many countries, of stable procedures for recruitment, selection, and promotion of qualified personnel, added to theinstability and limited remuneration of the public health staff members, is translated into multiple employment and limited competitiveness by the public sector for the recruitment and retention of public health professionals of a high caliber. In turn, this makes more difficult the efforts to develop an epidemiological capacity consistent with the need--efforts that would require many years and investment of resources in stable institutions and stimulants of creativity. In order to improve this capacity it is important to facilitate the establishment or adjustment of careers in public or civil service and to promote the review of the working conditions of the staff members, especially of those that would be required to dedicate themselves exclusively to the performance of their duties, with the aim of achieving greater stability, better remuneration, and greater identification with their mission and dedication to public management.

For the purpose of strengthening their participation in the transformation of the health systems, some university institutions and research centers have carried out significant efforts to review the teaching and practice of epidemiological research. However, although these efforts have been intensified since the XIV ALAESP Conference in 1987, they have found limitations in the context and in the actual internal process of incorporation of new concepts and contents into teaching and research; with excessive frequency both are becoming separated from actual practice in the services. In addition, the delivery of new knowledge tends to suffer from an inappropriate degree of complexity and abstraction, often more based on the speculative that on the reality in health. For the teaching of epidemiology and public health at both undergraduate and graduate levels in many institutions, techniques continue to be used that are predominantly discursive and passive and that do little to mobilize the capacity of the student to participate in the production of knowledge.

In addition, in some countries there is a noticable tendency to train epidemiologists specialized in isolated pathologies without, at the same time, promoting the capacity and experience to deal comprehensively with the health situation and the complexity of problems that require combining multiple responses. This limits the possibilities of the contributions of the practice of epidemiology to the definition of health policies, the transformation of the organization of the health systems, and the selection of the interventions that are required.

The rebuilding of the space of epidemiology in the formative process implies restarting the epidemiological tradition in causal thought, on the determination of health phenomena by the articulation of complex social and biological processes, and, at the same time, incorporating the powerful developments now occurring at the conceptual, methodological, and technical levels in the biological and social sciences and in the statistics applied to epidemiology. In this regard limitations have been identified in the mastery of the theory and methods of epidemiology by many educators and investigators. There has also been identification of a predominance of a clinical-cum-individual approach to the health problems and, at the same time, a trend toward the poor use of sophisticated quantitative techniques, without solid conceptual efforts or adequate reflection on the usefulness of the research.

The most promising prospect for the transformation of the teaching of epidemiology appears to be its integration into actual practice in the health services and the progressive contribution of the conceptual, methodological, and technical guidelines necessary for the identification of health problems in the community, their observation, description, and explanation, the formulation of proposals of intervention, and the evaluation of its impact. Based on this conceptual approach, the continuous training in epidemiology of all health workers should be strengthened in accordance with the profile of their activities. In addition, it becomes necessary to promote efforts to train high-level epidemiologists, to provide them with the potential to strengthen epidemiological practice at the conceptual, methodological, and technical levels.

Another important problem that affects the production of knowledge of public health is the deficiency of resources assigned at the institutional, national, and international levels for research in the field of epidemiology. It will be

necessary to redouble the effort to ensure a greater availability of resources, especially those aimed at promoting more appropriate innovative approaches and methods for the study of the health situation and the evaluation of the impact of the actions and services.

Both in the services and in the educational and research institutions there is limited access to current specialized scientific information on the innovations in the different fields of action of epidemiology. This has been an important restriction on the development of the critical, inquisitive spirit necessary in all investigators and on keeping those investigators and health workers familiarized with the proposals and discussions that are propelling the development of epidemiology at both the conceptual and methodological levels. This problem has been accentuated in recent years by the worsening financial limitations.

The limited exchange existing among the institutions providing services and those engaged in education and research, the limited development of environments for scientific discussion that emphasize the knowledge of the health situation, and the limited opportunities available to many investigators to publish in national and international journals that reach most of the health workers of the countries constitute additional limitations on the development of a scientific attitude toward this problem.

Among the multiple recommendations formulated in the various meetings to strengthen the practice of epidemiology in relation to the processes of decentralization, and the strengthening of local health systems in the countries, is the review of the functions and structure of the epidemiology units--those that should be reoriented to encompass the large fields of action already indicated; that is the systematic analysis of the health situation, epidemiological surveillance, the evaluation of the impact of the interventions on health, and the promotion of research at all levels.

Another widely recommended strategy consists of the promotion of scientific meetings and congresses on epidemiology and public health that are multidisciplinary and multi-institutional in character and have mass participation. These meetings are already carried out systematically in some countries and sporadically in others; they have as their principal objective serving as a forum for the presentation, discussion, and dissemination of scientific works in the field of epidemiology. They respond to a basic need on the road to constructing the hegemony of public health thought within the health systems, inasmuch as they will provide a space for the formation of a conscience for health and a common framework of knowledge and attitudes about health. To the extent that they strengthen the mechanisms to validate the knowledge produced, these meetings favor the constitution of a scientific community that will progressively elevate the quality of the production of knowledge and its utilization. At present, they appear to represent the best mechanism for the consolidation of the practice of epidemiology in the countries, in order to mobilize opinion based on the discipline, promote the generation of knowledge on health, and promote its dissemination and utilization as one of the elements necessary for the definition of policies and the organization and evaluation of the health services.

In many of these meetings there has been recognition of the need for evaluating the viability, feasibility, and potency of these and other strategies that are adopted for the promotion and the strengthening of the practice of epidemiology. Thus, the importance has been noted of evaluating progress with respect to the recovery of the hegemony of public health thought in the services in relation to comprehensive and intersectoral approaches aimed at confronting health problems at the level of their causes and determinants. It will be necessary to document the development of the capacity of foresight and rapid response in the face of acute problems, the monitoring of the determining processes of priority health problems, and the extent to which interventions are evaluated in relation to their impact on health and well-being. Similarly, there is a requirement to accompany the advances in research on the health situation of different population groups, the dissemination of that knowledge, and the integration of the practice of epidemiological research with the daily management of the systems of services at the local, regional, and national levels. Finally, it should be noted that there is a need for monitoring whether the epidemiological knowledge produced is incorporated in the definition of priorities and allocation of resources and, in particular, whether this is contributing to the desired transformation in the health services systems.

In summary, it will be necessary to adjust the mechanisms that facilitate a better utilization of the concepts, principles, and methods of epidemiology for the systematic analysis of the health situation and its trends, to monitor old health problems and detect new ones, and to evaluate the impact of policies, strategies, and health interventions. The incentive and support for epidemiological research and the discussion and dissemination of its results should

be supplemented by appropriate access to the scientific information generated both in the country itself and abroad, and the strategies for training in epidemiology and related disciplines should pay special attention to the training in and for the health services.

All these efforts, as they are integrated into current processes aiming at the review of the organization and operation of the health services systems in general and the local health systems in particular, will have to contribute not only to strengthen the role of epidemiology, but also to rebuild a comprehensive conception of public health, whose practice will translate into benefits for the people of the Region of the Americas.

(*Source:* Health Situation and Trend Assessment Program, PAHO.)

Vector-Transmitted Diseases in Central America, Belize and Panama

Dengue

Aedes aegypti infestation is widespread in the Subregion, with the exception of Costa Rica where it is localized. Dengue virus infection is endemic and periodically epidemic in all the Subregion, except Costa Rica and Panama. After a long period of absence of the disease, the dengue virus was introduced to Central America (CA) at the end of the 1970's. During this period, explosive epidemics of classic dengue associated with serotype 1 of the virus were registered in El Salvador, Guatemala and Honduras. At the beginning of the 1980's dengue-4 was introduced in Central America and, shortly thereafter, dengue-2 was detected. Presently, all three dengue serotypes are circulating in CA. During the 1980's, almost 70,000 cases of dengue were reported in El Salvador, Guatemala, Honduras and Nicaragua. However, this figure may represent a marked underestimation, due to the lack of adequate dengue epidemiological surveillance in Central America.

A great cause of concern in recent years has been the reporting of cases of dengue hemorrhagic fever (DHF) in some Central American countries. Nicaragua reported seven cases of DHF in 1985, all of them fatal, while El Salvador reported 153 cases during 1987-1988. It is important to remember that epidemics of DHF in Southeast Asia were preceded by the occurrence of sporadic cases of DHF. Also, the recent occurrence of a major epidemic of DHF in Venezuela underscores the great potential of DHF dissemination in the subregion.

This situation led El Salvador, Guatemala and Honduras to establish a three-party agreement to combat *Ae. aegypti* in bordering areas, and thus control the spread of dengue. Currently, these three countries are preparing their respective plans of action for combating the vector, reinforcing systems of epidemiological surveillance, and improving laboratory diagnosis of the disease.

Leishmaniasis

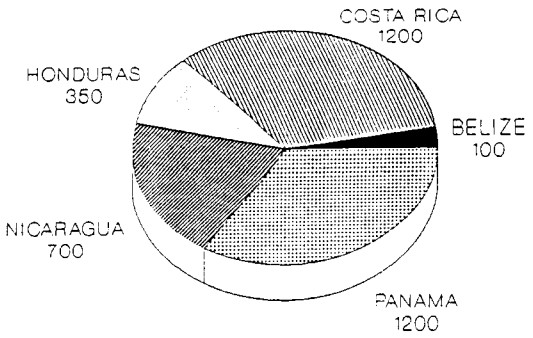
The total prevalence and precise geographical distribution of all forms of leishmaniasis (cutaneous, mucocutaneous and visceral) in this Sub-region, as for the rest of the Americas, is still unknown.

It occurs mainly in sylvatic foci in all the countries of the area, but in the last decade, it also occurred in domiciliary and peri-domiciliary environments, particularly in Costa Rica.

Cutaneous and Mucocutaneous Leishmaniasis

Cutaneous and mucocutaneous forms are the most frequently reported clinical cases, especially in Costa Rica, Nicaragua and Panama. Recently an increasing number of cases of both cutaneous and visceral cases have been reported in Honduras (See Figure 1).

Figure 1. Cutaneous leishmaniasis cases reported by year in selected countries of the Central American Subregion, around 1986.



IDRC/TDR/IMT-AvH-UPCH 1987
Workshop, Research on Control
Strategies for Leishmaniasis

Leishmaniasis caused by *L. mexicana* occurs mainly in Belize, Guatemala, and Panama. A small percentage of the patients develop diffuse cutaneous leishmaniasis in the absence of cell mediated immunity. The lesions cure spontaneously if located in the trunk and limbs, but the ulcers located in the ears remain active many years, producing severe and extensive mutilations (Chiclero's ulcer). Three sub-species of *Lutzomia olmeca* are involved in the transmission and *Lu. flaviscutellata* has been also incriminated. The reservoirs are a variety of forest rodents and marsupials.

Leishmaniasis caused by *L.amazonensis* is found mainly in South America, but it has also been isolated in Costa Rica and Panama. Its presence is also being suspected in Guatemala.

Leishmaniasis caused by *L. brasiliensis* occurs in Costa Rica, Guatemala, Honduras, and Panama. Infection is associated with jungle activities, and although transmission occurs throughout the year, there are seasonal fluctuations. Several jungle mammals have been incriminated as reservoirs, particularly the opossum and many rodents. The vector involved in the transmission has yet to be identified.

The relatively recent identification of *L.b.braziliensis* in cases of cutaneous leishmaniasis in British soldiers trained in Southern Belize, is a very important epidemiological finding. Both the vector and reservoir of *L.b.braziliensis* are still unknown.

L. braziliensis panamensis is primarily associated with deep jungle activities, but is also occurring in areas where the jungle has dissapeared. It occurs in Honduras, Nicaragua, Costa Rica, and Panama. The phlebotomine species involved in the transmission has not yet been determined, neither has the reservoir; nevertheless, the two-toed sloth and the three-toed sloth have been incriminated in Costa Rica and Panama.

Leishmaniasis by *L. chagasi* with assumed canine reservoir occurs in El Salvador, Guatemala, and Honduras. In the latter country the same parasite is producing both, cutaneous and visceral cases. The cutaneous lesions are atypical, with nodular, not ulcerated lesions, frequently misdiagnosed as lepromatous leprosy. This lesions are not concurrent with visceral involvement, and are not post-therapeutic manifestations of visceral leishmaniasis. Visceral leishmaniasis occurs maily in young children (less than two years old) and is commonly associated with severe malnutrition. The characteristics of a number of foci in Central America have yet to be determined.

Malaria

Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama together number 19.7 million inhabitants in malarious areas that represent 6.7% of the total of the malarious area in the Hemisphere.

The 148,373 cases of malaria reported in 1989 were 13.5% of the total number of cases notified in the Americas. A total of 91% of the cases is concentrated, in diminishing proportions, in Guatemala, Nicaragua, and Honduras. The predominant species in the Subregion is *P. vivax* (97.6%). The overall trend of the disease in the Subregion diminished between 1985 and 1987, and in 1988 showed an increase of 15.4% with respect to 1987, led by the increase in Nicaragua (94.3%) and followed by Honduras (55.7%) and Costa Rica (15.0%). In 1989 the occurrence continued to increase with respect to 1988--an increase of 19.9%--led by the increase in Honduras (54%), and followed by Nicaragua (39%) and Belize (21%).

Panama and Costa Rica are the two countries with the lowest number of cases in the last four years. Deterioration of the situation began for Costa Rica in 1983, and in Panama in 1986, because of epidemic outbreaks as a result of imported cases in areas already free from transmission. In El Salvador there were almost 96,000 cases of malaria in 1980; however, since then the figure has constantly declined up to 1989, when barely 9,605 cases were recorded.

Based on stratification of the malarious area, El Salvador uses an integrated control approach in the coastal region

of the country, where the most intense transmission of malaria is responsible for the great majority of cases. These activities are supported by decentralization of diagnosis and timely treatment of cases through the health services and a network of 2,500 voluntary collaborators. Actions aimed at the reduction of mosquitoes in breeding places are carried out through engineering works in swamps, lagoons, and canals in the areas of greatest transmission in an attempt to secure permanent control with less dependency on the application of insecticides, which is also carried out, but only in selected localities.

Belize

The program continued making efforts to improve the information and epidemiological surveillance system and knowledge of the vectors. The number of infections produced in 1989 by *P. vivax* was 2,617 and 95 for *P. falciparum*.

Costa Rica

By the end of 1988 success had been obtained in interrupting transmission in 79% of the malarious area, in which approximately 680,000 persons live. Thanks to the efforts made for surveillance and control of endemic disease, only 699 cases of malaria have been recorded among the 108,614 blood slides examined. The cases are scattered among 217 of the 7,321 localities in the country. The program has epidemiological information on 589 localities in the attack phase and 2,890 in the consolidation phase.

El Salvador

The number of recorded cases continued to decline from 44,473 in 1985 to 9,605 in 1989. The drop in the number of cases of *P. falciparum* is even more marked, from 4,373 in 1985 to only 40 in 1989. Emphasis continues to be placed on the reduction/elimination of breeding places, without neglecting other integrated control measures, among which are the mass distribution of antimalarial drugs to a population of 92,378 persons, selective distribution of such drugs to 4.5 million inhabitants, and the application of larvicides in an area of 530 square Km.

Guatemala

In 1989, 331,675 blood specimens were taken (10%) out of a total of 3,4 million persons at risk. Of the 42,453 cases recorded, 1,155 cases had infections from *P. falciparum*. As a vector control measure household spraying with deltametrin and fenitrothion is used in the localities with the most severe problems in accordance with epidemiological stratification. In addition, focal treatments are carried out and larvicides in powder form are applied with sprayers for more efficient performance.

Honduras

The number of cases increased from 19,095 in 1987 to 45,922 in 1989. Deterioration of the epidemiological situation was concentrated in Area 2 of Region III (El Progreso) and in Area 2 of Region IV (Marcovia). In the rest of the country endemicity remained stable. The increase in the search for patients in Region III produced a greater number of cases than in the previous year. Of the total population of 4.1 million in the original malarious area that occupies an area of 101,351 square Km, there are 2.5 million in an area of 46,546 square Km with transmission in which no control measures are applied owing to a lack of resources and in which migratory activities resulting from irrigation, urbanization, agricultural practices, hurricanes, floods, and sociopolitical conflicts increase the risk factors.

Nicaragua

During 1989 the epidemiological situation deteriorated, with 45,982 recorded cases. The present behavior of the dynamics of transmission depends on risk factors difficult to manage, such as the formation of innumerable natural breeding places and population migrations of combatants, producers, merchants, and repatriates, among others.

Panama

Malaria is confined to 241 of the 9,739 localities in the country, in which 427 cases of malaria were detected in 338,473 blood slides examined. The problem areas include almost 10,000 inhabitants in Jaqué-Darien, Puerto Piña, Puerto Obaldía, Alto Chucunaque, Alto Bayano, and Tucutí, where migration, nomadism, apathy, and precarious dwellings prevail.

The program faces serious economic difficulties that have prevented the acquisition of basic inputs and the financing of field operations. However, malariometric rates are maintained at acceptable levels in the country.

Trypanosomiasis Americana

Transmission as through the vector is highly prevalent in the Subregion is shown below with the exception of Belize, where only a few cases of human infection have been reported.

Taking into account the prevalence of positive serology in blood banks and the lack of mandatory serology to discard infected units (except in Honduras), it is suspected

that transfusional *T. cruzi* infection is also a problem. Table 1 shows the prevalence of positive serology in blood banks of the Subregion.

Table 1. Prevalence of positive tripanosomiasis serology in blood donors, from Central American countries.

Country	Year[1]	Sample[2]	%
Costa Rica	1983-1985		
Alajuela		1,306	0.8
Heredia		666	0.9
San Jose		602	1.6
Guatemala	1987		
Different cities		1,260	5.0
Honduras	1987		
Different cities		1,225	11.6

[1] Only data reported after 1980.
[2] Date in which the data was collected or reported.

The situation in the different countries is as follows:

El Salvador

The vector is present in 30-80% of the dwellings in rural areas and in small or medium urban agglomerations that account for 70-80% of the homes in the country. The *T. cruzi* infection rate in vectors is 25%. It is estimated that 20% of the rural population has positive serology for *T. cruzi.*

Guatemala

Human infection is frequently found in the Departments of Chiquimula, Jalapa, El Progreso, Santa Rosa and Zacapa. The triatomine house infestation rate was 31.0% for *Triatoma dimidiata;* the *T. cruzi* infection rate was 34.1% in *T. dimidiata* and 31.0% in *Rhodnius prolixus.* Prevalence of the infection in some rural areas is up to 16% of the population.

Honduras

The vector is present in the Departments of Choluteca, Comayagua, Copan, Francisco Morazan, Intibuca, Lempira, Ocotepeque, Loancho, El Paraiso, La Paz, Santa Barbara and Yoro. In 1983, the highest prevalence of seropositivity was found in the western and eastern departments and in the southern region. According to an estimate, about two-thirds of the population is at risk of contracting the infection transmitted by the vector. Infection rates of the human population in the domiciliated vectors have been found to vary at 32.2% and above. Infection rates as shown by serology vary from 0.2 to 16.6%, depending on the area.

Nicaragua

Even though no recent data is available, individuals from Chinandega, Esteli, Jinotega, Madrid, Managua, Matagalpa and Rivas were found to be infected with *T. cruzi.* The mountain zones of the northwest and central regions, and parts of the Pacific coast are the principal areas of domiciliated triatomine concentrations.

Panama

Vectors of *T. cruzi* are found in seven provinces of Panama including the Canal Zone. *Triatoma dimidiata* has been detected in 16.4% of the houses; with a *T. cruzi* infection rate of 3.1% in the Gualaca District. *R. pallescens* has been found in only 3.2% of the houses in the Chorrera District; the *T. cruzi* vector infection rate was 10.6%. The overall prevalence of the infection was 2.7% in Western Panama and up to 22.3% in some areas of Central Panama.

(*Source:* Communicable Diseases Program, PAHO.)

Epidemiological Activities in the Countries

Graduate Course in Epidemiology in Argentina

The Salvador University has organized the First Superior Course of Epidemiology, with a duration of one academic year and 600 hours of teaching, designed for health professionals. It is taught on a part-time basis and includes practical-theoretical activities, field activities, and seminars.

The staff in charge of teaching activities comprises all Professors and Teaching Auxiliaries of the "John Snow" Center for Research and Education in Epidemiology (CIDES), headquartered in the Juan A. Fernandez General Hospital for Acute Cases; all educators of the School of Public Health/Department of Public Health, School of Medicine, University of Buenos Aires, and in charge of the Program of Epidemiology in Program Areas/Municipal Health Districts of the City of Buenos Aires.

Some aspects of the study program include, epidemiology, history, current use and scope; epidemiology as the collective dimension of the health/disease process; epidemiological research as a service for the community; areas of production of epidemiological knowledge; epidemiology as an instrument of the decision-making level in health; its insertion as scientific substratum of the study of health services systems; instruments of epidemiological activity; epidemiology applied to the local health services; role of epidemiology in the system of peripheral agents; the role of the epidemiologist in the base hospital and in the conduct of local services; epidemiology applied to evaluation; and personnel training and epidemiology.

Partial evaluations and by teaching modules, and monitored research projects are carried out. The course earns 60 credits, which may be counted toward the Doctorate in Public Health offered by the same University. Space is limited and selection is based on background, special openings being reserved for applicants from abroad. The course runs from April to December.

For more detailed information please contact the Teaching Secretary of the Course:
Prof. Dr. Jorge D. Lemus
Escuela de Medicina, Universidad del Salvador
Tucumán 1845 PB
Capital Federal, Buenos Aires
Argentina.

Training in epidemiology at the national level in Guatemala

The General Office of Health Services of the Ministry of Public Health and Social Assistance of Guatemala, through its Division of Disease Surveillance and Control, offers a training course in epidemiology for public health physicians who upon completing the course will serve as regional epidemiologists in each of the health areas, in accordance with the policy of decentralizing the services and strengthening local technical capabilities.

The justification for the project is based on identification of the problems such as a process of epidemiological surveillance that is characterized by delays in the collection of data; a lack of local and systematic analysis of certain data; and delays in detecting local epidemiological problems and difficulties for taking actions on a timely basis. There is an insufficient use of epidemiology in evaluating programs and services, a lack of permanent analysis of the prevalent pathology, of risk factors, and of local and general resources for taking on the health problems analyzed and ranked, as well as an insufficient development of conditions for carrying out epidemiological research.

The purpose of the course is to strengthen the use of epidemiology in the health services, so as to promote local decision-making in accordance with the process of regionalization and decentralization.

The methodology will include theoretical-practical sessions in Guatemala City and practical work in the health areas with participation of the local team.

The Ministry of Public Health and Social Assistance, which is in charge of holding the course, will assign a field supervisor and involve the regional directors and area chiefs in administrative supervision of the practical work.

The PAHO/WHO Country Representative Office will provide technical cooperation and financial support. The Institute of Nutrition of Central America and Panama (INCAP) will provide the institutional framework for the course and will be in charge of coordinating it.

An advisory committee will take charge of permanent monitoring of the course. It will be made up of the participating institutions, PAHO/WHO, INCAP, the School of Medicine of the University of San Carlos of Guatemala,

the Guatemalan Social Security Institute, and the Development Project of the National Institute of Health.

The methodological proposal has two phases. The first, now under way, includes review of the basic concepts of epidemiology, statistics, demography, computer systems and social anthropology, and health situation analysis. Twelve weeks have been set aside for this stage. The first will be used to design a standard analytical model that will later be discussed by each participant in the course with his respective area team. Data collection will be done in five weeks. The last week of the first phase will be used to prepare a document that clearly states health priorities, based on the analyses that are progressively being undertaken.

The second phase, to be carried out from January to June of 1991, will begin with analysis of the evaluative information accumulated during the first phase, and will include proposing an epidemiological surveillance plan that incorporates the changes identified as necessary in the first phase; operations research into one of the priority problems in each area; and preparation of a causal research protocol (five weeks). The research would be done during the remaining months of the year under the supervision of the research unit of the Ministry of Health, and with advisory services from INCAP and PAHO.

Publications

Health Conditions in the Americas, 1990 edition, is the tenth publication in a series of quadrennial reports issued since 1954 as a way to document the health progress attained by the Member Governments of the Pan American Health Organization. This publication also presents to the XXIII Pan American Sanitary Conference an assessment of the health status of the Region's population in terms of the goal of health for all by the year 2000. This report does not include technical cooperation activities conducted between PAHO and its Member Governments; those activities are presented in the *Report of the Director, Quadrennial 1986-1989, Annual 1989.*

The 1990 edition's two volumes present information mainly for the 1985-1988 period. The first volume reports on health conditions from a regional perspective and comprises three parts and a statistical annex. The first part deals with the overall context: it describes some of the Region's political, economic, and social trends; the main demographic characteristics, and an overview of mortality and environmental health. The second part explores health conditions in the Region, focusing on children, adults, the elderly, and women, and health problems that affect the population in general. The third part, which examines the health systems infrastructure, describes the health sector's response to the problems that have been identified and reports on the environmental health infrastructure in terms of water supply and sewerage, urban sanitation, environmental pollution, and occupational health. The annex to this volume is a compilation of the most up-to-date statistical data available, which supplement information published in previous reports and serve to document the text. The second volume summarizes the health conditions and infrastructure in each of the Region's countries; its analysis by subject area follows the organization of the first volume.

Pan American Health Organization, 1990. Scientific Publication No. 524, ISBN 92 75 11524 9. Published also in Spanish (1990) with the title *Las Condiciones de Salud en las Américas,* edición de 1990. Publicación Científica No. 524 ISBN 92 75 31524 8.

AIDS Surveillance in the Americas

Number of AIDS cases by year, and cumulative number of AIDS cases and deaths as of 31 October 1990.

SUBREGION Country	Number of cases Through 1986	1987	1988	1989	1990	Cumulative total (a)	Total deaths	Date of last report
REGIONAL TOTAL	45,231	32,693	40,509	43,878	20,766	183,121	107,828	
LATIN AMERICA b)	3,654	4,514	6,804	7,490	1,583	24,077	10,016	
ANDEAN AREA	200	332	469	796	198	2,025	1,022	
Bolivia	3	2	3	3	...	11	7	30/Jun/89
Colombia	84	119	105	335	...	643	333	31/Dec/89
Ecuador	13	19	25	15	7	81	56	31/Mar/90
Peru	9	60	68	117	70	352	122	31/Mar/90
Venezuela	91	132	268	326	121	938	504	30/Sep/90
SOUTHERN CONE	104	128	254	331	172	989	396	
Argentina	73	72	169	229	108	651	242	30/Jun/90
Chile	22	41	55	60	...	178	71	31/Dec/89
Paraguay	1	6	2	4	3	16	13	31/Mar/90
Uruguay	8	9	28	38	61	144	70	30/Sep/90
BRAZIL	1,558	2,077	3,314	3,706	415	11,070	5,555	31/Mar/90
CENTRAL AMERICAN ISTHMUS	86	155	309	538	555	1,644	641	
Belize	1	6	4	0	...	11	8	30/Sep/88
Costa Rica	20	23	52	56	48	199	109	30/Jun/90
El Salvador	7	16	48	94	27	192	38	31/Mar/90
Guatemala	18	16	13	18	27	92	56	30/Jun/90
Honduras	15	66	130	301	427	939	305	30/Sep/90
Nicaragua	0	0	2	2	3	8	4	30/Jun/90
Panama	25	28	60	67	23	203	121	30/Jun/90
MEXICO	793	1,027	1,411	1,147	76	4,454	1,882	30/Jun/90
LATIN CARIBBEAN c)	913	795	1,047	972	167	3,895	520	
Cuba	3	24	24	20	0	71	29	30/Jun/90
Dominican Republic	115	294	292	499	167	1,368	194	30/Jun/90
Haiti	795	477	731	453	...	2,456	297	31/Dec/89
CARIBBEAN	467	375	522	742	304	2,422	1,405	
Anguilla	0	0	1	2	1	4	1	30/Jun/90
Antigua	2	1	0	0	...	3	3	30/Mar/89
Bahamas	86	90	93	168	70	507	273	30/Jun/90
Barbados	32	24	15	40	16	127	97	30/Jun/90
Cayman Islands	2	1	1	1	1	6	5	30/Sep/90
Dominica	0	5	2	3	2	12	11	30/Jun/90
French Guiana	78	25	34	54	...	191	118	31/Dec/89
Grenada	3	5	3	5	3	19	17	30/Jun/90
Guadeloupe	47	41	47	47	...	182	85	31/Dec/89
Guyana	0	10	34	40	24	108	49	30/Jun/90
Jamaica	11	33	30	66	26	166	80	30/Jun/90
Martinique	25	22	28	50	17	142	82	30/Sep/90
Montserrat	0	0	0	3	0	3	0	30/Sep/90
Netherlands Antilles	9	12	9	16	22	68	16	31/Aug/90
Saint Lucia	3	7	2	4	2	30	30	30/Sep/90
St. Christopher-Nevis	1	0	17	0	...	18	9	31/Dec/88
St. Vincent and the Grenadines	3	5	8	6	4	26	12	30/Sep/90
Suriname	4	5	4	35	27	75	59	30/Sep/90
Trinidad and Tobago	151	85	160	167	85	648	423	30/Jun/90
Turks and Caicos Islands	3	4	1	0	...	8	4	31/Dec/88
Virgin Islands (UK)	0	0	1	0	1	2	0	30/Sep/90
Virgin Islands (US)	7	0	32	35	3	77	31	30/Sep/90
NORTH AMERICA	41,110	27,804	33,183	35,648	18,879	156,622	96,407	
Bermuda	51	21	28	35	12	147	114	30/Jun/90
Canada	1,236	865	961	1,026	339	4,427	2,518	30/Sep/90
United States of America c)	39,823	26,918	32,194	34,585	18,528	152,048	93,775	30/Sep/90

* Privisional

(a) May include cases for year of diagnosis unknown.

(b) French Guiana, Guyana and Suriname included in the Caribbean.

(c) Puerto Rico included in USA.

Diseases Subject to the International Health Regulations

Number of cases and deaths reported by countries of the Region of the Americas up to 31 October 1990

Country and administrative subdivision	Cholera Cases	Yellow fever Cases	Yellow fever Deaths	Plague Cases
BOLIVIA	-	**34**	**26**	-
Cochabamba	-	26	18	-
Santa Cruz	-	8	8	-
BRAZIL	-	**2**	**1**	-
Maranhão	-	1	1	-
Pará	-	1	-	-
UNITED STATES OF AMERICA	**6**	-	-	**2**
California	2[i]	-	-	-
Colorado	-	-	-	2
Louisiana	2	-	-	-
New York	2[i]	-	-	-
PERU	-	**7**	-	**4**
Huánuco	-	1	-	-
Junín	-	1	-	-
Piura	-	-	-	4
San Martín	-	4	-	-
Ucayali	-	1	-	-

[i] Imported cases.

Note: The total number of cases and deaths notified in the Region of the Americas for 1989 is as follows:

- Cholera: Canada reported one case and no deaths.
-Yellow Fever: Bolivia reported 98 cases and 79 deaths; Brazil 9 cases and 3 deaths, and Peru 119 cases and 102 deaths.

- Plague: Brazil notified 26 cases and no deaths, and the United States of America 4 cases and no deaths.

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