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402 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 (ALAESPE), held 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 peri-

odic 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.

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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 deci-

sions 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 problems in 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 the instability 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 than 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 noticeable 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.)

403 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).