Research on Health Profiles.
Background Information on Mortality Analysis Projects

Research policy at the Pan American Health Organization (PAHO) has been formulated so that the limited financial resources available for research may serve as a catalyst to help encourage countries to mobilize their own human and institutional resources around subject-matter areas identified as priorities. In support of this policy the Internal Advisory Committee on Health Research has been established; its functions include definition of research priorities and evaluation of proposals for funding by the PAHO Research Grants Program. In addition, an active role has been assigned to the Organization's technical programs and country representative offices in promoting research as well as providing technical support during design and execution. In keeping with this policy, research to be carried out in all countries must probe factors affecting or determining the level and structure of health problems. In addition, the interrelationship between health and development, and between types and styles of health services organization and operation must be studied in light of the specific political-economic-social context in each country. One of the priority topics thus identified is research on health profiles, and activities for its support

were entrusted to the Health Situation and Trend Assessment Program.

In this document, health "situation," "conditions", or "diagnosis" will be used synonymously, and the health situation will be understood to have three main components: (1) the health "status," "level," "structure," "profile," or "situation", as such; (2) the health services system or health "sector"; and (3) the context or environment--physical, demographic, socio-economic, cultural, and political, specific to the space and time in which a society is evolving.

It is understood that these three components are closely interrelated; each is cause and consequence of the other two, and it is impossible to comprehend the health reality by analyzing any one of them separately. Rather, this artificial subdivision seeks to orient the intentionality, and thus the approach, the emphasis and the criteria for analysis, according to whether the fundamental concern of the user is to better understand health-disease processes and their present and past determinants, or his principal interest lies in advancing development of the health services system as well as sectoral and intersectoral coordination. In the first case, in addition to gaining knowledge on the range of

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health problems and determinants in a community, it will be necessary to know the infrastructure through which actions are expected to be delivered; in the second, in addition to knowing sector characteristics, the range of problems facing the human groups to be served should be known.

Since the Seminar on Current Uses and Future Prospects of Epidemiology (Buenos Aires, 1983), PAHO activities aimed at strengthening national epidemiological capability in countries have focused on the promotion and support of health situation assessment of the population, including its determinants and trends, in order to strengthen a systematic analytical process capable of providing timely information and feedback at various administrative levels and thereby contributing to better-informed decision-making. Initial efforts in this area were carried out in countries of Central America and Panama and promoted the establishment of national groups, with the encouragement and support of epidemiologists and statisticians. There were similar initiatives in several other countries, whether by interdisciplinary working groups which included staff from PAHO representations and other international agencies, or by specially hired consultants. It should be pointed out that, for the most part, these efforts were aimed more at improving the framework for programming Country-PAHO technical cooperation, than at strengthening analytical capability to be applied systematically by national teams as an integral part of planning, administration, and evaluation of their own activities.

The various assessments made in countries were quite dissimilar with regard to their motivation, approach, and quality. The scarcity of systematic and periodic assessments was frequently alleged to be due to absence of data, or to overwhelming deficiencies in the data with regard to type, quantity, or quality. However, in practically all the countries which participated in the exercise on updating their health situation analysis, it was confirmed that much more data were actually available than the staff--national and international, had assumed. Despite the fact that, in large measure, existing data were incomplete, seriously wanting in quality and timeliness, and scattered among a large number of institutions--not necessarily dependent on the health sector, the data were nonetheless potentially useful for those who knew of their existence and were aware of how to use them cautiously. There is a vicious circle: data deficiencies serve as an excuse for progressive underutilization and this in turn contributes to even greater deterioration, due to the low priority given to activities and resources necessary to improve data collection, processing, and analysis.

On the other hand, preparation of a good health profile is a multifaceted and complex enterprise for which there is no single approach or clearly superior set of procedures. It is necessary to learn how to select the most appropiate theoretical approaches, as well as the data and methods best suited to the subject and object of analysis. At the same time, subject areas and approaches for the study of which

satisfactory methods or data are not yet available call for existing methods to be reviewed and adapted, or for new sets of data--and methods and procedures for their collection and analysis, to be designed and carefully validated.

The complexity of the topic, the diversity of possible approaches, and the limitations on human and financial resources motivated the decision to develop the health situation research process in a progressive manner, and to initiate it at the precise point at which the analytical process itself should begin: utilization of the available information having the best coverage and quality, and which so far has not been fully taken advantage of for health situation assessment.

Thus, the first research projects on health profiles centered on the mortality component, with the objective of obtaining the most complete knowledge possible on the health situation, based on assessment of existing mortality data. At the same time, these projects were designed to help systematize procedures traditionally utilized in mortality analysis so as to facilitate and improve their use, and, finally, to test, validate, and confirm the usefulness of certain procedures not commonly used in these analyses. All projects had a component in common: health situation analysis based on study of the leading causes of death. In addition, each group could develop complementary lines of work.

As far as methodology was concerned, it was recommended that country-wide data be used and that comparisons be made between geographic subunits. The assessments were to begin with a discussion--as fully documented as possible, on the coverage and quality of the information, including an assessment of the relative size of the group of deaths due to ill-defined causes and the coverage and quality of medical certification. To determine the leading causes of death, the most recent three years of data available were to be used and analyzed by means of indicators based on proportional mortality and years of life lost prematurely (also referred to as years of potential life lost or potential years of life lost), in order to evaluate their respective informative content and complementarity.

In order to illustrate the effects of various criteria for grouping causes on the determination of leading causes of death, each research team was to apply the grouping and criteria generally used in their country, in addition to the ranking list used by PAHO ("R List"), the Basic Tabulation List of the 9th Revision of the International Classification of Diseases, and the list of 72 Selected Causes of Death used by the National Center for Health Statistics (NCHS) of the United States. Furthermore, and so as to gain experience and understanding of the indicator based on years of life lost prematurely (YLLP), various definitions of the indicator with regard to lower and upper age limits, and their effect on the determination of leading causes of death, were to be studied. Finally, the health situation was to be analyzed based on mortality structure by cause, as described through indicators for proportional mortality by

cause, YLLP by cause, and YLLP by cause and by death, utilizing in each case the procedure found in previous stages to be the best.

These studies were to contribute not only to substantive knowledge on the health profile, but to enhancement of the analytical process itself in institutions of the official sector. For this purpose, active participation was required both from the staff involved in information production, and from those responsible for decisions concerning actions to be carried out in the health services system. Thus, the research groups were made up essentially of epidemiologists and statisticians linked to the Ministries of Health, although in some cases researchers from academic settings participated as well.

Teams from the following 11 countries have participated in this line of research: Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Mexico, Paraguay, Suriname, Uruguay, and Venezuela. The investigators from projects which already concluded their analyses, as well as other selected experts in epidemiology, statistics, and demography, were invited by PAHO to the Regional Meeting on Guidelines and Procedures for Mortality Analysis held in Washington, D.C. from 22 to 26 February 1988. At this meeting the conclusions reached in the research projects were discussed, and recommendations and guidelines were formulated for making better use of mortality data in analysis of the health situation in countries of the Region. A summary of the meeting is presented below.

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

Regional Meeting on Guidelines and Procedures for Mortality Analysis

This meeting took place in Washington, D.C., from 22 to 26 February 1988. It was convened by the Pan American Health Organization (PAHO) to contribute to broader utilization of mortality data in health situation analyses. Its objectives were to develop recommendations for analysis of the mortality structure by cause and for the identification of leading causes of death. It was specifically intended that recommendations be made concerning procedures to be used at regional level for comparative analysis of the leading causes of death in countries, and concerning criteria to be used by countries in defining procedures for within-country comparisons and special studies. Formulation of these recommendations would be enhanced by the experience gained through the research projects on health profiles/mortality analysis carried out in countries with the technical support of the Health Situation and Trend Assessment Program and the financial support of the PAHO Research Grants Program.

Participating in the meeting, and reporting the results of their research, were the principal investigators of the projects. Other experts in the fields of epidemiology, statistics, and demography also attended, from the countries as well as from PAHO and the World Health Organization (WHO). Recommendations were formulated after discussions at plenary and group sessions.

The meeting was opened by the Director of the Pan American Sanitary Bureau, Dr. Carlyle Guerra de Macedo, who emphasized its importance in regaining visibility for the topic, underscoring its significance, promoting analysis and utilization of the available data and, finally, strengthening the capability to carry out health situation analysis at country level, as one of the elements in planning, monitoring, and evaluation of health actions and services.

The background for this meeting dates from the Seminar on Current Uses and Future Prospects of Epidemiology, held in Buenos Aires, Argentina in 1983; its recommendations included promoting analysis and research on the health situation and trends among different population groups. The changes in the health profiles of the population of the Region of the Americas add relevance to this activity.

The topics covered in the meeting revolved around two basic aspects facilitating characterization of the leading causes of death: the grouping of causes, or short lists; and indicators for surveillance of premature mortality.

Short Lists for Analysis of Mortality Structure by Cause

To introduce the subject, the origin and conceptual bases of the International Classification of Diseases (ICD) were described, as well as its uses and limitations in mor-

tality analysis and the expected modifications for the 10th Revision. The need to disseminate knowledge about the ICD and the devices it contains (rules, standards, provisions, and concepts which regulate its use) among those who analyze information was pointed out.

With respect to the 10th Revision of the ICD it was reported that its structure will be alpha-numeric, the number of categories will increase, and various classification criteria will be modified. At the last meeting of the Expert Committee on the ICD a short list of 77 categories was proposed, which was developed taking into account six principles suggested by the WHO Collaborating Center for Classification of Diseases for North America: hierarchy, comparability, expandability, consistency, possibility of detecting leading causes of death, and awareness of public health needs. It was made clear that this proposed list could be modified on the basis of the results of research conducted by the countries of the Region, since one of the purposes of such research was to develop a better instrument for describing the principal health problems.

Whether or not the tabulations should include deaths without medical certification was discussed in light of a WHO provision which specifies that when deaths without medical certification are under 2% they should be included in tabulations under the category "unknown cause," and when they exceed this percentage, they should be tabulated separately. Some countries tabulate total deaths by cause regardless of the proportion lacking medical certification. It was felt that studies need to be undertaken to ascertain the effect of their inclusion or exclusion on mortality structure by cause, before formulating suggestions concerning the existing provision.

The need to be able to analyze causes of death according to various epidemiological criteria was assessed and the way causes might be grouped according to avoidability criteria--according to the type of technology available for their prevention, was discussed, this being a grouping method utilized in several of the studies presented at the meeting. This type of grouping was originally designed in Chile to analyze infant mortality in that country; subsequently, it has been adapted for studying mortality in other age groups.

Upon discussion of the desirability of having a single list, the need for a regional short list facilitating comparative between-country mortality analysis was acknowledged. It was also recognized that different objectives may require different groupings. Short lists on mortality should be pertinent for their various intended uses and thus may differ depending on whether the purpose of the analysis is to generate knowledge, to identify the leading causes of death and study their trends, or to define priorities and identify key ideas for orienting actions, at political as well as technical levels. The need to have several lists for use at national level was emphasized, since within the countries of the Region mortality analysis also constitutes a fundamental tool for defining and monitoring policies, strategies, plans, and programs. It was pointed out that intentionality, re-

quired in any effective analysis, implies that no grouping criterion can be free of subjectivity.

It was concluded that, in addition to meeting the six criteria already adopted by the Expert Committee on the ICD, short lists should be appropriate for mortality analysis using a variety of epidemiological criteria; and they should be easy to construct and have good informative capacity and specificity in relation to their proposed use. The lists should also be dynamic, that is, able to be modified in accordance with changes in prevalent pathologies and in available preventive and therapeutic technologies.

Finally, PAHO was entrusted with the construction of a new short list based on the 9th Revision of the ICD, utilizing the results of the research projects and the criteria discussed, in order to facilitate comparisons between countries of the Region.

It was noted that any short list for regional use based on the 9th Revision must be compatible with the data collection form used by PAHO and WHO, but that this restriction would no longer apply once the 10th Revision is in use.

Surveillance of Premature Mortality: Years of Life Lost Prematurely

Specific death rates and proportional mortality are indicators traditionally used to highlight causes having a significant impact on health; the indicator based on years of life lost prematurely (YLLP) is a supplementary one which takes into account age at death. Proposed more than 35 years ago in Canada, it has only recently begun to be widely used in countries of the Region, and it is also known under other names, such as potential years of life lost or years of potential life lost. It is a useful indicator for calling attention to causes of death at an early age, since its magnitude depends on the numerical importance of a cause of death and on the age at which it occurs.

This indicator is attractive primarily because it uses current real data and is easy to calculate. Its principal disadvantage derives from the arbitrary nature of its construction, which requires definition of premature death and the accompanying age limits. Selection of age limits depends on the purpose of the indicator, as the causes of death which will stand out will depend, to an extent, on the limits selected. As is the case in proportional mortality by cause, the YLLP indicator is affected by the age distribution of the population. For the preceding reasons, interpretation of this indicator is not simple.

There was also discussion of some indicators derived from life table models which eliminate the effects of the age distribution of the population. They make it possible to study various aspects of the probability of survival, based on different assumptions about the reduction or elimination of specific causes of death and consequent changes in life expectancy. This type of indicator also has limitations,

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as it is calculated using a theoretical mortality structure based on data reflecting past risks. Nevertheless, it is an excellent means of analyzing and summarizing survival experience when the quality of the basic data justifies its utilization.

It was recommended that countries incorporate indicators derived from the YLLP into their publications, in view of their usefulness in calling attention to problems which cause death at an early age. However, it was emphasized that this indicator must be interpreted with care and used jointly with other indicators such as death rates from specific causes, proportional mortality, and life expectancy at birth and at other ages.

With respect to its construction it was recommended that birth (age "0") be used as the lower age limit; this limit was widely preferred to that of 1 year of age due to the importance of deaths under 1 year in countries of the Region. There was no consensus as to the upper limit, but age 65 was taken to be appropriate for purposes of general analysis. It was noted that this age must not imply a limitation, either biological or of economic productivity.

During the course of the meeting the participants from countries involved in the "Health Profiles" project presented the results of their research. This made it possible to compare the leading causes of death among the countries represented, which provided participants with valuable knowledge. In general, researchers found that the short list specific to each country was the one best reflecting its own health conditions. In relation to the YLLP, the great majority used birth as the lower limit, but otherwise set the upper limit in accordance with various criteria judged to be suitable for their country.

Strengthening the Mortality Statistics Systems

Different strategies for strengthening health situation analysis were also discussed at the meeting; prominent among them, the strengthening of mortality statistics. Participants reported on the current status of vital statistics systems in their countries, and considerable heterogeneity in the existing problems and the alternatives for overcoming them was evident.

Among the principal problems mentioned in regard to mortality statistics were coverage and completeness, as well as quality of the basic data. Whereas in some countries the completeness and quality of the data are satisfactory, in others less than half the deaths are registered. Other problems mentioned were inadequate information processing, limited utilization of mortality statistics and failure to realize their importance, as well as a lack of motivation to register events, both in the population and among health personnel. These problems vary among countries of the Region, which are at different stages in the development of their vital and health statistics systems. In addition, situations that correspond to different historical periods may coexist within the same country.

It was also pointed out that efforts to improve an instrument such as the International Classification of Diseases have not been accompanied in this Region by similar efforts to improve the mortality data which constitute both its subject and object. In addition, little has been done at national and international levels to improve medical certification of cause of death, underregistration of deaths, and deficiencies in the collection instrument itself.

The participants concluded that in order to strengthen vital and health statistics it is necessary for countries of the Region to promote and support the following activities: preparation of an assessment of the current status of existing statistical systems; reactivation of national committees on vital and health statistics, their convening and functioning; promotion of intersectoral cooperation for improvement of health statistics; facilitation of periodic dissemination of these statistics and promotion of their use through research at different levels; promotion of processing and use of statistics for analysis of the health situation at the local level, as well as training of personnel involved in the production of data; and, finally, promotion of more training and participation in this subject-matter area of epidemiologists and statisticians who work at different levels of the health services system.

In addition, participants requested that PAHO emphasize the urgent need to improve vital and health statistics; and that it provide greater support to countries of the Region for strengthening their statistical systems, especially in the following areas: coordination with other international agencies for utilization of resources and mobilization of national institutions and resources; development of projects in selected areas of countries, which may be extended to other areas and could serve for motivating health personnel to improve the collection, processing, and utilization of mortality data; development of research on mortality analysis at intermediate levels (provinces, counties, programming areas); and coordination of further research aimed at gaining knowledge of the real status of mortality statistics in countries of the Region, so that corrective measures may be applied. Finally, it was recommended that there be increased dissemination of the publication "Health Conditions in the Americas," in view of its usefulness in training and as an information source for health agencies.

Future Lines of Work

PAHO will continue to support country activities conducive to health situation analysis and, in order to strengthen this analysis, will employ the strategies of information dissemination, training, and research.

With regard to the research strategy it was reemphasized that mortality is not the only component of health situation analysis, nor has it been fully developed through the line of research currently being carried out. Several fu-

ture lines of research were specified which, it is hoped, will constitute epidemiological contributions to improved organization and monitoring of the health services. These future lines of work will require participation by technical and professional staff from research centers and universities, in addition to the Ministries of Health.

It was pointed out that in order to strengthen analytical capability and improve decision-making, working groups of statisticians and epidemiologists must be expanded to include demographers and health planners, so as to share with other areas of the Ministries of Health and other Ministries the experiences resulting from the approach being

followed. The regional meeting is a milestone within a process that must continue to unfold.

(*Source:* Health Situation and Trend Assessment Program, PAHO. Based on the Meeting's Final Report.)

More detailed information on the Regional Meeting and the papers presented may be obtained from: Health Situation and Trend Assessment Program, PAHO, Attn. Regional Meeting on Guidelines and Procedures for Mortality Analysis, 525 Twenty-third Street, N.W., Washington, D.C. 20037, USA.

Health Profiles, Brazil, 1984

Introduction

Mortality data of varying quality and coverage have been published in Brazil since 1944. The deficiencies detected, however, cannot justify the scarcity of studies using those data for health situation analysis. The research summarized below aimed to demonstrate the usefulness of available data for describing the health situation and to highlight leading causes of death in order to identify priorities for health actions. In addition, the study served as a basis for discussion of different groupings (lists) of causes and indicators of mortality not commonly used, in particular potential years of life lost (PYLL).

The authors start with a brief description of the general characteristics of the country and point out its great internal heterogeneity in conditions of living and health (see Table 1). This is followed by a description of the mortality information system, particularly with respect to its operation, variables registered, flow, and quality and coverage of the data, as well as their processing, editing, tabulation, publication and dissemination.

Methodology

All analyses were performed using mortality data for 1984. The source of the data is the national standard death certificate, filled out in duplicate: one copy for the Civil Register and the other to be collected by state health authorities. Data collected in 1984 are judged to represent 75% of the total number of deaths, estimated at 1.1 million.

Underenumeration is basically due to underregistration and to data collection problems. Average underregistration for the country is estimated at 24.9%, ranging from 5.6% in the southeastern region to 49.3% in the northern region. Data collection deficiencies are greatest in the northeast (7.5%). Data quality may be evaluated by the proportion of deaths due to "symptoms, signs and ill-defined conditions." This indicator ranges from 1.4% in the capitals of the southern region to 62% in the interior of the northeast. In less developed areas deaths "without medical assistance," that is, due to undefined causes, predominate. It should be pointed out that rapid expansion of data coverage initially causes an increase in the proportion of deaths due to ill-defined causes, through inclusion of data from less developed areas.

Grouping of Causes; Short Lists

The lists used in this study were: the ranking list used by PAHO ("R" list), the Basic List of the 9th Revision of the International Classification of Diseases (ICD-9), the list of 72 causes of death of the National Center for Health Statistics of the United States (NCHS), the Brazilian mortality list (ICD-BR), and a newly proposed Brazilian list called ICD-BR2.

The basic criteria defined prior to construction of the ICD-BR2 list were: ease of construction (use of three digits and maintenance of the same sequence as they appear in the ICD-9), and informative capacity (the five leading causes of death should include at least 50% of all

Table 1. General characteristics by large regions, Brazil, 1984.

Regions*	Area (8,511,965 Km²) %	Population (132,137,538 Pop.) %	Population under 15 years (%)	Life expectancy at birth (years)
North	42.0	5.5	46.0	57.7
Northeast	18.2	28.9	43.4	57.2
Southeast	10.9	43.6	34.1	65.7
South	6.8	15.3	36.2	66.2
Midwest	22.1	6.7	41.0	63.0
Brazil	100.0	100.0	38.2	62.3

* The Regions include the following states:
North: Amazonas, Pará, Rondônia, Acre, Amapá, Roraima.
Northeast: Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia.
Southeast: Minas Gerais, São Paulo, Rio de Janeiro, Espírito Santo.
South: Paraná, Santa Catarina, Rio Grande do Sul.
Midwest: Mato Grosso, Mato Grosso do Sul, Goiás, Distrito Federal.

deaths, and the first ten, 65%). In addition, inclusion of extremely broad categories as well as of residuals was to be avoided. The list should be inclusive of all deaths, but the category "all other causes" should not exceed 5% of all deaths. Finally, the authors recommend that there be between thirty and fifty categories.

With respect to utilization of lists, it is recommended that residual categories as well as ill-defined causes not be considered when ranking the leading causes of death. In addition, the recommendation is made not to include deaths from ill-defined causes in the denominator when calculating proportional mortality.

Mortality data from three state capitals (Recife, Belo Horizonte and Porto Alegre), with populations of similar size (1 to 2 million inhabitants each) but with health conditions known to be different, were used in order to evaluate the criteria mentioned above. Table 2 presents, as an example, the comparative analysis of the lists for data of the city of Belo Horizonte; this city occupies an intermediate position with respect to its health indicators.

Comparison of the different lists against the requirements mentioned showed that the Basic List of the ICD-9 has the most serious drawbacks: an excessive number of categories (276), use of the fourth digit, several categories with zero frequency, categories lacking breakdown, absence of explicit residuals for each category and absence of even a general residual category, which when calculated almost always exceeded 20% in the areas studied. These comments are also valid for the Brazilian mortality list (ICD-BR), which is very similar to the Basic List. The R list has as its almost only advantage its small number of categories (46). However, it presents, on the one hand, excessive detail for infectious and parasitic diseases and, on the other, excessive broadness in categories such as diseases of the heart, which comprise 20% of deaths in Belo Horizonte and 30% in another of the cities studied. The

most serious limitation of the NCHS list of 72 categories is that of not presenting as a ranking category ill-defined intestinal infections (ICD-9 category 009); this has particular importance in areas having high infant mortality, where this is one of the leading causes of preventable mortality.

Construction of the ICD-BR2 list started after analysis of deficiencies of the other lists, and thus it responds best to the criteria established. In the three cities studied, the first five categories on this list contain almost 51% of female and 45% of male deaths; the first ten contain 65 to 70% for both sexes. The residual was always under 5%.

Potential Years of Life Lost

Different age limits were studied for calculation of the indicator potential years of life lost, and comparative analyses were performed using the same three cities. The authors discuss advantages and disadvantages of using moving limits, such as life expectancy, but conclude that—in spite of apparent arbitrariness—it is better to use fixed limits so as to facilitate comparisons among different areas and over time. For ease of comparison, the lower age limit of 0 and the upper limit of 65 years were used as reference, with causes grouped in accordance with the ICD-BR2 list; those limits were compared to the upper limits 60, 70, 80, 85 years and the lower limits 7 days, 28 days and 1 year.

The main criterion used for selection of the lower limit was the indicator's ability to identify preventable causes of death. Although a limit of 0 was deemed acceptable the lower age limit selected was 7 days, in view of the fact that a high proportion of deaths under 1 year of age are preventable, but those occurring in the period 0 to 6 days rarely are. In more developed areas, deaths due "to certain conditions originating in the perinatal period" (perinatal

Table 2. Leading causes of death by selected lists, Belo Horizonte, Brazil, 1984.

No.	ICD-BR List		R List		72 List (NCHS)		ICD-BR2 List	
	Categories	%	Categories	%	Categories	%	Categories	%
1	Malignant neoplasms (140-208)	12,5	Diseases of the heart (390-429)	20,0	Diseases of the heart (390-398, 402, 404-429)	19,2	Malignant neoplasms (140-208)	12,5
2	Cerebrovascular disease (430-438)	10,7	Malignant neoplasms (140-208)	12,5	Malignant neoplasms (140-208)	12,5	Cerebrovascular disease (430-438)	10,7
3	Other diseases of the respiratory tract (466, 480-519)	9,3	Cerebrovascular disease (430-438)	10,7	Cerebrovascular disease (430-438)	10,7	Certain conditions originating in perinatal period (760-771.2, 711.4-779)	9,2
4	Certain conditions originating in perinatal period (760-779)	9,2	Accidents (E800-E949, E980-E989)	7,8	Certain conditions originating in perinatal period (760-779)	9,2	Diseases of pulmonary circulation and other forms of heart disease (415-429)	9,0
5	Diseases of pulmonary circulation and other forms of heart disease (415-429)	9,0	Certain conditions originating in perinatal period (760-769)	4,8	Accidents and adverse effects (E800-E949)	6,5	Ischaemic heart disease (410-414)	7,6
	Subtotal 1-5	50,7	Subtotal 1-5	55,8	Subtotal 1-5	58,1	Subtotal 1-5	49,0
6	Ischaemic heart disease (410-414)	7,6	Pneumonia and influenza (480-487)	4,5	Pneumonia and influenza (480-487)	4,5	Acute respiratory infections and pneumonia and influenza (460-466, 480-487)	4,6
7	Diseases of the digestive system (520-579)	5,4	Intestinal infections due to specified organisms and ill-defined (007-009)	3,3	Chronic obstructive pulmonary disease and allied conditions (490-496)	3,1	Motor vehicle traffic accidents (E810-E819)	4,0
8	Transport accidents (E800-E848)	4,0	Nutritional deficiencies (260-269)	3,1	Nutritional deficiencies (260-269)	3,1	Nutritional deficiencies and deficiency anaemias (260-269, 280, 281, 285)	3,8
9	Intestinal infectious diseases (001-009)	3,3	Diabetes mellitus (250)	2,6	Diabetes mellitus (250)	2,6	Intestinal infectious diseases (001-009)	3,3
10	Endrocrine and metabolic diseases and immunity disorders (240-259, 270-279)	3,1	Chronic liver disease and cirrhosis (571)	2,5	Chronic liver disease and cirrhosis (571)	2,5	Chronic obstructive pulmonary disease and allied conditions (490-496)	3,1
	Subtotal 1-10	74,1	Subtotal 1-10	71,8	Subtotal 1-10	73,9	Subtotal 1-10	67,8
	Residual	--	Residual	20,6	Residual	13,2	Residual	3,9
	Ill-defined	5,3	Ill-defined	5,3	Ill-defined	5,3	Ill-defined	5,3

Note: For percentage computation ill-defined causes were excluded.

causes) or to congenital anomalies are rare after the seventh day; and perinatal causes remain among the ten leading ones in terms of PYLL even if deaths under 7 days are excluded.

For selection of the upper limit the main criterion was to use an age similar to the life expectancy at birth of the country as a whole. Hence an upper limit of 70 years is suggested and the following points are raised: no significant changes were found in the ten leading causes in the three cities studied, in relation to those identified using an upper limit of 65 years. From a qualitative point of view, the limit of 70 years also appears more adequate if the indicator PYLL is seen in relation to potential years of productive life; in addition, Brazilian legislation establishes 70 years as the age for compulsory retirement. In conclusion, the age limits of 7 days and 70 years are recommended for calculation of the PYLL indicator in the country.

Descriptive Analysis

A descriptive analysis of mortality in the country was undertaken, grouping causes of death in accordance with the ICD-BR2 list and calculating the PYLL indicator using the age limits 7 days and 70 years. Due to previously mentioned deficiencies of completeness and quality, such analysis was restricted to data of capital cities of states, federal territories and the Federal District, areas which include nearly 25% of the population and 26% of recorded deaths in the country. In capital cities underregistration is low, and a large proportion of deaths have medical certification; also, within a single region of the country the mortality pattern does not vary markedly between the interior of a state and its capital city. However, the non-representativeness of these cities with respect to mortality in the entire country is noted, since the proportion of population and deaths in each region in relation to the totals for the entire country are not the same as the proportion of population and deaths of the capital of each region in relation to the entire group of capital cities. Hence the pattern observed in the analyses by sex, age and PYLL is closer to that of the southeastern region, the capitals of which contain 53% of the population of the entire group of capital cities. In other words, the general health situation of the country is not as good as might be concluded from study of the cities.

Table 3 shows the ten leading causes of death for the group of cities studied, and allows comparison of the position occupied by the various causes in different regions of the country. It may be observed that these ten causes represent between 65.6 and 70.5% of deaths in the cities of each of the regions. With the exception of intestinal infectious diseases, which are not among the ten leading causes of death in the southeast, south and west-central regions, and homicides in the northeast, south and west-central, all

other cause groups among the first ten are coincident in the regions. However, there are differences between regions concerning the order and weight of each group of causes. For example, intestinal infectious diseases are in first place in the northeast with 11.0% of all deaths and in thirteenth place in the southeast and south, with 2.3 and 2.1%, respectively. Ischaemic heart disease is in second place in the south with 15.0% of all deaths, and in seventh place, with 4.9% and 6.2% in the north and northeast respectively. These differences are accentuated even further when specific death rates are calculated; the risk of death due to intestinal infectious diseases is then found to be nearly 6.5 times greater in the northern and northeastern regions than in the southern and west-central regions, and homicides have rates 3.5 times greater in the southeast than in the south.

Mortality is known to be greater among males than among females, and in the group of Brazilian capitals this excess translates to 133 male deaths for each 100 female deaths. In spite of the usual excess male births, in countries with high mortality this results in female predominance in the population. According to data from the 1980 census in Brazil this means that women constitute 50.3% of the total population and 51.5% of those over 50 years of age.

Although the six leading causes of death are the same for both sexes, differences appear with respect to sequence, specific rates and proportional mortality. An extreme case is homicides, seventh leading cause of death among males and twentysixth among females: the specific death rate for this cause is 11 times greater in men than in women. For deaths from various diseases of the circulatory system, such as diseases of arteries, arterioles and capillaries (atherosclerosis) and hypertensive disease, higher specific rates for women were found; however, upon studying the different age groups it was seen that these causes act at much later ages among women than among men.

Table 4 shows that regional differences persist when mortality is analyzed by age group. Variations in the age structure of the population of the regions partly explain these differences, but it should be pointed out that almost 30% of deaths registered in the northern region, and only 12% in the southern region, are under 1 year of age. Upon analyzing the five leading causes of death among children under 1 (Table 5), it is evident that preventable causes continue to be extremely important, as shown by the high proportion of deaths due to intestinal infectious diseases and nutritional deficiencies. Deaths from acute respiratory infections could be significantly reduced as well. Conditions originating in the perinatal period, representing 37% of infant mortality, could be reduced through adequate prenatal care and care at delivery. In this regard it should be noted that the risk of death from these causes is at least two times greater in the northern and northeastern than in the southern and southeastern regions.

A similar phenomenon is observed in the 1 to 4 year age group, in which almost all deaths due to the first five leading causes can be prevented: acute respiratory infections,

Table 3. Ten leading causes of death and their position in large regions, Brazil, 1984.

Causes*	Brazil		North		Northeast		Southeast		South		Mid-west	
	%	Position	%	Position	%	Position	%	Position	%	Position	%	Position
Malignant neoplasms (140-208)	12.2	1	8.9	3	9.1	3	13.5	1	15.1	1	10.9	1
Cerebrovascular disease (430-438)	10.7	2	8.4	4	10.5	2	11.2	3	11.9	3	8.9	3
Ischaemic heart disease (410-414)	10.6	3	4.9	7	6.2	7	12.9	2	15.0	2	6.4	5
Diseases of pulmonary circulation and other forms of heart disease (415-429)	6.9	4	7.1	5	6.5	5	6.8	4	7.5	4	8.6	4
Certain conditions originating in the perinatal period (760-771.2, 771.4-779)	6.8	5	11.7	1	7.4	4	5.9	6	4.7	6	9.7	2
Acute respiratory infections and pneumonia and influenza (460-466, 480-487)	6.4	6	6.0	6	6.5	6	6.6	5	5.5	5	5.2	8
Intestinal infectious diseases (001-009)	4.9	7	11.6	2	11.0	1	2.3	13	2.1	13	2.3	11
Motor vehicle traffic accidents (E810-E819)	3.5	8	4.8	8	2.9	10	3.4	8	3.6	8	5.7	6
Accidents (except motor vehicle traffic accidents) and adverse effects (E800-E807, E820-E949)	3.3	9	4.0	9	3.8	8	2.8	10	2.6	10	5.6	7
Homicide (E960-E969)	3.1	10	3.1	10	2.6	12	3.6	7	1.1	19	2.3	13
Subtotal	68.4	--	70.5	--	66.5	--	69.0	--	69.1	--	65.6	--
Residual	31.6	--	29.5	--	33.5	--	31.0	--	30.9	--	34.4	--
Total	100.0	--	100.0	--	100.0	--	100.0	--	100.0	--	100.0	--

*Deaths from state capitals grouped according to ICD-BR2 List. Proportions exclude ill-defined causes.

Table 4. Proportional mortality according to age in state capitals, grouped by large regions, Brazil, 1984.

Age group (years)	North	Northeast	Southeast	South	Mid-west
- 1	29.8	27.3	14.3	12.3	17.4
1 - 4	6.3	6.0	2.0	2.0	3.5
5 - 14	3.2	2.2	1.4	1.5	2.8
15 - 49	21.6	18.8	22.8	20.8	29.4
50 +	39.1	45.7	59.5	63.4	46.9
Total	100.0	100.0	100.0	100.0	100.0

intestinal infectious diseases, nutritional deficiencies, diseases preventable by vaccination, and accidents (excluding traffic accidents). It should be mentioned that over one half of all deaths in this age group occur between 12 and 23 months of age, to a certain extent representing a "continuation" of post-neonatal infant mortality.

With regard to the 5 to 14 year age group, although in general it is the population group at lowest risk of death the weight of external causes is noteworthy; the first among these, motor vehicle traffic accidents, is responsible for 20% of all deaths in the age group. In the 15 to 19 year age group, homicides are the leading cause of death--12.4% of the total--followed by malignant neoplasms. Finally, at ages over 50 the first four causes of death are chronic degenerative diseases (60% of the total); acute respiratory infections are in fifth place.

Table 5. Specific death rates and proportional mortality for five leading causes of death in children under 1 year of age, state capitals, Brazil, 1984.

Causes[a]	Specific rate[b]	Proportional mortality	Cumulative proportion
Certain conditions originating in the perinatal period (760-771.2, 771.4-779)	1,618.1	37.0	37.0
Acute respiratory infections and pneumonia and influenza (460-466, 480-487)	639.0	14.6	51.6
Intestinal infectious diseases (001-009)	635.0	14.5	66.1
Nutritional deficiencies and deficiency anaemias (260-269, 280, 281, 285)	301.9	6.9	73.0
Congenital anomalies (740-759)	269.0	6.2	79.2

[a] According to ICD-BR2 List.
[b] Rates per 100,000 population. Deaths from ill-defined causes have been imputed proportionally.

Comparison of the PYLL indicator with proportional mortality (Table 6) shows that, although 8 of the 10 leading causes of death coincide, there are substantial changes in sequence and relative weight. For example, intestinal infectious diseases, which occupied seventh place with respect to total number of deaths (4.9%) are the leading cause in terms of PYLL with 14.2% of the total. Nutritional deficiencies rise from fourteenth to seventh place and acute respiratory infections from sixth to second Similar changes occur with homicides, which advance from tenth to fifth place, and motor vehicle traffic accidents, from eighth to fourth. On the other hand, cerebrovascular disease moves from second down to nineth place, ischaemic heart disease from third to tenth and malignant tumors from first to third.

Changes in position, especially for chronic diseases (tumors, cerebrovascular and ischaemic heart disease), are not due as much to exclusion of deaths of those over 70 years, as to the "qualified" weight that each death has in the calculation of PYLL, which depends on the age at death. That is, although ischaemic heart disease is the third leading cause of death between 7 days and 70 years, each death from this cause "steals" only 13.4 potential years of life, as it occurs at an average age of 56.6 years. Nutritional deficiencies, on the other hand, "steal" an average of 62.6 years for each death they cause, since they occur, on average, at 7.4 years of age.

Conditions originating in the perinatal period are the category most affected by the age limits selected for calculation of PYLL: they occupy fifth place in terms of total deaths, and fifteenth in terms of deaths between 7 days and 70 years, but in terms of PYLL they are in eighth place. The position occupied by this cause group was the most affected by non-inclusion of deaths during the first seven days of life.

Conclusions

The authors conclude that the study conducted proves that available mortality data are indeed useful for analysis of the health situation. In spite of acknowledged deficiencies, if handled using adequate epidemiologic criteria this information has much to contribute toward a better understanding of the health reality.

Utilization of a new mortality list which takes into account the epidemiologic characteristics of Brazil made it possible to improve the analysis of mortality by cause in the following aspects:

1. Enhanced visualization of causes subject to direct public health intervention (for example, diseases preventable by vaccination).
2. Improved ranking of cause groups for a better understanding of regional and national health conditions.

Table 6. Ten leading causes of death according to potential years of life lost (PYLL) between 7 days and 70 years and their position according to total deaths, state capitals, Brazil, 1984.

Causes[a]	PYLL				Total deaths	
	In years	%[b]	Per 1,000 pop.	Per death	%[b]	Position
Intestinal infectious diseases (001-009)	624,922	14.2	20.4	66.8	4.9	7
Acute respiratory infections and pneumonia and influenza (460-466, 480-487)	521,230	11.8	17.0	55.4	6.4	6
Malignant neoplasms (140-208)	301,885	6.8	9.8	18.0	12.2	1
Motor vehicle traffic accidents (E810-E819)	247,688	5.6	8.1	37.3	3.5	8
Homicide (E960-E969)	243,700	5.5	7.9	39.7	3.1	10
Accidents (except motor vehicle traffic accidents) and adverse effects (E800-E807, E820-E949)	242,494	5.5	7.9	41.4	3.3	9
Nutritional deficiencies and deficiency anaemias (260-269, 280-281, 285)	225,940	5.1	7.4	62.6	2.1	14
Certain conditions originating in the perinatal period (760-771.2, 771.4-779)	179,358	4.1	5.8	69.5	6.8	5
Cerebrovascular disease (430-438)	177,958	4.0	5.8	15.8	10.7	2
Ischaemic heart disease (410-414)	149,374	3.4	4.9	13.4	10.6	3
Subtotal	2,914,549	66.1	95.0	35.2	63.5	--
Ill-defined causes	319,266	6.8	--	45.5	4.5	--
All causes	4,727,334	100.0	143.5	34.0	100.0	--

[a] According to ICD-BR2 List.
[b] Ill-defined causes exluded.

3. Marked reduction of the size of residual categories in comparison to other lists.

Finally, the authors note that the ten leading causes of death in capital cities, in terms of PYLL, collectively show the complexity of the health situation in developing countries, filled with disparities and contrasts,--as is the case in Brazil--where leading causes of death include infectious diseases, together with social pathologies such as malnutrition and homicides, and chronic degenerative causes typical of older populations and more developed countries.

The Role of Epidemiology in Attaining Health For All

The Forty-first World Health Assembly on its Fifteenth plenary meeting, 13 May 1988, approved a resolution on the role of epidemiology which reads as follows:

"The Forty-first World Health Assembly,

Noting the importance of epidemiology as a tool for the formulation of rational health policy;

Recognizing the essential role of epidemiology not only in studying the causes and means of prevention of disease but also in health systems research, information support, technology assessment, and the management and evaluation of health services;

Recalling that the role of epidemiology in the work of WHO has for many years been emphasized by the World Health Assembly;

Emphasizing the needs of Member States for relevant epidemiological input in preparing and updating their health-for-all strategies, defining related targets and monitoring and evaluating their attainment;

Noting with concern the discrepancy between the content of training in epidemiology in most schools of medicine, public health and other health sciences and the needs of Member States;

Encouraged by the interest shown by epidemiologists and their associations including the International Epidemiological Association in promoting the broader view of epidemiology encompassing consideration of economic, social, cultural and other factors relevant to contemporary health problems, and in promoting related training;

1. URGES Member States to make greater use of epidemiological data, concepts and methods in preparing, updating, monitoring and evaluating their health-for-all strategies;

2. APPEALS to schools of medicine, public health and other health sciences to ensure training in modern epidemiology that is relevant to countries' needs regarding their health-for-all strategies and, in particular, the needs of developing countries;

3. WELCOMES the involvement and willingness of many epidemiologists around the world to collaborate with WHO in promoting new trends in epidemiology and related training;

4. REQUESTS the Director-General;

1) to convene as soon as possible a group of experts including adequate representation from developing countries to define the desired nature and scope of epidemiology in support of health-for-all strategies and related training in the expanded role of epidemiology;

2) to report to the Eighty-third Executive Board in January 1989 and to the Forty-second World Health Assembly on the implementation of this resolution, including the conclusions of the above-mentioned group of experts."

In the Region of the Americas the importance of the role of epidemiology, and the failure to take full advantage of its potential for the formulation of rational health policies and the management and evaluation of health services has been recognized since the 1970's. Out of this concern the Seminar on Current Uses and Future Prospects in Epidemiology (Buenos Aires, Argentina, 1983) was organized; and based on its conclusions the Thirtieth Directing Council of PAHO (1984) adopted Resolution XVI (see *Epidemiological Bulletin* Vol.5, No.6, 1984). Since then, activities aimed at strengthening the practice of epidemiology, including its applications in support of health planning and evaluation have started in many countries in the Region. Thus, this resolution will undoubtedly reinforce strategies and activities already in place in the Americas at both the regional and country level.

Epidemiological Activities in the Countries

Course on Development of Epidemiological Research Protocols - Panama

Through the initiative of the Departments of Epidemiology of the Ministry of Health and of the Social Security Administration, a course-workshop on research was held in the City of Panama in January 1988; it had the following objectives:

- discussion of the process of research in health,

- training professionals who function as epidemiologists in research,
- initiation of the development of research protocols through participatory methods.

There were 18 professionals attending the 72-hour course, among them physicians, nurses, dentists, and laboratory personnel.

The methodology utilized consisted of the selection of three research questions based on regional or national problems proposed by the participants. Through exhibits on specific topics, multidisciplinary workgroups and plenary discussion sessions, three provisional drafts of research protocols were presented at the end of the course. The research topics referred to the effects of pesticide contamination on health, factors related to the desertion of children in vaccination schemes, and factors associated with mortality from cancer of the cervix.

Workshop for Evaluating the Graduate-level Programs in Public Health in the Caribbean - Jamaica

The workshop was organized by the Department of Preventive and Social Medicine of the University of the West Indies, with financing from the International Coun-

cil for Development of Research. There was broad participation in terms of disciplines and countries represented. The evaluation was carried out through a survey of 200 graduates of the public and community health courses. In general, the graduates indicated that the courses met their needs; however, the discussion groups that reviewed the results of the survey recommended the following:

- strengthening the teaching of epidemiology (expansion of practical activities and utilization of more data from the Caribbean),
- strengthening continuing education and follow-up of graduates. Creation of a Caribbean Public Health Association was proposed to implement this recommendation partially,
- reintroduction of the course for the Diploma in Community Health, since its suspension in 1985 produced a hiatus between the basic training (Certificate in Community Health) and the Masters in Public Health, and
- consideration of a significant role at the teaching level (short courses) for CAREC, whose collaboration in previous years was recognized, that of supervising the graduates in research activities and in expansion of the availability of data on the health situation in the Caribbean for teaching purposes.

Diseases Subject to the International Health Regulations

Total cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas as of 30 June 1988.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague cases
		Cases	Deaths	
BOLIVIA	-	12	11	2
Cochabamba	-	1	1	-
La Paz	-	11	10	2
BRAZIL	-	17	12	2
Amazonas	-	1	1	-
Bahía	-	-	-	2
Goiás	-	2	2	-
Mato Grosso	-	1	1	-
Minas Gerais	-	12	7	-
Pará	-	1	1	-
CANADA	1(a)	-	-	-
British Columbia	1(a)	-	-	-
PERU		123	106	10
Cuzco	-	6	3	-
Huánuco	-	29	23	-
Junín	-	14	12	-
Madre de Dios	-	25	22	-
Pasco	-	1	1	-
Piura	-	-	-	10
Puno	-	25	25	-
San Martín	-	18	15	-
Ucayali	-	5	5	-
UNITED STATES OF AMERICA	3	-	-	1
Colorado	2	-	-	-
New Mexico	1	-	-	-
Texas	-	-	-	1

(a) Imported case.

AIDS Surveillance in the Americas

Cumulative number of cases and deaths.

Subregion Country	Cases[a]	Deaths	First report	Last report
REGIONAL TOTAL	74,735	40,654		
LATIN AMERICA[b]	7,083	2,557		
ANDEAN GROUP	444	194		
Bolivia	6	3	31 Dec 85	31 Dec 87
Colombia	174	21	31 Dec 86	31 Dec 87
Ecuador	43	24	31 Dec 85	30 Jun 88
Peru	81	46	30 Jun 82	31 Mar 88
Venezuela	140	100	31 Dec 84	31 Dec 87
SOUTHERN CONE	268	149		
Argentina	163	95	31 Dec 83	31 Mar 88
Chile	77	33	31 Dec 84	30 Jun 88
Paraguay	8	8	31 Dec 86	31 Dec 87
Uruguay	20	13	31 Dec 83	31 Mar 88
BRAZIL	2,956	1,386	31 Dec 82	31 Mar 88
CENTRAL AMERICAN ISTHMUS	277	158		
Belize	7	5	31 Mar 87	31 Dec 87
Costa Rica	57	29	31 Dec 83	31 Mar 88
El Salvador	23	14	31 Dec 85	31 Dec 87
Guatemala	34	29	30 Sep 86	31 Dec 87
Honduras	109	54	30 Jun 85	31 Mar 88
Nicaragua	-	-	30 Sep 87	31 Mar 88
Panama	47	27	31 Dec 84	30 Jun 88
MEXICO	1,233	349	30 Jun 81	31 Mar 88
LATIN CARIBBEAN[c]	1,905	321		
Cuba	27	7	31 Dec 86	31 Mar 88
Dominican Republic	504	54	31 Dec 85	31 Mar 88
Haiti	1,374	260	31 Dec 83	31 Mar 88
CARIBBEAN	905	553		
Anguilla	-	-	31 Mar 87	31 Mar 88
Antigua	3	3	31 Dec 85	31 Mar 88
Bahamas	188	95	31 Dec 85	31 Mar 88
Barbados	60	39	31 Dec 84	31 Mar 88
Cayman Islands	3	2	31 Dec 85	31 Mar 88
Dominica	6	6	31 Mar 87	31 Mar 88
French Guiana	113	78	31 Dec 86	31 Mar 88
Grenada	8	5	31 Dec 84	31 Dec 87
Guadeloupe	74	36	31 Dec 86	31 Dec 87
Guyana	16	8	30 Sep 86	31 Mar 88
Jamaica	56	40	30 Jun 86	31 Mar 88
Martinique	38	22	31 Dec 86	31 Dec 87
Montserrat	-	-	30 Jun 87	31 Dec 87
Netherlands Antilles	23	15	31 Mar 87	31 Dec 87
Saint Lucia	10	6	31 Dec 84	31 Dec 87
St. Christopher-Nevis	1	-	31 Dec 85	31 Dec 87
St. Vincent and the Grenadines	8	5	30 Jun 85	31 Dec 87
Suriname	9	7	30 Jun 84	31 Mar 88
Trinidad and Tobago	269	175	30 Jun 83	31 Mar 88
Turks and Caicos Islands	5	3	31 Dec 86	31 Dec 87
Virgin Islands (UK)	-	-	31 Mar 87	31 Dec 87
Virgin Islands (US)	15	8	31 Mar 87	31 Mar 88
NORTH AMERICA	66,747	37,544		
Bermuda	75	58	31 Dec 84	31 Mar 88
Canada	1,793	1,006	31 Dec 79	30 Jun 88
United States of America[c]	64,879	36,480	30 Jun 81	30 Jun 88

[a] Differences or changes in case-definition may lead to discrepancies with other published data.
[b] French Guiana, Guyana, and Suriname included in Caribbean.
[c] Puerto Rico included in USA.

15

What is epidemiology?
How has it developed?
Where is it headed?

This book traces the evolution of epidemiology through works chosen because of their enduring value, because they highlight the importance of the discipline in unconventional areas, or because they defined trends or advanced knowledge. By offering a sense of what epidemiology has meant in the past, how it developed, the challenges it faces now and will face in the future, this book hopes to stimulate debate on the history and development, the scope and limitations, and the uses and prospects of the discipline.

THE CHALLENGE OF EPIDEMIOLOGY
Issues and Selected Readings
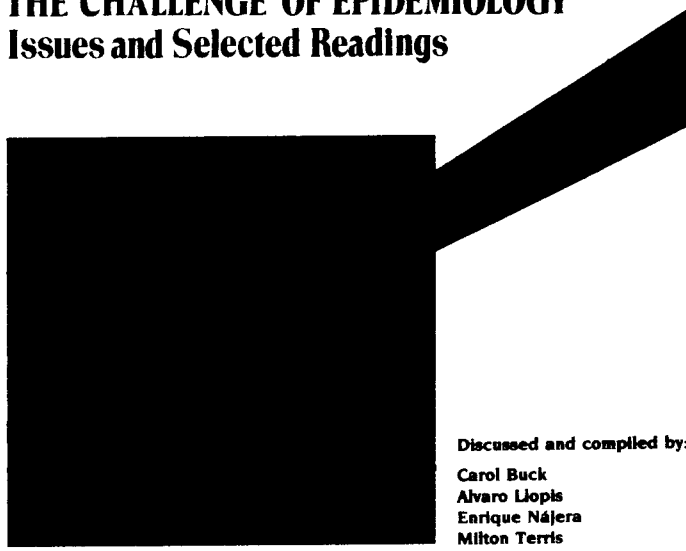
Discussed and compiled by:

Carol Buck
Alvaro Llopis
Enrique Nájera
Milton Terris

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CONTENTS:

Four eminent epidemiologists selected the works for this anthology from entries submitted by experts in epidemiology from throughout the world. Their discussions have been transcribed and are included as a frame of reference for the anthologized works. The book is a collection of 91 articles—ranging from an excerpt from Hippocrates written in 400 B.C. to articles published in 1985—and it is structured in five sections. The first two deal with the historical evolution of the discipline, while section 3 and section 4 address the application of epidemiology. Each section has been divided into subsections in order to present all significant topics within each area. Finally, section 5 offers the editors' views on the future of epidemiology.