THE GROWING NONCOMMUNICABLE DISEASE BURDEN, A CHALLENGE FOR THE COUNTRIES OF THE AMERICAS

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Introduction

Social and demographic trends in Western Hemisphere populations are introducing new challenges to public health. As sanitary conditions improve and population growth slows, health conditions change in a predictable pattern: the share of illnesses and deaths caused by infectious disease and perinatal difficulties declines, while the share caused by noncommunicable diseases increases.

Life expectancy rises when premature deaths during infancy and childhood are prevented. But premature and preventable deaths are not eradicated; they are merely shifted to later ages and different causes—including cardiovascular and cerebrovascular diseases, cancers, accidents, liver disease, and diabetes. There is growing evidence that a significant proportion of these premature deaths, and even of new cases of illness among adults, can be prevented by inducing changes in the population's life-style (1)—that is, by reducing smoking and alcohol abuse, by improving diets and increasing physical activity, by reducing obesity, and by making certain other changes in health services, safety practices, and environmental conditions (2).

Consequently, the application of behavioral sciences in promoting healthier life-styles emerges as the next great
public health endeavor (3). A particularly important part of this undertaking will be rendering the concept of health promotion useful and operational in nations with a wide range of different health conditions. New social and public health strategies will be needed to guide long-term health planning and to implement the actions required among the heterogeneous populations found in areas such as the Region of the Americas. This article seeks to describe and address the major features of the task involved.

Changing Health Conditions

Health conditions depend on many factors that limit social functioning and personal well-being, factors including the causes of risks, defects, diseases, disabilities, and deaths. However, these factors are difficult to measure effectively and have not been routinely measured so as to permit a comprehensive analysis of trends. Mortality data give a limited picture of the health of a population, but mortality data are more reliably measurable than morbidity data and are also available to assess secular changes in the results of some diseases.

Noncommunicable Diseases. In Europe and North America, noncommunicable diseases are indisputably the major contributors to mortality and morbidity. As the result of a trend that began a century ago, infant deaths and deaths from infectious diseases have become relatively uncommon, while deaths and disabilities due to vascular disease, cancers, and fatal injuries have become the greatest burden on society. There has also been a decrease in cardiovascular and cerebrovascular disease in the United States (4), but in general most deaths in all age groups within Europe and North America are accounted for by noncommunicable diseases and fatal injuries.

Among the different Latin American and Caribbean countries, patterns of mortality and morbidity have been quite different. But to one degree or another, as they pass through different phases of development, all of these countries appear to be heading toward the general demographic (5) and health conditions currently found in North America and Europe. This is suggested, among other things, by the similarity of leading causes of death in various subregions of the Americas. The leading causes of death among males around 1978 in North America, temperate South America (the Southern Cone countries), and the Caribbean were heart disease, malignant tumors, accidents, and cerebrovascular disease in that order. The order of leading causes was similar among females in these subregions, except that cerebrovascular disease replaced accidents as the third leading cause and accidents fell to fifth place in temperate South America and the Caribbean. A fairly similar situation was found in tropical South America, where heart disease, accidents, and malignant tumors ranked first, second, and fourth among men, and where heart disease, malignant tumors,
and cerebrovascular disease ranked first, second, and fifth among women. Finally, in continental Middle America accidents and heart disease ranked first and fourth, respectively, among men, while heart disease and malignant tumors ranked third and fourth among women (6).

It can be predicted that differential trends for proportional mortality will conform roughly to an “S-shaped” or sine curve in which there are three distinct phases. These phases are depicted in Figure 1. During the first phase, noncommunicable disease mortality is low and only increasing slowly among a relatively youthful population with a high birth rate, low life expectancy, and a relatively heavy burden of infant and communicable disease mortality. During the second phase, the proportion of noncommunicable disease deaths is at an intermediate level and rising rapidly among a population where the mean age is increasing as birth rates decline, life expectancy is rising, and the causes of infant and communicable disease mortality are being brought under control. During the third phase, the proportion of deaths from noncommunicable disease is relatively high and rising less rapidly toward an asymptote. This third phase is found among populations where life expectancy is high, birth rates are low, and infant and communicable disease mortality have been stabilized at a low level. Proportional mortality from noncommunicable diseases among a popu-

**FIGURE 1.** A model of the historical trend in noncommunicable disease mortality as a percentage of overall mortality.
ulation in this latter category could be expected to show the complete “S-shaped” secular trend if sufficient data—i.e. those corresponding to the present century—were plotted. The same sine curve could also be expected to appear in data for any of the transitional (second-phase) societies if these data were projected into the future for some 15 to 40 years.

Theoretically, each subregion or nation in Latin America and the Caribbean can be categorized as being in one of these three phases—depending on prevailing noncommunicable disease levels and trends together with associated demographic and other health conditions.

As Table 1 shows, the average 1970–1980 trends in mortality from major noncommunicable diseases (cardiovascular and cerebrovascular diseases, cancers, fatal injuries, and diabetes) fit the model in the five major subregions of the Americas (7–9). In North America (the United States of America and Canada), where longevity was highest, the rate of noncommunicable disease mortality was high and almost level—as would be expected in the later (third) phase. In temperate South America (Argentina, Chile, and Uruguay), where longevity was greater than in most other parts of Latin America, noncommunicable disease mortality was high but rising slowly. In the Caribbean (including Cuba, the Dominican Republic, and Haiti), a similar trend appeared to conform with a somewhat earlier period in the later phase of noncommunicable disease develop-

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Source: Office of Health Statistics, Pan American Health Organization, Washington, D.C., USA.
ment. Tropical South America (including the Andean countries, Brazil, French Guiana, Guyana, Paraguay, and Suriname) appeared to be in the intermediate phase, having lower rates of noncommunicable disease mortality but a steeper rate of increase in the proportion of deaths from that cause. Finally, continental Middle America (Central America, Panama, and Mexico) seemed to be in the initial phase of development, having a low rate of noncommunicable disease mortality and a relatively modest rate of increase. Obviously, these average subregional figures conceal the importance of non-communicable diseases in some countries (such as Brazil, Costa Rica, Panama, Mexico, and Venezuela) in the same way that average national figures generally conceal gross intracountry variations.

In addition, data obtained from national morbidity surveys, surveys or registers of specific diseases, and registers of social security systems and other health care institutions give an indication of the importance of noncommunicable disease morbidity in the Americas. Among the main facts emerging from assessments of these data are prevalence figures for hypertension ranging from 10% to 15% and for diabetes ranging from 2% to 8%; a rising incidence of ischemic heart disease and of lung and breast cancers in transitional societies; a high incidence of stomach and cervical cancers in the less developed countries; and an enormous demand placed upon health services and upon pension and other social benefit services as a result of cardiovascular, chronic, rheumatic, and mental diseases (10).

Chronic disease morbidity can also be expected to follow the same sine pattern as noncommunicable disease mortality— one distinct from acute communicable disease morbidity. However, if comparable morbidity and mortality rates are used, the chronic disease incidence curves will be lower than the mortality curves, and the prevalence curves will be higher. Also, since lethality is not constant through the three aforementioned phases, the morbidity and mortality curves will be closer in the initial phase and farther apart in the third phase, thus reflecting the comparatively lower lethality found in developed societies where social and health services are more accessible and provide relatively greater coverage.

Although there are unique variations among the trends in different nations of Latin America, most trends among the national and subregional populations involved conform to the sine curve. Noncommunicable disease rates are high enough to warrant immediate concern, or else are rising rapidly enough to deserve preparatory attention, or else (if social, economic, and demographic trends continue as expected) they will rise enough to pose problems for future generations. In support of the latter statement, it should be noted that life expectancy at birth in the hemisphere has increased from less than 40 years in 1948 to more than 60 years in 1983, and that the size of urban populations as of 1970 will probably have increased threefold by the year 2000 (5, 10).
It may be expected that different health conditions will require a different combination or different pattern of existing intervention approaches. That is, "primordial" prevention—or the prevention of causal factors in population groups free of them—may require the application of concepts and strategies in some sociocultural settings that are not equally emphasized in others for purposes of health promotion. In other words, a different approach to prevention and control may be required at each distinct phase. Among nations in the later (third) phase, noncommunicable diseases are a major present concern, and so there is an immediate need for programs to modify life-styles in order to prevent premature adult morbidity and mortality. Among nations in the intermediate phase, however, noncommunicable diseases are an emerging concern, and so there is a need to begin development of prevention and control programs. And finally, among nations in the initial phase, noncommunicable diseases are primarily a future problem, one that can be anticipated and perhaps averted by unconventional "primordial" prevention activities.

In sum, current figures and trends of chronic noncommunicable disease morbidity and mortality show important differences in the Americas between different subregions, different countries, and even different parts of the same country, differences that are largely due to variations in social, economic, and cultural conditions. However, consistent differences found between populations of comparable socioeconomic levels—and even of comparable genetic ancestry—merit further investigation. Such differences exist, for instance, with regard to high rates of stomach cancer in Chile, Costa Rica, Colombia, and Venezuela; high rates of esophageal cancer in adjacent areas of Southern Brazil, Northern Argentina, and Uruguay; and the virtual absence of ischemic heart disease, hypertension, and diabetes among the inhabitants of Peru’s high-altitude plateaus (10).

**Noncommunicable Disease Risk Factors.** Although causal inferences always can be questioned, most epidemiologists accept the evidence that six key sets of "risk factors" are responsible for a major share of adult noncommunicable disease morbidity and premature mortality (2, 3). These are as follows:

- Cigarette use and other forms of smoking are indisputably linked with lung cancer, other kinds of lung disease, cardiovascular disease, and cerebrovascular disease—as well as to fatal burnings in fires caused by cigarettes (11).

- Alcohol abuse clearly causes liver disease and is often a contributing factor in accidents, homicides, and suicides (12).

- Another cause of preventable death is failure or inability to obtain preventive health services (e.g., for hypertension control, cancer detection, management of diabetes, etc.—13).

- The role of eating habits and physical activity is more frequently debated, but moderate reduction of fat and salt consumption, increased fiber and vegetable consumption, and control of obesity appear to be helpful in preventing several forms of chronic disease (14).
Environmental risk factors such as occupational hazards, possession of handguns, and air and water pollution are also related to different types of injury and chronic disease (15, 16).

The concepts are only partially understood, but stress and social support (17) seem to be important, at least as indirect influences on adoption of risk-laden behavior or exposure to the direct risks listed above.

All six of these sets of risk factors have attained remarkable importance in North America and Europe, even though considerable progress has been made against those related to individual behavior patterns (such as diet, smoking, and exercise) in recent years.

Within a given population, the relative contribution of each risk factor to premature morbidity and mortality can be estimated. That is, the percentage of deaths attributable to each risk factor can be calculated from the relative risk (18) of death from various specific causes associated with each factor and the prevalence of the various risk factors in the population. This procedure leads to an estimate of the proportion of different categories of mortality that can be accounted for by each risk factor. Then, from mortality statistics, the numbers of attributable deaths are estimated for each risk factor and cause of death. Finally, the numbers of deaths from different causes are combined for each risk factor and presented as a ratio or percentage of total deaths. For risk factors where relative risk estimates are not available, the estimations are based on general consensus. Although all of these calculations depend upon uncertain guesses about relative risk and risk factor prevalence, they can be considered conservative approximations of the impact that different life-styles and environmental hazards have upon premature mortality.

In a study of attributable mortality in southwest Texas (19), very conservative assumptions were made in every case about relative risk and risk factor prevalence. In this way it was estimated that approximately half of all premature deaths (those occurring below age 65) could be attributed to four major risk factors: alcohol and drug abuse (12-18%), smoking and other tobacco use (10-15%), obesity and improper nutrition (10-15%), and failure to detect and treat hypertension, diabetes, and cancer in its early stages (8-12%).

The remaining unattributed mortality is probably due to genetic factors and to other risks such as stress that may cause reactions leading to death directly or may operate indirectly by influencing adoption of or response to the risk factors involved. Small differences in the apparent magnitude of the risk factors may not be important, but the general pattern supports a comprehensive approach to noncommunicable disease prevention based on interventions to reduce the prevalence of the major risk factors or to deter their growth.

Comprehensive data on risk factors are not available in Latin America and the Caribbean. However, a scattered set of studies have been performed to estimate the prevalence of certain risk factors in various populations. Studies on alcohol and drug use have been exten-
sively reviewed (20, 21). Studies of cigarette smoking have been conducted in a number of countries (22), especially in Venezuela (23). Some relatively comprehensive studies of noncommunicable disease risk factors have been performed in both southern and northern regions of Brazil (24, 25). And epidemiologic studies of cardiovascular disease risk factors have been published that deal with data from Puerto Rico (26), Cuba (27), Peru (28), Colombia (29), Mexico (30), and Argentina (31).

So far it has been found that 50–60% of all adults in the hemisphere are regular smokers, although heavy smoking is still more common among males, while the slopes of overall trends are higher for females and adolescents. At the same time, about 10% of the adult population consumes alcohol daily; drug abuse is rising; dietary patterns have changed in developed societies and are changing in transitional societies; accessibility to preventive services is insufficient; and unhealthy environmental forces linked to social and political stress have increased in recent years, as shown by the magnitude of injuries, disabilities, and deaths due to accidents and violence. Social support is somehow exerting a favorable influence in certain populations or countries where traditional family rights and structures persist.

Programs to Promote Health through Risk Factor Intervention

Local and regional studies have been conducted in Europe and the United States which illustrate some of the methods that might be applied to prevent noncommunicable disease through risk factor intervention. The methods studied have included assigning increased responsibility to public nurses, conducting special mass media programs, recruiting and training volunteer leaders, and modifying consumer products such as milk.

One outstanding example of the progress that can be made is provided by the North Karelia Project in eastern Finland, where a program to reduce noncommunicable disease mortality has been in operation since 1972. Seeking to reduce cigarette smoking, obesity, and fat consumption and to increase detection and treatment of hypertension, the project developed activities in the areas of (1) preventive health services, (2) information, persuasion, and training, (3) community organization, and (4) environmental change (32). The effects of the North Karelia Project have been evaluated through cross-sectional surveys of risk factor levels carried out in 1972, 1977, and 1982, and also by monitoring cardiovascular mortality in North Karelia and a matched reference area. These surveys showed significantly sharper relative decreases in cigarette smoking, blood cholesterol, and uncontrolled hypertension in the interviewed population as compared to the reference population. For example, the proportion of male smokers between the ages of 15 and 59 declined from 44% to 31% in North
Karelia, while it declined from 39% to 35% in the reference area. Corresponding reductions in mortality from cardiovascular disease were also observed. Moreover, the decrease in cardiovascular disease mortality among males was twice as great in North Karelia as it was in the whole country, where less intensive disease control efforts were under way (33).

National trends toward lower cardiovascular disease rates have also been observed in the United States and Canada, where general health education of the public and vigorous national campaigns against smoking and hypertension have been conducted. (Major demonstration projects are also under way at Stanford University—34—and at the University of Minnesota—35.)

In Europe, several national and regional studies have begun—for example in the German Democratic Republic and Federal Republic of Germany, in Switzerland, in Belgium, and in Great Britain (33). However, these projects have tended to be limited to the prevention of cardiovascular diseases.

In the Soviet Union a more comprehensive demonstration project has begun in the city of Kaunas in the state of Lithuania (36). Public health scientists originating the work there have chosen to take an "integrated" approach to noncommunicable disease prevention (37). The key feature of this concept is that, instead of addressing selected risk factors for a single disease category, the program considers risk factors that are broadly related to different categories of noncommunicable disease and fatal injury. Cigarette smoking, alcohol abuse, obesity and inactivity, and high fat consumption are top risk priorities. The project also calls for coordinated screening and other preventive services for early detection of hypertension, diabetes, and cancer. In addition, because stress, social support, and other factors related to mental health are broadly related to the direct risk factors, these too are being included in the "integrated" approach.

Although programs for noncommunicable disease prevention have initially concentrated on modification of lifestyles among adults, a new generation of studies has been concerned with promoting the development of health-enhancing life-styles during childhood and adolescence. Several longitudinal studies have illustrated effective methods for preventing the onset of smoking (38), and some promising results in the prevention of alcohol and drug abuse have also been obtained (39).

Methods that appear to effectively deter the onset of smoking or of alcohol and drug abuse are based on behavioral science. Rather than teaching primarily about the health effects of risk factors, they teach young people to resist peer pressure and aim at modifying social beliefs and perceptions of social desirability. Youth-oriented prevention activities may be particularly relevant for Latin America, where populations in the early stages on noncommunicable disease development need to consider health conditions that may appear in future generations of inhabitants.
Changes Needed in Public Health Policies and Strategies

The current secular socioeconomic, demographic, and health trends in the Americas point to a need for redefinition of policies and modification or development of major public health strategies. These responses should involve both national action and international technical cooperation.

For the countries of the Americas, the noncommunicable disease challenge carries implications for the areas of policy-making, planning, diagnosis, evaluation, intervention, research, and training. Within the general context of national health policies, decisions must be made about whether to postpone action on noncommunicable diseases until they (or their determinants) become a major problem, or until appropriate health infrastructures and isolated vertical programs develop in response to public demands; or else whether to start taking anticipatory actions that will favor harmonious modification or development of the entire health system.

To carry out this latter decision, intentional monitoring and surveillance of health disorders, programs, and program results must be attempted; arrangements that result in failure to make timely analysis of available data must be avoided; and data on emerging or future problems, as well as on critical, social, cultural, and economic indicators and variables, must be incorporated into current data-base systems in a timely fashion. A prospective view has to be developed through strategic planning, bearing in mind that a harmful environment is one element in the web of causation of major noncommunicable diseases, and that the more important trends associated with variations in noncommunicable disease patterns—trends such as population aging, urbanization, and industrialization—are all secular in nature and therefore amenable to long-term planning rather than mere conjunctural reactions.

Methods for health promotion and integrated intervention against synergistic risk factors that are common to more than one of these diseases have to be mastered, tested on a limited scale, and then expanded to the national level, giving adequate consideration to local socioeconomic conditions and cultures. The present situation and trends in providing health services for chronic diseases must be vigorously evaluated in order to rationalize present activities and resources, correct health infrastructure distortions, and augment health system coverage in a way that emphasizes expansion and development of primary care. In this vein the health sector must promote and support a multisectorial approach, since modification of factors such as smoking, diet, drug and alcohol abuse, and physical exercise require concerted participation by the whole society involved. Regarding research, particular interest must be kindled in explaining unusually high or low distributions of disorders or risk factors which are specific to the American continent. Finally, adequate human resources—in both quantitative and qualitative terms—must be developed through formal or in-service short training programs for health workers presently engaged in national programs, as well as through long-term development programs.
Regarding PAHO's part in these endeavors, the Organization directs its limited resources to promotional and cooperative activities in the areas of health care, research, and training. Among other things, the Inter-American Investigation of Mortality carried out in 1962–1964 (40), which focused upon urban areas, pointed out the importance of noncommunicable diseases throughout the Region. If adequate resources were made available, a similar survey carried out 25 years later would strengthen what we know about changes in the mortality profile already described.

To appropriately address the unique needs of its Member Countries, PAHO must adopt a regional perspective to carefully assess health conditions, risk factors, and program conditions in the hemisphere's different countries. To coordinate the acquisition of further insights into noncommunicable diseases, risk factors, and programs in the Americas, a plan for regional monitoring of integrated chronic disease control programs (Project MORE—41) was proposed in 1983. This project encourages comparative international study of noncommunicable diseases, risk factors, and programs for the long-term purpose of guiding cooperation with Member Countries' efforts to promote health by reducing or averting risk factors, and also for the purpose of promoting cooperation between countries.

Through Project MORE, the Pan American Health Organization intends to support the continued development of integrated programs for noncommunicable disease prevention and control in a variety of cultural and demographic settings. A demonstration study is being performed under the auspices of the PAHO/WHO Collaborating Center for Integrated Studies of Noncommunicable Disease Prevention at the University of Texas, USA. Three lines of investigation connected with Project MORE were undertaken in 1985, with the political support and active participation of selected countries. These Project MORE activities relate research and development on integrated programs, health services, and strategic planning. Brazil (through work involving two geographic areas), Cuba, Chile, Mexico, and Venezuela are participating in a multinational study of individual and population risk factors susceptible to intervention. It is intended that the results of this survey will provide a baseline for adopting an integrated approach in the six study areas selected. In addition, Brazil, Costa Rica, and Venezuela are now developing proposals for an investigation on the situation of health services for chronic diseases to be launched in 1987; and Brazil, Chile, and Costa Rica are expected to collaborate in identifying and assessing critical elements in the strategic planning of adult health promotion and protection.

Finally, antismoking activity is being conducted on a subregional basis. In November 1985 a smoking control meeting was held for representatives of the Southern Cone countries, and a similar activity was held in November 1986 for the countries of the Andean
region. This activity seeks to promote the national political decisions and actions needed to pursue a concerted multisectorial campaign against this major risk factor, and also to encourage a sociopolitical climate propitious for taking further action to promote health through prevention and control of noncommunicable diseases.

Concluding Remarks

Noncommunicable diseases present a new challenge for public health in Latin America. Current conditions in portions of the Caribbean and in the Southern Cone of South America are similar to those prevailing in Europe, North America, and other so-called developed regions where public health officers and epidemiologic researchers are actively grappling with hypertension, cigarette smoking, alcohol abuse, obesity, and other prevalent risk factors. In other parts of Latin America the same challenge is emerging or can be anticipated.

The concepts underlying public health action must be broad and flexible if they are to effectively address the varying conditions prevailing in different parts of the Americas. In the major industrial states of North America and Europe, much has been learned from early efforts to prevent chronic diseases and fatal injuries. Among other things, medical researchers have come to recognize that the behavioral sciences play a key role in prevention (42). It has also become evident that the category-specific funding systems needed to study the biological etiology and treatment of different diseases do not give proper emphasis to common behavioral risk factors or other social conditions that exert general influences on different diagnostic categories of disease (43).

Cigarette smoking and alcohol abuse together account for most premature deaths from noncommunicable diseases. In the industrialized countries these and other risk factors are related to stress, social isolation, poverty, and lack of education. Therefore, a comprehensive policy for prevention of noncommunicable diseases and fatal injuries requires the integration of social services and structures that are able as a whole to address all of those varied issues and concerns.

Research on noncommunicable disease prevention in North America and Europe has moved away from a “clinical” or “individual” approach concerned with particular patients and toward the “population” model, in which the effectiveness of preventive action is judged by its estimated effect upon an entire geographically defined population (44). The North Karelia Project in Finland illustrates the essential ingredients of an effective population program: public education, economic regulation, and active local participation. This Finnish project began as a regional, political response to public recognition that cardiovascular diseases could be prevented. Its success has depended more upon the active “grassroots” involvement of people in different sectors than upon central formulation of educational and regulatory programs. In a similar fashion, the control of noncommunicable diseases in general depends on popular support from outside the health sector.
In most Latin American countries, where noncommunicable diseases are only now emerging as important current or future problems, new methods of prevention must be developed. Within this context the notion of "primordial" prevention refers to preventive actions that keep whole populations or population subgroups from establishing life-styles and other conditions generating future increases in the incidence of noncommunicable diseases and fatal injuries. This concept implies a youth-oriented approach to prevention, but it also raises concern about the nature of industrial and urban development (15).

It implies, among other things, that societies which are not yet industrialized or urbanized may wish to consider new paths of development that avoid the well-known public health burdens of industrialized states. Also, where popular support is available, policies controlling the agricultural production and marketing of tobacco, alcohol, and certain foods can prevent the establishment of economic interests promoting consumption of those products. Unfortunately, it is also true that the need for economic expansion may itself limit the possibilities for controlling the marketing of harmful products or for controlling industrial and environmental conditions that can pose chronic disease risks.

In addition, given the demonstrated harmful effects of stress and social isolation, it appears that developing societies should avoid economic systems that produce social uprooting and forced migration. Of course, these are problems that involve historical processes more powerful than those usually considered within the realm of public health. Nevertheless, when the prevention of unnecessary mortality from noncommunicable disease is viewed as a global problem, many troublesome issues that come to the fore must be adequately understood and confronted.

Overall, it should be noted that political and economic disparities interact with the level of development of noncommunicable diseases in a predictable pattern. Among developing societies the burden of chronic disease is usually greatest within the more affluent classes, these being the first to adopt cigarette smoking or high fat consumption. In the more developed industrial states the burden tends to be greater within the lower classes, because these classes find those established practices less easy to discard than do more educated groups.

A similar pattern appears among women. Before women joined the economic mainstream in the United States and Canada, smoking rates among women were low. But economic and cultural changes have caused smoking among women to increase even as smoking has decreased among the more educated male subpopulations. This sex-specific pattern can be anticipated in developing populations where women are only beginning to become economically independent.

In seeking to address the growing challenge of noncommunicable disease prevention, PAHO's Member Countries must keep close watch over emerging morbidity and mortality trends. Knowledge about expected demographic trends and data on the causes of noncommunicable diseases need to be combined so as to deal with the unique and changing conditions in different regions and nations. Where
major risk factors are prevalent, public health programs can base themselves partly upon effective models found in Europe or North America. But where noncommunicable diseases are only emerging or future concerns, new paths must be found for socioeconomic and demographic development that can avoid an accompanying increase in morbidity and premature death among adults. Epidemiologists and public health planners need to employ new theories and methodologies in order for this problem to be effectively approached.

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