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### **CARDIOVASCULAR DISEASE, WITH EMPHASIS ON HYPERTENSION**

At its 125th Session, the Executive Committee requested the Subcommittee on Planning and Programming to review the topic on cardiovascular disease, with emphasis on hypertension. The Subcommittee reviewed the regional situation with respect to this problem and the opportunities for and barriers to the development of programs to reduce premature mortality from cardiovascular disease.

Based on the discussions during the meeting of the Subcommittee, there appears to be sufficient evidence to warrant the strengthening of programs for the prevention and control of hypertension, given their potential impact in the medium term. Special emphasis should be placed on addressing socioeconomic and gender inequities when implementing such programs.

Pursuant to Resolution CE120.R11 of the Executive Committee (1997), which recommends strengthening technical support for specific initiatives aimed at the prevention and control of noncommunicable diseases, the PAHO Program on Noncommunicable Diseases has developed an approach that integrates health promotion, primary prevention, and management of noncommunicable diseases. This rationale is based on the fact that these health problems share risk factors, control strategies, and that actions should target the same population groups. This provides the framework for the hypertension control initiative.

The Executive Committee is requested to analyze the need to support the development of surveillance of noncommunicable diseases and their risk factors, as well as the strengthening of prevention and control programs, and to issue the respective recommendations.

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## 1. Introduction

Hypertension is one of the most important risk factors for the main cardiovascular diseases—cerebrovascular disease and ischemic heart disease—which are the leading causes of premature death in adults in the Region of the Americas, especially among women. However, sustainable concerted action is currently lacking that would enable health systems and services, especially in Latin America and the Caribbean, to develop strategies and programs that are both efficacious and efficient. This document analyzes the magnitude of the problem, the difficulties caused by the lack of adequate information for decision-making and program development, and the barriers to the implementation of such programs. It also underscores the fact that the existing evidence and health infrastructure in the Member States are sufficient justification for an integrated approach to the prevention and control of cardiovascular disease in general, and hypertension in particular, as a strategy for reducing premature deaths in adults and improving the quality of life.

## 2. The Burden of Disease

### 2.1 *Magnitude of the Problem*

During the next 10 years, cardiovascular disease will claim roughly 20.7 million lives in the Region of the Americas, with some 2.4 million of the deaths attributable to hypertension.<sup>1</sup> In Latin America and the Caribbean, 31% of all deaths are caused by cardiovascular disease. By the year 2000, approximately 180,000 deaths from cardiovascular disease will occur in adult women aged 15 to 69, making it the leading cause of death in this age group. Furthermore, in men of the same age group, cardiovascular disease will result in 253,000 deaths annually, constituting the second leading cause of death after external causes. Mortality from cardiovascular disease ranges from 413.3 per 100,000 population in men and 352.8 per 100,000 in women in Paraguay to 178.1 per 100,000 population in men in Mexico and 149.0 per 100,000 in women in Canada.<sup>2</sup> The age-adjusted mortality by sex for the countries of the Region is presented in Table 1.

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<sup>1</sup> Murray CJL, Lopez AD, *The Global Burden of Disease*, World Health Organization, Harvard School of Public Health, World Bank, Harvard University Press, 1996.

<sup>2</sup> Pan American Health Organization, *Health Situation in the Americas: Basic Health Indicators 1999*, Special Program for Health Analysis, PAHO/WHO, 1999.

**Table 1. Mortality from Cardiovascular Disease by Sex, 1990-1994  
(per 100,000 population, adjusted by age)**

	Men	Women
Argentina	369.5	246.1
Bahamas	226.2	191.3
Barbados	290.9	236.2
Brazil	381.0	293.3
Canada	217.1	149.0
Chile	208.5	165.6
Colombia	284.8	272.2
Costa Rica	195.5	153.3
Cuba	263.9	219.8
Ecuador	211.3	185.4
El Salvador	192.7	190.7
Mexico	178.1	160.2
Nicaragua	246.5	240.7
Paraguay	413.3	352.8
Puerto Rico	225.6	162.2
Suriname	285.9	223.6
Trinidad and Tobago	345.7	293.8
Turks and Caicos Islands	237.7	220.5
United States of America	264.3	197.7
Venezuela	293.0	225.5

The two most important cardiovascular diseases are ischemic heart disease and cerebrovascular disease. It has been established that both can be prevented by preventing and controlling primary risk factors, the most significant of which are related to smoking, inadequate diet, and lack of physical activity. Controlling these risk factors results in a simultaneous reduction in secondary risk factors such as hypertension. Hypertension in itself is an important risk factor for these diseases. Controlled studies have shown that lowering blood pressure by an average of 5-6 mm of mercury can reduce mortality from cerebrovascular disease by as much as 35%-40%, and from ischemic heart disease by 15%-20%.<sup>3</sup> A significant decrease in mortality has also been observed in people 65 years and older who have been treated with antihypertensives. In this population group, cerebrovascular disease can be reduced by as much as 34% and ischemic heart disease by 19%, which would imply a 23% reduction in all deaths from cardiovascular causes.<sup>4</sup>

<sup>3</sup> Psaty BM, Smith NL, Siscovick DS, et al. Health outcomes associated with antihypertensive therapies used as first-line agents: a systematic review and meta-analysis, *JAMA* 1997; 277:739-745.

<sup>4</sup> MacMahon S, Rodgers A, The effects of blood pressure reduction in older patients: An overview of the randomized control trials in elderly hypertension. *Clin Exp Hypertens* 1993; 15:967-978.

## 2.2 Trends

Although mortality from cardiovascular diseases increases with age, it is important to have information on premature mortality, which, in theory, is preventable. To determine the changes in premature mortality, the potential years of life lost (PYLL) were calculated, using data from mortality registries and observing the change between 1960 and 1994 in 11 countries with information available for this period<sup>5</sup> and less than 15% underreporting of deaths (see Table 2). A significant drop in the PYLL from ischemic heart disease was observed in Argentina, Canada, Chile, and the United States. No significant changes were observed for this cause in the other countries, with the exception of Mexico, which reported an increase in the rate of PYLL. During this same period, cerebrovascular disease fell significantly in the majority of the countries, with the exception of Cuba and Venezuela.

**Table 2. Average Change in the Rates of Potential Years of Life Lost (PYLL) by Five-year Period 1960-1994<sup>5</sup>**

	Ischemic heart disease	Cerebrovascular disease
Rates of PYLL decrease	Argentina Canada Chile United States	Argentina Barbados Canada Chile Colombia Costa Rica Mexico Trinidad and Tobago United States
Rates of PYLL show no significant change	Barbados Colombia Costa Rica Cuba Trinidad and Tobago Venezuela	Cuba Venezuela
Rates of PYLL increase	Mexico	

Notwithstanding the reduction observed in the years of potential life lost from cardiovascular disease, what is certain is that given the changes in the age structure of the

<sup>5</sup> Pan American Health Organization, *Health in the Americas*, 1998 Edition, Scientific Publication No. 569, Vol. I, Washington, D.C., 1998.

population in all the countries of the Region, the number of cases is rising, imposing a significant burden on the health services. Furthermore, the countries of the Region with higher rates of PYLL have a premature mortality rate four times higher than that of the countries with lower rates, and this gap is widening for cerebrovascular disease.

### **3. It is Difficult to Tackle a Problem with Only Limited Knowledge of Its Magnitude and Distribution**

#### **3.1 *Surveillance of Hypertension and Related Risk Factors***

Although it has been demonstrated that maintaining normal blood pressure can significantly reduce mortality from cardiovascular disease, this clearly poses a real challenge to public health. One of the barriers to developing efficient programs is that the information on the magnitude of the problem in the countries of the Region is incomplete. Systems for the surveillance of risk factors must be developed that can provide information on their distribution in the population and identify groups in need of interventions.

Several risk factor surveys have been conducted in Latin America and the Caribbean. In two Latin American countries, Cuba and Colombia, the coverage has been national. In the Caribbean, surveys have been conducted in Barbados, Jamaica, Saint Vincent and the Grenadines, and Trinidad and Tobago.<sup>6</sup> However, lack of a standardized methodology and differences in the information collected prevent comparison of the results. Moreover, these cross-sectional surveys have usually been conducted only once. It is therefore impossible to assess trends and identify population groups in which changes have occurred in the prevalence of risk factors and other conditions such as hypertension.

Based on the data from these surveys, it has been estimated that the prevalence of hypertension in Latin America and the Caribbean ranges from 8% to 30%.<sup>7</sup>

#### **3.2 *Inequalities with Respect to Cardiovascular Disease***

The quality of mortality registries also constitutes a barrier to determining whether there is a social gradient for cardiovascular mortality and differences by sex, which would help call attention to gaps in both the incidence of this problem and access

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<sup>6</sup> Pan American Health Organization, Program on Noncommunicable Diseases, Networking for the Surveillance of Risk Factors for Noncommunicable Diseases in Latin America and the Caribbean, Washington, D.C., PAHO/HCP/HCN/99.08, September 1999.

<sup>7</sup> Orduñez PO, Espinosa A, Cooper R, Kaufman J, Nieto J. Hypertension in Cuba: Evidence of narrow black-white difference, *J Hum Hyperten*, 12:111-116, 1998.

to treatment. Not only is there significant underreporting in several countries, but it is unequally distributed among the different population groups (underreporting is usually higher in groups with lower income and educational levels). Chile is one of the countries with better mortality statistics, reporting mortality from ischemic heart disease of 101.1 per 100,000 population in men and 74.4 per 100,000 population in women; and mortality from cerebrovascular disease of 71.2 per 100,000 population in men and 69.5 per 100,000 population in women for the period 1994-1996. These national averages conceal major differences between people of different educational levels. Table 3 shows the age-adjusted mortality for men and women by years of schooling. For both ischemic heart disease and cerebrovascular disease in women there is a clear gradient, with lower rates in the groups with more schooling. In men, this gradient is evident for cerebrovascular disease. The risk ratio shows the existing gap between the higher mortality and lower mortality groups. For both diseases, the gap by years of schooling is greater in women than in men, and greater for cerebrovascular disease. Mortality from this cause is higher in men than in women in groups with higher educational levels, but the ratio is inverse in groups with lower educational levels, where women present higher mortality.

**Table 3. Mortality from Cardiovascular Disease by Years of Schooling and Sex in Chile, 1994-1996**  
(rates per 100,000 population aged 20 years and over, adjusted by age)

	Men		Women	
	Rate	Risk ratio	Rate	Risk ratio
Ischemic heart disease				
<i>Years of schooling</i>				
None	85.5	1.2	78.8	2.3
1 – 8	99.8	1.4	79.9	2.3
9 – 12	129.4	1.8	69.5	2.0
13 or over	73.9	1.0	34.3	1.0
Cerebrovascular disease				
<i>Years of schooling</i>				
None	84.5	2.6	93.6	3.4
1 – 8	75.4	2.3	72.4	2.7
9 – 12	70.5	2.1	59.3	2.2
13 or over	32.9	1.0	27.4	1.0

As noted earlier, it is cerebrovascular disease where the opportunities for improvement through adequate control of blood pressure are greatest, with the controlled studies showing reductions in mortality of up to 40% in adults. It would be worth exploring whether this situation obtains in other countries of the Region and whether these inequalities are caused by differences in the incidence of the disease, differences in

the prevalence of primary risk factors, or inequities in access to control and prevention of these risk factors and to the health services.

#### **4. Hypertension Can be Controlled, but Latin American and Caribbean Countries Have Difficulty Implementing these Types of Programs**

##### **4.1 *National Responses to Hypertension***

Between 1997 and 1998 the PAHO Program on Noncommunicable Diseases conducted a study to determine the organizational situation and status of hypertension prevention and control in 21 countries that together represent 88% of the Region's population. All of the countries, except one, indicated that they have a national program in place for the prevention and control of hypertension. Four have a program devoted exclusively to this problem. In the remaining 16, hypertension activities are part of programs for the health of adults or for the prevention of chronic diseases, having no clear priority within these programs (10 countries); or else, they are part of a program structured exclusively around the health services (6 countries). Six of the countries with national programs have allocated a budget specifically to hypertension.

In most of the countries the national programs are of recent creation, the vast majority in the current decade. The programming goals in almost all the countries are similar and meet basic criteria. However, only eight countries indicated that their program's goal was comprehensive—that is, the prevention, control, and management of hypertension. In seven more the goal was simply preventive and in five only control and clinical case management were pursued. It is significant that all the national programs make use of the country's health services infrastructure, but those with activities outside these services are few. Management guidelines are available in 15 countries, 10 of which have developed them by consensus; and 7 hold periodic working meetings to monitor and plan activities.

Despite the fact that effective hypertension control requires the involvement of both the community and professional organizations, less than half of the national programs include the nongovernmental sector. Only 6 out of 20 countries have working groups in which the nongovernmental sector actively collaborates.

##### **4.2 *Incorporating Hypertension Management into Primary Care***

Given the present and future prevalence of hypertension, its inclusion in the primary health care strategy represents both a challenge and a need. The management of cases, many of them diagnosed late, addresses only part of the problem. In order to meet the goals of reducing the prevalence of hypertension, lowering cardiovascular risks,

detecting cases of hypertension early, and improving the possibilities for treatment, it is necessary to make use of the primary health care mechanisms already in place for other types of problems.

Although this proposal was formulated several years ago, the success of the programs has clearly been limited. Table 4 shows the results of population surveys in three countries of the Region—the United States, Chile, and Cuba—that inquired about a history of hypertension, in addition to taking the respondents' blood pressure. Significantly, 32%, 37%, and 39% of the people with hypertension in the respective countries were not aware that they had the disorder. More serious yet, a large percentage (between 15% and 19% of hypertensives) knew that they had hypertension but were not being treated for it. Among those in treatment, approximately half were not under control. This implies that in the United States, Chile, and Cuba, of the total population with hypertension, only 24%, 22%, and 21%, respectively, have the problem under control.

**Table 4. Proportion of Hypertension Detected, by Treatment and Control Status, in the United States, Chile (Valparaíso), and Cuba**

	United States %	Chile %	Cuba %
Respondents unaware that they have hypertension	32	37	39
Respondents aware that they have hypertension			
Are not treated	16	19	15
Are treated			
- are not under control	19	22	25
- are under control	24	22	21
Total	100	100	100

Source: CARMEN Survey in Valparaíso, Chile (adults aged 25-64, 1997), National Survey of Risk Factors (adults 18+, 1997), NHANES III in United States (adults 18+ years, 1991-1994).

Any action to create or revitalize programs for the control of hypertension and its related risk factors should begin with recognition of the health services' potential in this area. Significant infrastructure is already in place, since an estimated 75% of the population in the Region of the Americas currently has some access to health services.<sup>8</sup> In

<sup>8</sup> Pan American Health Organization, *Health Conditions in the Americas*, Scientific Publication, No.549, PAHO/WHO, Washington, D.C., 1994.

many countries there is some treatment and control of hypertension. Health workers generally have basic knowledge in this area. It would be necessary only to update that knowledge and evaluate hypertension activities as part of their job performance; the activities should not be considered an additional outside demand. Accordingly, a strategy to increase detection and improve the management of hypertension would be justified.

### **4.3 *Economic Impact***

It has been demonstrated in several countries that the prevalence of hypertension is some three to six times higher in groups with no schooling than in those with higher education.<sup>9</sup> The low income of this first group seriously interferes with its ability to obtain the necessary drugs in the required dosage. Antihypertensives can cost up to US\$ 100 per month, putting them out of reach in countries where the average monthly income may be only \$50 to \$200.

Some Latin American and Caribbean countries lack studies that could furnish information on the economic impact of cardiovascular disease. However, it is known that in the United States, the total cost of this group of diseases is on the order of 2% of the gross domestic product.<sup>10</sup> A study on the cost of disease in Canada found that 21% of all such costs are attributable to cardiovascular disease, for a total of Can\$ 12 billion annually. These costs included treatment, consultations, and indirect costs, such as loss of income due to disability and death. Cardiovascular disease was also considered responsible for the highest proportion (32%) of income lost as a result of premature death.<sup>11</sup>

## **5. Primary Prevention of Hypertension Implies Acting Simultaneously on the Risk Factors for Noncommunicable Diseases**

### **5.1 *Role of Diet, Physical Activity, and Smoking***

Lifestyle modifications are particularly effective in preventing hypertension. Patients should be encouraged to adopt these modifications, especially if they have additional risk factors, such as dyslipidemias or diabetes mellitus. Even in cases where lifestyle modifications are not enough, adopting a proper diet, engaging in physical activity, and quitting smoking can lead to a reduction in the amount and dosage of the antihypertensives needed. It is well known that modifying lifestyles is no easy task and should be based on a health promotion and disease prevention approach that includes both the detection and control of specific risk factors.

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<sup>9</sup> Banco Mundial. *Invertir en Salud. Indicadores de Desarrollo Mundial*. 1993 (p. 45).

<sup>10</sup> American Heart Association, *Heart and Stroke Facts Statistics*, Dallas, AHA, 1993.

<sup>11</sup> Health Canada, *Cost of Illness*, Health Canada, 1996.

As a rule, studies show that risk factors tend to be concentrated in particular population groups. This phenomenon occurs not only in the industrialized countries, but in low-income countries as well, as seen in the data from a recent survey sponsored by the Program on Noncommunicable Diseases in three Bolivian cities. Table 5 shows that the prevalence of all cardiovascular risk factors is higher among people who suffer from hypertension than among people who do not.

**Table 5. Presence of Cardiovascular Risk Factors among People with and without Hypertension in Three Bolivian Cities, 1999**

Factor	Hypertensives	Nonhypertensives
Overweight BMI $\geq$ 25*	80.0%	55.3%
Centripetal obesity **	48.5%	38.9%
Physical inactivity	60.3%	49.8%

\* BMI (Body Mass Index)  $\geq$ 25 = Overweight and obesity

\*\* Waist-hip ratio  $>$ 1.0 in men and  $>$ 0.85 in women

## 5.2 *Community Intervention Projects (CARMEN)*

The past two decades have witnessed the development of community intervention programs geared to preventing the risk factors for noncommunicable diseases. Two of these initiatives are beginning to create a global network: CINDI (Countrywide Integrated Noncommunicable Disease Intervention), organized in the European Region, in which 24 countries participate; and CARMEN (Actions for the Multifactorial Reduction of Noncommunicable Diseases), organized in the Americas, in which five countries currently participate. Both are coordinated by the World Health Organization, which means that CARMEN network operations are coordinated by the Pan American Health Organization.

The purpose of the CARMEN project is to reduce the prevalence of risk factors for noncommunicable diseases by combining and coordinating health promotion and disease prevention activities in the community and its health services.

Actions to reduce the selected risk factors are grounded in the general principles of integration and the intersectoral approach. Integrated action implies interventions for the simultaneous reduction of a series of common risk factors for noncommunicable diseases at the individual and community level through a combination of preventive health care and health promotion interventions geared to the general population. Thus,

CARMEN recognizes the need to involve social institutions and organizations inside and outside the health sector and to coordinate their efforts, providing a framework for the integration of hypertension prevention and control.

## **6. Many Countries in the Region Have Resources to Address the Problem of Cardiovascular Disease but Require Better Organization to Improve Their Effectiveness and Efficiency**

### **6.1 *Pan American Hypertension Initiative***

With a view to promoting an organized effort, the U. S. National Heart, Lung, and Blood Institute and the Pan American Health Organization proposed the creation of a Pan American Hypertension Initiative, which has been joined by the Inter-American Heart Foundation, the Inter-American Cardiology Society, the Inter-American Hypertension Society, the World Hypertension League, and the Pan American Network of CARMEN Programs. The objectives of this initiative are to increase the detection of individuals with high blood pressure in all health services and to improve acceptance of and adherence to treatment by all patients found to be hypertensive. To this end it will be necessary to adapt and adopt adequate clinical guidelines, train health workers, and evaluate the effectiveness of patient education. This should take place within the framework of public policy and health systems development that facilitates the prevention and control of noncommunicable diseases in general and a clear decision to address the issue of adult health.

### **6.2 *Six Reasons to Strengthen and Develop Programs for the Prevention and Control of Hypertension***

In 1998, the U.S. Institute of Medicine published a study by a team of international experts specializing in cardiovascular disease control in developing countries.<sup>12</sup> The report concludes that hypertension control programs in these countries are an effective starting point for the prevention and control of cardiovascular disease, for the following reasons:

- Hypertension is a risk factor for both ischemic heart disease and cerebrovascular disease.
- These programs offer attractive advantages for health service providers and the community alike.

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<sup>12</sup> Howson CP, Reddy S, Ryan TJ, Bale JR. (eds), Institute of Medicine, *Control of Cardiovascular Diseases in Developing Countries: Research, Development and Institutional Strengthening*, National Academy Press, Washington, D.C., 1998.

- The objectives are easily measurable.
- The impact of hypertension awareness, together with improvements in treatment and control levels, can be evaluated in the short term (five years).
- The programs provide fertile ground for a coalition of several types of health service providers, each with an important role to play in the detection and management of hypertension and its sequelae.
- The concept of integrated reduction of cardiovascular problems as part of hypertension management permits the incorporation of strategies aimed at modifying other cardiovascular risk factors, such as smoking, hyperlipidemias, diabetes, and obesity.

Concerning this last point, experience in the Region has shown that the CARMEN program, which includes primary prevention strategies for several risk factors, goes much farther, since its aim is to decrease the risk not only of cardiovascular disease but of noncommunicable diseases.

In summary, the prevention and control of cardiovascular disease, and especially hypertension, can benefit from an integrated approach combining basic community interventions in primary care with clinical preventive interventions for high-risk individuals.

## **7. Discussion Items**

The following proposals are submitted for the consideration of the Executive Committee:

- Support the development of surveillance of noncommunicable diseases and their risk factors, including hypertension.
- Carry out controlled intervention projects that permit:
  - greater community awareness of the problem;
  - evaluation of the development, implementation, and cost of guidelines for the management of hypertension;
  - better education of people with hypertension;

- dissemination of best practice.
- Encourage partnerships with a variety of regional and national actors to support the inclusion of hypertension control strategies in noncommunicable disease programs. The Pan American Health Organization would serve as coordinator, utilizing its infrastructure to promote the full involvement of the Member States in this initiative.
- Create and support a working group on hypertension within the framework of the Pan American network of CARMEN programs.
- Strengthen the development of programs for the integrated prevention and control of noncommunicable diseases.