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REVIEW

Cardiovascular diseases in Latin America and the Caribbean: The present situation

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Summary In Latin America and the Caribbean, cardiovascular diseases (CVD) are already the leading cause of death and disability. Predictions for the next two decades include a near tripling of ischemic heart disease and stroke mortality in Latin American countries (LAC).

The present review has compiled information from the Pan American Health Organization and taking into consideration relevant information on risk factors and has gleaned from recognized studies, published in peer reviewed journals.

In general, epidemiological data are scarce and have been collected without standardized methodologies, especially on cardiovascular risk factors. The largest and most populated LAC have more complete mortality data and epidemiological studies have been performed by scientific societies and by health authorities. An analysis of mortality indicates that the recent declines in CVD seen in developed countries are not as favorable in LAC, nonetheless, there is considerable variability between countries and by age group. Some of the countries of the region are still in the epidemiological transition where both chronic and infectious diseases have a high prevalence. As the countries of the Region continue their rapid economic and demographic transition, CVD continue to grow in importance.

Several cardiovascular risk factors have a great health impact in the region. Tobacco, hypertension, diabetes, obesity and physical inactivity rank among the five most important causes of ill health and premature death in the Americas.

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The resources available to implement prevention and control programs, in most countries, are still very limited. Reversing current trends will require a wide range of strategies, some beyond the traditional realm of public health. Sustainable programs targeting both individuals at high risk and entire communities are needed in combination with effective policies to support the adoption of healthy lifestyles.

Contents

Epidemiological overview

Cardiovascular diseases (CVD) are emerging as a major public health problem in most parts of the world even in developing countries still afflicted by infectious diseases, undernutrition and other illnesses related to poverty. In most of the Latin American countries (LAC) and Caribbean countries (CC), CVD, are already the leading cause of death and disability among both men and women. Predictions for the next two decades include a near tripling of ischemic heart disease and stroke mortality in Latin America [1,2]. However, the resources available to implement prevention and control programs in the majority of the LAC are still very limited compared to the resources available in developed countries.

The present review has compiled information provided by PAHO and World Health Organization (WHO), and has taken into consideration relevant information on cardiovascular (CV) risk factors and CVD morbidity and mortality, from studies published by local as well as regional investigators, in select journals.

Health disparities and differences in development

The so-called epidemiological transition is contemporary to the region and has been recognized for more than 50 years. The bases of this transition include decreased mortality and prolongation of life, increased life expectancy and reduced fertility.

Among and within the countries of this region, there are notable differences in terms of diagnosis, treatments and access to care. These differences result from varied degrees of economical development, distribution of urban and rural populations and industrialization in each of the LAC and CC. The most industrialized countries of the region have the majority of their population concentrated in large and crowded cities and have the minority of their population living in rural areas. The less developed countries still have a high percentage of rural populations. In urban areas, the population has easy access to hospitals, but inequities caused by poverty and education still limit optimal health care. In rural areas, health services are even more limited for the population. The poor often face several health care barriers including the inability to afford user charges for health care, financial barriers for necessary prescription drugs, and lack of transportation to reach health services [3].

Some countries of the region, such as Bolivia, Guyana, Haiti, Honduras and Nicaragua, have extreme social inequities and health disparities and, according to PAHO, they should be considered for special assistance. These countries are ''Highly Indebted Poor Countries'', where the rate of debt payment leaves little national income for investments in health and other social needs. This situation results in very weak health systems and poor health indicators [4].

Prioritization of the reduction in gender differences is an urgent necessity in the region. In many of the LAC however, women's low social status, poor health, and subordination to men persist.

The region needs to promote gender equity in health and other aspects of development, but the data to monitor disparities between men and women, and progress in closing the gaps have not been readily available [5].

Some considerations about CVD mortality data

A recent analysis of the available data about mortality in the region indicates that the recent declines in coronary heart disease and cerebrovascular events were less favorable in LAC. In the USA and Canada, mortality rates declined about 60% in both sexes during the period 1970–2000. In LAC, declines in coronary heart disease mortality were observed for Argentina, Brazil, Chile, Cuba and Puerto Rico. In 2000, mortality rates among men were highest in Venezuela (137.3/100,000) and lowest in Argentina (63.5/100,000). For women the rates were highest in Cuba and lowest in Argentina. Cerebrovascular events also vary among countries. For example in 2000, mortality was highest in Brazil and lowest in Puerto Rico [6].

PAHO published in 2006 a new version of Health Statistics from the Americas, the most complete available information about this topic for the region, but in it, is stated that the countries strive to meet the growing demands for good data to monitor progress towards the Millennium Development Goals. The CVD mortality rates given by PAHO in the special topic: ''The ten leading causes of death in countries of the Americas'' correspond to mortality occurring around the year 2000, but in some countries like Guyana and Honduras the latest data are from the 1990s [7]. Table 1 shows CVD mortality rates by sex for different LAC and CC.

Variations in the first cause of death for CVD were seen among countries and by age group. For example, in the 45–64 age group, ischemic heart disease was the leading cause of death in 16 countries (for men in 18 countries and for women in 9 countries) while cerebrovascular disease (stroke) ranked first in 5 countries. For the age group 65 and over, ischemic heart disease ranked first in 15 countries and stroke in 9 countries [7].

In general, the largest and most populated countries in the region have more complete mortality data, with even differences among country regions published. A recent study in three Brazilian states and their capital cities compared adult mortality from diseases of the circulatory system, especially ischemic heart disease and cerebrovascular disease between 1980 and 2002. The annual decline in the adjusted mortality rates from the circulatory system ranged from −13.1 per 100,000 individuals in the state of Rio de Janeiro to −8.7/100,000 in the city of São Paulo. For ischemic heart disease, the annual declines were greatest in the city of Rio de Janeiro −5.0/100,000 and in the state of Rio de Janeiro −4.5/100,000, and smallest in the state of Rio Grande do Sul −2.8/100,000 and the city of São Paulo −2.7/100,000. From cerebrovascular disease, the range that was found extended from −6.5/100,000 in the state of Rio de Janeiro to −2.9/100,000 in the city of Porto Alegre [8].

The Ministry of Health of Chile, produced a comprehensive atlas describing the epidemiology of CVD in that country. The standardized rate of mortality for ischemic heart disease, the first cause of death in the country, by sex and age was 209.5/100,000 and for cerebrovascular disease the rate was 198.4/100,000 [9].

CVD mortality has also been documented in the small countries of Central America. In Costa Rica from 1970 to 2001, mortality from CVD dropped by an average of 33% (46.6% among women and 20.2% among men), while mortality from ichemic heart disease rose by an average of 18.4% (6.1% among women and 28.4% among men). The adjusted mortality rate for acute myocardial infarction among men rose by 12.8% over the study period and dropped slightly by 4.4% among women. Mortality from all CVD, ischemic heart disease and acute myocardial infarction was greater in men than in women during the entire study period [10].

In Guatemala, the mortality attributed to CVD has increased in recent decades. In 1969 the death rate for CVD was 65.9 per 100,000 population and, in 1986 it was 80 per 100,000. More recently, between the years of 1986 and 1999, the percentage for mortality due to CVD doubled from 7% to 13% [11]. In 2001, CVD were the second cause of mortality in Guatemala. It is projected that the incidence of CVD will increase substantially in the next decades due to the increase in life expectancy of the population and the adoption of unhealthy lifestyles. This trend will particularly affect urban areas, and middle and low-income communities [12].

Cardiovascular risk factors and their implications

In most LAC and CC, epidemiological data on risk factors are scarce and have been collected without standardized methodologies. The methodology of investigation and criteria to define cut points for

Table 1 Cardiovascular mortality rates in regions of Latin America and the Caribbean[a] around the year 2000 rate per 100,000

Geographic Regions	Both sexes		Males		Females	
	Ischemic heart disease	Cerebrovascular disease	Ischemic heart disease	Cerebrovascular disease	Ischemic heart disease	Cerebrovascular disease
Andean Area	54.9	36.7	60.9	33.9	48.8	39.6
Brazil	61.0	65.9	71.5	68.2	50.8	63.7
Central American Isthmus	39.2	32.0	42.1	30.5	36.2	33.4
Latin Caribbean	82.8	68.0	89.8	66.2	76.0	69.9
Mexico	53.0	28.9	60.6	28.1	45.8	29.7
Non-Latin Caribbean	100.6	75.9	113.2	76.8	88.3	75.1
North America	171.5	56.6	178.0	44.7	165.2	68.2
Southern Cone	57.0	63.2	68.3	62.6	46.0	63.8

www.paho.org/English/DD/AIS/HSA2006_TOC.pdf.

Andean Area: Colombia, Ecuador, Perú, Venezuela and Bolivia (with some limitation for Bolivia). Brazil: due to the magnitude of the population it is considered as an area Central American Isthmus: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. Latin Caribbean: Cuba, Dominican Republic, Haiti, Puerto Rico and the French Departments of French Guiana,Guadeloupe and Martinique, (with certain limitation for French Guiana).

Mexico: due to the magnitude of the population it is considered an area.

Non-Latin-Caribbean: Anguilla, Antigua and Barbuda, Bahamas, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, Netherlands, Antilles, Saint Kiss and Nevis, St. Lucia, St. Vincent, Suriname, Trinidad and Tobago, Turks and Caicos, Virgin Islands (UK) and Virgin Islands (US).

North America: Bermuda, Canada and the United States. These data were included as a comparison for data from Latin American and Caribbean regions.

Southern Cone: Argentina, Chile, Paraguay and Uruguay.

[a] Adapted from: Pan American Health Organization. Health of the Americas. 2006 Edition. Special topic: The ten leading causes of death in countries of the Americas. PAHO; 2006.

risk factors including cholesterol, systolic and diastolic blood pressure, etc., vary from country to country and according to the year of survey. In spite of these limitations, the InterAmerican Heart Foundation published ''Heart Disease and Stroke in the Americas 2000'' compiling the available data on CVD risk factor prevalence and CVD mortality [13]. More recently, the InterAmerican Heart Foundation jointly with the Latin American Society of Hypertension, completed the CARMELA study (Cardiovascular Risk Factor Multiple Evaluation in Latin America). The study provides new and comparable data about risk factors for heart disease and stroke, and the impact of socioeconomic status on CV risk in 11,550 healthy men and women in seven major cities in the region: Buenos Aires, Santiago de Chile, Bogotá, Quito, Mexico DF, Lima and Barquisimeto. Final results will be published soon [14].

PAHO recently published a document about chronic diseases and their relation with those CV risk factors that have the greatest public health importance in the region [3]. They include hypertension, diabetes mellitus, overweight and obesity, sedentary lifestyles, tobacco use and low intake of fruit and vegetables. Most LAC and CC are seeing a decreased consumption of fruit, vegetables, whole grains, cereals, and legumes and parallel increases in consumption of food rich in saturated fat, sugar, and salt, as well as milk, meat, refined cereals, and processed food. These changes in dietary patterns have been found to underlie the rise in prevalence of overweight and obesity.

Obesity is a growing problem in the region where several national surveys show that between 50% and 60% of adults and between 7% and 12% of children under 5 years old are overweight and obese. In Chile and Mexico, recent national surveys show that 15% of adolescents are obese [3,15].

Diabetes mellitus incurs a high burden for individuals and society. Thirty-five million people in the region are currently affected by diabetes, and the WHO forecast an increase to 64 million by 2025. The resulting burden is not only related to health care costs, but also to indirect costs caused by loss of productivity from disability and premature mortality. Medical expenditures for people with diabetes are 2—3 times higher than for those not affected by diabetes. In LAC and CC, many people with diabetes have limited access to health care, which means that indirect costs may exceed direct health care costs [16].

In the Caribbean, diabetes is recognized as a major health problem, with a documented prevalence of 16.4% in Barbados and 18% in Jamaica [17,18]. In the face of this evidence, one study has stated that the quality of care and control of diabetes in Jamaica and the rest of the Caribbean is poor [19]. In Central and South America, the prevalence of diabetes is estimated to be between 6% and 8%.

Mexico too has a high prevalence of diabetes, which increased from 7.2% in 1993 to 10.7% in 2003 in those between the ages of 20 and 69 [20].

The prevalence of diabetes and obesity was recently evaluated in four central cities of Argentina using a multistage probabilistic sampling design. While the prevalence of diabetes was between 6% and 8%, the prevalence of obesity was close to 26%. Hypertension and hypercholesterolemia affected one-third of the population [21].

In Mexico, Arredondo et al., estimated that the cost of care for diabetes and hypertension would increase from 11% to 14% between 2004 and 2006. This will impact tremendously the Mexican public health system. They predicted a greater increase in the cost of care for these diseases among the uninsured population [22].

Hypertension is one of the most important CV risk factors with a significant impact on public health. Mexico is one of the few countries in Latin America that has conducted various risk factor surveys. Official data indicate that the prevalence of hypertension increased from 26% in 1993 to 30% in 2000 [23]. The RENAHTA study documented the impact of hypertension on morbidity and mortality. Among hypertensive people, the mortality was 1.5% annually. A follow-up of several epidemiological studies reported that mortality in people with hypertension was 1.8 times higher than the mortality of the general Mexican population [2,24].

In Guatemala, there is limited information about the prevalence of risk factors. This limitation prompted an investigation of CVD risk factors including diabetes in the Municipality of Villa Nueva, which is a community that probably represents the health status of most large urban areas of Guatemala. This survey, which was part of the Central American Initiative of Diabetes (CAMDI) of PAHO, showed a high prevalence of risk factors in the adult population of this community: 54% overweight, 13% hypertension, 35% hypercholesterolemia, 8% diabetes, 15% metabolic syndrome and 16% current smoking. The prevalence of diabetes and hypertension was similar among men (9% and 12%) and women (7% and 14%). An interesting and alarming finding was the high proportion of cases of non-diagnosed diabetes and hypertension, in both men (56% and 63%) and women (39% and 28%) [25].

Smoking prevalence in LAC and CC varies widely, not only among but also within countries. Adult smoking prevalence is as high as 40% in Chile and Argentina, while it remains below 20% in Colombia, Costa Rica and Panama [26]. In the Caribbean, it is estimated that 5600 deaths annually are attributable to smoking [2]. The prevalence of tobacco smoking in Guatemala was investigated by two studies. Sakhuja and Barnoya found that 21% of men and 2% of women (mean age 38 years), from the rural highlands were current smokers [27]. The study by Barnoya and Glantz of tobacco use among physicians working at public hospitals in Guatemala City found that 18% of medical residents were current smokers, and that 35% were former smokers [28].

Rural-to-urban migration is thought to accelerate the development of adult high-risk lifestyles. Urban environments are associated with increased opportunities for mechanized or sedentary employment, consumption of energy-dense processed foods, and other lifestyle characteristics associated with the development of CVD. A study of rural-to-urban migration and cardiovascular disease risk factors in young Guatemalan adults, compared people still living in four Guatemalan villages in a dry, mountainous area 40—65 km northeast of Guatemala City, with those who migrated to urban Guatemala City, with respect to blood pressure, blood chemistry, anthropometry and body composition, physical activity, and food intake. Rural and urban women had similar prevalences of overweight, elevated body fat and low physical activity. Compared to rural men, more urban men were sedentary(79% vs. 27%), with higher body fat (15.3 ± 5.3% vs. 13.3 ± 5.7%), and serum cholesterol (165 ± 29 vs.151 ± 27 mg/dl). Women had higher serum cholesterol than men in both rural and urban areas. Urban residents consumed more saturated fats, red meat and sweetened beverages, and fewer legumes. This investigation confirmed that when people in a developing country move from rural-to-urban environment, they experience behavioural and physiological changes associated with a greater CVD risk, relative to those who remain in a rural setting [29].

The impact of CV risk factors was studied in some countries of the region. In the AFIRMAR study, researchers from Brazil evaluated the importance of several risk factors in the development of an acute myocardial infarction (AMI). A total of 1279 pairs, matched by age and sex, were enrolled. The independent risk factors for AMI in Brazil showed a conventional distribution pattern (smoking, diabetes mellitus and central obesity among others) with different strengths of association [30].

Argentina started to collect data about risk factors, in particular those related to ischemic heart disease, in the late 1990s. The FRICAS study (Factores de Riesgo Coronario Argentina), a case-control study with 1060 patients with AMI and 1050 healthy controls, showed some differences in cardiovascular risk by gender. The findings for women compared to men in terms of risk factor prevalence and risk for developing an AMI (given in terms of odds ratio), were as follows: hypertension 68% vs. 46% (odds ratio 3.15 vs. 2.26); diabetes 25% vs. 12% (odds ratio 2.37 vs. 1.56); serum cholesterol >220 mg/dl: 21% vs. 18% (odds ratio 3.05 vs. 1.16). Although women smoked less than men, 22% vs. 51%, the risk was greater: odds ratio 3.79 vs. 2.23. The risk for AMI increased sevenfold with hypertension and tobacco present together, sixfold when hypertension plus cholesterol $\geqslant$240 mg/dl were present, and by more than fourfold for the association of hypertension and diabetes [31]. Passive smokers were found to have an odds ratio of 1.7 for the development of an AMI and 3.2 when passive smoking was associated with hypertension [32]. This study also highlighted the importance of family history of heart disease for the development of AMI [33].

In the year 2000, with the same methodology of FRICAS, the study FRICAL (Factores de Riesgo Coronario en America Latina) was carried out in Cuba, Mexico, Venezuela and Argentina. Attributable risk (AR) for diabetes in the development of an AMI was 10% in Venezuela, 15% in Mexico, 5% in Cuba and 7% in Argentina. The AR for hypercholesterolemia was 27% in Venezuela, 3% in Mexico, 30% in Cuba and 36% in Argentina [34].

Recent data about the impact of CV risk factors came from the INTERHEART study, the most comprehensive case-control study recently published with South America and Mexico contributing 1237 cases and 1888 controls. The authors stated that in all regions, nine risk factors, based on traditional and some newly described risk factors, account for between three-quarters and nearly all the population attributable risk (PAR) for AMI. The relative importance of every risk factor varied, and was largely related to its prevalence. However, raised lipids, smoking, and psychosocial factors were the most important risk factors in all regions in the world. Some PARs associated with risk factors in men and women in South America were hypertension 32.7%; diabetes 12.7%; smoking 38.3%; and all nine risk factors evaluated in the study: 89.4% [35].

Consensus statements and Guidelines about interventions aimed at CV risk factors have been spread by scientific societies in the region, but

these actions have not had sufficient impact at the population level. One study preformed in Argentina evaluated physician attitudes on CV risk factors following an ischemic cardiac event. In the first part of the PRESEA Study (Prevención Secundaria en Argentina), researchers evaluated the clinical records of 2007 consecutive admissions in 54 hospitals due to angina, AMI, coronary angioplasty or coronary artery bypass surgery. Between 6 and 24 months following the hospital discharge, a total of 1399 of those patients were interviewed. Smoking habit was not registered in 19.5% of the women's charts and in 11.9% of men's charts at hospital admission. During follow-up, women compared to men had more hypercholesterolemia (211.8 ± 37.3 mg/dl vs. 204.4 ± 37.5 mg/dl), more hypertension (51% vs. 44%) and were more sedentary (57% vs. 38%), but smoked less than men (5% vs. 11%). Women were treated with similar protective drugs than men but in spite of a similar use of lipid-lowering and antihypertensive drugs, women had higher cholesterol levels and more uncontrolled hypertension than men [36,37].

CVD prevention initiatives in Latin America and the Caribbean

As the developing countries in this region of the Americas continue their rapid economic and demographic transition, chronic health conditions continue to grow in importance, and broader prevention efforts become even more essential. Physical inactivity now ranks among the five most important causes of ill health and premature death in the Americas. Reversing current trends will require a wide range of strategies, some of them well beyond the traditional realm of public health. Sustainable program activities aimed at the individual and at entire communities are needed in combination with initiatives to improve the environmental support for active lifestyles.

To overcome these limitations, recently PAHO, the regional office of the WHO has identified programmatic objectives and policies that seek to effectively prevent and control non-communicable diseases (NCDs), including CVD, in the Americas [38]. Other initiatives were developed years earlier, one of those included a variety of strategies that rely on the implementation of integrated community-based preventive projects, known as CARMEN Initiative (*Conjunto de Acciones para Reducción Multifactorial de Enfermedades No Transmisibles)*. The general objective of CARMEN is to improve the health status of target populations by reducing common risk factors associated with NCD and CVD. Several LAC and CC are already involved in this initiative [39].

There are several efforts underway in LAC and CC that should be the building blocks of future actions and changes in the health of the population. In Brazil, the ''Agita São Paulo Program'' and in Chile the ''Vida Chile Program'' are models for the use of physical activity to promote health in the general population. Starting as a local, grassroots initiative, the Agita São Paulo Program alliance went on to become an inclusive, statewide coalition of public and private institutions. The contagious effect of Agita São Paulo has already seen an impact on the rest of Brazil as well as many other countries in the Americas [40,41].

In order to encourage and move countries into action on healthy habits, PAHO is launching a media communication campaign: ''Let's eat healthy, live well and get moving, America!. The purpose of the campaign is to raise public awareness about the negative health consequences of obesity, to try to promote healthy dietary patterns and to improve physical activity levels [15].

The city of Bogotá, Colombia has provided a great example of how urban planning can impact positively on public health by promoting and facilitating physical activity in the population. Changes in the city include 250 km of bike trails, good pedestrian infrastructure, and efforts to improve road safety. Awareness of the urban changes taking place in Bogotá is spreading throughout the Americas and they are being adopted in several cities [15].

In Argentina, the PROPIA Program (Programa de Prevencion del Infarto en Argentina), from La Plata University in association with other governmental and non-governmental organizations, has as its objective to diminish the mortality and morbidity from atherosclerotic diseases in the general population. It has three foci of action: healthy food, promotion of physical activity and tobacco control [42].

Most countries in the Caribbean, recently held high level consultations to plan strategies to tackle the epidemic of CVD in response to data emerging from the region and especially the CCHD report [43]. Also the government of Jamaica has embarked on a multisectorial healthy lifestyle program, involving the ministries of health, education and agriculture, aimed at reducing CV risk factors [44]. The Caribbean Food and Nutrition Institute (CFNI) and the PAHO/WHO Office of Caribbean Program Coordination released in 2004 a protocol intended to serve as a resource for nutrition and

dietetic personnel and other health professionals involved in the management of subjects with obesity, diabetes and hypertension in the primary health care setting [45].

The capacity of the lay public to press for tobacco control in individual countries varies greatly. Brazil is one of the control leaders in the region, with prohibition on tobacco advertisement from 2000. It has developed a policy of smoke free public places and it facilitates access to treatment for smokers who want to quit. In Uruguay, multiple alliances among civilians and medical and NGO organizations have engaged in ''Alianza Nacional para el Control del Tabaco''. As a result of the joint efforts, Uruguay has become the first country among LAC and CC to pass a law banning smoking indoors. Venezuela has a long history of tobacco control from 1992 banning advertising from media and in some states, like Monagas (in 2005) declaring all public places smoke free. However, in Mexico a law signed in 2004 by health authorities restricts the application of effective tobacco control measures. Argentina has some cities with smoke free public places but there is not a uniform law on tobacco control throughout the country.

A number of Caribbean countries have signed and ratified the FCTC. The Caribbean Standards Bureau, based in Jamaica, is developing recommendations about warning labels and these recommendations will apply to all English-speaking Caribbean countries. Bermuda is tobacco free as of April 2006. In the late 1990s CLACCTA (Comite LatinoAmericano Coordinador para el Control del Tabaco) joined InterAmerican Heart Foundation and together initiated a movement to facilitate tobacco control policies in the Region. The InterAmerican Heart Foundation has a long tradition in public actions against tobacco, and now is focusing to move LAC and CC through the signature and ratification steps of the Framework Convention on Tobacco Control (FCTC) [46].

Conclusion

Latin American and Caribbean countries have a high mortality due to CVD associated with a high prevalence of CV risk factors including tobacco, diabetes, hypertension, obesity, and physical inactivity. At the present time it is acknowledged (WHO/PAHO) that most countries in the region have no policies or plans to combat CVD and many of them have no tobacco control or food or nutrition legislation. On the other hand, only a few countries have assigned resources to CVD prevention; admittedly resources are scarce.

In our vision the challenge for governments, health authorities, non-governmental organizations and all the people involved in prevention, is to close the gap between the existing reality and the desired CV health of the population. Numerous local or regional studies published on CVD and CV risk factors provide solid information upon which to base action and implement health policies in the region. Many of the approaches are affordable. Now is the time for these efforts to be made, before the impending CVD epidemic becomes overwhelming. Foundations and Scientific Societies have to make a great effort to inform the authorities and to provide them the cooperation to reduce the growing epidemic of CVD in Latin America and the Caribbean.

References

[1] Yach D, Hawkens C, Gould CL, Hofman KJ. The global burden of chronic diseases. JAMA 2004;291(211):2616—22.
[2] Pan American Health Organization. Health of the Americas (2002 ed.) vol. I. Washington, (DC): PAHO; 2002.
[3] Pan American Health Organization. Regional strategy and plan of action on an integrated approach to the prevention and control of chronic diseases, including diet, physical activity, and health. 47th Directing Council. Washington, DC; 25—29 September 2006. <http://www.paho.org/english/gov/cd/CD47-17rv-e.pdf>.
[4] PAHO Strategic Plan 2003—2007 — Mid-term Assessment Priority Countries. <http://www.paho.org/english/d/csu/PriorityCountries-eng.pdf>.
[5] PAHO: Gender, Health and Development in the Americas 2003. <http://www.paho.org/English/AD/GE/GenderBrochure.pdf>.
[6] Rodriguez T, Malvezzi M, Chatenoud L, et al. Trends in mortality from coronary heart and cerebrovascular disease in the Americas: 1970—2000. Heart 2006;92:453—60.
[7] Pan American Health Organization. Health of the Americas (2006 ed.). Special Topic: The ten leading cause of death in countries of the Americas. PAHO; 2006. <www.paho.org/English/DD/AIS/HSA2006_TOC.pdf>.
[8] Oliveira GMM, Klein CH, de Souza e Silva NA. Mortality from cardiovascular diseases in three Brazilian states from 1980 through 2002. Rev Panamericana Salud Pública/Pan Am J Public Health 2006;9(2):85—93(9).
[9] Atlas de Mortalidad por Enfermedades Cardiovasculares en Chile 1997—2003 — Proyecto FONIS 2005. de la U de Talca. www.minsal.cl.
[10] Roselló Araya M, Guzman Padilla S. Trends in mortality from ischemic heart disease and acute myocardial infarction in Costa Rica, 1970—2001. Rev Pan Salud Pública/Pan Am J Public Health 2004;16(5):295—301(7).
[11] Ministry of Public Health. National Epidemiological Bulletin No. 20. Guatemala; 2003.
[12] National Institute of Statistics for the year 2000. National Institute of Statistics. Health Report. Guatemala; 2002.
[13] Wielgosz AT, Champagne BM, Finizola B, et al. Heart Disease and Stroke in the Americas 2000. InterAmerican

Heart Foundation, Dallas; 2000. 7272 Greenville Avenue, Dallas, TX, USA.
[14] CARMELA study: InterAmerican Heart Foundation, 7272 Greenville Avenue, Dallas, TX, USA. www.interamerican-heart.org.
[15] Pan American Health Organization. Let's eat healthy, live well and get moving America: Communication campaign agains obesity. PAHO; 2006. www.dpaslac.org/uploads/1165006719.pdf.
[16] Barcelo A, Aedo A, Rajpathak S, Robles S. The cost of diabetes in Latin America and the Caribbean. Bull World Health Organ 2003;81:19—27.
[17] Foster C, Rotimi C, Fraser H, et al. Hypertension, diabetes, and obesity in Barbados: findings from a recent population-based survey. Ethn Dis 1993;3(4):404—12.
[18] Ragoobirsingh D, Lewis-Fuller E, Morrison EY. The Jamaican diabetes survey. A protocol for the Caribbean. Diabetes Care 1995;18(9):1277—9.
[19] Wilks RJ, Sargeant L, Gulliford MC, et al. Management of diabetes mellitus in three settings in Jamaica. Rev Panam Salud Publica, 1020-4989 2001;9(2):65—72.
[20] Diabetes in the Americas. PAHO Epidemiological Bulletin, vol. 22, no. 2; June 2001.
[21] Sereday MS, Gonzalez C, Giorgini D, et al. Prevalence of diabetes, obesity, hypertension and hyperlipidemia in the central area of Argentina. Diabetes Metab 2004;30:335—9.
[22] Arredondo A, Zuñiga A, Parada I. Health care costs and financial consequences of epidemiological changes in chronic diseases in Latin America: evidence from Mexico. Public Health 2005;119(8):711—20.
[23] Velazquez-Monroy O, Rosas Peralta M, Lara Esqueda A, et al. Prevalence and interrelations of noncommunicable chronic diseases and cardiovascular risk factors in Mexico. Final outcomes from the National Health Survey. Arch Cardiol Mex 2003;73(1):62—77.
[24] Rosas PM, Lara EA, Pastelín HG, et al. Re-encuesta Nacional de Hipertensión Arterial (RENAHTA): Consolidación Mexicana de los Factores de Riesgo Cardiovascular Cohorte Nacional de Seguimiento. Arch Cardiol Mex 2005;75(1):96—111.
[25] Survey of prevalence of diabetes mellitus, hypertension and associated risk factors in the municipality of Villa Nueva Guatemala 2002—2003. Ministry of Public Health of Guatemala, Institute of Nutrition of Central America & Panama and Pan American Health Organization. <http://www.procor.org/discussion/displaymsg.asp?ref=1440&cate=ProCOR+Dialogue>.
[26] Shafey O, Dolwick S, Guindon GE, editors. Tobacco control countries profiles. Atlanta (GA): American Cancer Society; 2003.
[27] Sakhuja R, Barnoya J. Perceptions and prevalence of smoking among people in the highlands of Guatemala. Cancer Cause Control 2001;12(5):479—81.
[28] Barnoya J, Glantz S. Knowledge and use of tobacco among Guatemalan physicians. Cancer Cause Control 2002;13(9):879—81.
[29] Torun B, Stein AD, Schroeder D, et al. Rural-to-urban migration and cardiovascular disease risk factors in young Guatemalan adults. Int J Epidemiol 2002;31(1):218—26.
[30] Piegas LS, Avezum A, Pereira JCR, et al., on behalf of the AFIRMAR Study Investigators *São Paulo, Joinville, and Salvador, Brazil*. Risk factors for myocardial infarction in Brazil. Am Heart J 2003;146:331—8.
[31] Ciruzzi M, Rozlosnik J, Pramparo P, Schargrodsky H, et al. Estudio FRICAS, Factores de riesgo para infarto agudo de miocardio en la Argentina. Rev Argent Cardiol 1996;64(II):10—40.
[32] Ciruzzi M, Pramparo P, Esteban O. Case-control study of passive smoking at home and risk of acute myocardial infarction. Argentine FRICAS (Factores de Riesgo Coronario en América del Sur). J Am Coll Cardiol 1998;31(4):797—803.
[33] Ciruzzi M, Schargrodsky H, Rozlosnik J. Frequency of family history of acute myocardial infarction in patients with acute myocardial infarction. Argentine FRICAS (Factores de Riesgo Coronario en América del Sur). Am J Cardiol 1997;80(2):122—7.
[34] Ciruzzi M, Schargrodsky H, Pramparo P, et al. Attributable risk for acute myocardial infarction in four countries of Latin America: FRICAL study. Medicina 2003;63:697—703.
[35] Yusuf S, Hawken S, Oupuru S, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (The INTERHEART Study): case control study. The Lancet 2004;364:937—52.
[36] PRESEAStudy Investigators. Prevención Secundaria en Argentina: Estudio *PRESEA* Rev Argent Cardiol 2000;68:817—825.
[37] Pramparo P, Schargrodsky H, Ciruzzi M, et al., for the PRESEA investigators. Gender differences in the coronary risk factors management: PRESEA Study. Atherosclerosis 2001;2(2):123.
[38] Enhancing regional capacity in chronic disease surveillance in the Americas: a peer review journal published by Pan Am Health Organ 2005;17(2):130—41.
[39] The CARMEN Network. An initiative for integrated prevention of noncommunicable diseases in the Americas. Pan American Health Organization, Washington; 2003.
[40] Matsudo SM, Matsudo VR, Araujo TL, et al. Nutrition and active life; 2005 247p. ISBN: 92 75 11612 1.
[41] Pan American Journal of Public Health. Special issue on physical activity; 2003, 80p. ISBN: 1020-4989.
[42] PROPIA — Programa de Prevención del Infarto en Argentina Universidad de La Plata-Facultad de Ciencias Medicas. <http://www.propia.org.ar>.
[43] The Caribbean Commission on Health and Development (CCHD); July 2005. <http://www.cpc.paho.org/%5CFiles%5CDocFiles%5C59_107.pdf>.
[44] National Policy for the Promotion of Healthy Lifestyles in Jamaica. Health Promotion and Protection Division, Ministry of Health; 2004. <http://www.moh.gov.jm/Policyforhealth.pdf>.
[45] PAHO 2004: Protocol for the nutritional management of obesity, diabetes and hypertension in the Caribbean. <http://www.paho.org/English/CFNI/cfni-ProtocolNMODH.pdf>.
[46] Bianco E, Champagne Beatriz, Barnoya J. The Tobacco epidemic in Latin America and the Caribbean: a snapshot. Prev Control 2005;1:311—7.