

# PROMOTING HEALTHY LIVING IN CENTRAL AMERICA

## Multi-Sectoral Approaches to Prevent Noncommunicable Diseases

Maria Eugenia Bonilla-Chacin and Luis T. Marcano Vásquez

March 2012





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# Health, Nutrition, and Population (HNP) Discussion Paper

## Promoting Healthy Living in Central America: *Multisectoral Approaches to Prevent Chronic Noncommunicable Diseases*

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**Abstract:** Noncommunicable diseases (NCDs) are the main cause of death and disability in Central America. However, communicable diseases and maternal and child conditions remain important causes of death and disability as well as of injuries. With the aging of the population and improvements in the control of infectious diseases, the share of NCDs in the total burden of disease is likely to increase. However, in Central America these diseases cause death at a much younger age than in higher-income countries. It is critical to prevent and control NCDs, both for their impact on health, as well as on the economy. When not controlled, they can cause costly hospitalizations and large productivity losses due to absenteeism, disability, and premature death. Finally, they can impoverish households hit by out-of-pocket payments for health services and drugs. A large share of NCDs can be prevented since they result from exposure to health risk factors such as unhealthy diets, physical inactivity, tobacco use, and the harmful use of alcohol. Central Americans have very high caloric diets, which are rich in sodium and refined sugars, and lifestyles that often involve low levels of physical activity. Similarly, large shares of youth in some of the countries smoke, while alcohol consumption among drinkers and the frequency of binge drinking in Nicaragua and Guatemala are very high. Although all countries in the region have introduced multisectoral interventions to prevent NCD risk factors, much remains to be done; for example, countries have been more successful controlling smoking than addressing physical inactivity, alcohol abuse, and poor diets. The role of the health sector is central to preventing NCDs: it needs to ensure surveillance of both NCDs and their risk factors. In addition, the sector needs to ensure effective multisectoral efforts to prevent them.

**Keywords:** Noncommunicable diseases, Central America, health risk factors, multisectoral health interventions, population-wide NCD prevention.

**Disclaimer:** The findings, interpretations, and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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## EXECUTIVE SUMMARY

1. Noncommunicable diseases (NCDs) are the main cause of death and disability in Central America. However, communicable diseases, maternal, perinatal, and nutritional conditions remain important causes of death and disability and also of injuries in the subregion.
2. With the aging of the population and improvements in the control of infectious diseases, the share of NCDs in the total burden of disease is likely to increase. However, what is worrisome about the pattern in Central America is that these diseases cause death at a much younger age than in higher-income countries, and many of these premature deaths and disabilities can be avoided.
3. It is critical to prevent and control NCDs, both for their impact on health as well as on the economy. When not controlled, they can cause costly hospitalizations and large productivity losses due to absenteeism, disability, and premature death. Finally, they can impoverish households hit by out-of-pocket payments for health services and drugs.
4. A large share of NCDs can be prevented since they result from exposure to health risk factors such as unhealthy diets, physical inactivity, tobacco use, and the harmful use of alcohol. For example, Central Americans have very high caloric diets that are rich in sodium and refined sugars, and lifestyles that often involve low levels of physical activity. Similarly, a large share of youth in Nicaragua, El Salvador, and Honduras smoke, while alcohol consumption among drinkers and the frequency of binge drinking in Nicaragua and Guatemala are among the highest in Latin America and the Caribbean.
5. Although all countries in the region have introduced multisectoral interventions to prevent NCD risk factors, much remains to be done; for example, countries have been more successful controlling smoking than addressing physical inactivity, alcohol abuse, and poor diets. Moreover, the design and implementation of these interventions and compliance varies across countries.
6. The role of the health sector is central to preventing NCDs: it needs to ensure their surveillance, along with the risk factors. In addition, the sector needs to ensure effective multisectoral efforts to prevent these conditions. This would require strong coordination with finance, transport, education, and other sectors.

## INTRODUCTION

7. The purpose of this document is to inform the Bank’s dialogue on the health sector in Central America. Its specific aim is to provide an overview of NCDs and their risk factors, and recommend ways to address the issues of poor diets, physical inactivity, tobacco use, and alcohol abuse.

8. The study focuses on NCDs due to their prominence in the burden of disease in Central America and their potential costs to the economies. Although communicable diseases, maternal, perinatal, and nutritional conditions are still responsible for a large portion of deaths and disability, particularly among the poor, their share has decreased in the last decades due to improved health care and rising incomes, while the numbers of NCDs and injuries have increased.

9. The study also focuses on risk factors for NCDs and on multisectoral policies to prevent the population’s exposure to them. There are market failures (that is, negative externalities or rationality failures) associated with some of these risk factors that justify government intervention, and are thus the focus of this document.<sup>1</sup> Second-hand smoke and the violence and traffic accidents caused by alcohol abuse are examples of market failures associated with risk factors for NCDs. There are additional spillover effects on the economy produced by chronic diseases (and thus by exposure to health risk factors), since they generate large costs to health systems and the economy as a whole. There is also evidence of spillover effects within households and social networks; for example, the diet of households’ adult members affects children’s diets. Finally, recent literature points to different “rationality failures” related to the consumption of “lifestyle”-related goods such as diet, alcohol, and tobacco. These rationality failures are related to the addictive or habitual nature of some of these goods, as well as time preferences that heavily discount future costs or benefits.

10. The document is based on desk reviews and an analysis of existing databases. Data on NCDs in the subregion are scarce and often not standardized across countries; thus, various issues were analyzed in some countries but not others. The first part includes WHO Global Burden of Disease data from 2004 and 2008, as well as risk factor data from the WHO Global Data Repository. The document also analyzes information from surveys of living standards, incomes, and expenditures. All the surveys include data on household food consumption, which were used to analyze diets. Some surveys also include data on individuals’ use of time, which were used to analyze physical activity. Finally, the survey from El Salvador had information on self-reported chronic conditions.

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1. F. Sassi and J. Hurst 2008.

11. The first section describes the burden of disease in the six Spanish-speaking countries in Central America and compares it with that of the Latin America and Caribbean Region (LCR) and of Organisation for Economic Co-operation and Development (OECD) countries. The second section describes major risk factors related to NCDs in Central America. The third reviews multisectoral interventions that have been launched to prevent or reduce public exposure to the risk factors. It also offers policy options to strengthen these efforts, based on international experience. The final section presents an overview of World Bank support to countries to prevent and control NCDs.

## ***BURDEN OF DISEASE IN CENTRAL AMERICA***

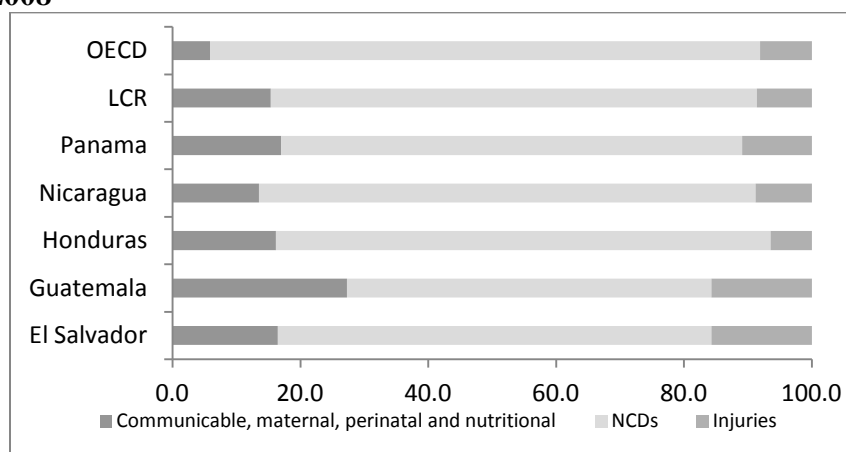
12. **Chronic noncommunicable diseases (NCDs) represent an important and increasing share of the burden of disease in Central America (CA).** There are several noncommunicable diseases<sup>2</sup> affecting the health of people in the region; the more prevalent NCDs are cardiovascular diseases such as ischemic heart disease and stroke, cancers, chronic respiratory diseases, diseases of the digestive system, neuropsychiatric disorders,<sup>3</sup> and diabetes mellitus. They are the main cause of death and forgone healthy life years in the six countries. The NCD share in the burden of disease, as seen in the graph below, varies largely across the six countries. With the aging of the population and improvements in the control of infectious diseases, the share of NCDs in the total burden of disease is likely to increase in any country. What is worrisome about the pattern in CA, as will be detailed in this document, is that these diseases cause death at a much younger age than in higher-income countries and that many of the premature deaths and disabilities can be avoided as they are the result of population exposure to unhealthy diets, physical inactivity, tobacco use, and alcohol abuse.

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2. The WHO Global Burden of Disease study used in this document includes among noncommunicable diseases the following subgroups of diseases: malignant and other neoplasms, diabetes mellitus, endocrine disorders, neuropsychiatric disorders, sense organs diseases, cardiovascular, respiratory, genitourinary, skin, musculoskeletal, congenital abnormalities, and oral conditions. Among the communicable diseases and maternal, perinatal and nutritional conditions the following: infectious and parasitic diseases, respiratory infections, maternal and perinatal conditions and nutritional deficiencies. Finally, among the injuries, it includes both intentional and unintentional injuries.

3. This study, though, will not discuss neuropsychiatric disorders.

**Table 1. Proportion of Age-Standardized Deaths Due to Communicable and Noncommunicable Diseases and Injuries in Central America and Latin America and the Caribbean—2008**



Source: WHO 2011c. Online database available at [http://www.who.int/healthinfo/global\\_burden\\_disease/estimates\\_country/en/index.html](http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html).

13. **Most countries in the subregion suffer from a heavy double burden of disease as communicable diseases as well as maternal, perinatal, and nutritional conditions remain important causes of death and disability.** Thanks to improvements in health care and increases in income, death rates due to communicable diseases as well as to adverse maternal and child conditions have significantly decreased in the last years. However, these conditions remain important causes of death and disability in the subregion. In five of the six countries, communicable diseases and maternal, perinatal, and nutritional conditions cause more than one-sixth of deaths; in Guatemala, they cause close to one-third (Table 1). These conditions also cause much disability in the region. In Guatemala and Honduras communicable diseases and maternal and perinatal conditions cause one in every three disability adjusted life years (DALYs)<sup>4</sup> lost; while still causing more than one in every five healthy life years lost in Nicaragua, Panama, and El Salvador. Costa Rica is the only exception to this pattern; in this country, infectious diseases and perinatal, maternal, and nutritional conditions cause a smaller proportion of deaths than in Latin America and the Caribbean region (LCR), where these conditions cause 21 percent of deaths. Only one in every ten deaths in Costa Rica is due to this group of diseases while four out of every five deaths are due to noncommunicable diseases. In the case of DALYs, communicable diseases in Costa Rica only represented one in ten DALYs lost in 2004 (Table 2). These diseases are often interrelated with NCDs. As will be discussed later, low birth weight and child malnutrition can contribute significantly to diabetes and cardiovascular diseases later in life; also, smoking and alcohol abuse can increase the probability of developing active tuberculosis and reduce the effectiveness of treatment.<sup>5</sup>

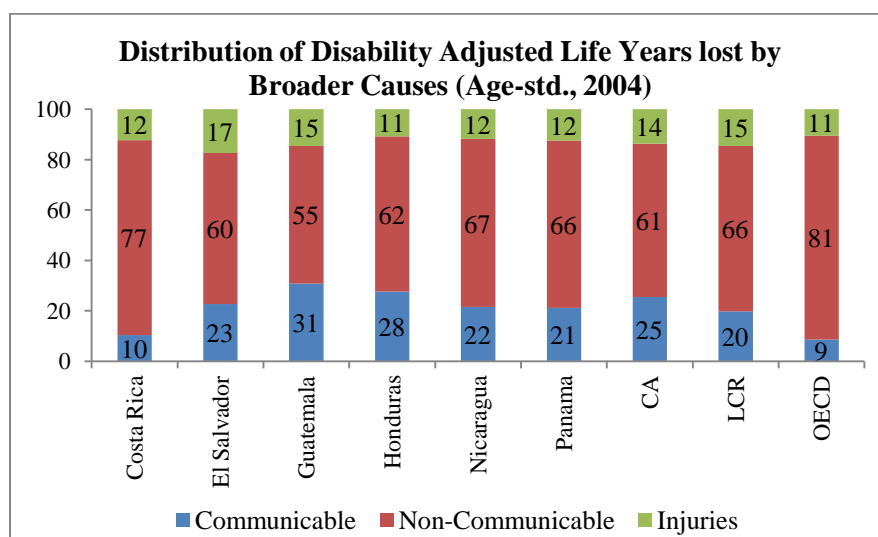
14. **In El Salvador, Guatemala, and Honduras injuries also represent an important and increasing share of the burden of disease, particularly injuries resulting from violence.** The level of violence in the subregion is high and increasing. According to the WHO Global Burden of Disease data of 2004 and 2008, El Salvador and Guatemala have some of the highest violence-related death rates in Latin

4. DALY is a measure of years of healthy lives lost to death and disability from a particular condition.

5. Meiro-Lorenzo et al. 2011.

America and the Caribbean. In 2004, Colombia had the highest age-standardized death rate due to violence with 81.7 deaths per 100,000, followed by Guatemala and El Salvador with 51.3 and 41.2 per 100,000, respectively. These are some of the highest death rates in the world. That same year, El Salvador had the third highest age-standardized death rate from road traffic accidents in LCR after the Dominican Republic and Belize. In 2008, while in Colombia the violence-related death rate was half its previous rate, death rates in Guatemala and El Salvador increased to 74.9 and 57.3 per 100,000, respectively, becoming the first and third highest violence-related death rates in the world. Despite these large death rates due to injuries, communicable diseases still cause more deaths and disability in Guatemala. More recent data on homicide rates in the subregion, using criminal justice data, rank Honduras as the place with the highest homicide rate in the world in 2011 (82 homicides per 100,000) followed by El Salvador in second place (66 per 100,000) and Guatemala in seventh place (41 per 100,000).<sup>6</sup>

**Table 2. Age-Standardized Disability Adjusted Life Years Lost by Broader Causes in Central American Countries and Country Averages of OECD and LCR in 2004 (percent)**



Source: WHO 2008.

## NCDs IN CENTRAL AMERICA

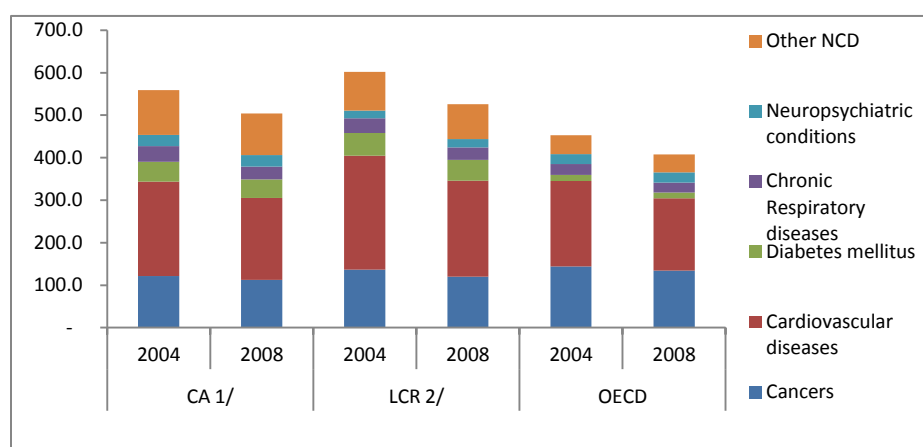
1. **Cardiovascular diseases are the main cause of death in the six countries.** Ischemic heart disease and stroke cause nearly 30 percent of deaths in Costa Rica, Honduras, Nicaragua, and Panama, about 21 percent in El Salvador, and 14 percent in Guatemala. Death rates due to cardiovascular diseases in the subregion are slightly lower than the average in LCR, but higher than those in OECD countries (see Figure 1). Thus, these countries will have to respond to these

6. UNODC 2011.

diseases with a much lower income base than in the OECD. The second major cause of death in the region is cancer. The share of these NCDs in the total burden of disease has also been increasing; in 2004, infectious and parasitic diseases were the second cause of death in Honduras and Guatemala, but by 2008, it was cancer.<sup>7</sup>

**2. Among NCDs, neuropsychiatric disorders account for an important share of deaths and disability among males.** According to the WHO Global Burden of Disease estimates, such death rates in El Salvador and Guatemala are among the highest five in the world.<sup>8</sup> In the subregion, most are related to alcohol and drug abuse, while in Guatemala, they are caused by drug-related disorders. In the two countries, the rates (for males) are 3.7 and 4.8 times higher, respectively, than for females. Although the countries have a relatively low per capita level of alcohol consumption, among drinkers it is high, and episodes of binge drinking are common.

**Figure 1. Age-Standardized NCD Death Rates (Population-Weighted Averages)**



Source: WHO 2008 and 2011c. The online database can be found at [http://www.who.int/healthinfo/global\\_burden\\_disease/estimates\\_country/en/index.html](http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html).

**3. Age-standardized NCD death rates in Central America are similar to the LCR average but higher than the OECD average.** The subregion has a different disease burden than that of higher-income OECD countries, as communicable diseases represent a larger share in the six countries. Despite this, if the subregion were to have the same age structure as the OECD countries, the NCD death rates in CA would be higher than those in the OECD; for example, the average adult female NCD death rate in the subregion is 1.4 times higher than the average in OECD countries (see Figure 1), and 1.1 higher for adult males. However, averages vary by country; for example, Costa Rica, most of whose disease burden is from NCDs, has the second lowest death rate due to NCDs among males, and the third lowest among females in LCR, while Panama has the second lowest death rate for females. In contrast, in Honduras, the rates are among the highest in LCR.<sup>9</sup> Thus, most Central American countries need to respond to the

7. WHO 2008 and 2011.

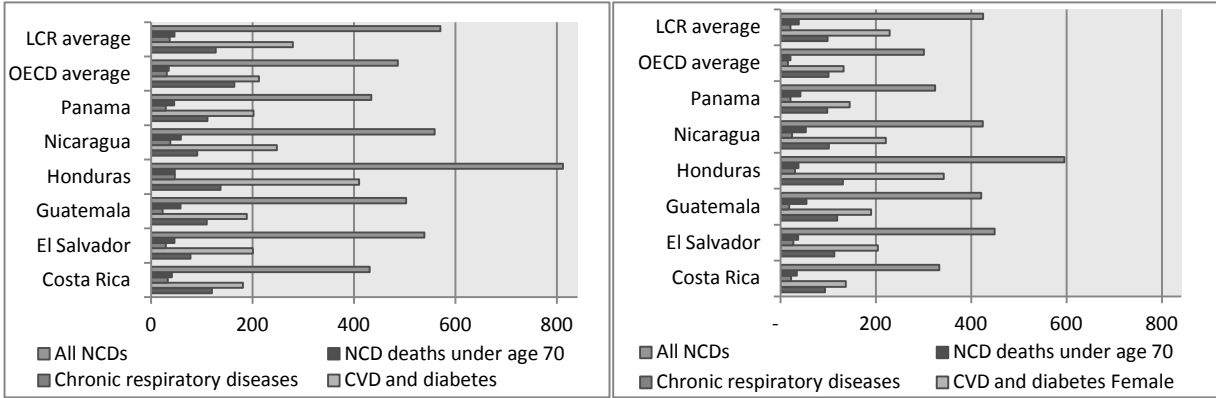
8. WHO 2011a.

9. WHO 2011b.

problem with fewer resources than OECD countries although they account for higher death rates and large socioeconomic costs.

4. **Not only are NCD death rates higher in the subregion than in richer countries, but the deaths also occur at a younger age.** As many as half of NCD deaths among adult males occur in those under 70 while the figure is only 35 percent in OECD countries. The disparities are also large for females—40 percent in the subregion as opposed to 21 percent in OECD countries.

**Figure 2. Age-Standardized Deaths per 100,000 in Central America and OECD and LCR Country Averages in Adult Males and Females, Respectively**

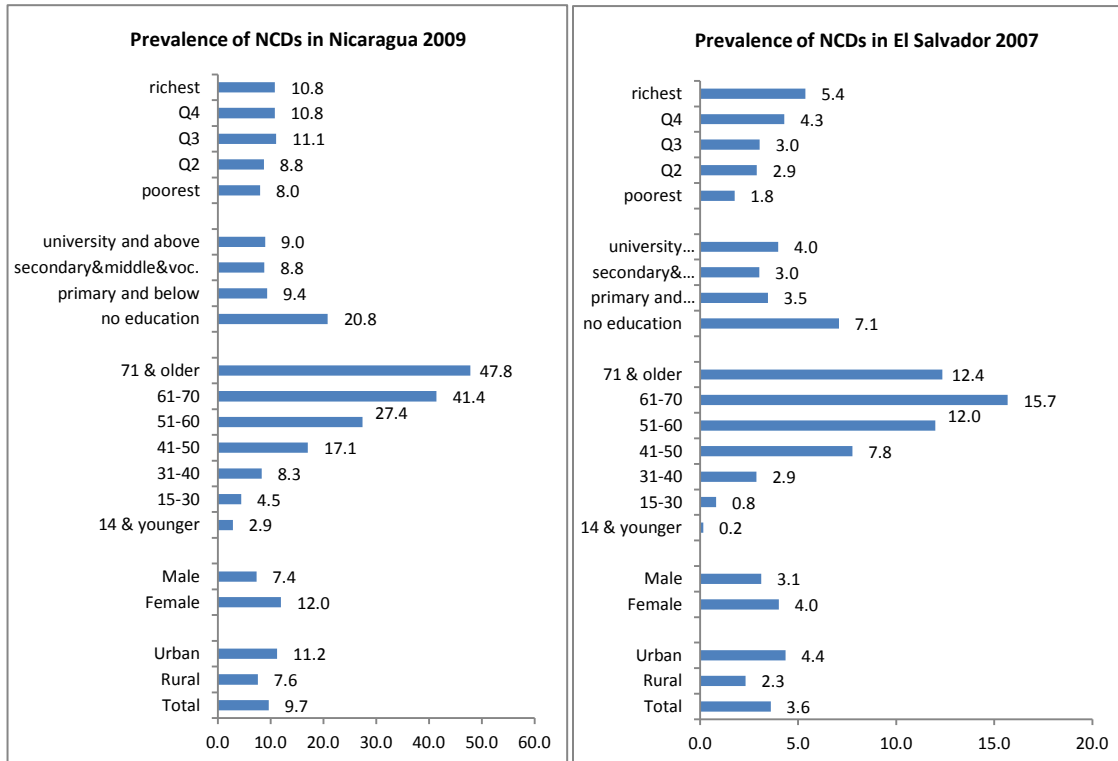


Source: WHO 2011c.

5. **NCDs affect everyone, rich and poor, rural and urban dwellers, and people with and without education.** Figure 3 shows the distribution of people who reported a chronic condition in two countries in the region. As seen in the graphs people at different income level report having an NCD. Also, a large percentage of both rural and urban population reports a chronic condition as well as a large share of people at different levels of education; the pattern varies by country, but in general people with no education are more likely to report one condition. However, with the data at hand, it is not possible to know who is affected the most or to make reliable country comparisons. Very few countries have information on the distribution of NCDs across socioeconomic conditions and even across education levels or geographic location in CA. The little information available, as is the case of the two countries shown in the graphs, is often self-reported and thus likely to be biased, since many people with an NCD do not know about their condition. People with better access to the health sector, such as the most educated, urban dwellers, and the rich might be more likely to know as they tend to have better access to health care. In addition, in Nicaragua the survey asks about chronic conditions which could include chronic communicable diseases such as HIV/AIDS and TB.



**Figure 3. Self-Reported NCDs in Nicaragua 2009 and in El Salvador 2007**



*Source:* Estimates based on Nicaragua Living Conditions Measurement Survey 2009 and El Salvador Multipurpose Household Survey 2007.

6. **A large percentage of those with NCDs in the subregion do not know about their health conditions.** The Diabetes, Hypertension, and Risk Factor Surveys sponsored by the Pan American Health Organization (PAHO) in Central America showed that a large percentage of people with hypertension and diabetes do not know they have them (see Table 3); in Managua, among adults surveyed, 9.8 percent had diabetes, but only 54 percent had been diagnosed.

**Table 3. Prevalence of Adults (20 Years and Older) of Diagnosed Diabetes Mellitus, Newly Diagnosed Diabetes Mellitus, and Hypertensive by Type —2003–06**  
(percent)

	San José	San Salvador	Guatemala City	Tegucigalpa	Managua
<b>Diabetes mellitus</b>					
Known diabetes	6.3	5.4	4.3	2.5	5.3
Newly diagnosed	2.5	2.2	2.9	2.9	4.5
<b>Hypertension</b>					
HTA stage 2	2.3	0.7	1.2	2.7	2.8
HTA stage 1	7.7	3	5.1	8.3	7.5
Pre-hypertension	26.7	17.5	26.6	25.1	33.2
known HTA	15.3	16.4	11.2	11.8	18.6

*Source:* PAHO 2010. The Central American Diabetes Initiative (CAMDI). Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors. Belize, San José, San Salvador, Guatemala City, Managua, and Tegucigalpa. PAHO, Washington, DC.

## ***ECONOMIC EFFECTS OF NCDs IN CENTRAL AMERICA***

7. **Not only do NCDs cause numerous deaths and disabilities but increasingly pose an economic challenge to the Central American countries.** These diseases require continuous care over long periods and can result in hospitalizations, particularly if not controlled, creating a major economic burden for health systems, as well as important fiscal pressures. To better control them and avoid acute episodes, health systems will need to change from those that focus on acute conditions to ones that can also provide continuous care for people with chronic conditions or people at high risk of developing them.

8. **NCDs generate important developmental challenges for Central America,** as they cause large productivity losses due to worker absenteeism, disability, and premature death. In addition, patients with chronic conditions often assume high out-of-pocket costs for health services and pharmaceutical products, which can impoverish households.

9. **Little information exists on the economic impact of NCDs in the subregion, although some is available on the impact of particular conditions.** The World Economic Forum, along with the Harvard School of Public Health, recently estimated the costs associated with cardiovascular diseases (CVD) in 2010 in the Americas, which, as mentioned before, are the

main cause of death in Central America. In all LCR countries except Cuba, the total cost of CVD to the health systems in 2010 was about US\$10 billion, while the total productivity cost is US\$19 billion (see Table 4).

**Table 4. Costs Attributed to CVD in 2010 in the Americas**  
(US\$ billions, except per capita values)

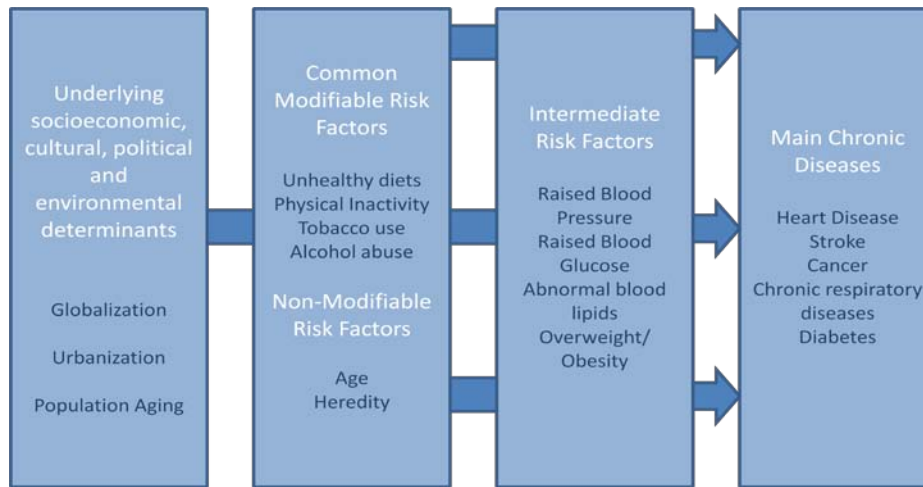
The Americas region	Total costs (without productivity costs)	Productivity costs	Total costs (including productivity costs)	Per capita total costs	Per capita total costs (adults only)
AMR-A (USA, Canada, and Cuba)	165.9	108.2	274.0	736	1,206
AMR-B (all other countries in the region)	8.8	17.2	26.0	52	108
AMR-D (Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, and Peru)	0.9	2.1	3.1	36	91

Source: D. E. Bloom, et al. 2011.

## **RISK FACTORS**

**10. Many chronic conditions in Central America are preventable and have a similar set of known determinants.** Cardiovascular diseases, cancers, chronic respiratory conditions, and diabetes share a number of intermediate risk factors such as high blood pressure, high blood glucose, abnormal blood lipids, and overweight/obesity (Figure 4), which are partly due to unhealthy diets (for example, those that are energy-dense and have few vegetables and fruits, but are high in sugar, fats, and salt), physical inactivity, tobacco use, and alcohol abuse. In addition, alcohol is a risk factor for traffic accidents and violence. Finally, these common factors are affected by socioeconomic, cultural, and environmental determinants such as population aging, rapid urbanization, and globalization. Nonmodifiable determinants of chronic diseases are age and heredity.

**Figure 4. Determinants of NCDs**



Source: WHO 2005.

Note: The framework was modified to include alcohol abuse.

11. **The next section focuses on the prevalence and distribution of NCD risk factors in Central America** and will follow the framework presented in Figure 4. With the information available, it is not possible to explain the reasons for the epidemiological profile or the distribution of modifiable risk factors in the subregion; however, evidence from elsewhere highlights the importance of underlying factors such as rapid urbanization and globalization, which will be discussed below.

## DETERMINANTS OF RISK FACTORS

### Demographic Transition

12. **The extent of NCDs will continue to increase as the region experiences a demographic and epidemiological transition.** Demographic change has been rapid, moving from high to low levels of fertility and mortality rates, and higher life expectancies; this pattern has been accompanied by an epidemiological transition, where the main cause of death has shifted from infectious diseases and maternal and perinatal health problems to chronic NCDs, which are more prevalent among older adults.

13. **Lower mortality rates, particularly for child mortality, have increased life expectancy in all six Central American countries.** Since the 1960s, life expectancy at birth has increased more than 20 years; on average, it is similar to the regional average of about 74 years. Costa Rica, along with Chile, Cuba, and Puerto Rico, has a life expectancy of 79, the highest in the

region; Panama is next, where it is 76. All the others have life expectancies of 71 to 73 years.<sup>10</sup> These changes are mainly due to rapid decreases in infant and maternal mortality in the last decades.

**14. Life expectancy differs markedly by gender. Central American females live an average of six more years than males, and the gap has increased over the years.** In 1960, the average life expectancy of females was less than three years higher than males. This increase could be traced to reduced maternal mortality and increased violence and traffic accidents, which mainly affect young males.

**15. At the same time that the populations' health has improved, fertility rates in all six countries have decreased, reflecting significant progress in the demographic transition.** Costa Rica's child cohorts are already smaller than older cohorts, and its fertility rate is at replacement level (2.1 children per woman); still, the population continues to grow because a large percent is at the reproductive age.<sup>11</sup> Further, the child cohorts are decreasing, while the older cohorts are increasing. Thus the prevalence of NCDs is likely to increase as the population ages.

**16. At present, all six countries benefit from the “demographic dividend,” a period that could promote development—given the relatively large share of working-age population.**<sup>12</sup> Thus, this age group will need to be healthy and experience fewer NCDs to reap the potential benefits. In this regard, it is expected that the pattern in Costa Rica will be repeated in the other countries in the coming years, as the working-age population increases relative to the number of youths and older adults, and dependency rates decrease<sup>13</sup> (see Figure 5). However, given its low fertility rate, the demographic dividend in Costa Rica will last for a shorter time than in the other countries, and it will last longest in Guatemala, given its slower decrease in fertility rates. Once the demographic dividend ends, dependency ratios increase again due to the larger share of older adults in the population.<sup>14</sup>

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10. World Bank data from UN Population.

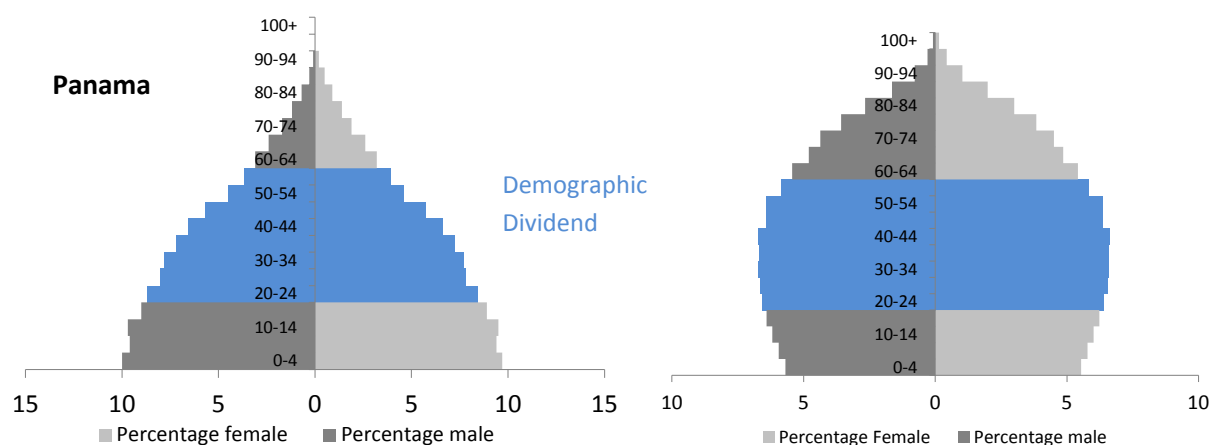
11. Bongaarts and Bulato 1999.

12. Ibid.

13. Cotlear, ed. 2011.

14. Ibid.

**Figure 5. Demographic Dividend: Panama's Population Pyramids, 2010 and 2050**

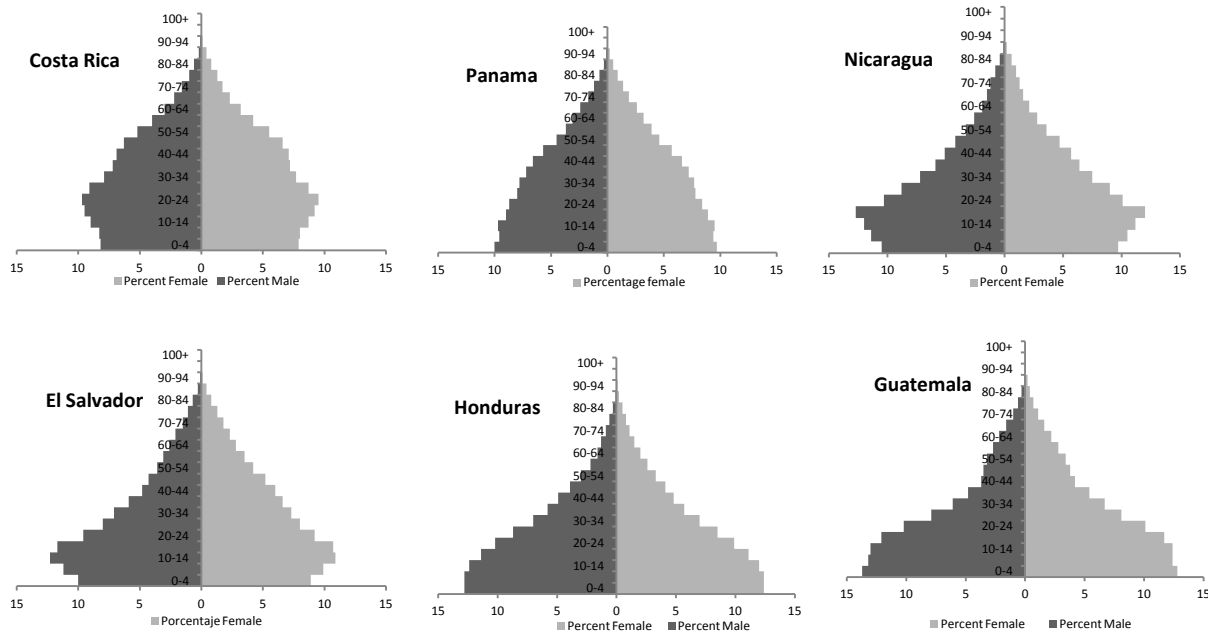


Source: US Census Bureau 2011.

17. **Younger cohorts in El Salvador and Nicaragua have also decreased, but stabilized in Panama** (see Figure 6). Panama and El Salvador have fertility rates that are slightly above the replacement level and thus will continue to grow, but also have an expanding elderly population. In contrast, Nicaragua, Honduras, and Guatemala still have relatively high fertility rates and thus will continue to have large population growth rates. In particular, Guatemala has the highest fertility rate in LCR, at about four children per female. In Guatemala and Honduras, younger cohorts are still increasing (see Figure 6).

18. **The share of older adults in all six countries is growing, thus NCDs are likely to increase.** For example, while the over-60 group in Honduras in 2010 represented only 5.5 percent of the entire population, it is expected to be 16.6 percent in 2050; in Panama, the numbers are 10 percent and 23 percent, respectively (see Figure 5).

**Figure 6. Population Pyramids in Central America, 2010**



Source: US Census Bureau 2011.

## Rapid Urbanization and Globalization

19. **Urbanization brings major changes in lifestyles that affect public health.** Although little data is available about its effect on Central Americans' exposure to health risk factors, evidence from elsewhere shows that rapid urbanization affects food consumption patterns and physical activity. It has been associated with higher caloric intake in diets, along with greater intake of fats and oils, and more animal protein from meat and dairy products.<sup>15</sup> Such factors combine with lower energy expenditure in urban jobs, compared with those in rural areas, and less physical activity during leisure time.<sup>16</sup>

20. **The percentage of the urban population in Central America has rapidly increased.** At present, most of the population lives in urban areas; it is only in Guatemala and Honduras that slightly less than half are urban dwellers. In contrast, in the 1960s, the majority in all six countries was rural.

15. John Kearney 2010.

16. WHO 2005.

**Table 5. Percentages of Those in Urban Areas**

<b>Country name</b>	<b>1960</b>	<b>1980</b>	<b>2010</b>
Costa Rica	34.3	43.1	64.3
El Salvador	38.3	44.1	61.3
Guatemala	31.1	37.4	49.5
Panama	41.2	50.4	74.8
Nicaragua	39.6	49.9	57.3
Honduras	22.7	34.9	48.8

*Source:* World Bank Databank.

21. **Another driver of changes in diets and physical activity is globalization.** Reduced barriers to trade, the growth of transnational food companies, foreign direct investment, and liberalization of media are thought to be some of the channels by which globalization affects healthy behaviors.<sup>17</sup> For example, a descriptive study of the effect of reduced trade barriers on diets in Central America (Thow and Hawkes 2009) found that the trend contributed to increased availability of animal products and processed foods. This fact, along with social and demographic changes, increased the consumption of meat, dairy products, and processed foods.

### **Modifiable Risk Factors**

22. **The prevalence of unhealthy diets, physical inactivity, tobacco use, and alcohol abuse are likely to be some of the main risk factors associated with the rise of NCDs in the subregion.** Despite progress in the demographic transition, most of the countries, except for Costa Rica, have comparatively young populations. More research will be needed to determine how important each of these modifiable risk factors is in explaining the current epidemiological profile in the subregion; however, it is likely that unhealthy diets and physical inactivity play a larger role than tobacco use and alcohol abuse, since more people in the subregion are exposed to them. In addition, in 2004, estimates from WHO indicate that the two major risk factors for health in LCR were high blood glucose and high blood pressure,<sup>18</sup> both closely associated with diet and physical inactivity.

23. **Energy-dense diets, as well as those high in sugar, salt, and fat also increase the risk of NCDs** as they increase the risk of high blood pressure, high blood glucose, high cholesterol, and

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17. A. M. Thow and C. Hawkes 2009.

18. WHO 2008.



overweight/obesity. As such, they increase the risk for cardiovascular diseases, diabetes mellitus, certain cancers, dental problems, and osteoporosis.<sup>19</sup>

**24. Data from household surveys show daily caloric, fat, and carbohydrate consumption per adult-equivalent above recommended amounts.** None of the countries has data on individual food consumption. However, based on nationally representative household surveys, some estimates on average consumption per adult equivalent can be made for some countries in the region (see Annex 1 on the methodology used in the dietary analysis). These estimates are not comparable across countries, given the different household surveys used, but can provide some idea on the dietary patterns of each country and differences within countries. The recommended average calorie intake varies with age and gender, as well as the amount of daily physical activity. Using the Centers for Disease Control (CDC)-recommended thresholds for daily caloric intake, the normal range is 1,165 to 2,755.

**25. A large percentage of households in Guatemala, Honduras, Nicaragua, and Panama have adult-equivalent caloric consumption that is much higher than recommended to maintain a healthy weight** (see Table 6). In Guatemala, this percentage has increased over time (see Figure 7). By 2008, about 40 percent had daily caloric intakes higher than recommended.

**Table 6. Daily Caloric Intake per Adult Equivalent (Percentage of Households)**

Calories	Guatemala 2006	Honduras 2004	Nicaragua 2005	Panama 2008
0–1,165	12.2	28.8	29.5	27.6
1,165– 2,755	49.2	54.5	57.1	55.7
2,755– 4,132	26.7	15.4	11.1	11.4
4,133– 5,510	8.1	1.2	1.9	3.0
5,510 & over	3.8	0.1	0.4	2.4

*Source:* Estimates based on the Guatemala Living Conditions Survey 2006, Honduras Living Conditions Survey 2004, Nicaragua Living Conditions Survey 2005, and Panama Living Conditions Survey 2008.

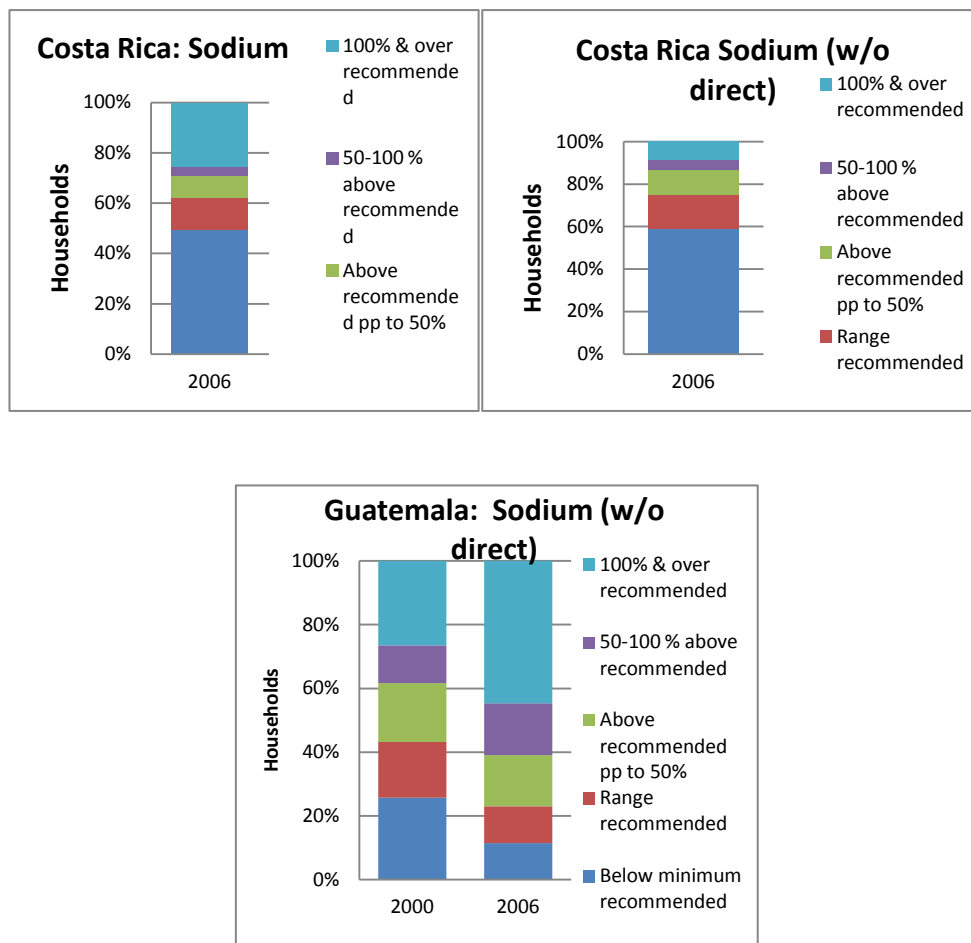
**26. Adult equivalent consumption of sodium is much higher than recommended in Central America.** The CDC<sup>20</sup> recommends a sodium intake of about 1,500 mg a day for adults and 2,300 mg as the “tolerable upper level.” However, nearly all Guatemalan households consume much

19. WHO 2004.

20. <http://www.cdc.gov/Features/dsSodium/>.

more (see Figure 7); for about 80 percent, the figure is over 2,400 mg a day. This could be an underestimate, since it does not include salt bought by the household; rather, it only includes the sodium content of the prepared food the adults consume. As mentioned before, diets rich in salt can cause hypertension, a risk factor for heart disease. In Costa Rica, the percentage of households with sodium consumption above the recommended amount is smaller.

**Figure 7. Costa Rica and Guatemala Consumption of Sodium per Adult Equivalent, including and excluding Salt Bought Separately by the Household**



*Source:* Estimates based on the 2006 Household Income and Expenditure Survey in Costa Rica and the 2000–06 Guatemala National Living Standard Surveys, 2000 and 2005–06.

**27. Households in Central America tend to consume relatively high levels of fruits and vegetables; however, with the exception of households at the highest income level, these intakes are below WHO/Food and Agriculture Organization (FAO) recommended levels.** According to WHO and FAO, the recommended level of fruit and vegetable consumption is more than 400 grams per person per day. On average, consumption in all the countries studied is lower than the recommended amount (see Table 7), in both urban and rural areas and across income quintiles. In some countries, only at the highest income quintiles do households on

average consume the recommended amounts. The classification used in this study is United States Department of Agriculture's (USDA's) nutrition guide, MyPlate; however, following the WHO and FAO recommendations, this classification excludes tubers.

**Table 7. Average Consumption per adult equivalent of Fruits and Vegetables in Central America across Rural and Urban Areas and Consumption Quintiles (*in grams*)**

Country and year		Total	Urban	Rural	Consumption quintiles				
					Poorest	II	III	IV	Richest
Costa Rica									
2004	Fruits	143	167	104	67	80	142	176	247
	Vegetables	100	111	83	51	73	96	121	160
	Vegetable-Proteins	35	29	43	32	37	35	35	34
Guatemala									
2006	Fruits	127	154	96	84	90	113	147	202
	Vegetables	329	364	287	240	272	309	380	443
	Veg-Proteins	195	171	224	169	206	203	203	194
Honduras									
2004	Fruits	176	257	91	59	106	173	237	314
	Vegetables	77	105	47	31	51	75	101	130
	Veg - Proteins	47	49	44	43	48	50	49	43
Nicaragua									
2005	Fruits	195	194	196	126	136	167	193	290
	Vegetables	83	103	52	20	43	62	88	150
	Veg - Proteins	68	54	88	75	71	70	67	61
Panama									
2008	Fruits	91	87	100	60	65	64	93	138
	Vegetables	207	180	261	287	140	150	190	262
	Veg - Proteins	53	60	39	21	34	36	42	100

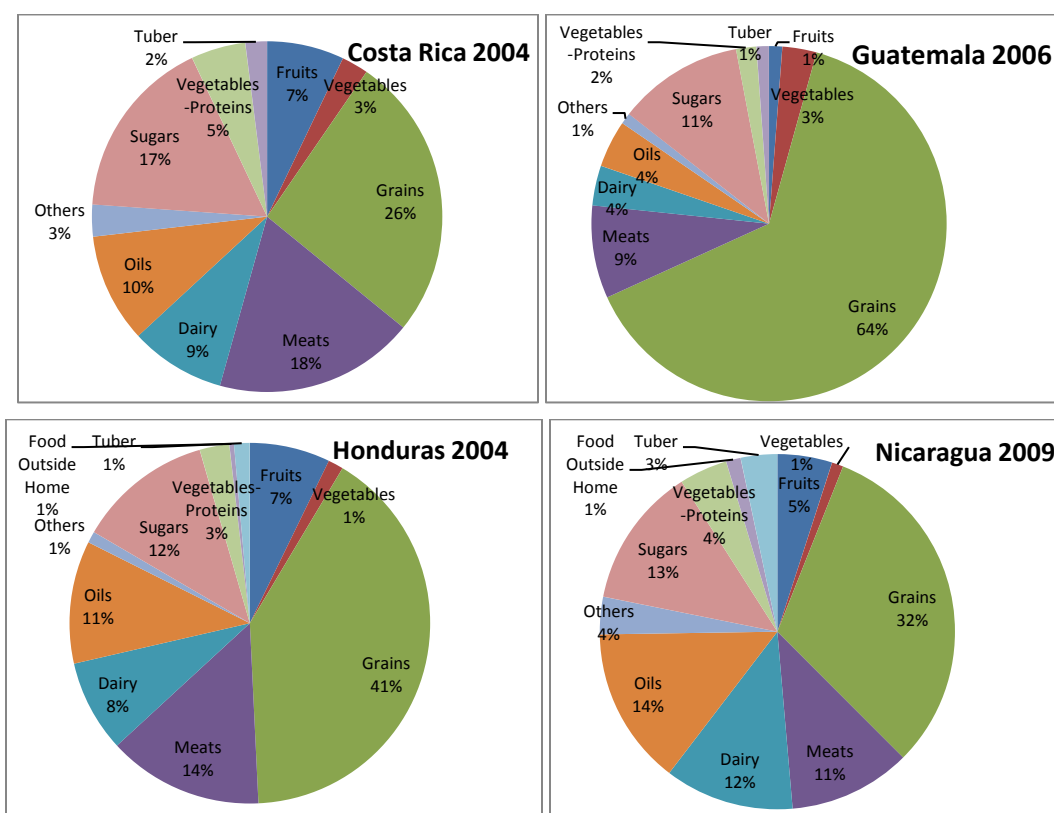
*Source:* Estimates based on the Guatemala Living Conditions Survey 2006, Honduras Living Conditions Survey 2004, Nicaragua Living Conditions Survey 2005, and Panama Living Conditions Survey 2008.

**28. Households in the subregion have relatively high consumption of refined sugars, mainly from sugary drinks.** The caloric intake from added sugars is often as high, and in some cases higher than those from fruits and vegetables (see Figure 8). Calories from refined sugars, mainly sweetened beverages and sweets represent about 10 to 17 percent of total calories consumed, which is higher than the recommended WHO threshold of less than 10 percent of

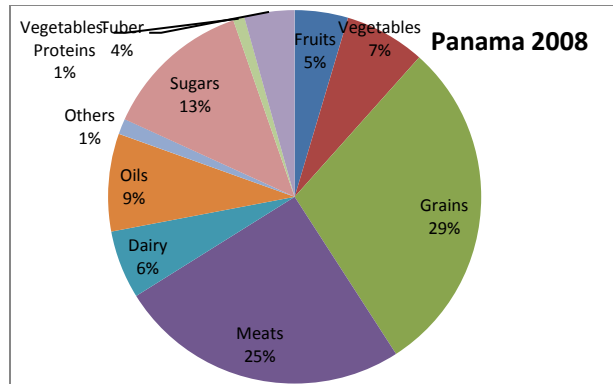
total energy intake.<sup>21</sup> Unlike other sources of energy (for example, meats, dairy, vegetables, or grains), the percentage of calories from sugary foods does not vary as much across countries, income levels, or location within countries. Costa Rica is the country with the highest average share of household calorie intake from refined sugars, at 17 percent. In the others, refined sugars represent 10 percent or more of the total calorie intake.

29. **The main source of energy in the diet varies from country to country.** In Guatemala, grains represent the largest share of household caloric intake, while in Panama, which has the highest per capita income, the largest share is from animal protein and dairy, which could account for the high cholesterol levels among the adult population. As discussed earlier, Panamanian adults have the highest cholesterol levels in the region and the lowest share of calories from grains.

**Figure 8. Share of household consumption of different food items (in calories)**



21. WHO/FAO 2003.



Source: Estimates based on the Guatemala Living Conditions Survey 2006, Honduras Living Conditions Survey 2004, Nicaragua Living Conditions Survey 2005, and Panama Living Conditions Survey 2008.

30. **Physical activity reduces the risk of hypertension, coronary heart disease, stroke, diabetes, breast and colon cancer, depression, falls, and of becoming overweight;**<sup>22</sup> it also improves bone and functional health. For adults ages 18 to 64, the WHO-recommended threshold for weekly physical activity is at least 150 minutes of moderate-intensity aerobic activity, at least 75 minutes of vigorous-intensity aerobic activity, or an equal combination of moderate- and vigorous-intensity activity per week. For children and youth ages 5 to 17, it recommends at least 60 minutes of moderate- to vigorous-intensity physical activity each day. Finally, older adults should do at least 150 minutes of moderate-intensity aerobic physical activity each week or at least 75 minutes of vigorous-intensity aerobic activity, or an equal combination of moderate- and vigorous-intensity activity.

31. **In 2004, about 17 percent of those over 12 in Costa Rica did not meet these recommended thresholds** (physical activity is taken to mean all activities that require energy expenditure—not only exercise, which is a particular subset of physical activity that is planned and repetitive).<sup>23</sup> In figure 9, the graph on the left includes not only exercise but also household chores such as cleaning, cooking, ironing, gardening, and gathering wood.

32. **Costa Rican adult males and youth are the most likely to be physically inactive, although they are also the most likely to exercise.** As shown in Figure 9, although adult males and teenagers are more likely to exercise than females and working-age adults, they are less likely on average to meet the recommended threshold for physical activity, since they do not engage as much in other activities. Conversely, females exercise less but engage in more physical activity, mainly through household chores.

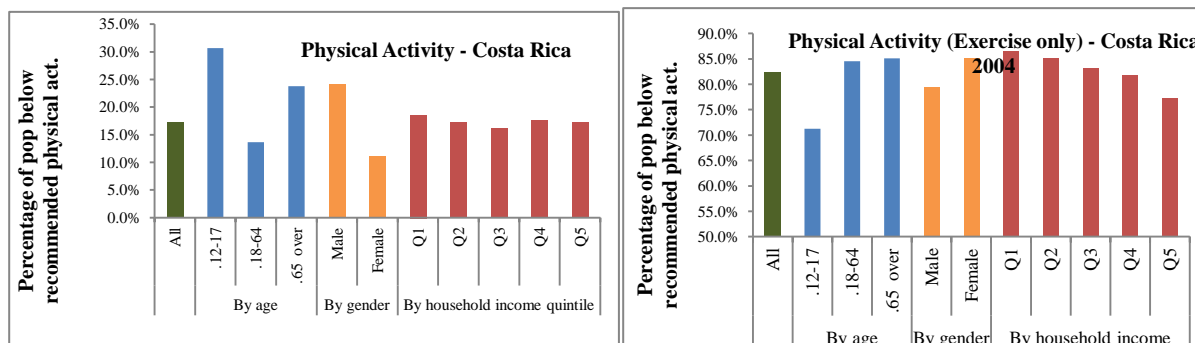
33. **The higher the household income level, the higher the percentage of the population that meets the recommended thresholds for physical activity.** As noted in the graph on the right (in figure 9), the higher the income level, the higher the percentage of individuals who meet the

22. <http://www.who.int/dietphysicalactivity/pa/en/index.html>.

23. Ibid.

threshold for physical activity from exercise. Even when other types of physical activity are included, the pattern persists—although with a smaller gradient.

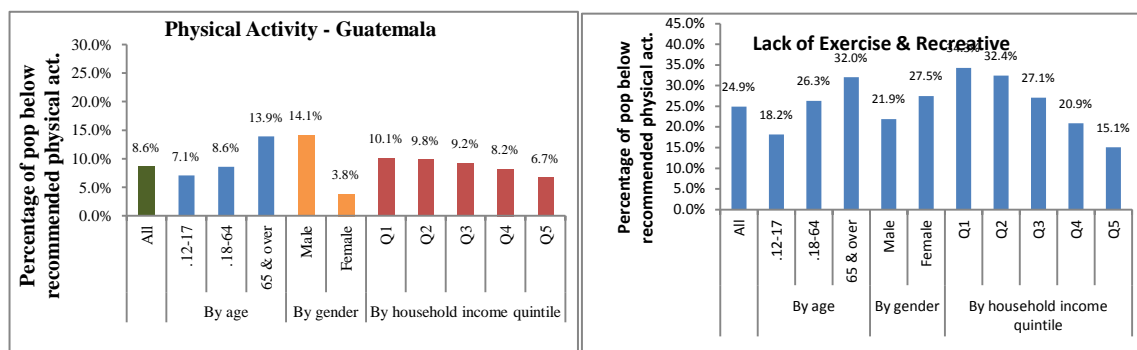
**Figure 9. Percentage of Population below the Recommended Level of Physical Activity in Costa Rica 2004**



Source: Costa Rica INEC (Instituto Nacional de Estadística y Censos) Multipurpose Household Survey 2004.

34. In Guatemala, about 14 percent of males and 4 percent of females are physically inactive (Figure 10). These percentages are lower than those in the other countries; this is similar to the situation in Mexico, where 37 percent of males and 38 percent of females do not meet the WHO-recommended thresholds for physical activity.<sup>24, 25</sup> In Guatemala, older adults as well as those in the lowest-consumption quintiles tend to be more physically inactive than younger adults and those with the highest incomes. However, if only sports and recreational activities are considered, females are more physically inactive than men (see figure 10, the graph on the right), and the income gradient exacerbates this fact.

**Figure 10. Percentage of Population below the Recommended Level of Physical Activity in Guatemala 2006**



Source: National Living Conditions Survey (ENCOVI) 2006.

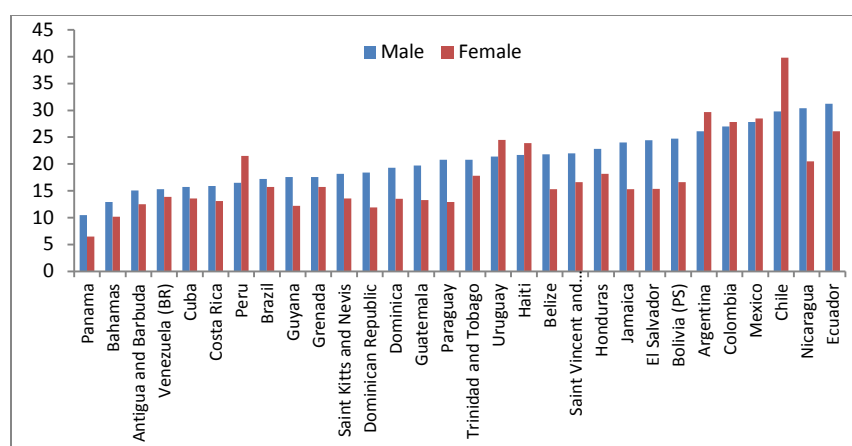
24. WHO 2001b.

25. <http://www.who.int/dietphysicalactivity/pa/en/index.html>.

*Note:* The graph on the left defines physical activities as the following: care of animals, house repairs, garbage collection, child care, washing and ironing, fetching water, cutting wood, sports, and cultural and recreational activities. The graph on the right only includes sports and cultural or recreational activities.

**35. In Guatemala and Costa Rica, about one in four adult males smokes, while fewer than one in ten females smoke in Honduras, Guatemala, and Costa Rica.** In Guatemala and Costa Rica, 7 percent and 4 percent smoke, respectively, and in Honduras, the figure is 3 percent. In Panama, the figure for males 18 and older is 17.4 percent, and for females, 4 percent. These rates are lower than in some South American countries such as Argentina, Chile, Venezuela, and Uruguay whose age-standardized male smoking rates are higher than 30 percent, according to the WHO Global Observatory Data Repository for 2006.

**Figure 11. Current Users of Tobacco Products among 13- to 15-Year-Olds in LCR Countries, 2008**



*Source:* WHO database from the Global Youth Tobacco Surveys.

**36. Although little information exists on tobacco use among adults, the Global Youth Tobacco Surveys have collected a fair amount of data about tobacco use among young people in five of the six countries;** for example, the data show high levels of tobacco use among youths in Nicaragua and El Salvador. Nicaraguan youths have one of the highest rates in LCR (see Figure 11): a third of 13- to 15-year-old boys smoke, as well as a fifth of girls. The situation is not too different in El Salvador and Honduras, where between a fourth and fifth of boys smoke, as well as 15 percent of girls. These data could actually underestimate the numbers, since surveys do not cover high-risk populations; instead, they only sample youths who are enrolled in school.<sup>26</sup> These patterns of tobacco use among youths is worrisome since evidence from the various countries shows that smoking usually starts in early adolescence and that people

26. PAHO 2001.

who begin at an early age are less likely to quit and more likely to become regular smokers than those who start later.<sup>27</sup>

**37. Tobacco is one of the leading risk factors for health in the world.** It increases the risk of lung cancer, as well as mouth, pharynx, esophagus, larynx, bladder, pancreas, and other cancers. Its use has also been linked to infertility and delays in conceiving, and during pregnancy increases the risk of premature births and stillbirths as well as neonatal deaths.<sup>28</sup> Also, it increases the risk of chronic obstructive respiratory disease and coronary heart disease. Exposure to secondhand smoke is also harmful.

**Table 8. Alcohol Use in Central America in Liters of Pure Alcohol Consumed and Percent of Drinkers Reporting Heavy Episodic Drinking, 2005**

	Consumption per capita	Consumption among drinkers	Episodic heavy drinking per week (male) %	Episodic heavy drinking per week (female) %
Costa Rica	5.6	9.96	13.8	12.5
El Salvador	3.6	—	—	—
Guatemala	4.0	17.66	—	—
Honduras	4.5	—	—	—
Nicaragua	5.6	20.50	37.2	11.0
Panama	6.9	—	—	—
LCR	8.7			
Argentina	10.0	12.12	17.5	0.3
Canada	9.8	12.59	15.5	3.5
Peru	6.9	10.00	7.0	0.4

Source: WHO 2011d.

**38. Alcohol consumption in most of the countries poses great risks to health.** Although consumption in Central America is relatively low per capita—in some cases, less than half the regional average—it is not the consumption per se that constitutes a health risk, but its abuse, which includes high consumption among drinkers and frequent episodic heavy drinking. And, while per capita consumption is low, average consumption among drinkers tends to be high, particularly in Nicaragua and Guatemala, and episodes of binge drinking common (Table 8). Based on these data, the WHO Global Status Report on Alcohol and Health ranks these two countries among the five with highest alcohol consumption risk in the hemisphere. Table 8 shows drinking patterns in three countries in the hemisphere, which, when compared to Central American countries, have high average per capita consumption, but relatively low-risk consumption patterns.

27. WHO 2010.

28. WHO 2009 and 2010.



39. **The harmful use of alcohol is the third leading risk factor for deaths after high blood pressure and high blood glucose in LCR<sup>29</sup> and is likely to be as problematic in Central America**, given the high death rates due to closely linked diseases and injuries. It is also the leading cause of DALYs lost in LCR and likely to be in the subregion: alcohol abuse causes over 2.3 times more DALYs lost in LCR than the second leading risk factors, which are overweight/obesity.<sup>30</sup> Alcohol increases the likelihood of more than 60 types of diseases and injuries,<sup>31</sup> causes a large share of liver cirrhosis, epilepsy, poisonings, traffic accidents, violence, and several types of cancers such as mouth, esophagus, liver, colon, rectal, and others.

### Intermediate Risk Factors

40. **The percentage of Central American males with hypertension is lower than that in LCR and similar to that of OECD countries** (Table 9). However, there are significant variations across countries, because the figure in Costa Rica, Panama, and Nicaragua (for males) is over 42.5 percent. Still, the subregion has a smaller percentage of adult females with hypertension than does LCR, but higher than OECD countries. Honduras, Nicaragua, and Panama have the highest numbers, which might be connected to unhealthy diets—particularly those high in sodium. High blood pressure (systolic blood pressure higher than 140 or diastolic blood pressure higher than 90) is the main cause of heart disease and can also lead to other chronic diseases such as kidney failure.

**Table 9. Percentage of Adults (20 and Older) with Elevated Blood Pressure (SBP $\geq$ 140 or DBP $\geq$ 90 or on Medication) (Age-Standardized Estimate) in Central America, LCR, and OECD Countries - 2008**

	Male	Female	Both sexes
Costa Rica	42.5	32.9	37.8
El Salvador	39.4	31.4	35.2
Guatemala	39.9	32.7	36.0
Honduras	41.7	35.2	38.4
Nicaragua	42.6	35.5	39.0
Panama	43.3	34.1	38.7
CA	41.1	33.5	37.2
LCR	44.1	35.3	39.5
OECD	41.5	32.0	36.7

Source: WHO 2011b. Online database available at <http://apps.who.int/ghodata/>.

29. WHO 2008.

30. Ibid.

31. WHO 2011c.

41. **The percentages of adults with high cholesterol in the subregion are below the regional and OECD averages of 42.2 percent and 58.2 percent for males, and 45 percent and 56.8 percent for women, respectively.** As with hypertension, there are large country variations; Panama and Costa Rica have greater percentages of males with high blood cholesterol than the LCR average. High cholesterol is also a major risk factor for heart disease; it is associated with diets rich in animal fats, such as meat, eggs, and dairy products.

42. **As seen in table 10, the percentage of adults with high levels of glucose in the blood in Central America is similar to the LCR average, but much higher than the OECD average.** Among adult females, the average in Central America is much higher than in the LCR and in OECD countries. Both Guatemala and Panama have the highest percentage with high blood glucose; again, these are much higher than those in LCR and OECD countries. Elevated glucose levels in the blood increase the likelihood of developing diabetes mellitus; those with levels of plasma glucose higher than 7 mmol/L during fasting are considered to have developed diabetes,<sup>32</sup> which can cause cardiovascular diseases, blindness, kidney failure, and gangrene. As with high blood pressure and cholesterol, diabetes is often the result of unhealthy diets and lack of exercise.

**Table 10. Percentage of Adults (20 Years and Older) with Raised Fasting Blood Glucose and Raised Total Cholesterol in Central America, LCR and OECD**

	Raised fasting blood glucose ( $\geq 7.0$ mmol/L or on medication)(age-standardized estimate)			Raised total cholesterol ( $\geq 5.0$ mmol/L) (age-standardized estimate)		
	Male	Female	Both sexes	Male	Female	Both sexes
Costa Rica	10.1	10.2	10.2	37.4	44.6	41.1
El Salvador	11.3	10.7	11.0	31.4	37.7	34.9
Guatemala	11.5	14.0	12.8	23.3	31.6	27.7
Honduras	8.6	8.4	8.5	26.5	33.3	30.1
Nicaragua	8.6	9.4	9.0	27.0	32.9	30.0
Panama	10.9	11.2	11.1	40.1	45.3	42.8
CA	10.3	11.2	10.8	28.6	35.5	32.3
LCR	10.6	10.9	10.8	42.2	45.0	43.8
OECD	9.5	7.5	8.5	58.2	56.8	57.7

Source: WHO 2011b. Online database available at <http://apps.who.int/ghodata/>.

32. Diabetes mellitus is a disease characterized by the body's insufficient production of insulin or an improper response to insulin, a hormone produced by the pancreas that absorbs glucose and converts it into energy.

43. **Average Central American adults, particularly females, are overweight.** The mean BMI for males and females 20 and older—25.7 and 27.2, respectively—is higher than the BMI cut-off for people who are overweight. Half of adult males and two-thirds of adult females in Central America are overweight. More worrisome, one-third of adult females and 16 percent of males are obese. Evidence increasingly points to the harmful effects of overweight/obesity. They are important risk factors for developing chronic conditions, as they increase the risk of developing high blood pressure, cholesterol, and high blood glucose levels, cardiovascular diseases, diabetes, musculoskeletal diseases such as osteoarthritis and some cancers (such as colon, breast, and endometrial).<sup>33</sup> They are due to an imbalance between an individual’s caloric intake and his or her caloric expenditure. Thus, they are the result of energy-dense diets that are not counterbalanced by sufficient physical activity. As discussed earlier, a large percentage of households in the subregion have very high caloric diets while a large percentage do not engage in much physical activity. A Body Mass Index (BMI)<sup>34</sup> higher than 18 and lower than 24.9 is considered normal, while one that is equal to or higher than 25 is considered overweight, and one higher than 30 is considered obese.

**Table 11. Percentage of Overweight/ Obese People in Central America, LCR, and OECD Countries**

	BMI ≥ 25 (age-standardized estimate)			BMI ≥ 30 (age-standardized estimate)		
	Males	Females	Both sexes	Males	Females	Both sexes
Costa Rica	60.3	58.8	59.6	20.9	28.3	24.6
El Salvador	59.1	65.6	62.5	20.2	32.9	26.9
Guatemala	48.6	58.6	53.9	13.8	26.7	20.7
Honduras	46.7	57.8	52.4	12.9	26.3	19.8
Nicaragua	53.3	63.2	58.4	16.8	31.3	24.2
Panama	58.2	64.1	61.2	19.4	32.1	25.8
CA	52.6	60.7	56.8	16.3	28.8	22.8
LCR	56.2	58.4	57.4	18.9	27.8	23.6
OECD	55.1	44.5	49.8	19.1	19.4	19.3

Source: WHO 2011b. Online database available at <http://apps.who.int/ghodata/>.

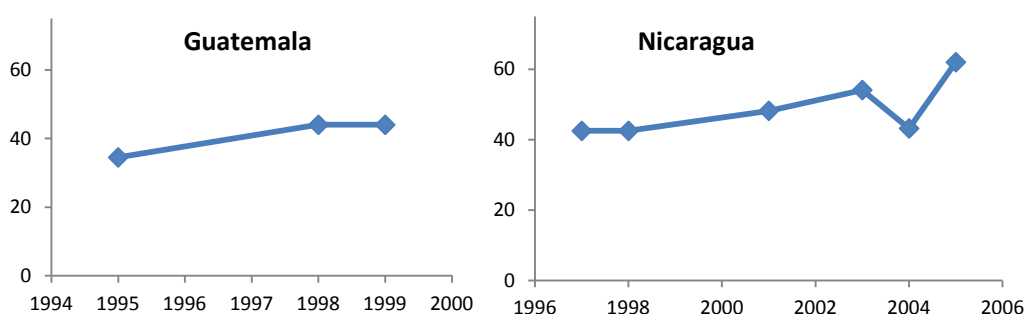
33. <http://www.who.int/mediacentre/factsheets/fs311/en/>.

34 Body Mass Index is an index of kilograms divided by the square of height in meters.

44. **Central America has a higher percentage of overweight/obese people than do LCR or OECD countries** (see Table 11). Among males, Costa Rica, El Salvador, and Panama are leading this high subregional average, with close to two-thirds of men overweight and 20 percent obese. Among females, the percentage does not vary as much across countries, as two-thirds or more are overweight and about a third are obese in all of them. These percentages are higher than those in richer countries: in the OECD, on average, fewer than half the women are overweight while a fifth are obese.

45. **The percentage of those overweight/obese has been increasing rapidly.** In particular, this trend has occurred among females; although only two of the countries have collected BMI data over the years, it appears that the rapidly rising percentages have occurred since the 1990s.

**Figure 12. Percent of Overweight Females (BMI Equal or Larger than 25) in Guatemala and Nicaragua**



Source: WHO Global Database on Body Mass Index

46. **In most of the countries, a high percentage of overweight/obese adults and children coexist with high levels of chronic malnutrition.** This is particularly the case of Guatemala, where close to 60 percent of adult females and 50 percent of adult males are overweight/obese, while chronic malnutrition rates for children are about 43 percent.<sup>35</sup> In many households, the conditions coexist: about 13 percent and close to 10 percent of Guatemalan and Nicaraguan households, respectively, have overweight mothers and stunted children.<sup>36</sup> These percentages are among the four highest in the world.<sup>37</sup> Often these two conditions are interrelated: “Barker’s hypothesis” indicates that low birth weight is associated with increased rates of high blood pressure, heart disease, stroke, and diabetes.<sup>38</sup>

35. Guatemala, Ministry of Health 2010.

36. J. Garret and M. Ruel 2003.

37. Ibid.

38. World Bank 2006.

## MULTISECTORAL APPROACHES TO PREVENT NCD RISK FACTORS

47. **A large share of NCDs can be prevented.** Such conditions are not only the result of a population aging, but also of unhealthy diets, physical inactivity, smoking, and alcohol abuse. These risks factors are generated by a complex combination of socioeconomic, political, cultural, and environmental factors, including rapid urbanization and the globalization of risk factors such as smoking. Given the complexity, measures to prevent them require the participation of different sectors, including health, education, finance, transport, and urban planning, among others.

### Role of the Health Sector

48. **The health sector has a key role to ensure that interventions to prevent and control NCDs occur.** It is the one sector that can initiate dialogue among relevant actors and ensure that actions to prevent risk factors are designed and implemented. Also, it must assess the size of the NCD problem and the factors driving it.<sup>39</sup> In addition, the sector needs to launch secondary prevention measures aimed at the most at-risk populations (this is, however, not the focus of this document). Some of the interventions screen for the presence of an NCD or are pharmacological, aimed at reducing the risk of developing a condition. Those the WHO considers the most cost-effective (“best buys”) at the clinical level are listed in box 1.

#### Box 1. “Best Buys” among Clinical-level Interventions

- Counseling and multidrug therapy, including glycaemic control for diabetes for people 30 and older with a 10-year risk of fatal or nonfatal cardiovascular events;
- Aspirin therapy for acute myocardial infarction;
- Screening for cervical cancer, once at age 40, followed by removal of any discovered cancerous lesions;
- Early case finding for breast cancer through biennial mammograms (50 to 70 years) and treatment of all stages;
- Early detection of colorectal and oral cancer;
- Treatment of persistent asthma with inhaled corticosteroids and beta-2 agonists.

*Source:* WHO.Global Status Report on Noncommunicable Diseases 2010.

49. **Some of these services are commonly offered by the public health sectors in the subregion.** In particular, cervical cancer screenings are offered in all countries as part of the

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39. M. Meiro-Lorenzo et al. 2011.

basic package of preventive clinical services of public providers, who are also increasingly offering other interventions on a regular basis.

**50. One of the most important country and health sector responses to the NCDs is surveillance.** To prevent and control chronic conditions, it is vital to have information on their prevalence as well as of direct and intermediate risk factors for the onset of these diseases. As noted earlier, the monitoring systems for NCD risk factors are weak; many of the countries do not have information on some of them, such as the extent of tobacco use among adults and physical activity, or only have information for a subset of the population. In addition, some of the efforts have not been continuous, but rather one-time events. Many of the activities to monitor risk factors were supported by the Pan American Health Organization/WHO or the CDC, such as surveys on hypertension, diabetes, and risk factors in major urban areas, as well as the Global Youth Tobacco Surveys.

**51. Efforts to improve surveillance will also require improvements in vital statistics, particularly with respect to the cause of deaths.** For example, WHO found that for its 2008 Global Burden of Disease estimates among the six countries, only Costa Rica had complete information on death registrations and causes of death, while data for Panama, El Salvador, Nicaragua, and Guatemala were incomplete, and Honduras had little information for most causes of death.

**52. The health sector will need to adapt its organization and functioning.** Health systems in LAC were designed to respond to acute episodes of communicable diseases, not to chronic conditions that require continuous care over long time periods. Thus, the systems must adjust to the new demands (see Table 12). More research will be needed in Central America to better understand each country’s available options to adapt its health sector to meet the NCD challenges.

**Table 12. Differences between Acute and Chronic Conditions Relevant for Health Systems**

<b>Acute conditions</b>	<b>Chronic conditions</b>
Treat to heal Discontinuous episodes with resolution Treatments are positive because duration of disease is short Prevention often does not require behavior change  Most are resolved without new episodes and do not cause deaths Individual feels sick and seeks care	Treat to prolong life and avoid complications Continuous illness with complications Treatment compliance very low  Prevention requires adjustments in lifestyles  Often accompanied by long-term disability before death Disease silent for years; often diagnosis of

One-off direct medical expenditure	complications
One-off indirect costs (transport)	Ongoing costs for families and health systems
Information systems count episodes	Substantial indirect costs (repeated visits to health services)
	Patients need to be tracked, not just recorded

Source: M. Meiro-Lorenzo et al. 2011.

### Multisectoral Approaches to Prevent Risk Factors

53. **As the main chronic conditions have a common set of risk factors, reducing them is a critical step in controlling NCDs.** The previous discussion shows large country variations in exposures. However, some similarities exist: All Central American countries have large percentages of people who are overweight/obese (particularly females); thus, improving diets and increasing physical activity would be priorities. Alcohol abuse is also an important risk factor, particularly in Nicaragua and Guatemala. Finally, in Nicaragua and El Salvador, tobacco use is particularly high among youth; thus, an additional effort is needed to prevent it.

54. **Interventions exist to change unhealthy diets, promote physical activity, and reduce tobacco use and alcohol abuse, which are extremely cost-effective in preventing the onset of NCDs.** Many require the participation of other sectors, such as education, transport, finance, and agriculture. The interventions in box 2 are those that are considered best buys by WHO.

#### Box 2. “Best Buy” Interventions

- Protect people from tobacco smoke and ban smoking in public places;
- Warn about the dangers of smoking;
- Enforce bans on tobacco advertising, promotion, and sponsorship;
- Raise the tobacco tax;
- Restrict access to alcohol (for example. raise the drinking age, promote government control of alcohol distribution and sales);
- Raise the alcohol tax;
- Enforce bans on alcohol advertising;
- Reduce salt intake and salt content of food;
- Replace trans fat in food with polyunsaturated fat;
- Promote public awareness about diet and physical activity, including through mass media.

Source: WHO 2011a. *Global Status Report on Noncommunicable Diseases 2010*.

**55. The trend in overweight/obesity in Central America is one of the main issues for policy makers.** However, no country in the world has been able to reverse this problem, and the list of best buys only includes a few cost-effective interventions to improve diets and physical activities. Nevertheless, there is mounting international evidence about other programs and policies that have been able to improve diets, increase physical activity, and, in some cases even reduce BMIs. Some of those included in the WHO Global Status Report on Noncommunicable Diseases are low cost and cost-effective. They include the following:

- a. **Promoting adequate breastfeeding and complementary feeding to avoid child malnutrition.** Evidence from observational studies points to a relationship between low birth weight and child malnutrition, and chronic diseases in adults; thus, it is important to reduce child malnutrition. Most Central American countries include this intervention among the basic services provided by the ministries of health. Still, various population groups in some countries are underserved and continue to have among the highest malnutrition rates in LCR.
- b. **Levying food taxes and applying subsidies to promote healthy diets.** Examples of these taxes and subsidies exist: Several states and cities in the United States apply taxes on sugar and sweetened beverages; although they tend to be small, some subdivisions are trying to increase them. Evidence indicates that soda taxes moderately reduce soft drink consumption in children and adolescents, but this reduction is offset by increased consumption of other high-calorie drinks.<sup>40</sup> Evidence also shows that although current tax levels on sodas have little impact on overall consumption, some groups of children—those already overweight or in low-income households and African American children—are more sensitive to these taxes, particularly when the sodas are not available at schools.<sup>41</sup> Larger effects on weight are expected from higher taxes because numerous studies find that changing the relative prices of food and beverages alters their consumption and, as the price of unhealthy food rises in relation to healthy food, the consumption of the latter increases.<sup>42</sup> There are other international examples of taxing unhealthy foods: Denmark introduced a saturated-fat tax, and Hungary is proposing a new tax on foods with “too much” sugar, salt, or fat, while increasing taxes on liquor and soft drinks, all to pay for state-financed health care.<sup>43</sup> The New York City ban on trans fats in restaurants can also be understood as an infinite tax. There are also examples of subsidies to healthy foods to promote their

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40. J. Fletcher et al. 2010.

41. Roland Sturm et al. 2010.

42. The Robert Wood Johnson Foundation 2009.

43. Mark Bittman, *New York Times Op-ed Sunday Review*, July 24, 2011.



consumption; for example, Brazil’s “Fome Zero” program subsidizes produce markets and state-sponsored, low-cost restaurants.<sup>44</sup>

- c. **Restricting the marketing of foods and beverages high in salt, fats, and sugar, especially to children.** Worldwide, children respond to the marketing of food, which is critical, since food promotion influences children’s knowledge, preferences, purchasing, consumption, diet, and weight-related health status.<sup>45</sup> Thus, from 2007–08, the United Kingdom limited ads for high fat, salt, and sugar foods.<sup>46</sup> Also, in 2010, the WHO developed a “Set of Recommendations on the Marketing of Foods and Non-Alcoholic Beverages to Children,” and in May 2011, PAHO organized a regional expert consultation in the Americas on these recommendations for the hemisphere.

56. **The WHO status report also lists other programs and policies with evidence on effectiveness but not much on cost-effectiveness in reducing overweight/obesity.** These programs include the following:

- a. **School-based interventions to improve nutrition and increase physical activities.** There is increasing evidence on the effectiveness of school-level interventions to decrease obesity levels. The most effective are multifaceted, including curriculum, policies, and social and physical environments.<sup>47</sup> Evidence indicates that there needs to be both a change in behavior as well in the environment—particularly in the food available at the school and the physical activity regimen—for the interventions to be effective.<sup>48</sup> Some of the most successful have included compulsory physical activity classes. Thus, Mexico recently introduced a policy that prohibits the sale of foods and beverages with high caloric content and low nutritional values in the schools and also mandates daily physical exercise in all schools. All Central American countries have school health programs or “Schools that Promote Health” (*Escuelas Promotoras de la Salud*), which could be the basis for school-based interventions aimed at preventing NCDs.
- b. **Workplace programs for physical activity and healthy diets.** There are several experiences in developed countries on worksite interventions that have improved vegetable and fruit intake as well as fiber, fat, and dairy intake, and total energy. Among them are point-of-purchase labeling in cafeterias and vending machines, modifying food service preparation to reduce sodium and fat, offering more fruits and vegetables, and expanding healthy food options.<sup>49</sup> There is also evidence of positive though small effects of programs aimed at increasing physical activity at the worksite. These programs tend to be comprehensive, and include individual

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44. Ibid.

45. Gerald Hastings and Georgina Cairns 2010.

46. Ibid.

47. Juliana Kain et al. 2010.

48. Ibid.

49 A. Yancey 2007.

counseling and group education, along with physical and environmental changes, such as on-site fitness facilities and accessible stairways.<sup>50</sup>

- c. **Community interventions to prevent obesity.** Besides school- and work-based interventions, there is evidence that other community-based actions have been effective in promoting healthy lifestyles, as in the program Agita São Paulo in Brazil. This program encourages people to engage in at least 30 minutes of moderate physical activity a day, on most days of the week. The program targets students, workers, and the elderly, organizing large events that reach many people and conducting ongoing activities with different partnering institutions.<sup>51</sup>
- d. **Designing the built environment to promote physical activity.** Several examples already exist in the region. One of the best-known examples is in the city of Bogota. This city has a sustainable public transportation system, *Transmilenio*, which includes an extensive network of bike lanes and set-aside street space for recreational cyclists and pedestrians on Sundays and holidays, called *Ciclovía*. Evidence shows that road facility designs, like street density, connections, and proximity to *Ciclovía* lanes are associated with physical activity.<sup>52</sup> This example was extended to several other cities in the region, although not to Central America.

**57. Costa Rica is the only country in Central America where the alcohol control policy framework includes all the policies considered as “best buys” to prevent alcohol abuse, a risk factor for NCDs, road traffic accidents, and violence.** All countries have policies to control alcohol (Table 13); however, only Costa Rica has virtually all the policies considered best buys; Guatemala, one of the countries with the riskiest consumption pattern, has the least. All except for Guatemala impose taxes on alcoholic beverages. In addition, all except Nicaragua have a minimum drinking age related to the sale and serving of alcoholic beverages. Only Costa Rica and Honduras have legally binding regulations on alcohol advertising and sponsorship. Given these limitations, it can be concluded that there is much room for improving policies to prevent alcohol abuse, particularly in Guatemala and Nicaragua, the countries with the highest risk consumption patterns in the subregion.

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50 Ibid.

51. S. M. Matsudo et al. 2003.

52 Robert Cervero et al. 2009.

**Table 13. Alcohol Control Policies in Central America**

	<b>Costa Rica</b>	<b>El Salvador</b>	<b>Guatemala</b>	<b>Honduras</b>	<b>Nicaragua</b>	<b>Panama</b>
Excise tax on beer/wine/spirits	Y/Y/Y	Y/Y/Y	N/N/N	Y/Y/Y	Y/Y/Y	Y/Y/Y
National legal minimum age for off-premise sale of alcoholic beverages (beer/wine/spirits)	18/18/18	—	18/18/18	18/18/18	N/N/N	18/18/18
National legal minimum age for serving alcoholic beverages (beer/wine/spirits)	18/18/18	NA	18/18/18	18/18/18	18/18/18	18/18/18
Restrictions for on/off premise sale of alcoholic beverages: Time (hours/days), location (places/density), specific events/intoxicated persons/ petrol stations	Y/Y/Y/Y/Y	Y/—/—/—/Y	Y/N/Y/N/N	Y/ Y & N/N/Y/Y	Y & N / N/N/Y/ N	Y/Y/N/N/N
National maximum legal blood alcohol concentration (BAC) when driving a vehicle (general/young/professional), in %	0.05 / 0.05 / 0.05	0.05 / 0.05 / 0.05	N/N/N	0.07 / 0.07 / 0.07	0.05 / 0.05 / 0.05	0.08 / 0.08 / 0.08
Legally binding regulations on alcohol advertising/ product placement	Y/N	N/N	N/N	Y/Y	— / N	Y/Y
Legally binding regulations on alcohol sponsorship / sales promotion	Y/Y	N/N	N/N	Y/Y	N/N	N/N

Source: WHO 2011d.

58. **Panama has the most restrictive and enforceable laws for tobacco control in the region.** Most of the countries have introduced measures to control tobacco use that are included among the “best buys” interventions and part of the WHO Framework Conventions for Tobacco Control. However, some countries have more restrictive measures than others.<sup>53</sup> For example, laws have been passed to create smoke-free environments in all the countries, but they are strongest in Panama, where smoking is banned in all public places and legislation is enforced. Similarly, all mandate health warnings on cigarette packages, but Panama has the strongest restrictions in terms of the percentage of the package that must show the warning (50 percent). Honduras has an even more restrictive policy (80 percent), but it is not implemented, as in Nicaragua, where the mandated space is also 50 percent. None of the countries had a mass-media campaign in 2009 or 2010, following the WHO Global Status Report. Nicaragua, Honduras, and Panama adopted strict bans on tobacco advertising, but as of December 2008, the bans were only implemented in Panama.<sup>54</sup>

**Table 14. National Retail Prices of a Pack of 20 Cigarettes—2008 and 2010**

Country	Price of a 20-cigarette pack of the most sold brand (2008)		Taxes as % of price of most sold brand	Price of a 20-cigarette pack of the most sold brand (2010)		Taxes as % of price of most sold brand			
	International dollars at purchasing power parity	In US\$ at official exchange rates	Total tax	International dollars at purchasing power parity	In US\$ at official exchange rates	Specific excise	Ad valorem excise	Import duties	Total tax
Costa Rica	2.33	1.35	56	2.22	1.55	0	44	0	56
El Salvador	2.79	1.40	41	3.51	1.75	26	18	0	55
Guatemala	2.26	1.29	57	2.88	1.70	0	46	0	57
Honduras	2.23	0.95	45	3.11	1.43	26	0	0	39
Nicaragua	2.90	1.06	20	3.55	1.30	16	0	0	29
Panama	3.32	1.96	32	5.23	3.25	0	42	0	47
Uruguay	2.92	1.85	66	4.09	3.32	54	0	0	72
Venezuela (Rep. Bolivariana)	4.55	3.96	71	5.64	6.17	0	68	0	71

Source: WHO 2011e (appendix 4).

59. **Most of the countries increased tobacco taxes in the last few years, but they can be raised substantially higher.** At present, in all the countries except Nicaragua, taxes represent about half the purchase price of a pack of 20 cigarettes (Table 14). However, the price of a pack of the most sold brand is only somewhat more than US\$2 (at official exchange rates) in Panama. In contrast, the price of the most sold brand in Venezuela is over US\$6, of which 71 percent is

53. WHO 2011d.

54. Ibid.

tax. In addition, WHO recommends that taxes be 75 percent of the retail price,<sup>55</sup> and as the table illustrates, none of the Central American countries reach this level.

## **WORLD BANK SUPPORT TO PROMOTE HEALTHY LIVING**

**60. World Bank support to Central America through knowledge, convening, and financial services focuses on extending the package of health and nutrition services to underserved populations.** Some already include interventions considered best buys<sup>56</sup> to prevent and control NCDs at the clinical level, such as screening for cervical cancer and multidrug therapy for hypertension.

**61. In most cases, this financial support has been coupled with funds to strengthen information systems.** Such support has included the development of individualized electronic management information systems; these are important tools for the health sector to provide continuous and coordinated care with populations at high risk of developing NCDs or to those who already have these conditions.

**62. However, this support has not yet included funds to improve surveillance, although the Bank has provided it in other LCR countries.** The Bank has supported the development of health surveillance systems in Argentina, Brazil, and Uruguay.

**63. The World Bank, given its structure and its support to different sectors in the region, could provide technical and financial support to develop and implement policies and programs aimed at decreasing exposure to risk factors.** In all six countries, the Bank maintains regular contact with the ministries of economy and finance, education, agriculture, commerce, and urban planning. Such dialogue gives the Bank some leverage to support the countries' efforts to develop policies and programs to prevent risk factors that are outside the direct responsibility of the health ministries, such as taxing tobacco and alcohol products, and launching policies to create school and workplace environments that will promote physical activity and healthy diets and lifestyles.

**64. Finally, the Bank has supported regional efforts and could also help promote a regional strategy to prevent NCD risk factors.** Some activities would need a regional strategy to increase their effectiveness; for example, different prices and tax rates for tobacco and alcohol in neighboring countries could create conditions for smuggling these products into those countries where the costs and rates were lower. The Bank has previously offered support for regional strategies and could do this to prevent NCDs.

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55. Ibid.

56. WHO 2001a

## REFERENCES

- Bittman, Mark. “Bad Food? Tax It and Subsidize Vegetables.” *New York Times Op-ed Sunday Review*, July 24, 2011.
- Bongaarts, J. and R. A. Bulato. 1999. “Population Momentum.” In Cotlear, D., ed. Paolo de Sa and Daniel Cotlear.
- Cervero, Robert, O. Sarmiento, E. Jacoby, L. Gomez, and A. Neiman. 2009. “Influences of the Built Environments on Walking and Cycling: Lessons from Bogotá.” *International Journal on Sustainable Transportation* 3: 203–26.
- Cotlear, Daniel, ed. 2011. *Population Aging: Is Latin America Ready?* Directions in Development Series, Washington, DC: World Bank.
- Fletcher, J., D. Frisvold, and N. Tefft. 2010. “The Effect of Soft Drink Taxes on Child and Adolescent Consumption and Weight Outcomes.” *Journal of Public Economics* 94: 967–74.
- Garret, J., and M. Ruel. 2003. “Stunted Child-Overweight Mother Pairs: An Emerging Policy Concern.” Food Consumption and Nutrition Division Discussion Paper 148, International Food Policy Research Institute. Washington, DC.
- Guatemala, Ministry of Health. 2010. V. Encuesta Nacional de Salud Materno Infantil (National Survey of Maternal and Child Health) 2008–09. Guatemala City.
- Hastings, Gerald, and Georgina Cairns. 2010. “Food and Beverage Marketing to Children.” In *Preventing Childhood Obesity: Evidence Policy and Practice*, ed. Elizabeth Waters, B. Swinburn, J. Seidell, and R. Uauy. Blackwell Publishing Ltd, Chichester, West Sussex.
- Kain, Juliana, Y. Gao, C. Doak, and S. Murphy. 2010. “Obesity Prevention in Primary School Settings: Evidence from Intervention Studies.” In *Preventing Childhood Obesity: Evidence Policy and Practice*, ed. Elizabeth Waters, B. Swinburn, J. Seidell, and R. Uauy. Blackwell Publishing Ltd.
- Kearney, John. 2010. “Food Consumption Trends and Drivers.” *Phil. Trans. R. Soc. B* 365: 2793–807.
- Matsudo, S. M., V. Matsudo, T. L. Araujo, D. R. Andrade, E. L. Andrade, and L. C. de Oliveira. 2003. “The Agita Sao Paulo Program as a Model for Using Physical Activity to Promote Health.” *Revista Panamericana de la Salud Pública* 14 (4): 265–72.
- Meiro-Lorenzo, Montserrat, T. Villafana, and M. Harrit. 2011. “Effective Responses to Non-Communicable Diseases: Embracing Action Beyond the Health Sector.” HNP Discussion Paper, World Bank, Washington, DC.

PAHO (Pan American Health Organization). 2001. *Epidemiological Bulletin* 22 (2).

The Robert Wood Johnson Foundation. 2009. "Sugar Sweetened Beverage Taxes and Public Health." *Healthy Eating Research and Bridging the Gap*. University of Minnesota, School of Public Health. Minneapolis.

Sassi, F., and J. Hurst. 2008. "The Prevention of Lifestyle-related Chronic Diseases: An Economic Framework." Organisation for Economic Co-operation and Development Health Working Paper 32, Paris.

Sturm, Roland, Lisa M. Powell, Jamie F. Chriqui, and Frank J. Chaloupka. 2010. "Soda Taxes, Soft Drink Consumption and Children's Body Mass Index." *Health Affairs* 29 (5): 1050–58.

Thow, A. M., and C. Hawkes. 2009. "The Implication of Trade Liberalization for Diets and Health: A Case Study from Central America." *Globalization and Health* 5 (5).

UNODC (United Nations Office on Drugs and Crime). 2011. *2011 Global Study on Homicide*. Vienna.

WHO (World Health Organization). 2011a. *Global Health Status Report on Noncommunicable Diseases*. Geneva.

———. 2004. *Global Strategy on Diets, Physical Activity and Health*. Geneva.

———. 2005. *Preventing Chronic Diseases A Vital Investment*. Geneva.

———. 2008. *Global Burden of Disease 2004—Risk Factor Estimates for 2004*. Geneva.

———. 2008 and 2011. *Global Burden of Disease Study 2004 and 2008*. Geneva.

———. 2009. *WHO Report on the Global Tobacco Epidemic 2009*. Geneva.

———. 2010. *Gender, Women and the Tobacco Epidemic*. Geneva.

———. 2011b. *Global Burden of Disease 2008*. Geneva.

———. 2011c. *Global Health Observatory Data Repository—Burden of Disease*. Geneva.

———. 2011d. *Global Status Report on Alcohol and Health*.

———. 2011e. *Global Status Report on the Tobacco Epidemic 2011*. Geneva.

WHO/FAO (World Health Organization/Food and Agriculture Organization). 2003. *Diet, Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation*. WHO Technical Report Series. Geneva.

World Bank. 2006. *“Repositioning Nutrition as Central to Development: A Strategy for Large scale Action.”* Washington, DC.

Yancey, A., N. Pronk, and B. Cole. 2007. “Workplace Approaches to Obesity Prevention.” In *Handbook of Obesity Prevention: A Resource for Health Professionals*, ed. S. Kumanyinka and R. Brownson.



## ANNEX 1: DIETARY ANALYSIS METHODOLOGY

1. The dietary analysis presented in this paper uses the Living Standard Measurement Surveys (LSMS), the Income and Expenditures Surveys, and the nutritional database of the U.S. Department of Agriculture. The Living Standards surveys and the Income and Expenditure Surveys provide information on seemingly food consumption at household level; they provide information on quantity and cost of different food items consumed. Whereas, the nutritional database of the USDA provides the food composition at product level.

2. There are three types of data that are commonly used to evaluate food availability and consumption patterns in the world.<sup>57</sup> The first type is data on food supply and utilization which form the basis of food balance sheets. These data allow an assessment of food availability at an aggregate level, not of food actually consumed. In addition, these data would not allow any examination of the patterns of consumption or food availability across different socioeconomic groups. The second type is data from household income and expenditure surveys which is the type used in this study. Although these data can only give us information at a household level, it allows evaluations of socioeconomic variations across population groups. Finally, the third are data from individual food consumption surveys. This is the most reliable source of data for this type of analysis; however, individual nutrition surveys are expensive and time consuming and thus not many countries have them. None of the Central American countries included in this study have nationally representative individual nutrition surveys. Table 15 presents results using the three types of data for the early 1990s for Canada and a few European countries. As seen in the table, results using household budget surveys, although higher, are similar to those using individual surveys.

**Table 15: Mean intake of energy and macronutrients from food balance sheets (FBS), household budget surveys (HBS), and individual surveys (IDS) – 1990-1992**

	Canada			Poland			Spain		
	FBS	HBS	IDS	FBS	HBS	IDS	FBS	HBS	IDS
Energy (kcal)	3017	2115	2057	3348	2629	2093	3688	2634	2022
Protein (g)	94.8	81.3	87.2	102.5	71.6	68.2	105.0	93.5	90.7
Carbohydrates (g)	331.0	269.4	239.7	442.0	344.0	264.9	364.3	294.0	201.7
Fat (g)	128.4	84.6	80.4	114.7	106.9	83.3	181.2	121.0	84.1

L. Serra-Majem et al (2003).

<sup>57</sup> L. Serra-Majem, D. MacLean, L Ribas, D Brulé, W Sekula, R Prattala, R. Garcia-Closas, A Yngve, M Lalonde, A Petrasovits. "Comparative analysis of nutrition data from national, household, and individual levels: results from a WHO-CINDI collaborative project in Canada, Finland, Poland and Spain. *Journal of Epidemiological Community Health*. 2003; 57: 74-80.

3. For this paper we analyze two years of detailed nutrition information from Guatemala and Panama, and three years from Nicaragua. In most countries the years analyzed are close to each other; most of the information comes from the first half of the 2000s. In the case of Nicaragua, although data from the first two years come from comparable surveys, the sample frame slightly changed between the two surveys<sup>58</sup>, and thus the results are not fully comparable. In addition, the 2009 data might reflect the effects of the economic and financial crisis and thus its results will also need to be assessed with caution. Finally, in the case of Panama, the years are 2003 and 2008 when the food crisis started and thus comparisons across those two years might be problematic. Only in the case of Guatemala, the data in the two years are fully comparable.

**Table 16: Countries and Surveys**

	<b>Baseline</b>	<b>Follow up</b>
Costa Rica	Income and Expenditures, 2004	n/a
Guatemala	Living Standards, 2000	Living Standards, 2005/6, 2011
Honduras	Living Standards, 2004	n/a
Nicaragua	Living Standards, 2001	Living Standards, 2005, 2009
Panama	Living Standards, 2003	Living Standards, 2008

4. To estimate the nutritional profile of households in Central America we identify and input the USDA codification of the nutritional database to the food items listed in the Living Standard and Income and Expenditure Surveys. We first identify and match food items in the surveys with the USDA nutritional database. Most fruits, vegetables, beverages, and meats were matched at this stage. Products that were not matched were mainly local and traditional meals, some fruits or vegetables without translation and unusual foods. We then try to identify meals in the surveys with equivalent items in the USDA database. The list of Latino foods in the USDA database helped in matching several items in the surveys.<sup>59</sup>

5. Once this matching was complete we converted the different foods into their nutrition equivalent. First, the amount of food was converted into grams using as reference the typical presentation of the product. Once weight of products was obtained, nutritional consumption was

<sup>58</sup> The 2005 survey includes a larger sample. This survey included larger samples in areas already surveyed in 2001 and also sampled new populated areas that did not exist in the previous census (1995). The expansion of the sample was not neutral. The biggest expansion was carried out in those departments where poverty incidence was the highest, probably areas with difficult access, or sparsely distributed.

<sup>59</sup> For example, the USDA database includes several types of tamales and bean soups, specific items like arepas, pupusas, empanadas, and typical Latino meals. Finally, meals without equivalences were broken down into their components and matched by the main ingredient. For example, “prepared turkey” (pavo preparado) was coded as the item “turkey, all classes, meat & skin, cooked, roasted” in the USDA database.

assessed in terms of energy, carbohydrates, fats, and sodium. Energy is measured in calories and, carbohydrates, fats and sodium in grams. Finally, we also classified the food consumed based on the food groups used in “My plate” which is part of the communication strategy of the “Dietary Guidelines for Americans, 2010”<sup>60</sup>. These groups are: grains, proteins, vegetables, fruits, dairy products, and oils. To these groups we added the “added sugar category” which includes sweetened beverages, candies and other desserts.

6. Thus, the nutrient equivalent (Ni) of the food item (i) could be given by the expression.

$$N_i = \frac{Q_i}{15} * \frac{p_i}{100} * \frac{f(N)_i^k}{100}$$

Where

$Q_i$  = Quantity of food item (i) bought or acquired by the household in last 15 days in grams.

$p_i$  = Percentage of edible portion, assumed to be 100

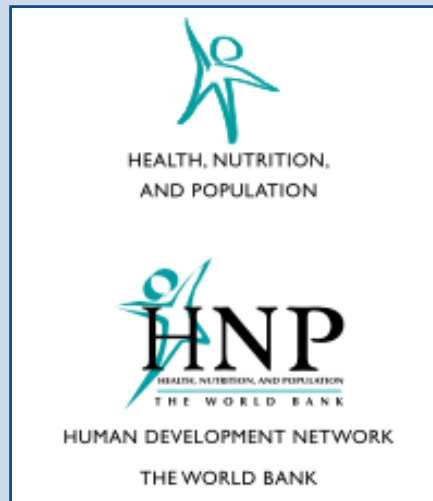
$f(N)_i^k$  = Conversion factor for the relevant nutrient or proximate (k) from nutritional database per 100 grams. (k) may be calories, carbohydrates, fat or sodium.

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<sup>60</sup> US Department of Agriculture and US Department of Health and Human Services. 2010.







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