


3-10

The Nutrition Transition in Chile

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Executive Summary

The nutrition transition in Chile has occurred very rapidly. In particular, obesity rates in all age groups have increased instead of decreasing, despite the goals established by the Ministry of Health (MOH) for the period 2000–2010.

Data on the nutritional status of the Chilean population from different sources, such as the National Board for Day Care Centers (JUNJI), the National Board for School Assistance and Scholarships (JUNAEB), and the MOH, show that obesity increased significantly during the 1980s and presently constitutes the main nutritional problem of the population. In preschool children who attend day care centers belonging to JUNJI, the prevalence of obesity is 10.6 percent; this figure varies according to age: in 2- to 3-year-olds it is 6 percent; in 3- to 4-year-olds, 11 percent; and in 4- to 5-year-olds, 14 percent. Among first-grade schoolchildren, for which JUNAEB has collected yearly data since 1987, obesity prevalence is currently 18.5 percent. In pregnant women obesity has also increased markedly, from 12 percent in 1987 to 32.6 percent in 2004. For adults, the 2003 National Health Survey of the MOH showed that there is a 22 percent prevalence of obesity (body mass index [BMI] > 30) and a 1.3 percent prevalence of morbid obesity (BMI > 40). Obesity varies according to gender and educational level; it is higher among women (25 percent compared with 19 percent in men) and among adults from low socioeconomic levels.

In the year 2000 the MOH established sanitary goals for the decade 2000–2010, aiming to reduce obesity prevalence in preschool children attending JUNJI centers from 10 to 7 percent and in first-grade schoolchildren from 16 to 12 percent. For pregnant women, the goal was to reduce the prevalence from 32 to 28 percent.

Epidemiological and nutrition changes in Chile were so rapid that maternal and child policies were not changed successfully to address these changes until 1998, when the National Board for Health Promotion was created. This commission introduced a strong health promotion policy to cope with the increasing obesity in the country. Nonetheless, although the policy was well designed—it followed

a decentralized model for regions and counties, it focused on the main risk factors for chronic diseases, it had well-trained human resources, and it changed food programs to cope with obesity instead of undernutrition—obesity has continued increasing. The main reason for this failure appears to be a lack of political commitment to making obesity prevention a high priority for funding and regulation.

A clear, high-priority strategy to prevent obesity is necessary at the national level. It will require the participation of schools and preschools at the county level. It will also require involvement by both the government and the private sector. The government must enact laws and regulations against the marketing of unhealthy food practices by the food industry and promote physical activity at all levels of society. The private sector will need to compromise on issues related to agricultural production that affect cost of high-calorie foods. Without such a strategy, Chile will not accomplish its goals for the year 2010.

Your assignment is to recommend a set of policies the Chilean government should pursue to slow down and even eliminate the increase in overweight and obesity in Chile's population, particularly among children. Justify the policy measures along the food chain, from food production to the effects on public health and nutrition, and assess their likely positive and negative consequences for public health, agriculture, nutrition, and economic development.

Background

The nutritional status of the Chilean population changed rapidly from a high prevalence of undernutrition in the 1970s to its almost total eradication at the end of the 1980s. Undernutrition measured by the Monthly Consolidated Registry of the MOH, which includes 1.2 million preschool children attending the national health care centers, decreased from 15.5 percent to 5 percent between 1975 and 1993. Low birth weight (<2,500 grams) declined from 11 percent to 5 percent in the same period. In pregnant women and children, a decrease in the proportion of wasting along with a

significant increase in the prevalence of overweight and obesity has been observed (Vio and Albala 1998). According to the theory of the nutrition transition, these shifts are due to modifications in the diet, which in turn have been associated with demographic, economic, social, and epidemiological changes (Popkin 1994). During the 1990s Chile increased its per capita income twofold in real terms, from US\$2,600 in 1987 to US\$5,000 in 1997. A significant share of this increase was spent on processed foods rich in fat, sugar, and salt; TV sets; appliances; and cars (Albala et al. 2002). This lifestyle shift has led to an increase in energy intake as well as a decrease in physical activity, with consequences for obesity rates. During the 1970s undernutrition was a major problem in Chile, decreasing progressively until the 1980s, when an economic setback again increased the nutritional deficit (Vio et al. 1992). At the same time, however, the prevalence of obesity in adults, particularly in low-income women, was high (Albala et al. 1986). This coexistence of obesity and undernutrition has been one of the underlying factors in transitional periods and occurred in Chile during the 1980s (Albala et al. 2001). In the following years, this situation shifted rapidly to increasing obesity rates, with Chileans eating diets high in refined sugar, salt, processed foods, and fat derived from animal products (more than 65 kilograms per person per year in 2000 and after) and very low in fiber (FAO 2007). This diet sets Chile in a classical post-nutritional transition stage. This paper analyzes the trends for obesity in children, pregnant women, and adults in the past 20 years in relation to the nutrition transition and food and nutrition policy in Chile.

Data Collection

The trends in the prevalence of obesity presented here are based on secondary analyses of individual data sets from population-based studies and aggregate data sets collected routinely by Chilean national public institutions. The 2003 National Health Survey from the MOH is a cross-sectional study aimed at estimating the prevalence of chronic diseases and nutrition-related risk factors for these diseases among people 18 years and older (Ministry of Health and National Institute of Statistics 2004). Data were collected between May and December 2003 from a nationally representative sample of 3,428 subjects (1,559 men and 1,869 women).

Aggregate data sets emanate from the MOH, JUNJI, and JUNAEB. The MOH collects aggregate data for the entire population attending the national network of health services, which includes approximately 70 percent of the national population zero to six years old. JUNJI collects data from approximately 70,000 children of low and middle-low social economic status attending day care centers, and JUNAEB collects data on approximately 220,000 children entering first grade (around 70 percent of the national population in that grade). The nutritional status of preschool children and schoolchildren entering first grade was analyzed using the weight/height indicator and a cut-off point of > 2 standard deviations to define obesity using the National Center for Health Statistics reference (WHO 1983). For pregnant women, aggregate data were collected from the MOH for all Chilean pregnant women attending the National Primary Health Care Centers for routine pregnancy health control. Nutritional status was determined using the MOH reference (Rosso 1985), which is based on weight-for-height by age. The nutritional status of adults ≥ 18 years and the elderly was determined using the WHO criteria (WHO 2000) for BMI categories (overweight BMI is 25–29.9; obese BMI, 30–39.9; and morbidly obese BMI, > 40).

Prevalence of Childhood Obesity

It is well known that obesity is the result of interactions between genetic and environmental factors. Among genetic factors, there exists a hereditary predisposition to develop this disease. Several studies in twins who are genetically identical have shown that even when they live separately from each other, their BMI and percentage of body fat run parallel (Lobstein et al. 2004). When both parents are obese, children have an 80 percent likelihood of being obese, which decreases to a 40 percent likelihood when only one parent is obese. Interactions between inherited and environmental factors have led to increased obesity. Given that the Chilean population has experienced no relevant shifts in its genetic constitution in the past decades, lifestyle factors, particularly an increase in energy consumption and sedentary behavior, have clearly been responsible for this phenomenon.

Available epidemiological anthropometric data on obesity prevalence in children clearly demonstrate a remarkable increase in its prevalence in the past

two decades. Figure 1 shows the evolution in the prevalence of overweight and obesity in children attending JUNJI centers between 1995 and 2005; overweight remained stable at about 22 percent throughout the years, whereas the proportion of obesity rose from 8.6 percent to 10.6 percent between 1995 and 2000, fluctuating between 10.1 percent and 10.6 percent in recent years. Comparing the percentage of obesity using the test of proportions relative to the 1995 value shows that there was a significant rise in the years 1997 and 2000 compared with the rate in 1995 ($p < 0.05$).

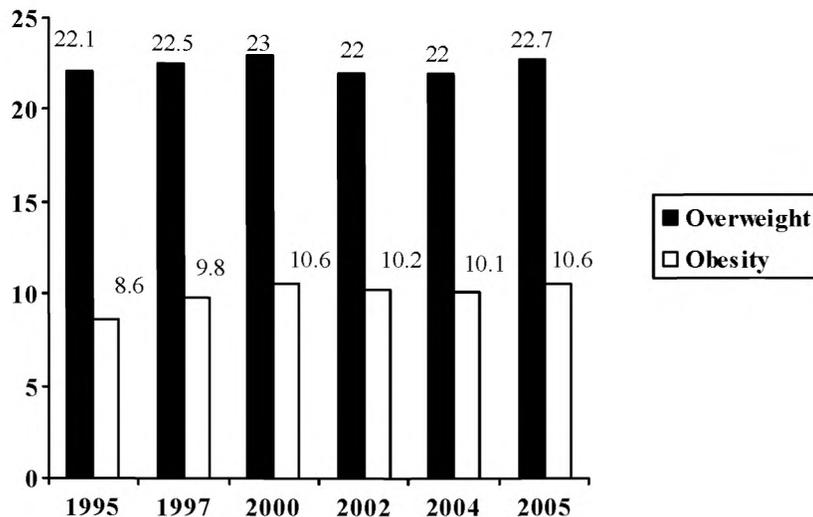
Figure 2 shows how the prevalence has varied according to age during recent years. Two-year-old children have the lowest obesity prevalence: approximately 6 percent. In three-year-olds it increases almost twofold and continues to increase in the four-year-old group with a prevalence of 14 percent. These data confirm the data in Figure 1 showing that the percentage of obesity has remained relatively stable since 2000; a slight increase was observed, however, in the two youngest age groups in 2005. We tested for

differences in obesity prevalence within the same year according to age using the test of proportions. The results showed that statistical differences exist between the obesity prevalence of two- and three-year-olds and also between three- and four-year-olds in each of the years ($p < 0.01$ and $p < 0.05$ respectively).

Each year since 1987 JUNAEB has collected weight and height data for approximately 70 percent of the schoolchildren entering first grade in the country; this represents approximately 220,000 children. This database has been essential to knowing the nutritional status of this age group for the past 15 years.

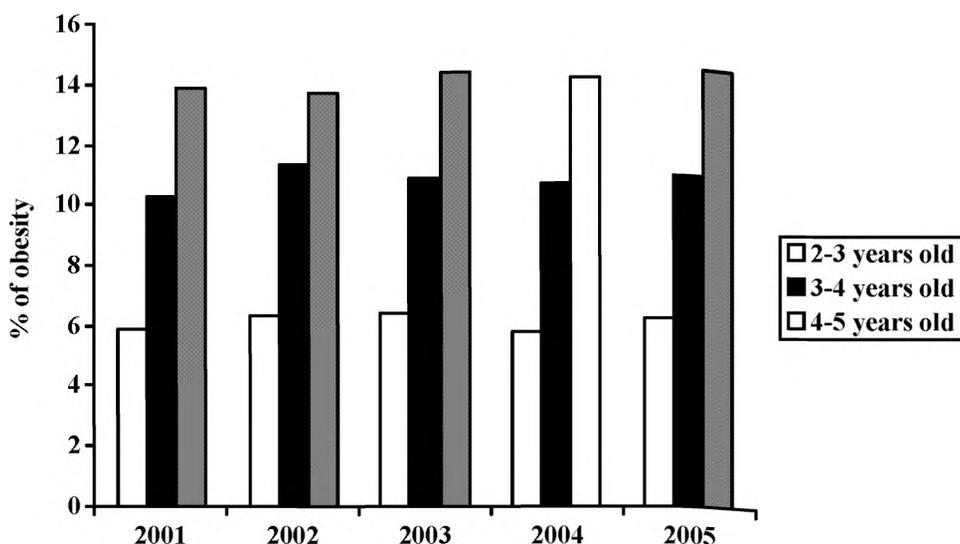
Figure 3 shows the prevalence of obesity in schoolchildren in first grade between 1987 and 2005. A marked rise in obesity occurred between 1987 and 1997, during which time the proportion of obesity doubled. After 1997 obesity rose slowly until 2001–2002 and remained stable thereafter, with small increases observed in 2004 and 2005 (17.3 percent and 18.5 percent respectively).

Figure 1: Prevalence of Overweight and Obesity (%) in Preschool Children (2–5 years old), 1995–2005



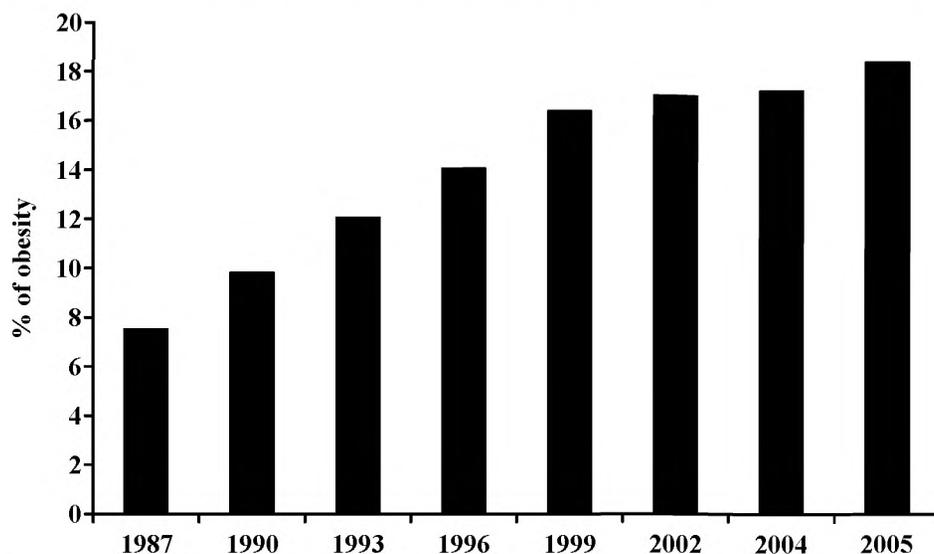
Source: JUNJI.

Figure 2: Evolution of Obesity Prevalence (%) According to Age in Preschool Children (2–5 years old), 2001–2005



Source: JUNJI.

Figure 3: Prevalence of Obesity in Schoolchildren Attending First Grade, 1987–2005



Source: JUNAEB.

Obesity Prevalence in Pregnant Women

In relation to pregnant women, the MOH issued a statistical series in 1987 when the reference that considers weight and height was first adopted

(Rosso 1985). Women attending prenatal controls in health care centers were classified into four groups: low weight, normal, overweight, and obese. In this epidemiological series, a significant decrease in low-

weight pregnant women was observed, as was an important increase in obesity from 12 percent in 1987 to 34 percent in 2002, with a slight decrease to 32.6 percent in 2004.

Obesity Prevalence in Adults

For adults, no follow-up system to assess nutritional status is available, as is the case for children or pregnant women. There are only cross-sectional studies that include representative samples from Santiago in 1987 and 1992 (Berríos 1994, 1997; Berríos et al. 1990). In these samples obesity prevalence in men increased from 6 percent in 1987 to 11 percent in 1992 and in women from 16 percent in 1987 to 24 percent in 1992. A study carried out in Valparaiso in 1997 found a prevalence of 14 percent for men and 23 percent for women respectively (Jadue et al. 1999). Only since the release of the 2003 National Health Survey (Ministry of Health and National Institute of Statistics 2004) are representative data available for the country by region and by urban-rural categories, showing a prevalence of 38 percent for overweight, 23.2 percent for obesity, and 1.3 percent for morbid obesity. The highest prevalence of obesity and morbid obesity is observed in women from 45 to 64 years, as depicted in Table 1. Obesity prevalence varies according to socioeconomic level, measured in this case by education as a proxy indicator, showing that subjects with a low educational level

have a prevalence twice as great as those with a high educational level.

Policy Issues

Obesity and hyperlipidemias are important risk factors for most chronic diseases and have large adverse impacts on individuals, families, communities, and the country as a whole. At the individual level the negative impacts of obesity range from nonfatal complaints related to quality of life to diseases that lead to an increased risk of premature death. These impacts include psychological problems ranging from lowered self-esteem to clinical depression, discrimination in health care and employment with economic consequences, respiratory difficulties, musculo-skeletal problems, skin problems, infertility, type 2 diabetes, gallbladder disease and cancer, cardiovascular problems (hypertension, stroke, and coronary heart diseases), and cancers that are hormone related and associated with the large bowel. Hypertension, diabetes, and raised serum cholesterol are between two and six times more prevalent among obese women. Severe obesity is associated with a 12-fold increase in mortality in 25- to 35-year-olds compared with lean individuals. Rates of anxiety and depression are three to four times higher among obese individuals.

Table 1: Prevalence of Overweight, Obesity, and Morbid Obesity in Adults by Sex

Age category	Overweight (BMI 25–29.9 kg/m ²)		Obesity (BMI 30–39.9 kg/m ²)		Morbid obesity (BMI ≥ 40 kg/m ²)	
	Men % (95% CI)	Women % (95% CI)	Men % (95% CI)	Women % (95% CI)	Men % (95% CI)	Women % (95% CI)
17–24	14.0 (8.3–19.7)	19.6 (12.4–26.8)	10.0 (3.5–16.4)	7.1 (2.3–11.9)	0.3 (0–0.8)	1.1 (0–2.3)
25–44	50.0 (44.0–56.1)	34.9 (29.4–40.4)	18.0 (13.6–22.4)	23.4 (18.6–28.3)	0.1 (0–0.3)	2.7 (0.8–5.0)
45–64	52.0 (45.4–58.7)	35.2 (29.1–41.2)	24.4 (19.3–29.6)	36.3 (30.4–42.2)	0.4 (0–0.9)	3.0 (1.8–4.2)
≥ 65	46.5 (38.3–54.7)	39.2 (32.3–46.0)	27.8 (21.2–34.4)	29.8 (23.7–36.0)	0.1 (0–0.4)	1.2 (0.1–2.3)
Total	43.2 (39.3–47.0)	32.7 (29.3–36.1)	19 (16–22)	25 (22–28)	0.2 (0.1–0.4)	2.3 (1.4–3.3)

Source: Ministry of Health and National Institute of Statistics 2004.

Note: 95% CI indicates 95 percent confidence interval.

At the level of families, communities, and the country, obesity has a high cost. Recent estimates suggest that about 2–8 percent of total health care costs in developed countries are attributable to obesity. For the United States, the cost of obesity in 1998 was estimated at US\$78.5 billion (Finkelstein et al. 2003), including costs of diagnosis, treatment, and management of obesity and not including indirect costs arising from loss of productivity. If the current lifestyle trend in young and adult populations around the world persists, the World Health Organization (WHO) projected that the toll of obesity and chronic diseases will increase over the next 10 years by a further 17 percent (WHO 2005b). As a result, health care costs in the United States may amount to 17.7 percent of gross domestic product (GDP) by 2012.

As a consequence of the epidemiological and nutrition transition in Chile, the MOH changed its traditional maternal and child policies in 1998, giving high priority to chronic diseases and obesity as major problems. The National Board for Health Promotion (VIDA CHILE) was created with 28 governmental organizations and adopted a decentralized model to reach 12 regions and 341 counties. Specific strategies were adopted to cope with obesity at preschool facilities through JUNJI, schools through JUNAEB and the Ministry of Education, public and private workplaces, and municipalities. One of the main accomplishments was the calorie reduction in the school and preschool food program, which covers 1.5 million children per day. With this change in focus from prevention of undernutrition to prevention of obesity, the school food program emphasized including more healthy and less caloric foods in the diet, such as fruits and vegetables 10 times a week, fish and pulses twice a week, and skim milk every day, as well as decreasing saturated fats, sugar, and salt.

On November 21, 2000, VIDA CHILE presented a set of goals for combating obesity over six years to the president of the republic (VIDA CHILE 2000). These goals sought to reduce obesity prevalence in preschool children aged two to five years attending day care centers from 10 percent to 7 percent; in school-age children in first grade from 16 percent to 12 percent; and in pregnant women from 32 percent to 28 percent by 2006. Thereafter, during the discussion of the National Health Reform, these

goals for obesity were established as sanitary goals for the period 2000–2010 (Ministry of Health 2002).

Five years later, at the end of 2005, obesity rates had not changed. In preschool children this figure remained stable at about 10.6 percent; in schoolchildren in first grade, it increased to 18.5 percent; and in pregnant women, the figure in 2004 was 32.6 percent. The trend in childhood obesity is similar to that in the United Kingdom, where the government set a goal of stabilizing childhood obesity prevalence at 10 percent, but instead saw it increase from 9.9 percent in 1995 to 13.7 percent in 2003 (Cole 2006). Since the late 1970s, obesity rates in United States have more than doubled in children 6 to 11 years of age and more than tripled among those 12 to 19 years of age (Nestle 2006). As a consequence, type 2 diabetes mellitus is no longer rare in pediatric practice (Koplan et al. 2005).

What has happened in the past five years in Chile? VIDA CHILE has continued to take action and set clear regulations at the central level in order to tackle obesity throughout the life cycle (Salinas and Vio 2002). Educational materials on food and nutrition have been developed for primary school programs (Olivares et al. 2004); they have not, however, been implemented by the Ministry of Education. Guidelines for active living have been developed with clear messages promoting physical activity for all population groups (Vio and Salinas 2003; Salinas and Vio 2003), but they have had little dissemination and application. Food education for the population has continued through the delivery of booklets given to customers at supermarkets (Domper et al. 2005). Food and dietary guidelines issued in 1997 (Castillo et al. 1997) have been reviewed and now include messages on physical activity and tobacco as part of guidelines for healthy living (INTA, University of Chile, and Ministry of Health 2005). In addition, the MOH recently developed the Global Strategy against Obesity (EGO-Chile) (Ministry of Health 2005a), following a similar strategy recommended by WHO and PAHO (WHO 2000, 2005a). Developed with the participation of the Ministry of Education, JUNAEB, JUNJI, and the Institute of Nutrition and Food Technology (INTA), the MOH strategy is

used as a baseline for childhood obesity prevention policy (Ministry of Health 2005b).

Nevertheless, these efforts have been insufficient for decreasing obesity prevalence in the country. In general, the population knows both what healthy eating means (as shown in different national surveys) and the benefits of engaging in physical activity, but many people persist in eating foods that are high in sugar, fat, and salt and in leading inactive lives.

Stakeholders

To solve the obesity problem, a multisectoral, multidisciplinary approach is required, involving various stakeholders, including individuals, the public and private sectors, and nongovernmental organizations (NGOs). The relevant sectors include health, agriculture, food industry, commerce (in particular food retailers and supermarkets), food marketing and publicity, sports and physical activity institutions, education, labor, and transportation, as well as local governments. Scientific institutions and international agencies also have an important role.

The main stakeholder groups are

- preschool and school-age children attending day care centers and schools;
- parents of preschool and school-age children;
- obese mothers;
- government institutions (Ministry of Health, Ministry of Education, Ministry of Agriculture, Ministry of Planning, JUNJI, and JUNAEB);
- Congress;
- NGOs;
- organizations of producers, retailers and supermarkets, and consumers;
- food industry (all industries related to food production, food processing, food marketing, and food retailing);
- scientific institutions (such as the Chilean Nutrition Society, the Clinical Nutrition Society, the Obesity Society, the Chilean Medical College; and
- international agencies (International Union for Nutrition Sciences—IUNS, WHO, the

Food and Agriculture Organization of the United Nations [FAO], the United Nations Children's Fund [UNICEF]).

Policy Options

There are several policy options for effective interventions to decrease obesity rates in schoolchildren. One example is an intervention related to nutrition education and physical activity in public schools, such as the pilot study in the small city of Casablanca. This program set up educational activities on food and nutrition, with materials developed by INTA and FAO (Olivares et al. 2004), and increased physical education time, as well as improving the quality of these classes with very limited additional resources. With this intervention, obesity decreased 50 percent at the end of the second year, and this reduced prevalence was maintained thereafter (Kain et al. 2005). One option, therefore, is to generalize this model to the 11,000 schools in the country, increasing physical education classes from two to four hours per week and introducing food and nutrition education into the curriculum. This policy was stated in a report of the task force from the Ministries of Health and Education called "A Proposal for an Integrated Approach to Tackle Infant Obesity" (Ministry of Health 2005b), but it has not been implemented. Moreover, accessible places to engage in physical activity and recreation in the cities are needed, given that Chile is an urban country.

Another possibility is to work with the Ministry of Agriculture to promote agricultural policies that affect the cost of high-calorie foods and the production and consumption of healthy foods. Paradoxically, Chile's food production is focused on exports, and its main food exports, such as fruits, vegetables, and salmon, are highly nutritious, but internal consumption of fiber and fish is extremely low. Chileans consume less than 170 grams per person per day of fruits and vegetables (compared with the WHO recommendation of 400 grams per day) and less than 20 grams per person per day of fish.

Food labeling is recommended worldwide by the FAO and WHO and has been obligatory in Chile since November 6, 2006. A strong education campaign to teach consumers how to read labels to

enable them to choose healthy foods should be implemented (Zacarias and Vera 2006).

Politically, Congress could enact laws regulating the production, processing, and marketing of unhealthy food in the same way that many countries addressed tobacco following United Nations agreements against tobacco. Presently, there are strong WHO/FAO recommendations for the food industry (WHO 2003, 2004), which should be implemented as laws and regulations at the country level. In Chile a food regulation law is being discussed in Congress to cope with these aspects (Senado de Chile 2007).

Another option is to initiate a strong marketing campaign through the mass media, particularly TV (considering that the average amount of time spent watching TV is two to three hours per person per day), informing parents about the risks of childhood obesity, foods that are unhealthy, and the benefits of physical activity. An example of this type of marketing campaign is the “5 a day” campaign to increase consumption of fruits and vegetables in the U.S. population (National Cancer Institute and Produce for Better Health Foundation 1999; WHO 2004). This option is particularly important to counteract the high impact that food marketing companies have on children from age two years and beyond, according to a recent report of the Institute of Medicine in United States (McGinnis et al. 2006).

Assignment

Your assignment is to recommend a set of policies the Chilean government should pursue to slow down and even eliminate the increase in overweight and obesity in Chile’s population, particularly among children. Justify the policy measures along the food chain, from food production to the effects on public health and nutrition, and assess their likely positive and negative consequences for public health, agriculture, nutrition, and economic development.

Additional Readings

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