Obesity: the impacts on public health and society
THE VISION OF BARILLA CENTER FOR FOOD & NUTRITION

The Barilla Center for Food & Nutrition (BCFN) is a center of multidisciplinary analysis and proposals which aims to explore the major issues related to food and nutrition on a global scale. Created in 2009, BCFN intends to listen to the demands emerging from society today by gathering experience and qualified expertise on a worldwide level and promoting a continuous and open dialogue. The complexity of the phenomena under investigation has made it necessary to adopt a methodology that goes beyond the boundaries of different disciplines. These topics under study are broken down into four areas: Food for Sustainable Growth, Food for Health, Food for All and Food for Culture. The areas of analysis involve science, the environment, culture and the economy within these areas. BCFN explores topics of interest, suggesting proposals to meet the food challenges of the future.

THE BCFN CONTRIBUTION TO THE MAJOR ISSUES IN FOOD AND NUTRITION

The multidisciplinary analysis concerning the people, environment, economy and society has led to the definition of 4 specific lines of interconnected studies on the issues related to food and nutrition.

FOOD FOR ALL

In the area Food for All, the Barilla Center for Food & Nutrition addresses the issues of access to food and of malnutrition, with the aim of reflecting on how to promote better governance of the global food system in order to make a more equitable distribution of food possible and to encourage a better impact on social welfare, health and the environment.

FOOD FOR SUSTAINABLE GROWTH

With reference to the area Food for Sustainable Growth, the Barilla Center for Food & Nutrition aims to examine the issue of a better utilization of natural resources within the food chain. More specifically, the analyses performed have allowed us to point out the weaknesses, to assess the environmental impact of the production and consumption of food and to formulate (a set of) proposals and recommendations concerning personal and collective lifestyles that can have a positive effect on the environment and natural resources.

FOOD FOR HEALTH

In the Food for Health area, the Barilla Center for Food & Nutrition decided to start its research work by analyzing the relationship that exists between nutrition and health. It thoroughly analyzed the various recommendations made by the most authoritative scientific institutions in the world, in addition to the themes that emerged at different stages of discussion with the most qualified experts, thus providing civil society with a concise and effective overview of concrete proposals aimed at facilitating the adoption of a correct lifestyle and a healthy diet.

FOOD FOR CULTURE

In the Food for Culture area, the Barilla Center for Food & Nutrition described man's relationship with food. In particular, the BCFN wanted to retrieve the most important steps along the path that have accompanied the development of the man-food relationship, bringing (through moments of comparison) the fundamental role of the "Mediterranean menu" and its relevant dimensions to the center of attention.
THE CURRENT PARADOXES ON FOOD AND NUTRITION

AN IN-DEPTH ANALYSIS OF THE GLOBAL SCENARIOS OF OUR TIME AND THEIR CONSTANT AND VERY RAPID DEVELOPMENT
REVEALS A WORLD FILLED WITH STRIKING PARADOXES

**EXCESS OF FOOD OR ACCESS TO FOOD?**

In the world today there are more than 1 billion people suffering from hunger while there is an equal number who are suffering the consequences of over-nutrition, contracting serious metabolic diseases such as diabetes, for example. Yet, today the global food system is able to provide adequate nutrition for all the human beings on the planet. The causes of this situation are not easy to find and remove. This should act as a stimulus to identify and propose urgent and effective solutions.

- **OVEREATING:** 29 million
- **LACK OF FOOD:** 36 million
- **CHILDREN:** 155 million overweight or obese people
- **148 million** undernourished people
- **GLOBAL FOOD PRODUCTION USED THEIR NUTRITION**
- **ANNUAL GLOBAL WATER DEMAND FOR LIVESTOCK**

**FEED PEOPLE OR CARS?**

Another form of misuse of the resources of the Earth concerns the competition between biofuels and food. An increasing proportion of agricultural land is being used for the production of biofuel. In doing so, we are choosing to give water to our cars instead of food to human beings.

- **THE COMPETITION BETWEEN:** Cars (biofuels)
- **IS COMPETITION BETWEEN:** People

**DID YOU KNOW?**

The annual consumption of corn in the United States is 390,000 cubic meters.

- **55%** is used for food
- **45%** is used for the production of ethanol for fuel

**3 billion LIVESTOCK ANIMALS**

There are about three billion farm animals on the planet. A third of the global food production is destined for their nutrition, and these animals contribute significantly to climate change factors. In fact, it is estimated that they are responsible for at least 50% of the agricultural emissions.
# INDEX

<table>
<thead>
<tr>
<th>Executive summary</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The obesity epidemic: scenario and socio-economic impacts</td>
<td>17</td>
</tr>
<tr>
<td>1.1 The global scenario and its dimensions</td>
<td>18</td>
</tr>
<tr>
<td>1.1.1 United States</td>
<td>21</td>
</tr>
<tr>
<td>1.1.2 Europe</td>
<td>22</td>
</tr>
<tr>
<td>1.1.3 Others countries</td>
<td>24</td>
</tr>
<tr>
<td>1.1.4 Excess weight and obesity among children in different geographic areas</td>
<td>24</td>
</tr>
<tr>
<td>1.2 The impacts of obesity and being overweight on health and longevity</td>
<td>27</td>
</tr>
<tr>
<td>1.2.1 Obesity and life expectancy</td>
<td>27</td>
</tr>
<tr>
<td>1.2.2 Obesity and disability</td>
<td>28</td>
</tr>
<tr>
<td>1.3 The socio-economic costs of obesity</td>
<td>30</td>
</tr>
<tr>
<td>1.3.1 The different types of costs linked to obesity</td>
<td>30</td>
</tr>
<tr>
<td>1.3.2 The sum of indirect and direct costs in the United States, Europe, and in developing countries</td>
<td>31</td>
</tr>
<tr>
<td>1.4 The economic impact of obesity in the United States: an overall appraisal of costs</td>
<td>33</td>
</tr>
<tr>
<td>1.5 The economic impact of obesity in Italy: Impact on healthcare spending forecast for 2050</td>
<td>35</td>
</tr>
<tr>
<td>2. The social, environmental, and cultural dimensions of obesity</td>
<td>39</td>
</tr>
<tr>
<td>2.1 Obesity in different socio-economic groups</td>
<td>40</td>
</tr>
<tr>
<td>2.1.1 Obesity between men and women</td>
<td>40</td>
</tr>
<tr>
<td>2.1.2 Obesity in different age categories</td>
<td>40</td>
</tr>
<tr>
<td>2.1.3 Obesity and socio-economic conditions</td>
<td>41</td>
</tr>
<tr>
<td>2.1.4 Obesity and Education</td>
<td>44</td>
</tr>
<tr>
<td>2.1.5 Obesity in different ethnic groups</td>
<td>46</td>
</tr>
<tr>
<td>2.2 Childhood obesity</td>
<td>49</td>
</tr>
<tr>
<td>2.2.1 Causes of obesity in children and adolescents</td>
<td>49</td>
</tr>
<tr>
<td>2.2.2 The effects of obesity in children and adolescents</td>
<td>54</td>
</tr>
<tr>
<td>2.3 The costs of obesity in the working world</td>
<td>56</td>
</tr>
<tr>
<td>2.4 The impact of obesity on environmental sustainability</td>
<td>59</td>
</tr>
<tr>
<td>3. The fight against obesity: the role of governments and the private sector and the results of prevention policies</td>
<td>71</td>
</tr>
<tr>
<td>3.1 Public policies for dealing with the problem</td>
<td>72</td>
</tr>
<tr>
<td>3.1.1 The WHO guidelines</td>
<td>72</td>
</tr>
<tr>
<td>3.1.2 The role of the government in consumer choice</td>
<td>73</td>
</tr>
<tr>
<td>3.1.3 Conclusive considerations</td>
<td>75</td>
</tr>
<tr>
<td>3.2 The use of tax leverage for disincentivizing the consumption of certain foods</td>
<td>77</td>
</tr>
<tr>
<td>3.2.1 Introduction</td>
<td>77</td>
</tr>
<tr>
<td>3.2.2 Taxes on “junk food”</td>
<td>78</td>
</tr>
<tr>
<td>3.2.3 Pros and cons of taxation on junk food</td>
<td>79</td>
</tr>
<tr>
<td>3.3 The role of industry and market perspectives</td>
<td>82</td>
</tr>
<tr>
<td>3.4 Assessing possible interventions of prevention</td>
<td>88</td>
</tr>
<tr>
<td>3.4.1 The EPODE program</td>
<td>83</td>
</tr>
<tr>
<td>3.4.2 The Actionsanté program</td>
<td>85</td>
</tr>
<tr>
<td>4. The BCFN recommendations</td>
<td>93</td>
</tr>
<tr>
<td>Bibliographic notes and references</td>
<td>98</td>
</tr>
</tbody>
</table>
Dear Reader,

Obesity is on the rise worldwide and it raises concerns because of its negative effects on people’s health and on the sustainability of current and future healthcare systems. Not only are Western countries hit by this phenomenon, but many emerging countries are also being affected.

A few figures will suffice to understand the gravity of the situation: according to World Health Organization projections, in 2015 approximately 2.5 billion adults will be overweight, 700 million of whom will be obese. The spread of obesity in children is even more startling: worldwide, one school-age child in ten is obese or overweight, which is equal to 155 million children, 30-45 million of whom are classified as obese.

These people are living in an uncomfortable condition from the viewpoint of quality of life and the risk of chronic diseases, with a high probability of a reduction in life expectancy.

The importance and urgency of this topic has driven us to do an in-depth investigation of the phenomenon, in relation to the diet and lifestyles adopted, as well as the various factors that combined to create this current state of overweight and obesity in the world and its resulting consequences. We considered the importance of the environment we live in, the characteristics of the family and workplace, the responsibility of the schools, the policies of governments, and the role of the food industry and retail distribution.

This work contributes to the understanding of this complex phenomenon and indicates specific proposals for intervention. However, here I would like to emphasize a point that is general in nature: there are no easy and unequivocal solutions when dealing with topics of this scope and magnitude. To slow down and reverse the epidemic in progress, it is necessary to drastically increase every individual’s awareness of the impacts of obesity on individuals and groups, and enact multi-stakeholder, medium-long term plans involving institutions, food production chain entities, and individuals in joint actions aimed at significantly and permanently changing people’s choices and behavior.

The road will be long and challenging, but if everyone does their part, the outlook for a better, healthier life will be possible for all.

Enjoy the read!

Guido Barilla
Presidente BCFN
EXECUTIVE SUMMARY

T he World Health Organization (WHO) has recognized that obesity is a global epidemic. It has been demonstrated that overweight and obesity represent crucial risk factors for the onset of different chronic diseases which are responsible for 60% of deaths worldwide. This has led the European Association for the Study of Diabetes (EASD) to recognize the prevention and treatment of obesity as “the most important public health issue worldwide.”

Globally, about 1.5 billion adults are overweight and among them, 200 million men and about 300 million women are obese (WHO). These values have doubled compared to values in 1980 and projections estimate that by 2015, about 2.5 billion adults will be overweight and 700 million will be obese. This phenomenon has some significant impacts on society from the point of view of costs linked to treatment of disease and its complications (personal medical care, hospital care, healthcare, and drug services). Direct costs linked to obesity represent a 2%-8% share of total healthcare costs worldwide (WHO); healthcare spending incurred by an obese person is on average 25% higher than that of a person of normal weight (Withrow and Alter, 2010). Another significant share of costs, defined as indirect costs, is linked to the loss of productivity. The reasons which have led to the explosion of the obesity phenomenon and the differences in the prevalence of this condition found among different social groups are cultural and economic in nature, besides being purely biological and epidemiological.

Factors such as education levels, income, and social status seem to be determinant factors relative to the likelihood of an individual becoming obese. Childhood obesity, particularly in Western countries, represents a growing problem with remarkable healthcare and social significance. Scientific literature has, in fact, pointed out the existence of a consolidated relationship between cases of overweight/obesity in childhood and in adulthood (Sandhu et al., 2006; Dietz et al., 1998). For this reason, childhood obesity is critical for the phenomenon to last throughout an individual’s entire lifetime, with significant consequences due to the increased likelihood of contracting chronic diseases such as diabetes, hypertension, cardiovascular diseases, and cancers in adulthood. Overweight and obesity also have important implications in the work environment, generating a negative impact on workers as well as employers. In fact, different studies show that, on average, overweight or obese people earn lower salaries, are excluded from certain types of occupations (such as sales or customer relations), and are victims of discrimination in the workplace. Furthermore, companies incur costs linked to absenteeism (Finkelstein, Fiebelkorn and Wung, 2005; Ricci and Chee, 2005), lower productivity at work due to health problems or “presenteeism” (Rucci and Chee, 2005), and disability (Sturm, Ringel and Andreyeva, 2004). According to a recent study (Finkelstein et al., 2010), the annual cost attributable to obesity among full-time employees in the United States would amount to circa 73.1 billion dollars.

Governments (national and supranational) have the duty to intervene first to reduce the problem of obesity. The potential tools at their disposal are:

- the use of different forms of information, education, and persuasion to make individuals more aware of their own behavior (dietary and not), and its correctness;
- favor the availability of healthier eating options (or facilitate access to healthier options which already exist) and create the presuppositions to combat sedentary lifestyles;
- impose rules or use tax measures to discourage consumption of certain products.

Different countries have recently initiated (or are still in the phase of studying) interventions concerning the taxation of certain categories of products. However, the use of taxes as a tool in this context remains a much-debated topic. This is a direct intervention and from the point of view of costs, it is one of the most advantageous measures. However, issues of equality, difficulty in the choice of foods to be considered, and uncertain effects on long-term eating habits may arise. In any case, without the simultaneous implementation of interventions favoring the selection of healthier alternatives and the consumer’s actual accessibility to them, it does not seem to be a measure that can have a significant impact on behavior. The proper execution of governmental programs also requires involvement by the food and retail industries, in consideration of their significant role in defining product offerings, and the communications skills of these players, which are able to influence end user demand and the composition of food consumption. In recent years, consistent with the progress of nutritional science and their role in society, companies have begun to execute positioning policies, developing the range, marketing, and promotion of dietary education, and sponsoring sports and physical activities aimed at supporting governments’ commitment to combating overweight and obesity.

Some winning factors can be identified from an analysis adopted by some OECD countries to prevent obesity and its consequences (Sassi, 2010):

- combination of many interventions put into action by the relevant players, which produce their effects over different time horizons;
- high participation in the individual interventions by the relative population;
- sustainability of the effects of the interventions on people’s behavior in the long term.

Furthermore, it is fundamental that the various interventions be combined into a medium-to long-term prevention strategy (to avoid the risk of suspensions or slowdowns due to the emergence of more contingent needs or political changes), which covers different age groups and groups at risk while it represents an effective solution at a sustainable cost, guaranteeing health gains that are greater than individual interventions (to be evaluated with suitable systems of measurement).

Having taken all these elements into account, the BCFN has identified seven priority recommendations to deal with the obesity epidemic.

1. Inform and mobilize public opinion. Make public opinion more aware and reactive to obesity’s consequences on health, its impact on society, and its economic and environmental costs.

2. Plan a joint government-private sector commitment. Activate integrated and coordinated medium- and long-term plans to combat obesity which involve all the major players concerned.
1. **Spread the culture of prevention.** Educate people on the concept of a limit and transmit the culture of prevention so that healthy behavior increasingly becomes a conscious choice.

2. **Teach healthy habits in childhood.** Reinforce establishments which educate and inform young people.

3. **Use the tool of price in a balanced manner.** Carefully evaluate the pros and cons of introducing tax disincentives such as taxes on junk food.

4. **Encourage commitment from industry and retail.** Get the food industry and retail involved in public health initiatives promoted and led by governments.

5. **Combat the obesogenic environment.** Combat the factors that lead to taking on improper lifestyles and food choices which make it difficult to make healthy choices.
### Causes of Obesity

- Ample supply of low-priced foods that have a high caloric intake and a low nutritional value
- Progressive drop in food and beverage prices and a worldwide increase in per capita income and more extensive purchasing power
- Labor conditions: increased outsourcing that causes long workdays and very sedentary lifestyles
- High urbanization and long, frequent car trips
- Lifestyles: less time dedicated to the preparation and consumption of meals, little activity, and low level of dietary education

### The Magnitude of the Phenomenon

#### Today

- 1.5 billion
- Overweight: 1 billion
- Obese: 500 million

#### 2015

- 2.5 billion
- Overweight: 1.8 billion
- Obese: 700 million

### The Cost of Obesity

As a percent of total healthcare expenditure

- France: 4.6%
- Great Britain: 6%
- Italy: 6.7%
- United States: 5-10%
- Europe: 8%
- World: 2-8%

On average, healthcare spending incurred by an obese person is 25% higher than that of a person of normal weight.

### Recommendations

1. Inform and mobilize public opinion so people are more aware and reactive about the economic, social, and environmental consequences of obesity
2. Plan a joint effort by governments and the private sector, activate integrated plans over the medium-to long-term
3. Spread the culture of prevention so that healthy behavior increasingly becomes a conscious choice starting during pregnancy
4. Teach healthy habits starting in childhood, facilitating access to suitable organizations and spaces
5. Use the price lever in a balanced manner, carefully evaluating the "pros" and "cons" on the introduction of tax disincentives such as taxes on "junk food"
6. Encourage the food and distribution industries’ commitment to public health initiatives promoted and guided by governments
7. Battle the obesogenic environment, combat the factors that lead to incorrect lifestyles and eating habits that make it hard to make healthy choices

### The Magnitude of the Phenomenon

- Obese: 500 million
- Overweight: 1 billion

### Trends

- 2015:
  - Obese: 700 million
  - Overweight: 1.8 billion

### Sources

1. THE OBESITY EPIDEMIC: SCENARIO AND SOCIO-ECONOMIC IMPACTS
1.1 THE GLOBAL SCENARIO AND ITS DIMENSIONS

In 1997, the World Health Organization (WHO) recognized obesity as a global epidemic and launched this alert again in 2002, with specific reference to Europe. Indeed, in recent years, obesity rates have increased worldwide, both in developed and developing countries, although with some marked differences in the various countries, with the sole exception of Sub-Saharan Africa.

Before analyzing the data relative to the phenomenon in the various geographic areas, it is useful to define what is meant by obesity and being overweight. WHO defines these conditions as a state of excessive accumulation of fats – adiposity – with potentially harmful repercussions on health. An individual’s degree of adiposity cannot be immediately measured; however, there are some proxies based on anthropometric features that can be easily measured and are recognized internationally. In particular, the Body Mass Index (BMI), measured as the ratio between weight (in kilograms) and height (stated in m²), is the indicator most used.

Figure 1.1. Weight, height, and body mass index

The National Institute of Health’s (NIH) began to define the condition of obesity in terms of BMI in the 1980s, and in 1998 it was established that a BMI value higher than 25 kg/m² equals the threshold of being overweight and that a value greater or equal to 30 kg/m² means a person is considered obese.

Obesity is a complex disease with multiple factors, but at the individual level, the main culprit in the majority of cases of obesity is a combination of excessive contributions of calories and reduced physical activity: in other words, the intake of calories is greater than those consumed by exercise or normal daily activities. A limited number of cases is instead due to genetics, health reasons, or psychiatric illnesses.

In regard to the causes of obesity at the group level, however, reference is especially made to the characteristics of the socio-economic environment. In particular, the term “obesogenic environment” was coined in the 1990s, when studies were begun on which environmental risk factors influenced the nascent epidemic of obesity and it was defined as: “the sum of influences, opportunities or life conditions that have promoted the onset of obesity.” The term includes the entire range of social, cultural, economic, and infrastructural conditions which affect the potential for an individual to lead a healthy life. For example, think of people’s reduced physical involvement in daily activities, due to technological progress, or some features of the urban landscape that can condition accessibility, availability, and consumption of some foods, or the performance of physical activity, which limits people’s possibilities of choice.

The concern for the exponential growth in rates of obesity and being overweight is that these conditions represent crucial risk factors for the onset of many chronic diseases, which are responsible for 60% of deaths worldwide (and 86% in Europe). This has led the European Association for the Study of Diabetes (EASID) to recognize the prevention and treatment of obesity as “the most important public health issue worldwide.”

Figure 1.2 shows the results of some studies aimed at establishing the causal nexus between obesity and some of the most important chronic diseases. The diagram illustrates the relationship between obesity and some of the most important chronic diseases, with arrows indicating the direction of causality.

Figure 1.2. The chronic disease prevention (CDP) model
Obesity: the impacts on public health and society

SINCE 1980, THE NUMBER OF OBESE AND OVERWEIGHT PEOPLE WORLDWIDE HAS DOUBLED

Now that the various definitions supplied are clarified and the extent of the problem has been shown, we will move on to analyze the major trends observed in the different geographic areas on the planet.

WHO estimates that globally about 1.5 billion adults are overweight and among them, 200 million men and about 300 million women are obese. These values are doubled compared to values in 1980, and projections estimate that by 2015 about 2.5 billion adults will be overweight and 700 million will be obese. Today, 65% of the world’s population lives in countries where obesity and being overweight are responsible for a higher number of deaths than those due to malnutrition or hunger.

Starting in the 1960s, a generalized increase in the BMI has been observed in all the OECD countries: in fact, prior to 1980, the obesity rate in these countries had always remained under the 10% threshold, and then grew, until it doubled and in some cases tripled over a thirty-year period.

Figure 1.3. Evolution and estimate of the percentage of obese and overweight people in the population in some OECD countries

Although obesity and being overweight are present internationally, some significant differences have been found among the different geographic areas regarding the manner in which they develop and in the gravity of their distribution.

1.1.1 United States

The United States presents a clear case due to the percentage of its population that is obese and overweight. About 68% of Americans are overweight, and 34% of the adult population (over 61 million people) appears to fall within the identification criteria for the definition of conditions of obesity. Furthermore, the NIH deems that it is possible to identify a percentage equal to 4.7% of the American adult population that could be included in the so-called “extreme obesity” category (BMI >40).

Figure 1.5 shows the growth trend in the prevalence of obesity from 1990 to 2010 in the American adult population. In 1990, ten states had an obesity rate that was below 10% of the adult population of both sexes and no state exceeded 15%. In 2000, no American state had a prevalence of obesity below 10%, while 23 states were actually at values which were around 24%, without exceeding the 25% threshold. The situation worsened dramatically in 2010: 36 states have surpassed the 25% threshold, and 12 of them (Alabama, Arkansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Oklahoma, South Carolina, Tennessee, Texas, and West Virginia) have gone over 30%.

Figure 1.4. Overweight individuals (A) and obese individuals (B) in some countries (% of the adult population, 2008)*

* The data on overweight individuals includes those with a BMI >25 kg/m^2, while the data on obesity includes only those individuals with a BMI >30 kg/m^2.

Source: reproduced by BCFN, based on OECD data, 2010.
Obesity: the impacts on public health and society

1.1.2 Europe

The obesity phenomenon is also growing strongly in Europe. Looking at the statistics produced by the OECD, the obese adult population went from a share of 6.6% in 1978 to a 13.4% share (about 66 million people) in 2010. Average European BMI is about 26.5 kg/m², among the highest in the world, but considerable differences are found between countries. In fact, the prevalence of obesity over the past decade has increased to between 10% to 40%, with higher rates in Eastern Europe compared to Western Europe. The European countries that are now most affected are: England (24.5%), Hungary (19.5%), Greece (18.1%), Spain (17.5%), Germany (14.7%), and France (11.2%). Over the past twenty years, the highest growth rates (over 25%) were found in Spain, Italy, Poland, and the Czech Republic.

Analyzing the Italian situation in particular, it is noted that 58.3% of the adult population is of a normal weight, 29.6% is overweight, 10.5% is obese, while 2.6% is underweight. However, the distribution of these four categories of individuals throughout Italy shows a remarkable difference between the North and the South: in fact, all the regions of southern Italy and its islands, with the exception of Molise, show a percentage of obesity and being overweight that is higher than the national average.

Looking toward the future, the OECD data shows a growing trend for the next ten years: by 2020, the overweight and obese adult population (ages 15-74) will be 45% of the total. Despite one of the lowest rates of prevalence in Europe, the obesity phenomenon is also increasing in France. About one person out of ten is obese and when overweight people are included, it reaches 40% of the population. The projections produced by the OECD show that this figure will grow until it reaches 45%.

With regard to Great Britain, after the United States, it is the country that is hardest hit by overweight individuals and obesity (Figure 2.4). A Health Survey study has published some estimates on its future distribution, in terms of BMI, in the male and female populations in England. According to the study’s forecasts, in 2050, 60% of the male population and 50% of the female population may be obese. On the other hand, the share of the English male population with a BMI ranging from 18.5 and 25 kg/m² (normal weight) in 2050 will drop from the current 30% to below 10%.

### Figure 1.5. Obesity growth trends (BMI >30 kg/m²) among the adult population in the United States (1990-2010)

### Figure 1.6. Percentage of change in the prevalence of obesity in the past twenty-five years in Europe

### Figure 1.7. Evolution and projection to 2020 of the prevalence of being overweight and obesity in the adult population (ages 15-74) in Italy
1.1.3 Other countries

Although the phenomenon is expanding, in Asian countries prevalence rates are more markedly contained compared to the United States and Europe (3% of the adult population is obese in Japan and 4% in South Korea). However, the speed with which the phenomenon is growing in China is worrisome: in 2004, there were 60 million obese Chinese, and 200 million were overweight, but in 2009 this increased to 100 million obese people and 310 million people who were overweight. Another emerging country, Brazil, is already dealing with the problem of having a high share of population that is overweight and obese, with rates similar to those in Europe, and the prevalence of obesity is concentrated especially in the female population.

1.1.4 Excess weight and obesity among children in different geographic areas

In the global context outlined above, it can be noted that all Western countries are experiencing exponential growth in the phenomenon of childhood obesity, as well as overweight children. As it is easy to imagine, the impact generated by overweight and obese children and adolescents is extremely significant, for countries’ budgets in terms of negative costs for healthcare, as well as its repercussions on the proper physical and cognitive development of children and adolescents.

According to data collected by the International Obesity Task Force (IOTF), obese and overweight school-age children number 155 million, or, one child out of every ten children. Among them, 30-45 million are classified among the obese, which means 2-3% of the population ranging in age from 5 to 17 years.

The gravity of the expansion of the phenomenon of obesity and being overweight to the youngest population groups is shown - once again citing a shocking American figure - in the tripling of cases of overweight youth from 1970 to the present time. According to a recent study by the Trust for America’s Health and the Robert Wood Johnson Foundation, almost one-third of American children and adolescents are overweight or obese. In particular, according to the NIH, 16% of children between the ages of 6 and 19 are currently obese, while another 15% is at a strong risk of becoming obese.

The problem of childhood obesity is also increasingly widespread in Europe: in the member states of the European Union, about 400,000 children are considered overweight and over 85,000 are considered obese. In regard to youth obesity only, its prevalence in Europe is now ten times higher compared to the 1970s.

In Italy, an investigation promoted by the Health Ministry in cooperation with HSBC (Health Behaviour in School-aged Children), involving over 42,000 third-grade students and 44,000 parents, revealed worrisome levels of bad eating habits, sedentary lifestyles, and being overweight. 22.9% of the children studied were overweight, and 11.1% were in an obese condition. Regional variations were evident, with percentages that were generally lower in northern Italy and higher percentages in southern Italy. The study also revealed that parents do not always have a correct idea of their child’s weight status: among mothers of overweight or obese children, 36% did not deem their child to be overweight and only 29% thought that the amount of food the child consumed was excessive.

Instead, the figure on childhood obesity is low and has been relatively stable for the past twenty years in France. However, OECD projections estimate strong growth in the risk of childhood obesity.
1.2 THE IMPACTS OF OBESITY AND BEING OVERWEIGHT ON HEALTH AND LONGEVITY

1.2.1 Obesity and life expectancy

One of the most important studies, conducted to highlight the relationship between obesity and mortality, carried out on a sample of one million adults representing Europe and North America, concluded that the mortality rate increases very quickly when individuals surpass the threshold of 25 kg/m². An obese person with a BMI between 30 and 35 kg/m² has a life expectancy that is four or five times lower than the life expectancy of a normal weight person; this gap increases to reach ten years when the BMI is between 40 and 45 kg/m² (third-degree obesity). This relationship seems to be weaker only after age 70, a phenomenon known as the obesity paradox, where the mortality rate seems to be lower among overweight people compared to normal weight people (this effect is mostly due to the decrease in body mass due to chronic diseases).

Figure 1.8 reports the results of a study published in the *Annals of Internal Medicine* and conducted on a sample of 3,457 people, examined over a time period of about forty years. The study’s objective was to highlight the correlation between potential years of life lost and BMI, divided into categories. Potential years of life lost were estimated through the number of deaths recorded in the population sample during the course of the entire period studied.

The categories studied were the following:
- First group: BMI between 18.5 and 24.9 kg/m²;
- Second group: BMI between 25 and 29.9 kg/m² (overweight);
- Third group: BMI equal to or higher than 30 kg/m² (condition of obesity or hyper-obesity).

The average age of the people in the sample was 40 and the population was divided by sex and distinguished between “smokers” or “non-smokers.” If the category of non-smokers is examined, the data appear to be very clear. In the women belonging to the second group (BMI 25-29.9 kg/m²), a decrease in life expectancy at age 40 was found to be about three years compared to that of the first group, while for women in the third group (BMI >30 kg/m²) this decrease was about seven years. In men, the ratio is similar, despite an average lower life expectancy.

Despite the wealth of studies conducted on the subject, it is hard to isolate and understand what the general impact of the obesity epidemic is on average life expectancy, as it is difficult to forecast its future impacts.

Leading institutions such as the English Department of Health confirm that if the rate of prevalence of obesity continues to grow at the present pace, by 2050 average life expectancy will have to be adjusted downward by at least five years.
Nevertheless, there are other studies which present less pessimistic estimates, such as a study by Foresight\(^\text{15}\) which estimates - in the event that current growth rates are confirmed regarding the prevalence of obesity - a decrease in average life expectancy of only about six months.

1.2.2 Obesity and disability

The causal nexus between obesity and disability is instead stronger. In Europe, the disability rate recorded among the obese population, measured by the ADL (Limitation in Activities of Daily Living) indicator, is about double that of the normal weight population. In the United States, an obese 70-year-old person can expect to spend 40% of his remaining lifetime with diabetes, 80% with hypertension, and 85% with types of osteo-arthritis, while a normal weight person will show values that are about 17%, 60%, and 68%, respectively.\(^\text{16}\) The American Medical Association\(^\text{17}\) has conducted a test on a total of 5,724 participants belonging to the three weight categories described previously, who were asked to perform six different physical tests in order to evaluate the degree of disability in relation to their BMI. Socalled “functional impairment” (percentage of interviewees who showed that it was difficult or even impossible for them to carry out certain physical exercises\(^\text{18}\)) doubled in obese people compared to people whose BMI was within the normal range.

Figure 1.8. Population survival rates based on BMI

IN THE WORLD TODAY

Data in % of the total population

- Overweight
- of whom obese

<table>
<thead>
<tr>
<th>Country</th>
<th>Overweight</th>
<th>of whom obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>16.5</td>
<td>16.5</td>
</tr>
<tr>
<td>Austria</td>
<td>24.5</td>
<td>24.5</td>
</tr>
<tr>
<td>Belgium</td>
<td>52.4</td>
<td>52.4</td>
</tr>
<tr>
<td>Canada</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>34.0</td>
<td>34.0</td>
</tr>
<tr>
<td>Denmark</td>
<td>51.4</td>
<td>51.4</td>
</tr>
<tr>
<td>Estonia</td>
<td>38.4</td>
<td>38.4</td>
</tr>
<tr>
<td>Finland</td>
<td>45.2</td>
<td>45.2</td>
</tr>
<tr>
<td>France</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Germany</td>
<td>29.1</td>
<td>29.1</td>
</tr>
<tr>
<td>Greece</td>
<td>24.9</td>
<td>24.9</td>
</tr>
<tr>
<td>Hungary</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Iceland</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Israel</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Italy</td>
<td>13.6</td>
<td>13.6</td>
</tr>
<tr>
<td>Japan</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Mexico</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>New Zealand</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Norway</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Poland</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Portugal</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>South Korea</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Spain</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Sweden</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Turkey</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>United States</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Data in % of the total population

THE LINK BETWEEN OBESITY AND DISABILITY IS VERY HIGH

Fonte: OCSE, Health at a Glance 2011
1.3 THE SOCIO-ECONOMIC COSTS OF OBESITY

1.3.1 The different types of costs linked to obesity

Obesity is a phenomenon that not only has negative repercussions on an individual's health, but it also involves significant economic costs which burden the entire community, and obviously, the individual and his family members. In addition to being recognized as a disease by WHO (2000), obesity is a basic risk factor for many non-transmittable chronic diseases, with repercussions on medical (direct) costs as well as the (indirect) costs linked to the loss of productivity due to the onset of the diseases. Direct costs refer to medical expenditures for the treatment of the disease and its complications (personal healthcare, hospital care, medical, and drug services). In fact, it is known that obesity is responsible for some diseases such as hypertension, Type 2 diabetes, high cholesterol, heart diseases, stroke, asthma, and arthritis.

According to different scientific studies, with the increase in obesity levels, medical expenditures for the diagnosis and treatment of these diseases are destined to grow in the coming years. Different studies provide retrospective and future estimates on the degree of impact that obesity will have on the diseases mentioned above and the extent of the healthcare costs directly associated with the phenomenon. There are different methods to calculate the impact of these costs: case studies, dynamic models, surveys that are representative at the national level, regressive analyses, and forecasted simulations.

Aside from the direct costs, there is another category of costs defined as indirect costs, which represent an equally significant part of the socio-economic impact of obesity, and among them, the costs which play the most important role are costs that have an effect on productivity.

Some sub-categories can be found within indirect costs that linked to the topic of labor productivity:
- absenteeism: days lost by workers absent from the workplace for health reasons linked to obesity;
- presenteeism: decrease in productivity of obese or overweight workers in the workplace;
- premature mortality or years of healthy life lost (QALY) due to diseases linked to obesity;
- increase in insurance premiums in cases of disability linked to obesity.

In addition to costs connected to productivity, there are other indirect costs linked to the development of human capital. In fact, the effects of obesity and being overweight may also have negative consequences on educational performance (similar to the topic of workplace productivity).

This is a significant issue that has significant economic potential, especially in light of the increasing levels of childhood and adolescent obesity.

Finally, there are other indirect costs that can be traced back to the psycho-social sphere (depression, etc.) in overweight and/or obese individuals, but this is a cost category that has not been much explored until now, especially from the point of view of its economic impacts on society.

1.3.2 The sum of indirect and direct costs in the United States, Europe, and in developing countries

According to a recent study, it is estimated that direct costs linked to obesity are about 2-8% of total healthcare costs at the global level and that healthcare expenditures incurred by an obese person are, on average, 25% higher than that of a person of normal weight. These estimates may be deemed conservative, and therefore, the actual figure may be much higher. Up to now, it has unfortunately been impossible to find publications in literature which more accurately quantify the costs linked to obesity and being overweight at the global level. However, there is much data available for the most developed countries.

Starting with the situation in the United States, the country with the world’s highest share of an obese population, and for which various studies are available in this regard, in recent years there has been an exponential increase in costs relative to medical care linked to obesity and diseases which are connected with it (direct costs). It is estimated that in the United States, these costs amount to about 5-10% of total healthcare spending and to about 1% of its GDP.

According to some studies, in 2008 these costs amounted to $147 billion for adults only and to $14.3 billion for children. Meanwhile, only ten years prior, these costs were $78.5 billion, half of which were financed by Medicare and Medicaid programs.

In 2006, the differential between costs for healthcare spending incurred by an obese person and a normal weight person was about $1,429, compared to $930 in 1998, and which, in terms of percentage, is about 42% more. Again in the same year, the increase in the per capita percentage relative to annual costs attributable to obesity was estimated at 36% for the Medicare program, at 47% for the Medicaid program and at 58% for private payers.

According to another study, the differential between per capital healthcare expenditures incurred by an obese person compared to that of a normal weight person was about 8% in 1987, while this percentage rose to 38% in 2007. Instead, with regard to the category of indirect costs, it is estimated that the impact of these costs would amount to about $64 billion.

Thus, by adding up the direct and indirect costs, economic costs linked to obesity in the United States would total about $227 billion.

Other studies are attempting to forecast the impact that direct costs may have in coming years if the phenomenon’s growth trend should continue at the levels recorded between 1970 and 2004. In 2030, these costs should be between $860.7 and $956.9 billion, which represent 16%-18% of total healthcare costs incurred in the United States.

According to another study, it is estimated that in 2030 there will be 11 million more obese people in the United States than there are today, and consequently, it is estimated that costs for healthcare spending linked to diseases connected to obesity will increase to about $48-66 billion each year by 2030.

Regarding per capita healthcare spending, a study (CBO, September 2010) forecasts three scenarios which may occur by 2020:

1. if the percentage of obese people should remain unchanged compared to 2007 (28%), per capita healthcare spending would increase by 65% (going from $4,550 in 2007 to $7,560 in 2020);
2. if the percentage of obese people should rise at the same pace recorded between 2001...
and 2007, in 2020 this percentage would be 37% and per capita healthcare spending would be 3 percentage points higher compared to the spending in the first scenario ($7,760);

If the percentage of obese people should return to 1987 levels, this percentage would be around 20% and per capita healthcare spending would be $7,230, about 4% lower than the spending forecast in the first scenario.

As can be easily understood, literature on the situation in the United States is vast and therefore, the data available, especially with reference to forecasts, may vary.

The chart in Figure 1.9 summarizes the cost categories linked to obesity and their relative costs.23

Figure 1.9. Major cost categories linked to obesity and being overweight and their economic impact in the United States

<table>
<thead>
<tr>
<th>COST CATEGORY</th>
<th>SUBCATEGORY</th>
<th>MAIN EFFECTS</th>
<th>RELATIVE COSTS</th>
<th>TOTAL COSTS</th>
<th>TOTAL AMOUNT (NOT IN DOLLARS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIRECT MEDICAL COSTS</td>
<td>Abdomen</td>
<td>Workdays lost due to obesity (compared to a normal weight person)</td>
<td>10-20% higher</td>
<td>$14.3 billion</td>
<td>$86 billion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk of a higher percentage of abdominal</td>
<td>20-40% higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abdominal costs at the national level due to abdominal and attributable to obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prevalence</td>
<td>Prevalence of obesity (in one year)</td>
<td>1.5% higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevalence of obesity (in one year)</td>
<td>1.5% higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prevalence of obesity (in one year)</td>
<td>1.5% higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Premature death</td>
<td>Years of life lost due to obesity (compared to life expectancy)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>QALYs lost due to obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRANSPORTATION COSTS</td>
<td>Fuel costs</td>
<td>Fuel costs (per person)</td>
<td>742 million (2010 US$)</td>
<td>742 million (2010 US$)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel costs (per person)</td>
<td>2.55-2.7 billion (2010 US$)</td>
<td>2.55-2.7 billion (2010 US$)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental costs</td>
<td>Environmental costs (in terms of class)</td>
<td>0.1-0.3 levels less</td>
<td>0.1-0.3 levels less</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>School days absent (per school)</td>
<td>1.2-2.1</td>
<td>1.2-2.1</td>
<td></td>
</tr>
</tbody>
</table>

The economic impact of obesity in the United States: an overall appraisal of costs

It is calculated in the United States that for every BMI point higher than 30, total annual medical expenditure (public and private) per capita increases by 8% (or about $300 more for each BMI point). Compared to annual medical expenditure per capita of 53,950 (for a normal weight person with a BMI lower than 25), a person with an index ranging between 30 and 34 incurs annual medical expenditure of 54,675 (+18% compared to that of a normal weight person). The divergence increases more than proportionally with the increase in the BMI coefficient; spending amounts to $6,120 (+55%) with an index ranging from 35 and 39, and 7,555, almost double (+91%), with a 20% index greater than 40.

If some costs which have been neglected until now (such as, for example, larger-sized clothing, seats in theaters, more spacious stadiums, etc.) are taken into consideration, according to some research studies, total (direct and indirect) costs linked to obesity would amount to about $450 billion every year. The graph shown below illustrates the distribution of costs per category.

Figure 1.10. Subdivision of costs linked to obesity in the United States (billion dollars)


Moving on to the situation in Europe, according to the European Charter on Countering Obesity (Ministerial Conference of the European Region of WHO, Istanbul, November 2006), obese and overweight adults would be responsible for up to 8% of healthcare spending. According to the latest estimate made by the European Commission, total direct costs linked to obesity incurred by the Member States of the European Union in 2006...
amounted to about €59 billion a year, but the same study forecasted a much greater overall economic impact (a figure which could vary from €118 to €236 billion a year). According to other studies, in 2002 the total amount of indirect and direct costs totaled about €33 billion a year.\(^\text{14}\)

Analyzing the latest WHO data (2006), it can be noted how, for example, in Sweden direct costs are estimated at $45 per capita annually and indirect costs are estimated at $157 per capita annually; in Germany, direct costs per capita are estimated at $35 annually, while in the Netherlands the value differs slightly ($32). In recent years, in other countries such as Great Britain, these costs are rising at surprising levels: they went from £13 per capita annually in 1998 to £25-31 per capita annually in 2002. In Great Britain, it is also estimated that these costs could be up to 70% higher in 2015, compared to the costs recorded in 2007.\(^\text{15}\)

Analyzing the situations of some European countries, it was noted how, for example, in France, in 2002, direct costs varied from €2.1 to €6.2 billion and represented from 1.5% to 4.6% of total healthcare spending.

In Italy, it was calculated that in 2005, annual direct and indirect costs for overweight/obesity conditions amounted to €22.8 billion annually, of which 64% was for hospitalizations (EXPENDITURE Study, University of Milan).\(^\text{17}\) All this indicates how obesity is actually responsible for a series of serious cardiovascular, metabolic, bone and joint, cancerous, and respiratory diseases which involve a decrease in life expectancy and a considerable burden for the Italian National Health Service.

In 2009, the Scuola Superiore Sant’Anna estimated that the impact of the social cost of obesity in Italy was €8.3 billion, equal to about 6.7% of public healthcare spending. Forecasting an average life expectancy of 75 years for an obese person, the same study estimated that the additional total social cost for an obese eighteen year old would be about €100,000 during the course of his or her life, compared to a peer of normal weight.

As anticipated, for some years now the obesity phenomenon has also begun spreading to developing countries, and there is now some scientific evidence which quantifies its economic impacts on society. A significant number that can help in understanding the extent the phenomenon is taking on even in these countries is the percentage of costs linked to obesity on GDP. In 2001, the percentage recorded in China was 2.1%, while in India it was 1.1%.\(^\text{18}\)

According to another study, in China, healthcare spending just for obesity was equal to almost $50 billion in 2000 and it is forecasted that this figure will rise to about $112 billion by 2025.\(^\text{19}\) In Brazil, another one of the economies considered to be emerging, total costs linked to obesity and being overweight represented about 3% of total hospitalization costs for men and 5.8% for women, which correspond to 6.8% and 9.1% of all hospital stays.\(^\text{20}\)

Although the healthcare costs of these countries cannot be directly compared with those of Western countries, it can be presumed that diseases associated with obesity and being overweight are having a significant impact on hospitalizations, and more in general, on the healthcare costs of developing countries, with percentages that approach those of developed countries.

\[\text{The economic impact of obesity in Italy: Impact on healthcare spending forecast for 2050}\]

In the coming years, the dynamics of public healthcare spending is a result of the evolution and reciprocal interaction of certain components:

- demographic number and structure by sex and age of the population;
- economic: propensity found in all advanced economies toward a growth in overall healthcare spending that is proportionally higher than the growth in GDP;
- epidemiological prevalence of major diseases, in particular, chronic diseases;
- exogenous: scientific discoveries, technological changes, their impact on the effectiveness and costs of the provision of healthcare, policies to contain healthcare spending, etc.

To highlight the contributions of the individual factors, the proposed forecasting model is based on a modular type of approach founded on the interaction between the following variables:

- the growth of healthcare spending in line with GDP;
- the variation in population numbers;
- the variation in the demographic mix;
- consideration of the flexibility in per capita healthcare spending compared to a variable in available income.

This model is based on the review of 2010 estimates for public healthcare spending for the resident Italian population and GDP. Instead, forecasts for the 2011–2050 period used:

- for growth estimates of demographic variables, the main hypothesis for the projections prepared by ISTAT (National Statistics Institute) in “National Population Forecasts by Age and Sex - 2007–2051.”
- for the evolution of available income, the projections of growth rates on a ten-year basis of actual GDP, supplied by the Italian General Accounting Office.

The starting point is 2010 public healthcare spending, which totaled €113.5 billion, equal to 7.3% of Italy’s GDP. The projection for public healthcare spending up to 2050 concentrated on estimating the impact of the demographic and economic factors. Demographic changes and growth in available income have an impact of over €168 billion on healthcare spending compared to 2010. At the end of the period, public healthcare spending will reach a sum close to €281.5 billion, equal to 9.7% of GDP in 2050. The growth in the ratio is not standard over the years: most of the growth will be concentrated in the first decades of the period under consideration, while the rate tends to stabilize in the last decade.

The evolution of the ratio between public healthcare spending and GDP is contained in Figure 1.11. This model is based on the hypothesis that the current epidemiological framework will remain unchanged. It is possible to hypothesize introducing a variation of the epidemiological framework into the forecasting model that can be associated with the increase of a risk factor for many diseases (cardiovascular diseases, diabetes, some tumors, etc.), such as obesity.

The basic hypotheses are the following:

- in Italy, obese children are 11% of the population;
- it is estimated that the number of obese adults will increase by an annual average of 2.4% until 2050 and an annual average of 2.8% from 2025 to 2050, taking into account that 70% of children
Figure 1.11. Evolution of the ratio between public healthcare spending and GDP between 1992–2010 period and projection by 2050.

Figure 1.12. Trend in the number of obese persons in Italy (millions).

The change in the epidemiological assumptions on obesity combined with the assumptions on the demographic mix brings the number of obese people to almost 14 million in 2050 (compared to about 5 million people who would be recorded in the event that the assumptions are not changed). By crossing the data relative to per capita healthcare costs associated with every obese person and the growth in the number of obese people, it is possible to estimate a greater impact on healthcare spending.

With a forecast up to 2050, this simulation leads to greater spending, compared to the baseline case model, of about €24.3 billion, with a consequent impact of healthcare spending on GDP equal to about 10.6% (compared to 9.7% in the forecasting model’s baseline case).

The total cost caused by the epidemiological framework simulations for the 2010–2050 period is €347.5 billion.

Figure 1.13. Trends in healthcare spending/GDP ratio in the baseline case and in the event of changes in the epidemiological framework on obesity.
2. The Social, Environmental, and Cultural Dimensions of Obesity
2.1 OBESITY IN DIFFERENT SOCIO-ECONOMIC GROUPS

The explosion of the obesity phenomenon and the differences in the prevalence of this condition found among different social groups are cultural and economic in nature, in addition to being purely biological and epidemiological. Factors such as education levels, income, and social status seem to be determinant factors relative to the probability of an individual becoming obese. Some evidence of the existing relationships between obesity rates and some variables which determine individuals’ socio-economic status will be provided below. However, first it is necessary to understand how the phenomenon breaks down differently, just at the levels of sex and age.

2.1.1 Obesity between men and women

The worldwide obesity rate is trending higher in the female population than the male population1 (Figure 1.4). Different attempts have been made to explain this phenomenon. An American study, for example, demonstrates how, starting in 1970, women experienced a progressive drop in actual income compared to the number of hours dedicated to work and how this was closely connected to an increase in obesity rates. Furthermore, it also emerged that women who had experienced nutritional imbalances (phenomena that are more widespread among females than males) in adolescence are more likely to develop obesity in adulthood. As will be seen below, the gender difference in the prevalence of obesity appears to be significantly correlated with other individual characteristics, such as socio-economic status, ethnic group, some psychological, metabolic, and endocrinological factors (hormone levels), and the level of physical activity.

2.1.2 Obesity in different age categories

Statistical evidence collected in some countries shows how the relationship between body weight and age categories follows an upside-down “U” curve. Weight tends to slowly increase with advancing age, until it reaches a peak around age 50, and drops as individuals age, through the spread of chronic diseases, most of which cause a loss in body weight. This phenomenon can be traced back to the different lifestyles adopted over the entire lifetime of individuals. During the early years of life and adolescence, physical activity which tends to be more intense and regular and a more controlled diet allows a good BMI level to be maintained (even with the due differences and exceptions among the different countries), while with the passage of years and the start of work activity, a generalized growth is noted in the prevalence of obesity in the countries observed. This is due, for example, to the high degree of outsourcing in the job market in high-income countries, which, for the most part, provides jobs that are sedentary. However, upon reaching age 50, there is a slow inversion of the trend, due to the appearance of the first symptoms of chronic diseases and the consequent prevention and control measures adopted, such as low cholesterol or low sugar diets.

2.1.3 Obesity and socio-economic conditions

A study published in the Journal of Epidemiology Community Health3 analyzed the prevalence of obesity in relation to the degree of the distribution of well-being (measured as the distance between the income of the richest and that of the poorest). Although this factor is not sufficient on its own to explain the differences in the obesity rates among the different countries observed, the results show how a high degree of inequality in income distribution generally corresponds to a greater prevalence of obesity in the population. The graph in Figure 2.2 shows a cluster of countries with similar obesity rates which tend to be limited, compared to limited social inequality (countries occupying the center of the table): as the values on the axes increase, a rather sustained increase is shown in the prevalence of obesity, as in the case of the United States and Greece.

![Figure 2.1. Prevalence of obesity in different age categories (2010)](image-url)

Source: reproduced by BCFN, based on OECD data, 2010.
OECD provides another measurement of social disparity in relation to obesity, equivalent to the likelihood of being obese in the poorest classes compared to the wealthiest classes (Figure 2.3). This analysis also confirms that the level of social disparity generates a greater likelihood that women will be more overweight or obese than men. Indeed, women who belong to the wealthiest classes have significantly lower obesity rates than women belonging to poorer social classes, while this data is less evident in the case of men.

Source: reproduced by BCFN, from Pickett K. E. et al., 2005.

Note: the values in the columns in the charts refer to the likelihood of an individual belonging to the lowest social/income class being obese (A) or overweight (B) compared to an individual belonging to the highest social/income class. For example, in France, men belonging to the lowest social/income class are 2.4 times more obese than men belonging to the highest social/income class.

Source: reproduced by BCFN, based on OECD data, 2010.
2.1.4 Obesity and Education

There are many studies which highlight the existing relationship between the number of years dedicated to education and lifestyle and obesity. People who have dedicated more time to their education generally consume less tobacco or alcohol, do not take drugs, and have a lower than average prevalence of obesity and being overweight.\(^5\)

![Figure 2.4. Obesity and education levels in men (A) and women (B) in some OECD countries](image)

*Source: reproduced by BCFN, based on OECD data, 2010.*

![Figure 2.5. Disparity between obesity (A) and excess weight (B) based on education levels for men and women (2010)](image)

*Note: the values in the bar graphs refer to the likelihood of an individual with little education being obese (A) or overweight (B) compared to an educated individual.*

*Source: reproduced by BCFN, based on OECD data, 2010.*
IN ITALY, A SAMPLE OF INDIVIDUALS BETWEEN 25 AND 44 YEARS OF AGE SHOWS HOW THE PREVALENCE OF OBESITY FALLS AS THE LEVEL OF EDUCATION RISES

Figure 2.6 shows the results of a study conducted in four OECD countries, highlighting that the prevalence of obesity decreases with an increase in years of education, also showing how the inverse ratio between obesity rate and education level is more marked in the female population than in the male population. Indeed, there does not seem to be any relationship between education level and obesity in men, with the exception of Korea, where it is, in any case, mitigated by a very low rate of obesity.

The disparity index can also be applied to education levels, thus allowing an evaluation of the difference between the obesity rate among less educated individuals compared to those with more education (education levels are measured on the basis of the number of years they dedicated to schooling).

In Figure 2.5, it is noted that the level of disparity is also higher for the obese population in comparison with the overweight population. Moreover, the effect of education on obesity and being overweight is markedly higher in women compared to men. Indeed, the graph shows as an example that a Spanish woman with little education is about 18 times more likely to be obese than an educated woman. For men, the probability instead increases 2.2 times.

In Italy, an analysis performed on a sampling of adult individuals whose ages ranged from 25 to 44 clearly shows how the prevalence of obesity is gradually reduced as education levels (defined by the diplomas in their possession) increase, for both women and men (Figure 2.6).

2.1.5 Obesity in different ethnic groups

Ethnic groups and the dynamics of migration are dimensions which generate different lifestyles and eating behaviors. Ethnic minorities often belong to the lowest social classes and tend to be marginalized; this can lead to obesity and overweight (in poorer social classes, with lower educational levels and income, the overweight and obesity rate tends to be higher).

For example, in England, the female population shows different trends depending on diverse ethnic groups, with a peak in the prevalence of obesity recorded among women of color, while for men the data appears to be more linear, as shown in Figure 2.7.

Figure 2.7. Prevalence of obesity in different ethnic groups in England (2007)

Figure 2.8 shows how the female African-American population of the United States also has overweight and obesity rates that are sharply above the average.

The role that an obesogenic environment plays is also remarkably important - as in the case of the United States - because it causes an increase in the prevalence of obesity among immigrants, who are often accustomed to lifestyles and eating habits that are radically different from those in the United States.

During the period from 1991 to 2008, the average obesity rate for the U.S.-born population went from 13.9% to 28.7%, while the rate for immigrants went from 9.5% to 20.7%. A study...
published in the *Journal of Community Health* notes how, starting from a lower average rate of obesity and being overweight among immigrants compared to native-born U.S. citizens, the risk of obesity and being overweight among immigrants increases along with their stay in the United States (Figure 2.9).

**Figure 2.9. Average obesity rate of a sample of approximately 450,000 people who emigrated from 30 countries in relation to the length of their stay in the United States compared to the population born in the United States (2008).**

2.2 **CHILDHOOD OBESITY**

Childhood obesity, particularly in Western countries, represents a growing problem with considerable healthcare and social significance.

International scientific literature has supplied proof of a solid relationship between being overweight/obese in childhood and being overweight/obese in adulthood. Indeed, childhood obesity is critical for the phenomenon to persist throughout the entire life of the individual, with significant consequences on increasing the likelihood of contracting chronic diseases in adulthood, such as diabetes, hypertension, cardiovascular problems, and tumors.

For overweight and obese children, this can involve a series of psychological and physical consequences (conditions of malaise linked to being overweight, such as motor difficulties, anxiety, asthma, the onset of psychological problems, which involve low self-esteem and social isolation) which can manifest themselves during childhood (early consequences), in addition to often more serious problems which they may more easily encounter in adulthood (later consequences).

In general, childhood obesity is more evident if there is a family connection (a child of obese parents has over a 70%-80% probability of being overweight than a child whose parents are of normal weight), if there are improper eating habits, and if the child does not perform enough physical activity.

2.2.1 Causes of obesity in children and adolescents

The origin and causes of obesity are many and complex: there are (few) cases in which the causes and origins are of a genetic nature, but in the majority of cases the child’s and the family’s lifestyle determine the onset and persistence of the disease.

**Nutrition**

As stated previously, one of the causes of obesity in children and adolescents is linked to the chronic and prolonged excess intake of calories. Parents’ concern for their child is often seen when the child or the adolescent does not eat much, but rarely when they overeat. On the one hand, parents’ concerns may have a basis, since an insufficient diet leads to deficiencies of various types, which can impair growth; on the other hand, an excessive caloric intake causes the child to be overweight, and then causes him/her to actually become obese. Aside from the total number of calories, the composition of the diet may also contribute to the development and maintenance of cases of people who are overweight and obese: in fact, a diet rich in fats fosters the accumulation of lipids through:

- Caloric density. Fats give food greater caloric density; therefore, the amount of energy
taken in is greater when the same volume is ingested. Since the feeling of satiety is influ-
enced by the food's volume and its composition (ratios between proteins, fats, and car-
bohydrates) and since low caloric density foods are more voluminous than high caloric
density foods, the latter tend to induce less satiety than the former;
- Palatability: fats give food greater appeal (consistency, freshness, etc.) and therefore en-
courages their consumption, increasing the total energy contribution;
- Most-generating characteristics: the lipid's own metabolic characteristics cause the intake of fats
to be followed by their efficient deposit as triglycerides. In fact, energy cost for the digestion,
absorption, metabolism, and storage of lipids ranges between 2% and 4% of the energy
content of the lipids taken in; thus, they are much less than the energy costs for carbohydrates
(5%-24%) and proteins (25%-30%). A significant association between the level of adiposity
expressed as a percentage of total body weight, and a diet's lipid content, expressed as a percent-
age of total caloric contributions, has been clearly demonstrated in obese children.11

Even the fiber contained in foods is important: a limited amount of fiber contributes to re-
ducing the meal's volume and speeding up the absorption of nutrients. Therefore, overeat-
ing can cause an increase in the volume of fat cells (hypertrophy) and also cause an increase
in their number (hyperplasia).

This phenomenon occurs mostly in the first two years of life and during puberty and is
associated with a specific predisposition to obesity in adulthood, in addition to difficulty in
losing weight and keeping it within limits, due to the impossibility of eliminating the mature
adipocytes once their process of differentiation has been completed.

Intervention during the growth stage is of fundamental importance because it can lead to
better and more lasting results than results which can be obtained in adulthood. Parents
should be the first to notice the child's excessive weight gain and report it to the pediatri-
cian, who is surely the best person to help them. However, often a strong appetite is inter-
preted as a sign of well-being and so the tendency is to encourage it rather than limit it, in
the hope that the obvious excess during puberty will dissipate. In addition to high caloric intake (compared to the energy expended), a diet's caloric density (fruits, vegetables, grains).
This is an important factor in the increase of obesity and being overweight in children and adolescents, along with factors linked to lifestyle.

Food supply characteristics

There is a general consensus in medical and scientific literature when discussing the cor-
relation between obesity and being overweight in adolescents and the types of supply/access-
sibility of foods present on the market.

Analyzing changes in food supply12 in the United States13-15 are shown as:
- these studies demonstrate that the consumption of soft drinks starts in the second half of
  the 1980s, while maintaining a less marked, but constant increase over time in the sec-
  ond half of the 1990s. This consumption is closely correlated with obesity in adolescents,
since carbonated and sugared drinks (soft drinks) are significantly linked to levels of
obesity in adolescents;
- this explosion benefited from the beverages' massive presence within the distribution
  system, and in particular, from soft drink-related advertising campaigns, which doubled
  in the United States from $541 million in 1995 to almost $800 million in 199914 (during
  the same period of time, advertising expenditures on foods and foodstuffs dropped 20%,
going from $11.6 to $9.8 billion);
- the increase in the consumption of soft drinks was accompanied by an increase in food
eaten outside of the home (in restaurants, pubs, fast food restaurants, etc.), often served in
portions having percentages of nutrients that are higher15 than those of a normal meal.16
The habit of eating snacks between meals has also continued to spread; the greatest contribu-
tion to the increase of energy intake recorded in the United States over the past twenty
years seems to be due more to snacks than to the calories taken in during main meals.17
Again in the United States, an additional factor that has caused the increase in obesity and
being overweight in children and adolescents, and more in general, in the population, is the
decline (in real terms) of the average prices of food. This has generated an increase in foods
that are purchased and eaten and an increase in preferences for high caloric density foods
(snacks, chocolate, potato-chips) which, within the average reduction of prices noted, have
recorded the greatest contractions and tend to cost less than those foods which are low in
caloric density (fruits, vegetables, grains).18
The way the current food supply has been developed and shaped in many of the world's
countries has been a factor in the increase of obesity and being overweight in children
and adolescents, along with factors linked to lifestyle.

Urban changes

Lifestyles which provide suitable activity is one of the factors that most reduce the likeli-
hood of obesity and being overweight.

Historically, physical exercise was an activity that did not necessarily have to be planned
during the day or the week, since it was an integral part of daily and working life. The
increase in the distances traveled18 to reach the place of work/study has reduced people's
physical mobility, as well as mobility in their work environment. Social and technological
improvements have made work more sedentary.

In such a situation, changes in urban places and spaces where children and adolescents
grow up produce effects on their level of motor activity. More specifically, the creation
of “urban sprawl” and the increase in miles traveled by car have had a significant impact on
children's and adolescents' physical activity levels, as they rarely walk or use bicycles to get
to school or places of amusement.19

Consider that in 1977, 15.8% of trips made by children and adolescents ranging in age from
5 to 15 were carried out by walking or using a bicycle; in 1990 this percentage dropped to
14.1%, in 1995 to 9.9%, and now it is below 4%.

Such a reduction is due to parents' increasing willingness to accompany their children to
school or to places of amusement, due to the distance between the place of residence and
the school being too great to be covered by their children on foot or on bicycles, and due to
the unavailability of special lanes or paths free from automobiles and dangers.

Nevertheless, since this situation seems to represent an outside variable, it would be
opportunity to encourage policies to promote and facilitate some sports activities also. The
loss of opportunities to practice motor activities of this kind (walking to school or playing
with friends) has an additional impact on the lower propensity for physical exercise in other
situations (group sports activities, etc.)20 and this is an additional factor in the lower
propensity to adopt an active lifestyle as an adult.
Obesity: the impacts on public health and society

SNACKS AND SOFT DRINKS AVAILABLE IN SCHOOLS THROUGH VENDING MACHINES

THE IMPORTANCE OF PARENTS’ ATTITUDES AND BEHAVIOR

The spread of sedentary lifestyles

A sedentary lifestyle is another risk factor for obesity and being overweight. The spread of sedentary lifestyles in childhood often benefits from a change in family and social demands which leave few, if any, possibilities to perform basic motor activities. For example, children spend many hours in front of the television or at the computer because their parents tend to be busy at work until the evening hours. The constant increase in the time young people spend in front of the computer, television, or electronic devices is confirmed by an American study which calculated that the average time youth, ranging in age from 8 to 18, spent in front of electronic devices in 2009 was 7 hours and 38 minutes a day. Compared to five years previously (2004), an increase of 1 hour and 17 minutes was recorded.

Furthermore, current trends indicate that children and adolescents leave home less and less, since parents are very apprehensive about their safety and they participate less frequently in physical education activities (in particular, adolescent girls). And there are numerous international studies which have associated this behavior with an increase in the prevalence of childhood obesity. Physical exercise, besides preventing an excessive increase in body weight, is of fundamental importance for a child’s growth, since it promotes and helps to modify the ratio between lean mass (muscle tissue) and fat mass (adipose tissue). Therefore, it would suffice to practice medium-intensity aerobics, such as a walk that subjects muscles to a slightly intense but constant effort, allowing energy to be drawn from reserves of fats.

Changes at school

Not only has the way children and adolescents arrive at school changed, but the school environment has also changed. In recent years, for example, there has been a radical change noted in the food served at school and the food available through vending machines. As analyzed previously, the consumption of soft drinks increased exponentially between the late 1970s and the late 1990s and this is partly due to the availability of soft drinks sold through vending machines in schools.

In the United States, the spread of vending machines also benefited from the policies adopted by vending machine operators who paid more and more royalties to schools, thus providing increased income for school budgets. Furthermore, in the United States many schools have allowed vending machine companies to advertise products for sale. In these schools, the possibility of easily having constant access to certain products (potato chips, snacks, soft drinks, etc.) in vending machines is correlated to obesity and being overweight. It has been estimated that an increase of ten percentage points in the availability of these products at school produces an increase of one BMI point in children and adolescents.

Family and genetic factors

As mentioned previously, parents’ treatment of their children, often dictated by apprehension for their health and safety, combined with the demands of their work, fosters the acquisition of behaviors and habits based on a sedentary lifestyle in children and adolescents. An Italian multipurpose investigation carried out by ISTAT in 2000 demonstrated how 25% of overweight children and adolescents had an obese or overweight parent, while the percentage rose to about 34% when both parents were obese or overweight. This underlines how crucial family factors are in the development of obesity: the family’s example is fun-
 Obesity: the impacts on public health and society

**SIGNIFICANT RISK FACTOR**

Consequences occur and psychological, emotional, social, in addition to

In conclusion, a child can inherit a predisposition to obesity from his parents' genes, but it

The results of this study, which is of a pioneering nature within the scope of scientific

In a recent study published in Nature, a team of researchers from Cambridge University

Obviously, the study concerned a condition that was rather rare at the population level and

In addition, people who were overweight or obese in their youth have greater exposure

CHILDHOOD OBESITY IS A SIGNIFICANT RISK FACTOR FOR ADULT HEALTH

2.2.2 The effects of obesity in children and adolescents

Childhood obesity is recognized as one of the major public health problems, due to the

It is premature to forecast the impact of this and other genetically transmitted abnormalities

Children themselves perceive obesity and being overweight as undesirable situations; therefore, actual cases of discrimination can arise among children linked to these conditions. In some studies, it has been shown that children placed in front of photographs of obese children have defined them as lazy, idle, and undesirable as friends, but the truly interesting result is that overweight children also indicated that other overweight children were lazy, idle, and undesirable as friends. This situation worsens during the transition to adolescence: obese adolescents, in fact, are teased, mocked, and isolated. Furthermore, cases of severe and chronic obesity tend to increase aggressive and provocative behavior since the adolescent has to “fight” harder to be accepted. Finally, due to the lower level of self-esteem and greater exposure to depression, anxiety, and isolation, obese adolescents are more inclined to behave in ways that are negative for their own health, such as, for example, alcohol consumption and smoking cigarettes.

In addition to the health consequences, obese and overweight children have emotional, social, and psychological consequences. A significant negative repercussion on children affected by obesity and being overweight is the low self-esteem they have, which often makes them feel inadequate with regard to their social frame of reference, compared to their peer group, and which may have more marked manifestations of depression, loneliness, anxiety, isolation, and marginalization by their playmates and at school. To a great extent, children become aware of themselves and their identities by also perceiving how others behave with them: in fact, the self-esteem that a child or an adolescent has increases or decreases according to the responses that he gets from his frame of reference. In the majority of cases, obesity and being overweight are the subject of scorn and, therefore, obese or overweight children suffer from low self-esteem. Depression is another possible consequence of obesity which affects overweight and obese children. In certain cases, these children tend to feel insecure and inferior to other children and react by isolating themselves and falling into a depression, while in other cases they try to be very friendly to be accepted and can actually become “the heart and soul” of a group. As occurs with obesity and being overweight, depression in children and adolescents persists at a high level in adulthood, with consequences on life expectancy, socio-economic status, and the lower likelihood of marrying and forming a family. Depression is another possible consequence of obesity which affects overweight and obese children. Children themselves perceive obesity and being overweight as undesirable situations; therefore, actual cases of discrimination can arise among children linked to these conditions. In some studies, it has been shown that children placed in front of photographs of obese children have defined them as lazy, idle, and undesirable as friends, but the truly interesting result is that overweight children also indicated that other overweight children were lazy, idle, and undesirable as friends.

In addition, obesity in children is a significant risk factor for adult health. Its major effects on health can be summarized as being problems of a metabolic nature (insulin resistance, glucose intolerance, hypertension) and non-metabolic in nature, such as bone and joint diseases (valgus of the lower limbs, joint pain, reduced mobility, flat feet), skin diseases (strie rubrae, acanthosis nigricans), liver diseases (fatty liver), and respiratory diseases (desaturations and nocturnal apnea).

In addition, people who were overweight or obese in their youth have greater exposure to cardiocirculatory diseases (hypertension, coronary diseases), musculoskeletal diseases (early onset of arthritis due to the increase in static-dynamic demands on the spine and lower limbs, subjected more to the weightload), metabolic diseases (diabetes mellitus, high cholesterol, high triglycerides, etc.), up to the development of tumors in the gastrointestinal tract. Increases in body weight and other obesity indices in youth (but not only) can translate into later increases in blood pressure.

A study which recently appeared in the New England Journal of Medicine monitored almost 5,000 American children born between 1945 and 1984, arriving at the conclusion that childhood obesity involves a more than double likelihood of death by age 55, due to the increased risk of developing diseases linked to metabolism, coronary diseases, and hypertension.
Obesity: the impacts on public health and society

The growing rates of obesity and being overweight have important implications on job market dynamics and on workers in the public and private sector. Different studies show how overweight or obese people on average earn lower salaries, are excluded from certain types of occupations (such as, for example, customer relations or sales), and are victims of discrimination in the workplace. In particular, through a study conducted to understand what the impact of obesity is on salaries, it was shown that women are at the greatest disadvantage, without distinguishing among ethnic groups: in fact, both body mass index and weight seem to have negative effects on salaries. The worst data is recorded among white women, for whom it is estimated that being 64 pounds (about 29 kg) overweight causes a 9% reduction in salary, the equivalent of one year and a half of education or three years of work experience. Furthermore, discriminatory behavior against overweight or obese people also occurs during the phase of access to the market or in the workplace. For example, in Great Britain obese people of working age are 15-20% less likely to be hired. Similar discriminatory behavior has been found in Finland, especially against obese women. In Australia, obese people of working age are the category most excluded from the job market: 8% more compared to their peers, and if they are older, the likelihood of exclusion rises to 20%. As previously mentioned in Chapter 1, the costs to companies for obesity and being overweight are linked to absenteeism (Finkelstein, Fiebelkorn and Wang, 2005; Ricci and Chee, 2005), lower productivity at work due to health problems or “presenteeism” (Ricci and Chee, 2005), and disability (Sturm, Ringel and Andreyeva, 2004). The majority of estimates relative to these costs present in the literature refer to the United States, the country which records the highest percentage of obese adults. From the point of view of direct costs, a study estimates that in the United States, companies spend about $45 billion each year for their obese and overweight employees’ medical care. Indirect costs arising from days absent from the workplace caused by obesity are instead equal to $730 for every male employee and $1,063 for women. This study reports that, on average, obese workers miss two days more of work compared to their normal weight colleagues. A more recent study contains data that is even higher: 5.9 working days more are lost each year. According to another recent study, the annual cost that can be attributed to obesity among fulltime employees in the United States would amount to about $73.1 billion, out of which 82% is connected to medical expenses and presenteeism, while the remaining 18% is connected to absenteeism. In the United States, the per capita costs of obesity which are incurred by companies would total $16,900 for obese women with a BMI higher than 40 and $15,500 for men in the same BMI category.

2.3 THE COSTS OF OBESITY IN THE WORKING WORLD
A study conducted by the Australian government estimates that obese workers are absent 17% more than their normal weight colleagues, and for a longer time, or on average, 3.8 days a year compared to people with a normal body type, at 3 days a year. Other studies underline a third effect arising from obesity, which is greater exposure to accidents in the workplace. In fact, overweight workers would be exposed to a risk of disability that is 26% higher than their colleagues’ risk. This risk would rise to 76% for obese workers.

It was indicated that the direct and indirect costs to the employer increase proportionally with the growth in workers’ BMI. In the case of third-degree obesity, healthcare spending is 81% greater than the expenditure incurred for people of normal weight, with an annual cost in terms of lost workdays that amounts to a sum ranging from $460 to $2,485 per capita. Taking into account the prevalence of obesity in the workforce, the estimated loss to an American company with 1,000 employees is about $285,000 a year.

According to a Gallup research study conducted in the United States in 2011, on an aggregate level overweight or obese workers are absent from work 450 million days more a year than their normal weight colleagues, which translates into a loss of productivity equal to $153 billion a year.

In addition to losses in terms of productivity, companies incur medical expenses that are 42% higher for obese or overweight employees compared to other employees.

Lastly, but certainly no less important, it was found that obesity represents one of the major risk factors for early withdrawal from work.

**Figure 2.10. Annual estimates of costs tied to lost productivity and absenteeism, subdivided by weight categories among full-time workers in the United States**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PERCENTAGE OF AMERICAN WORKERS EMPLOYED FULL-TIME</th>
<th>AVERAGE NUMBER OF &quot;UNWELL&quot; DAYS A MONTH</th>
<th>ESTIMATE OF WORK DAYS LOST BY FULL-TIME WORKERS (**)</th>
<th>ANNUAL ESTIMATE OF COSTS DUE TO LOSS OF PRODUCTIVITY ARISING FROM ABSENTEEISM (***)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons of normal weight and without chronic diseases</td>
<td>13.9%</td>
<td>0.34</td>
<td>base</td>
<td>base</td>
</tr>
<tr>
<td>Overweight or obese persons with one or two chronic diseases</td>
<td>17.9%</td>
<td>0.36</td>
<td>1,505,995</td>
<td>$513,544,175</td>
</tr>
<tr>
<td>Overweight or obese persons with three or more chronic diseases</td>
<td>30.2%</td>
<td>1.08</td>
<td>94,381,528</td>
<td>$52,356,821,142</td>
</tr>
<tr>
<td>Overweight or obese persons with three or more chronic diseases</td>
<td>30.2%</td>
<td>1.08</td>
<td>94,381,528</td>
<td>$52,356,821,142</td>
</tr>
<tr>
<td>Persons of normal weight and without chronic diseases</td>
<td>14.8%</td>
<td>1.07</td>
<td>45,659,781</td>
<td>$15,563,165,458</td>
</tr>
<tr>
<td>Persons of normal weight and without chronic diseases</td>
<td>14.8%</td>
<td>1.07</td>
<td>45,659,781</td>
<td>$15,563,165,458</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td></td>
<td>449,845,652</td>
<td>$153,598,049,221</td>
</tr>
</tbody>
</table>

**Note:** Observation Period: January 2 - October 2, 2011. Sample Observed: 109,874 full-time employees (United States).

| Assumption of 112,590,754 full-time employees (United States). Conversion of "unwell" days and days lost in the workforce is 0.032. |
| Source: reproduced by BCFN from Gallup, Healthways Being Index, 2011. |

### 2.4 THE IMPACT OF OBESITY ON ENVIRONMENTAL SUSTAINABILITY

Economic growth, social changes, and the constant search for a higher standard of living have given rise to the tendency to eat foods once considered rare and prestigious more often and in larger quantities. If the possibility of eating a greater variety and wealth of foods has undoubtedly brought some benefits, such as the disappearance or mitigation of nutritional deficiencies in developed countries, the trend toward eating more than necessary and the reduction in physical activity arising from new and diverse types of work, often with imbalances among the various nutrients in the diet, has exposed people to other serious risks such as obesity, hypertension, diabetes, etc.

Consumption of food that is constantly above the recommended calorie requirements by a growing number of people, especially in Western countries, does not only represent a risk to health, but also puts more pressure on natural resources and the environment.

In this regard, scientific literature includes overeating among food waste (Smil, 2004). In reference to food waste generated in the last stage of the food production chain (household and restaurant waste, which in Western countries represents the greatest share of waste occurring throughout the entire production chain), a significant portion is due to the oversized portions served and the quantity of food served, and more in general, to the tendency to eat more than is necessary.

Obviously, all this translates into a greater impact on the environment and overconsumption of natural resources for the production of foods which are not strictly necessary for proper body sustenance. For an estimate of food waste’s environmental impacts in terms of consumption of resources (ecological footprint), water (water footprint), and greenhouse gas emissions (carbon footprint), see the paper the BCFN recently published on this topic.

More generally, different studies have demonstrated that overconsumption of food has an indirect impact on global warming. A study by the London School of Hygiene and Tropical Medicine demonstrated that the high obesity rates in the most developed countries caused 1 billion tons of greenhouse gas emissions every year (out of a total of 31.6 billion tons of greenhouse gas emissions every year).

In conclusion, when comparing a population of obese persons to a normal weight population, on average, the results show that the obese population consumes about 20% more food.
Obesity: the impacts on public health and society

Why narrative medicine?

Illness does not only concern the unhealthy organ and its symptoms (which are typically referred to as diseases), rather, it concerns the inseparable relationship between a person’s life and his/her sickness. At this point, it is no longer called a disease, which is associated with a mechanical approach, but is transformed into an illness, which then connects it to the person’s life experience.

Narrative medicine deals with how people experience their illnesses as a state of being, and the meaning that the sick person assigns to a course of treatment to be initiated with his/her therapist or other healthcare providers.

According to Rita Charon of Columbia University, an expert on narrative medicine, “narrative medicine fortifies clinical practice with the narrative competence to recognize, absorb, metabolize, interpret, and be moved by stories of living with illness. This helps doctors, nurses, social workers, and therapists improve the effectiveness of care and their affiliation with patients and colleagues. Our research and our awareness missions are to conceptualize, evaluate, and spearhead these ideas and practices so that they are employed in every country.”

Columbia University has initiated an educational program in narrative medicine, named “Narrative Medicine Science,” which allows it to have the same significance as evidence-based medicine.

The Center for Humanities in Medicine of King’s College London also affirms that it is a scientific method which does not benefit only individual cases, but the entire healthcare system. In fact, starting from better care for an individual case, and multiple cases told through stories, the ability to understand by written or oral listening is also spreading to a practice to other clinical cases, improving the level of treatment in healthcare.

In Italy, the ISTUD Foundation promoted the O.N.I.C.E. project. It collected 149 stories from obese people through the Associazione Amici Obesi [Friends of the Obese Association] website over a two-month period from March to May 2011.

Research was conducted using a narrative which investigated not only the medical conditions of illness, but also explored what it actually means to live with an illness at the center of one’s life. In the second phase, the collected stories were analyzed using the narrative medicine method. Out of these 149 stories, 92% were stories told by women, while only 8% were men’s stories. The 30–39 age group, to which 41% of participants belonged, was the age group most represented.

The evidence found through people’s stories is that obesity does not only come at a cost to health, but actually also has social, monetary, psychological, and relationship costs to both the individual and society. It is fundamental that people who are affected by this chronic illness rediscover the ability to love themselves, in a house in the city, but in a place which was full of greenery and room to play.

Once upon a time there was a girl named Serena who lived with her mommy and daddy, her brother Daniele and her paternal grandmother, Isolina, who had never married, in a house in the city, but in a place which was full of greenery and room to play.

The childhood of future obese persons can be spent either in a reassuring environment, expressing pride in belonging to their families, or in bitter places which are unpleasant to remember.

Once upon a time there was a boy named Antonio who lived with his mom, dad and little sister in a house in a very ugly city, where all anyone ever thought about was work and they missed all the beautiful things around us, where living in a condo building means not even knowing your next-door neighbor, where sadness is hidden in various ways, ranging from alcohol to drugs, and where everyone appears to be so nice, but deep down they have skeletons in their closets... this “fun city” is so ugly [...].

Once upon a time there was a girl named Isabella who lived with her mommy and daddy until she was 8. She had 7 sisters, 700 sheep, 6 dogs, 3 cats, a few hens, 5 goats, 3 donkeys, and a pig or two, obviously in a house in the country [...]. A sharecropper’s house with no indoor plumbing, with no running water (we had a well) but so much vegetation and just think, we paid the rent with the sheep’s manure, which the farmowner used as fertilizer for his fields.

In regard to the family environment and the habits practiced therein, it is deduced from the stories that the refrigerator contained a certain amount of “unhealthy foods,” even if most of them were placed in the pantry. Foods that the narrators considered junk food were packaged foods and were mostly meant to be eaten between meals, such as soft drinks, snacks, potato chips, and snack cakes.

It is instead surprising to note how only rarely was the food which appeared on the tables of future obese persons considered to be poor quality, since almost half of the family’s diet was described as balanced, varied, and rich in fruits and vegetables. This fact is interesting if it is combined with the following descriptions, which portray the family’s food as being served in large quantities, or being fatty because it was fried or highly seasoned. It is evident that the problem is not always to be found in the kinds of foods that are eaten, but in how the food is prepared and in what quantity it is served.

It is understood that, starting in childhood, the obese child has the opportunity to access food criteria that is less healthy than the criteria used at home, by eating independently, which he/she manages by using secret places to stash stolen food, or food that was asked for and obtained in quantities that exceeded the proper amount.

At home, healthy balanced food was cooked, with lots of vegetables and fruits, the quantity was never excessive. The refrigerator was full of healthy items, too many [...]. while the pantry was also full of equally healthy items. Perhaps there were also secret places where food was stashed. Oh yeahhhhh!!! I would want to take a shower so I could fill myself up with food (bought on the sky)! The refrigerator was filled with all kinds of things, while the pantry was filled with everything except snacks, which are instead now plentiful everywhere.

At home we cooked a variety of foods, and in large portions, with many fatty sauces, but with lots and lots of vegetables too. The food we liked best was actually, it is, cheese of every kind and quality, splashed down in industrial quantities.

The refrigerator was full of all kinds of treats, while the pantry was full of pasta.
Obesity: the impacts on public health and society

When grandmother would cook, the food was fatty, when mom cooked the food was healthier, but she couldn’t cook too often [...] but Sunday was a holiday and we stuffed ourselves with food.

I would often eat away from home, without anyone knowing about it and without enjoying what I was eating, gulping it down because I was afraid of being seen.

Aspects of the approach to nourishment also clearly emerge from the narrations, which underline how, from childhood, obese persons identified food as a form of transgression, a consolation, a pleasure, or even as an obsession. It can already be pointed out to her that she was “breaking down.”

Growing up, the girl kept getting taller, up to 140 cm. [4 feet, 6 inches], and kept getting fatter, until she hit a weight of 69 kg. [152 pounds] at age 12. There was no doubt: she had become obese.

The first things that made her notice it were the mirror and the scale [...] in addition to her mother, who with her constant criticism, told her she was “breaking down.”

Growing up, the girl kept getting taller, up to 165 cm. [5 feet, 4 inches], and kept getting fatter, until she hit a weight of 80 kg. [176 pounds] at age 22. There was no doubt: she had become obese. Everyone pointed it out to her.

The family started saying that the important thing was to be in good health, making her feel she was supported.

They begin to be oriented toward the family’s aspirations and society’s stereotypes of beauty, which are directly proportional to thinness. Therefore, the first preoccupation that is triggered in an obese adolescent is the individual himself realizes that he is overweight, and becomes aware of the condition of their own body. Therefore, it can be stated that this is precisely the moment when the person who had initially been thought of as fat or chubby now becomes obese, in the minds of others as well as in their own mind.

Family members are often the ones who convey this awareness, especially mothers, although many people independently become aware of the condition of their own body.

Awareness of being obese may occur through intervention by the family or an educational figure of reference, but it must be kept in mind that what often happens is the individual himself realizes that he is obese through an object, such as a mirror, a scale, or clothing that can never be worn. How dramatic this realization is can be seen.

I was always chubby as a child and as a teenager, although thanks to weight-lifting I had a rather “square” shape and when I ate I did so with gusto, sometimes only to be a glutton, sometimes only out of habit, and other times because I was actually really hungry.

Normal. I like defining it this way. In the sense that I was neither too thin nor had a few extra kilograms. Normal. That was until age 20.

Instead, in other cases, they try to value some positive points of their appearance or they become very judgmental about being fat.

I was always chubby, but very reassuring.

I had been chubby ever since I was little; I was always chubby, round, but not fat, let’s say I was pretty to look at.

Instead, I’m the usual fat lady.

Her body was enormously disgusting.

Awareness of being obese may occur through intervention by the family or an educational figure of reference, but it must be kept in mind that what often happens is the individual himself realizes that he is obese through an object, such as a mirror, a scale, or clothing that can never be worn. How dramatic this realization is can be seen.

I was always chubby ever since I was little; I was always chubby, round, but not fat, let’s say I was pretty to look at.

Instead, I’m the usual fat lady.

Her body was enormously disgusting.

Awareness of being obese may occur through intervention by the family or an educational figure of reference, but it must be kept in mind that what often happens is the individual himself realizes that he is obese through an object, such as a mirror, a scale, or clothing that can never be worn. How dramatic this realization is can be seen.

I was always chubby as a child and as a teenager, although thanks to weight-lifting I had a rather “square” shape and when I ate I did so with gusto, sometimes only to be a glutton, sometimes only out of habit, and other times because I was actually really hungry.

Normal. I like defining it this way. In the sense that I was neither too thin nor had a few extra kilograms. Normal. That was until age 20.

Instead, in other cases, they try to value some positive points of their appearance or they become very judgmental about being fat.

Very chubby, but very reassuring.

I had been chubby ever since I was little; I was always chubby, round, but not fat, let’s say I was pretty to look at.

Instead, I’m the usual fat lady.

Her body was enormously disgusting.
obese people tend to be defensive about their weight.

When she would leave the house, she mostly wore black; to go elsewhere, she would take the car. The crowd would look at her and she felt she was being mocked by anyone she would see laughing or whose gaze lingered a little longer on her person, but this happened at work too. It would happen to her if she saw her co-workers talking, she would think that they were talking about her in a negative fashion [...] When she was among them, she would smile and be courteous, that was her specialty.

The crowd would look at him and he would feel like a piece of garbage. When among them, he isolates himself and his wife has pointed it out to him more than once.

She was always smiling. Over time, her friendliness became a shield, her emotions were different when she was among people. Sometimes she smiled too much, almost taking pleasure in making herself disappear. Sometimes she didn’t even feel like setting foot outside the door so she wouldn’t be seen; you pretend nothing is wrong and you’re dying inside [...] in silence, and with a polite smile on your face.

Their relationships with work

Obese adults do not seem to have difficulty in finding a job and therefore they are persons who tend to be professionally fulfilled, but who are not satisfied because, again, the positive result is canceled out by the weight of their bodies. In fact, the latter may have created some limitations on three levels in their job search: on the functional level, because an obese person may appear unfit for certain duties that require speed; on an aesthetic level, because the fact of being fat again brings up their problems of relationships with others, since they are exposed to colleagues’ prejudices; and on the internal level, because all these aspects are transformed into a feeling of worthless-
ness, which has a great impact on the obese person and on their quality of life. She looked for a job and she did find many, but she never found a job that was stable [...] and she thought that her heavy body could hinder her, but only lately, that is, now that she was seeing that the weight was starting to “make itself felt.”

She looked for a job and as it happened, she found one at age 22, and thought that with her heavy body, she always felt embarrassed.

He looked for a job and as it happened, he found one right away.

**Their relationships with social relations (family and friends)**

The lives of obese adolescents change little by little and begin to take on more independence, sometimes, a break in relationships with their families even occurs.

In the meantime, marriage and two little girls changed my life, which, along with work, became more and more stressful also because I managed to lose the few good habits I had. I stopped smoking and gained more weight.

The lives of the people who told their stories present a path of very significant changes and the achievement of important objectives. However, very often the narrators express dissatisfaction and seem to concentrate on how much weight they manage to lose, rather than on motives for happiness, such as creating a family.

Then my other half arrived, the other half of happiness, such as creating a family.

The journey through treatments

The first medical consultation usually occurs during adolescence. That is, when the esthetic issue arises and especially, when parents realize that it is unlikely that their son/daughter will lose weight as they grow and develop.

The first diets produce a remarkable weight loss in 84% of the cases, but do not demonstrate that they last over time. Instead, this unleashes the “yo-yo effect” or the tendency to gain and lose weight at different times.
Obesity: the impacts on public health and society

Treatments usually begin during adoles-
cence, when the awareness of being obese
finally emerges, and continue for many years
until a decision is made to use bariatric and
other surgery. It is thought that if profes-
sionals and the family listened to each other
better and coordinated more, beginning
in childhood, both the illness and the high
expenses faced by affected persons could
be prevented. Through the narratives, it is
deduced that these persons believe that the
money spent for treatment is wasted when
the treatment doesn’t work; they are much
more willing to agree to spending money
for a treatment that is effective. From other
narrations collected in February 2012, the
annual cost of often useless visits to nutri-
tionists, dieticians, doctors, psychotherapists,
and other people who say they can make
people lose weight varies from a minimum
of £120 to a maximum of £2,892.

When I was 17, I spent a fortune on dieticians:
in addition to giving me amphetamines, they
also would give me local injections on the in-
ner thighs to reduce their size (the pain was
intolerable and they didn’t do a damned thing).

At the time, the cost was almost 700,000 lire
monthly (my grandfather was paying...). I did
it, let’s say, for eight months, for a total of
5,600,000 lire (2,892 euros).

Afterward, expenses were relatively limited:
for a private dietician, who was always giv-
ing me amphetamines, as when I spent a
total of about 100,000 lire between visits and
pills every two months, for a period of
about one year (1,200,000 lire = circa 630
euros). And then another ten months a few
years later (1,000,000 lire = circa 516
euros). Since I was being monitored at the fat
I am spending about 25 euros every 3-4
months (even less, since the checkups are
often 5-6 months apart). The first year I
had four appointments in all, this year only
one (for a total of 125 euros).

Last year I went to a nutritionist. She
charged me 100 euros without an invoice
and 120 euros with an invoice to give me
a crazy diet and say lecithin-based sup-
plements, which were very expensive,
and a mild diuretic, at an exorbitant
price. I went out the door and she never
saw me again, even though I did leave her
the 120 euros. The treatment cost about
13.50 euros a week for three years, but
they never supplied supplements or any-
thing else. Every week there was a hostess
who held the meetings, so at least they did
offer you a service (it wasn’t just one ap-
pointment and see you in six months for
the checkup). With the Zone Diet, the doc-
tor had cost me about 100 euros. Also to
eat the middle meal I ate the little bars,
1.60 euros a day. (Even if they didn’t tell
me to eat their bars, I could have cooked
the meat myself, but you know, a sugar
junkie would do anything to have some-
thing sweet...) [ ...] Then I spent 100 euros
last year for a checkup with the ear, nose
and throat specialist, who told me that
even though I had a strong impression of
not hearing well, I had no ear problems,
but he also strongly advised me to lose
weight (...). He was also in the expenses.

Final thoughts

In all 149 stories collected within the scope
of the O.N.I.C.E. study, moments of social
discrimination linked to obesity and its
perception emerged in Italy.

Being obese is not a single condition;
moreover, a family situation that is cor-
related from early childhood to the rela-
tionship with food.

Furthermore, it is found that the obese
person spends many years not following a
scientifically valid treatment to lose weight,
but instead makes a series of clumsy at-
tempts with unqualified personnel.

Instead, the myth that esthetic concerns
are what really drives the choice made for
treatment must be cleared up, because the
true perception of the illness occurs when
the body sends symptoms of serious threats
to health. It is precisely because of reasons
linked to physical suffering that the decision
to start a course of treatment is made, plac-
ing oneself in expert hands.

Unlike the stereotype presented by the
media, that “fat is beautiful and happy,” a
strong streak of loneliness and sadness is
found, which can actually cast a shadow
over important and joyous events such as
a wedding, the birth of a child, and pro-
fessional and educational success.

Furthermore, unlike the cliché that says
that people who are suffering from a dis-
ease are professionally unreliable, obese
persons are very serious and responsible:
unlike other studies which demonstrated
difficulties in access to the working world,
all of the project’s participants stated they
had a solid professional position where,
however, relationships with colleagues
tend to be formal and difficult.

Future hypotheses to be taken
into consideration

Although it is a chronic illness, it has been
attested that obesity can be cured.

- It is unthinkable that those who suffer
from it must face the course of treat-
ment alone. In fact, a narrative medi-
cine has revealed the need for strong
decisional and motivational guidance
to support people who undertake the
journey through treatment, in order to
reach sufficient self-control to consoli-
date the weight loss achieved through
treatment.

- Treatments, from diets to bariatric sur-
gery, only work if they are personalized
and take the individual into account: it
would be desirable to create a course
of healthcare that is well-defined or is
the subject of media communications
whilst, limit the propaganda of random
hopes. Furthermore, treatments and
tools for prevention must be acces-
sible nationwide through a common
welfare program guaranteed by syner-
gy between the national and regional
governments, and their healthcare and
social agencies, in alliance with one
another.

- Families must be educated on proper diet
and the ability to recognize the first
signs of obesity through an active contribution
from schools and pediatricians: in fact,
a synergy must be created to spread a
culture that is oriented toward healthy
food education and an active lifestyle.
Unfortunately, the messages being given
in the schools are often contradictory, on
the one hand, teachers advise children
to eat raw fruits and vegetables: on the
other, there are vending machines in the
school hallways that dispense low-cost
products not in keeping with the recom-
dendations.

- Until now, the media have dealt with the
issue of obesity only in a superficial man-
ner and linked to esthetics; they must
now activate awareness campaigns for
the population on the subject of obesity
as a disease to be treated, and not simply
as an imperfection to be corrected.

Obesity prevention will lead to objective
savings for the healthcare system (rela-
tive to diseases such as diabetes and other
dysmetabolic syndromes, cardio-
cerebral-vascular problems, bone and
joint syndromes) as well as for the peo-
ple involved in treatment, and therefore
it may be considered a social investment
for all nations.
3.1 PUBLIC POLICIES FOR DEALING WITH THE PROBLEM

3.1.1 The WHO guidelines

Today, non-communicable diseases such as cancer, chronic pathologies of the respiratory system, cardiovascular diseases, and diabetes represent a primary threat to human health. These four pathologies cause 35 million deaths per year, about 60% of the total deaths in the world, and 80% of those registered in medium-low income countries. More than 80% of cardiac diseases, type 2 diabetes, and a third of the tumoral forms can be prevented by eliminating the risk factor which generates them, such as consuming tobacco-based products, unbalanced diets, physical inactivity, and excessive consumption of alcohol. Nonetheless, without a consistent and joint commitment by the governments, industry, and the main stakeholders at global level, the death rate due to these pathologies shall continue to grow. It is estimated that over the next 10 years, deaths from non-communicable diseases will increase by 17% at global level and, even more worrying, the increase will be most acute in Sub-Saharan Africa (+27%) and the Middle East (+25%).

The fight against non-communicable diseases and their risk factors must, therefore, be among the primary options of global policymakers’ agendas and it is necessary to form a basis of consent on the matters of public health which necessarily require medium-long term policies. In the resolution at the end of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases, held in September 2011, WHO provides some important guidelines for adopting policies aimed at fighting the morbidity and mortality of noncommunicable diseases, asserting: “It is necessary to acknowledge how an increase in prevalence, morbidity, and mortality in non-communicable diseases is widely combative through the adoption of shared and multi-sectoral actions by member States and other stakeholders involved at the national, regional, and global levels. A reduction in the level of exposure of single individuals and the collectivity of identified risk factors, together with the reinforcement of actions aimed at creating a higher awareness in choices in daily life, are defining factors for the success of these strategies.”

WHO has dedicated a whole section to the policies needed for reducing the incidence of the risk factors in the Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases 2008-2013. The main objective is to convince individuals to consciously make more healthy choices during their daily lives. It is necessary to involve both the public sector and the private sector in various environments, such as agriculture, finance, business, urban, education, and sport, and in different contexts, such as schools, work, family, and associations.

Among the risk factors upon which WHO has focused its efforts, are obviously overweight and obesity, which are increasingly assuming the form of a global epidemic. In 2004, WHO published a document which identifies and explains certain strategies which can be pursued in order to limit the expansion of the phenomenon, including:

- Promote and support breastfeeding during the first 6 years of life and develop specific feeding programs for infants;
- Develop a national program on nutrition focused on the prevention of non-communicable diseases;
- Establish and implement guidelines for healthy eating and favor a more healthy composition of food by means of:
  - decreasing quantities of salt;
  - eliminating trans-fatty acids;
  - decreasing saturated fats;
  - limiting sugars;
- Provide precise information to consumers in order to incentivize more conscious choices;
- Implement a program leading the main producers of food and non-alcoholic drinks to realize more responsible marketing campaigns, especially for children.

3.1.2 The role of the government in consumer choice

The fight against obesity, in the same way as the fights against the consumption of tobacco or alcohol abuse, is connected to the action of the governments. Through the regulation and imposition of taxes, the implementation of campaigns for information and awareness, or a mixture of all these measures, governments can play a fundamental role in addressing the process of consumer choice. The measure and the approach – which can be more or less paternalistic – with which the State decides to intervene on consumer choices can define some of the criticalities linked to the possible distortions of consumption. Defining the level of “interference” to be exercised by the policymakers on individual choices in relation to the set objectives and expected results thus becomes decisive.

Government programs may, therefore, be subdivided into four typologies:

- Actions aimed at extending the possibilities of choice by consumers;
- Actions aimed at changing consumer’s preferences without influencing the final price;
- Actions aimed at increasing the final price of certain products or services;
- Prohibition to consume certain products.

Expansion of the possibility of consumer choices

The expansion of the possibilities in choice is the least intrusive adoptable measure because it does not limit consumer freedom. For example, the offer of new urban transport procedures, aimed at limiting the use of personal vehicles and thus avoiding the formation of excessive traffic and pollution, is a measure for expanding the public transport offered to consumers. The limit of these least intrusive measures is cost and the uncertainty of their success: in fact, consumers are supplied with a wider range of possibilities without, however, a clear indication of choice. In the case of the fight against obesity, incentives could be supplied to food manufacturers for healthier foods for the purpose of being able to market them at lower prices, increasing the products available to consumers at a set price.
Obesity: the impacts on public health and society

3.1.3 Conclusive considerations

In short, governments may encourage changes in the lifestyle of citizens, favoring the availability of new alternatives for healthier consumption or facilitating access to those already existent; or again, they may use various forms of persuasion, education, or information in order to make healthy options more attractive and the subject of conscious choice. This “discree” approach can be costly and hard to realize. In fact, a more direct approach, based on the imposition of rules or the use of tax measures directly concerning the products, may prove to be more immediately applicable and less costly to realize from an economic point of view, but it affects all consumers indistinctly with high political and social costs and potentially regressive effects.

An investigation on the policies adopted at the national level indicates how OECD and EU countries are intensifying efforts to encourage a healthy diet and an active lifestyle

Most of the countries promote initiatives aimed at school-age children, such as introducing healthy foods in school menus and vending machines, health education programs, or improving opportunities for physical activity. Many governments distribute nutritional guidelines and messages promoting health, encouraging the use of bicycles or traveling by foot. On the other hand, governments can be resistant to the use of normative or fiscal instruments due to the complexity of such instruments, but also because they fear conflict with the food industry, which does not help achieve public health objectives. Nonetheless, in recent years there has been an increase in the initiatives concerning the taxation of certain categories of products.

Combining different interventions in a prevention strategy covering various age ranges and groups at risk can provide an effective solution at a sustainable cost, guaranteeing a much greater gain in health than that achieved through the single interventions. It is calculated that such a strategy would cost no more than €9 per inhabitant in Mexico, €15 in Japan and England, €17 in Italy, and €24 in Canada: an infinitesimal percentage of the overall health expenditures in these countries, and which would only constitute a small part of that 3% of health expenditures which OECD countries spend on average for prevention policies. If implemented, this strategy would prevent 155,000 deaths by chronic illnesses every year in Japan; 75,000 in Italy; 55,000 in Mexico; and 40,000 in Canada, given that the incidence of chronic diseases would decrease, reducing disability and improving the quality of life.

It is clear that the outcome on people’s health can only be achieved in the medium-long term, a time span that goes well beyond the usual alternations in national governments. The projects to be activated often involve long realization times and repeated investments over time.

In order to concretely achieve the expected results, it is necessary that the initiatives be inserted into medium-long term plans, in order to avoid the risk of suspensions or delays dictated by the emergence of other requirements, above all in conditions of limited available public resources – such as those which we are currently experiencing.

Another element of great importance, aimed at guaranteeing the achievement of the objectives pursuant to these plans, is the perfection of reliable systems for measuring results, in order to evaluate the true effectiveness of the actions taken, both in the short and long term. Only in this way is it possible to verify, using certain data, the correctness of the actions taken and their validity, not only from a social-cultural viewpoint, but also regarding economics and people’s health.
3.2 THE USE OF TAX LEVERAGE FOR DISINCENTIVIZING THE CONSUMPTION OF CERTAIN FOODS

3.2.1 Introduction

The previous section analyzes the range of possible actions to be implemented and the policies to be adopted in order to reduce the obesity epidemic. In recent years, the OECD has made an important contribution to the development of the topic, publishing studies, formulating proposals, and analyzing various and feasible plans of action for governments, bodies, and international institutions. Such analyses clearly show how the impact on economy and health of the programs aimed at increasing physical activity and favoring the adoption of a balanced and healthy diet in the population is more effective when representing an ample and coordinated action of prevention than single specific interventions, which may be useful, but may prove less intensive and of doubtful effectiveness in the long term. In other words, coordinated prevention interventions would be more effective, less costly, and longer lasting over time, compared to single interventions.

The governments have various possibilities for encouraging citizens to adopt healthier and more balanced lifestyles and dietary models: in order to make people more aware of their eating habits, they can use education and information, such as recommending or not recommending certain foods, tax instruments, or introduce restrictive regulations.

The use of tax leverage for a more restrictive regulation is a “transparent” approach because it clearly indicates what is to be achieved and the message is explicit; but, at the same time, this causes problems concerning equity, in that it affects all consumers in an indiscriminate manner, including those who are not obese or those leading a healthy lifestyle, and has a different impact on the various population groups in economic terms. In this way, complex regressive effects can be generated on certain types of consumption and consumers.

In relation to the potentially negative side effects of tax instruments, until recent years, OECD countries aimed their efforts in the battle against obesity by using instruments of education and information, mainly focusing on school-age children, regulating meals served in school canteens and foods sold in vending machines within the schools and areas used for physical activity, and introducing, albeit infrequently, information courses on health by means of distributing guidelines on diet and physical activity.

In the last three years, however, there has been a strong acceleration related to the use of taxation on consumer food products aimed at fighting the obesity epidemic. At the same time, in many European companies (for example, France, Spain, and Italy), activities promoting lifestyle and healthy eating models, especially using local initiatives, such as those launched in the United States (“Let’s Move”), in Great Britain (“Change4life”), and in Switzerland (“Action-sante”), are extensive and coordinated. The novelty of these programs is that a relevant role...
the food and distribution industries can play in the fight against obesity has been acknowledged. Therefore, in partnership with the food industry, actions were implemented to reformulate the offer in an attempt to reduce the content of certain ingredients deemed potentially damaging to the health (first of all, by reformulating the recipes regarding total fats, saturated fats, and salt), to reduce the average size of portions sold, to make healthier alternatives available with respect to present products with high caloric content, and to limit the advertising of these latter products, in particular advertising aimed at children, who are more vulnerable.

The most important innovation in this framework, one which has produced opposing reactions among the different stakeholders, is linked to the imposition of specific taxes in order to limit the consumption of foods whose content and caloric count are considered unhealthy.

3.2.2 Taxes on “junk food”

Between the end of 2010 and the start of 2011, many countries in the OECD have introduced taxes on foods and beverages deemed and/or defined as unhealthy and having an unbalanced caloric composition, which are also commonly known as junk food. The idea behind the use of tax leverage, together with other measures for fighting obesity, lies in the most consolidated economic relationship existing between the price and quantity of goods: that is, an increase in the price of goods corresponds to a decrease in the quantity sold/consumed.

Therefore, the use of the tax instrument has two effects: the first potential effect is to change eating habits and reduce the assumption of unhealthy foods; the second, certain, effect is to increase tax revenue for the State’s coffers.

In particular, OECD countries recently using the tax instrument include:

- Denmark. In 2010, duties on some pastry and cake products, chocolate, ice cream, and sugared beverages increased by 25%. In October of 2011, a surcharge of 16 Danish Crones (€2.15) per kilogram of nutrient was introduced on foods having a concentration of saturated fats exceeding 2.3%. The declared objective was to safeguard public health and the reduction of connected health costs, but also an increase in tax revenue for the State. Economic estimates, in fact, speak of an increase in revenue equal to at least €200 million per year. More specifically, foods subject to taxation include butter, oils, and dairy products in general. The estimates carried out by the Danish government indicate an expected reduction of 4% in the annual consumption of saturated fats. The impact on prices registered for the months following the introduction of the surcharge include a 30% increase in the price of a package of butter, 8% for a pack of crisps, and 7% for one liter of olive oil.

- Hungary. In 2011, a “chips tax” was introduced with the objective of slowing the problems of weight and obesity and, at the same time, dedicating additional resources to the national health system. The tax is applied on certain foods having a high content of sugars, salt, caffeine, and excess carbohydrates. The rates on such foods have increased by 5-20%. The tax is equivalent to €1.60 for every 100 liters of sugared beverage having a fruit content lower than 25%, €3.35 for every 10 kg of prepackaged confectionary, and €6.67 for every 10 kg of food aromas and salted snacks. The incremental revenue for the State is estimated at €70 million per year. Not available, however, are estimates on the expected reduction in consumption of the affected foods.

- Finland. In 2011, a tax of €0.75 was introduced for each kilogram of confectionary products and it was decided that the excise tax would be increased by €0.03 per liter for sugared beverages (from 4.5 to 7.5 euro cents per liter).

- France. In January 2012, France introduced a tax both on sugared beverages and beverages containing sweeteners. The tax is €7.16 for every 100 liters of sugared beverages or beverages with added artificial sugars, equivalent to about 7.2 euro cents per liter, equal to about 2.4 euro cents per can.

### Figure 3.1. Countries which have introduced taxes on “junk food”

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>YEAR</th>
<th>TYPOLOGY OF TAX</th>
<th>FORESEEN REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>2010</td>
<td>Increase in duty of 25% on chocolate, ice cream, sugared beverages and foods rich in sugar</td>
<td>N.D.</td>
</tr>
<tr>
<td>Denmark</td>
<td>2011</td>
<td>2.15€ for each kg of saturated fat, on foods having a content of saturated fats &gt; 2.3%</td>
<td>200 million €/l</td>
</tr>
<tr>
<td>Denmark</td>
<td>2011</td>
<td>Expected effects of reduction 4% consumption per annum of saturated fats</td>
<td>Effects recorded in average price increase of 30% for a package of butter, 8% for a pack of crisps, 7% for a liter of olive oil</td>
</tr>
<tr>
<td>Denmark</td>
<td>2011</td>
<td>Rates increased between 5 and 20% on foods and beverages containing sugar, caffeine, and carbohydrates in high content</td>
<td>70 million €/l</td>
</tr>
<tr>
<td>Denmark</td>
<td>2011</td>
<td>1.6€ for every 100 liters of sugared beverages having a fruit content lower than 25%</td>
<td>6.67€ for every 10 kg of food aromas and salted snacks</td>
</tr>
<tr>
<td>Denmark</td>
<td>2012 (January)</td>
<td>7.16€ every 100 liters of sugared beverages or those having added sugars (4.4 euro cents per can)</td>
<td>210 million €/l</td>
</tr>
</tbody>
</table>

Other countries are discussing the opportunity to introduce taxes on “junk foods” as instruments for reaching the objectives of reducing obesity, and among these are Italy, Belgium, Ireland, Romania, and Great Britain.

3.2.3 Pros and cons of taxation on junk food

The idea of taxing certain foods rather than others for the purpose of encouraging consumers to reduce their consumption is a very controversial issue. The varying positions (pros and cons) are related to two distinct themes: the first is linked to the methods for identifying food to be taxed; the second is correlated to the opportunity and typology of duties to be applied in order to reduce consumption of these foods.

Regarding the first theme, and as can be gathered from an analysis of the cases reported above, there is no universally acknowledged methodology to be followed in order to unequivocally identify which foods are to be taken into consideration and in what way. Rather than the type of consumed food per se, it is the quantity and frequency with which it is consumed that can cause problems due to its poor nutritional and caloric balance, as well as a sedentary lifestyle. Sugar, fats, and salt are essential to living, but they can produce damaging effects to human health when ingested in high doses or exceeding the required amount and/or for prolonged periods of time.
International guidelines set precise indications on the recommended levels to be taken for each nutrient deriving from a daily diet as a whole: continuously exceeding such reference values increases the probability of having effects on health. Given that, to date, there is no subjective and recognized methodology which indicates the threshold values for the various nutrients beyond which individual foods are considered unhealthy, different taxation schemes have been applied which only affect certain categories of foods and/or nutrients, and these differ country to country.

With reference to the second theme, on the one hand there are those who sustain that taxation of foods having an unbalanced content and caloric count is necessary in order to protect public health and the sustainability of healthcare systems; on the other hand, there are those who sustain that imposing a tax on one of these types of food does not lead to any significant change in eating habits, but could instead generate unforeseen side effects.

If one observes the estimates elaborated by the various countries of the impact caused by a reduction in the consumption of “junk food” following the introduction of specific taxes, it becomes clear that the variable used is relative to the elasticity of consumption with regard to price.

Nevertheless, it is hard to estimate what the overall reaction of the consumers will be in relation to increases in price due to taxation, when only the elasticity of consumption to price is considered. Individuals choose foods according to their cultural and social backgrounds, and according to preferences linked to individual taste and – an increasingly relevant phenomenon – to the availability and concrete accessibility of such food (consider, for example, that it is not always possible to eat fruit or fresh vegetables during the work day), and considering price as the only factor for inducing changes in eating habits proves reductive.

In this context, taxation on “junk food” could also cause side effects which, in fact, can annul or limit the action implemented by the fiscal instrument to a large extent. It could happen, for example, that some consumers reduce their consumption of healthy food in order to compensate for the higher cost of foods having an unbalanced content and caloric count. Other consumers could address their preferences to replacement foods which may potentially also be considered “junk food” simply because different criteria of classification are used. Still others might absorb the increase in price and keep their consumption habits unaltered.

This raises problems in relation to the regressive and partially discriminatory effects produced by taxing foods with an unbalanced content and caloric count. Given that citizens having lower incomes spend a higher quota of their income on food compared to higher income citizens, such tax is more of a burden on those with lower incomes. On the other hand, citizens with the lowest incomes are the ones at greatest risk of becoming obese.

In conclusion, when wishing to use fiscal instruments, the intervention should be of a notable entity (contained increases are not very visible and do not cause changes in consumer’s habits) and extended to replacement products, unhealthy alternative products, etc.

With reference to the analyzed cases, it must be stressed that there is no common and ample application which includes, for example, the substitute products. Taxing sugared beverages, which medical-scientific studies deem responsible for the increase in obesity, may not lead to the desired effects of reduced consumption, when implemented only for that category of products, only using tax instruments, and without the aid of information and education campaigns on the issue.
3.3 THE ROLE OF INDUSTRY AND MARKET PERSPECTIVES

It is evident, from the previous sections and the previous documents published by the BCFN, that there are many players who can and must have an active and proactive role in order to significantly reduce the extent of the problem of obesity. Due to a global increase in prevalence of this pathology and the problems of public health connected to it, governments, as the main responsible bodies for the sector, have started to put programs into practice for preventing and fighting the phenomenon (sections 3.1 and 3.2). In order to make government programs more effective, the involvement and close collaboration of manufacturing and distribution companies operating throughout the food chain are necessary, considering the important role they play in the creation of the product offer and their communication skills which can influence food consumption. During recent years, the food industry has undertaken a decisive and progressive process of variation and enlargement of what it offers to consumers. They are doing this by reformulating products already on the market to obtain nutritional profiles which are more aligned with the main international guidelines and the launch of new product lines designed for obtaining predefined nutritional characteristics (see, for example, products with nutritional and healthy claims). Together with these actions, communications to the public have been enriched with specific information on the role that individual products can play within a correct diet (GDA system) and with suggestions for correct consumption; self-regulation codes for communication toward sensitive targets have also been introduced. Shown below are two in-depth examinations: one, on the French program Epode and, the second, on the Swiss program Action santé. They represent examples of programs in the fight against obesity which actively involve the main stakeholders of the food chain.

The EPODE program

In 2003, eight French cities initiated, with the representation of the Ministries for Families, Youth, Teaching, Agriculture, and Diet, the EPODE project (Ensemble prévenons l’obésité des enfants), which has several initiatives for fighting and preventing childhood obesity. In particular, the EPODE project aims to:
- integrate school courses with teaching campaigns on the theme of dietary education;
- promote a dynamic and non-sedentary lifestyle;
- adapt the food offered at school canteens for the purpose of getting children used to a healthy and diversified diet;
- involve parents in the healthy development of their children.

The project intends to carry forward two programs realized on two levels—one national and one local. At the national level, guidelines are established through the interaction between three different bodies (a group of independent nutrition experts, the involved ministries, and a number of multinationals active in the food sector), at the local level, the implementation and coordination of the identified policies are entrusted to a project manager who can count on the collaboration of the local authorities and main stakeholders.

The project consists of the involvement of all the local stakeholders (schools, media, associations, retailers, supermarkets, etc.) in the implementation of a long-term strategy aimed at modifying the urban environment so that it favors correct lifestyles and eating habits for families and children in particular.

Figure 3.2. The local stakeholders involved in the EPODE project

Among the different initiatives, of particular relevance is the use of advertising channels as a vehicle for making children and their families aware of the importance of a healthy diet, through messages of social communication emphasizing the importance of eating fruits and vegetables, a varied diet, and practicing sport. The program involves several partners among multinational companies\textsuperscript{15} and some local groups.

With a view to public-private partnerships, the companies make a yearly contribution (for a minimum duration of 5 years) equal to €1 for each inhabitant of the cities which adhere to the initiative. Private contributors add to the public commitment, which can vary from €1.50 to €3 per year per inhabitant. The cities participating in the EDOPE project must be able to guarantee:
- recruitment of a local full-time project manager;
- the organization of specific activities each month;
- participation in national meetings of comparison with other member cities;
- financing of €1.50 per inhabitant per year for a period of five years.

The success of these initiatives can be appreciated when one considers the great participation of the local stakeholders registered in the eight French pilot cities: between 2003 and 2008, an encouraging reduction in the average BMI of children was registered\textsuperscript{16}.

Between 2008 and 2011, in collaboration with DG Health and EC Consumers, a European plan was realized, EEN (EPODE European Network)\textsuperscript{17} with the objective of distributing the EDOPE project to other countries or implementing similar programs. Today, the EEN project involves about 4 million people in 226 French cities, 38 Spanish cities, 16 Belgian cities, and 13 Greek cities.

The Actionsanté program

Recognizing the necessity to realize a network of cooperation with government programs which covers as many phases of the food chain as possible, the project involves companies active both in the production and distribution of foods. The partners in Actionsanté may choose to actuate a voluntary action in one of the following four fields of action:
- information for consumers, diffusion of complete and comprehensible information on the products in order to facilitate balanced diet choices;
- marketing and advertising: clear rules in the form of a code of conduct for marketing and advertising, in order to reduce the exposure of sensitive categories of consumers to foods rich in calories;
- composition and offer of foods: easily-available foods and non-alcoholic beverages with a lower content of fats, salt, and sugar in order to facilitate a balanced diet;
- promotion of an environment that favors physical activity: promoting spaces that favor physical activity and building the necessary infrastructures in order to encourage the daily practice of a physical activity.

Figure 3.3. Development of the number of member partners and the actions implemented during the three years 2009-2011 (A); number of actions completed to date in relation to Actionsanté per category and promoting company (B)\textsuperscript{18}

\textsuperscript{15} nestslé, Mars, Migros, Traitafina, Coop, Swisse Pledge, Selecta, Unilever, Unilever Food Solutions, Nestlé, Coop, Migros, Mars

\textsuperscript{16} Source: Actionsanté, Activity Report, 2011.
In summary, an analysis of the sustainability reports of a number of major companies in the food industry reveals that food production and distribution companies are implementing actions aimed at:

- promoting correct lifestyles and eating habits starting from the earliest age through productive strategies and communication in line with the indications emerging from the most accredited and authoritative scientific studies concerning the relationship between food, lifestyle, and health;
- improving the available scientific knowledge by means of investments in applied research and the creation of mixed university-company groups which may lead to improved comprehension of the links between obesity and a set of external variables (environment, school, communication campaigns, etc.)
- improving the processes of communication on the matter of relations between eating, lifestyle, and health at a young age, spreading, in a simple and transparent manner, the nutritional values of various foods and good eating rules by means of the various communication channels available (web, advertising, packaging, etc.)

More specifically, four main areas of intervention have been identified for food production and distribution companies.

1. The corporate role of food industries:
   - actively collaborate with public institutions for promoting and realizing plans aimed at opposing and reducing the current increase in prevalent obesity within the population;
   - promote and realize activities of communication aimed at increasing awareness in people’s choices;
   - continued careful attention when implementing communication campaigns aimed at sensitive targets.

2. Product strategy:
   - continue reformulating existing products, in relation to progressive technological ability;
   - develop new products which can offer a wider choice in relation to individual nutritional requirements.

3. Information supplied to the consumer:
   - facilitate access and understanding of nutritional information (nutrition labels, daily guidelines);
   - implement communication campaigns with specific codes of self-regulation and independent procedures for verifying effectiveness;
   - implement marketing campaigns for promoting the consumption of products which may significantly contribute to a correct diet and to inform people and make them aware of the comprehension of health claims.

4. Information and dialogue with stakeholders:
   - monitor the results obtained by means of specific indicators and progressively improve the objectives to be reached, implementing strategies and actions aimed at the continuous improvement of the product offer.

In conclusion, the implementation of coordinated actions between governments and the industrial agro-food sector is one of the most important strategies for the realization of effective plans aimed at making the adoption of healthy eating habits and correct lifestyles easy for people.
3.4 ASSESSING POSSIBLE INTERVENTIONS OF PREVENTION

In recent years, the governments of OECD countries have adopted a set of measures for improving the diet of its citizens, increasing practical physical activity and, therefore, preventing obesity and its consequences. The implemented interventions originate from the following three categories:

1. Health education and promotion of healthy eating:
   - media campaigns;
   - interventions in schools;
   - interventions in the workplace.
2. Regulation and tax measures:
   - tax measures aimed at lowering the price of fruits and vegetables and raising that of foods rich in fats;
   - public regulation or self-regulation by companies in the food sector concerning advertising of baby foods;
   - mandatory labelling of food.
3. Interventions related to primary healthcare:
   - medical consultancy for individuals at risk;
   - medical and intensive dietary consultancy aimed at individuals at risk.

Summarized in the following table are the effects on subjects involved and the costs of each intervention. The analysis resumes a study realized by the OECD, which focuses on the following countries: Canada, Great Britain, Italy, Japan, and Mexico. The analysis only considers the costs sustained by the public sector, whereas those sustained by the private sector are excluded.

All the costs are shown on equal terms of buying power in American dollars in terms of purchasing power parity (USD PPP) and 2005 was chosen as the year of reference. Some interesting messages have emerged from the study including:

- Combining various interventions in one strategy of prevention covering various age ranges and groups at risk can provide an effective solution at relatively sustained costs, guaranteeing notably higher gains in terms of health, compared to single interventions.
- Before showing the significant impacts and reaching a good cost-effectiveness ratio, the interventions aimed at the youngest age groups may require more time compared to the other interventions.
- It is estimated that each of the interventions presented each year could potentially save between 25,000 and 75,000 years of life accumulated in the five analyzed countries, compared to a situation in which there were no interventions of prevention and chronic diseases associated with obesity (ischemic heart disease, stroke, cancer, etc.) would only be treated on emergence. It has been calculated that the intervention with the highest impact in terms of saved years of life (therefore, with the highest savings in terms of health expenditure) is that linked to medical and dietary consultancy for individuals at risk (240,000 years of life saved in the five countries), which is also the most costly in terms of investment.
- The impact of these interventions on health expenditure is relatively limited (around 1% of the costs sustained for chronic diseases linked to the phenomenon of obesity), whereas the direct costs sustained for implementing the interven-

### CATEGORY OF INTERVENTION | TYPOLOGY OF INTERVENTION | EFFECTS OF THE INTERVENTION ON THE INVOLVED SUBJECTS | COST OF THE INTERVENTION
--- | --- | --- | ---
Health education and promotion of healthy eating | Media campaigns | Increase in the consumption of fruits and vegetables equal to 18 grams per day Percentage of the population practicing physical activities increased by 2.35% | About 0.5-2 USD PPP per capita
Interventions in schools | Increase in the consumption of fruits and vegetables equal to 38 grams per day Decrease in the consumption of fats of about 2% Reduction of about 0.2 of the BMI | About 1.2 USD PPP per capita
Interventions in the workplace | Increase in consumption of fruits and vegetables equal to 46 grams per day Percentage of workers practicing physical activities increased by 12% Reduction of about 0.2 of the BMI | About 2.5 – 5.5 USD PPP per capita
Regulations and tax measures | Tax measures aimed at lowering the price of fruits and vegetables and raising that of foods rich in fats | Increase in the consumption of fruits and vegetables between 8 and 11 grams per day Decrease in the proportion of fats consumed ranging from 0.58% to 0.76% | About 0.03 - 0.15 USD PPP per capita
Public regulation or self-regulation by companies in the food sector relating to advertising foods for children | Reduction of about 0.13-0.34 BMI points | Public regulation about 0.14-0.55 USD PPP per capita
Mandatory labeling for foods | Increase in consumption of fruits and vegetables equal to 10 grams per day Decrease in the proportion of fats consumed by about 0.42% Reduction of about 0.02 BMI points | About 0.31 – 1.1 USD PPP per capita
Interventions related to primary healthcare | Medical consultancy aimed at individuals at risk | About 4.5-9.5 USD PPP per capita
Mandatory and intensive dietary consultancy aimed at individuals at risk | Decrease in the proportion of fats consumed by about 10% Reduction of about 2.12 BMI points | About 9-20 USD PPP per capita
Obesity: the impacts on public health and society

With reference both to the effects and costs of the single interventions and to the key factors for the success of the interventions of prevention, also noted in these countries are dynamics similar to those found in the OECD countries considered in the OECD study *Fit not Fat*.

In particular, the interventions that influence prices and tax measures prove, in the short term, to produce the highest savings in terms of health expenditure. Nonetheless, it would be necessary to implement systems evaluating the effectiveness of the interventions not only from a merely economic viewpoint or the costs linked to the implementation of such interventions, but also the effects in the medium-long term, considering these interventions as true and real investments having long-term effects.

**Figure 3.4. Years of life saved by effect of the interventions of prevention (yearly average)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Interventions in schools</th>
<th>Media campaigns</th>
<th>Self-regulation by companies in the food sector related to advertising foods</th>
<th>Labels for foods</th>
<th>Interventions at workplaces</th>
<th>Public regulation relating to advertising foods</th>
<th>Medical consultancy</th>
<th>Tax measures</th>
<th>Medical-dietary consultancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Italy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mexico</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>England</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Canada</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Figure 3.5. Costs of the interventions and savings in terms of healthcare expenditure (billions of dollars PPP)**

Source: OECD, 2012.

With reference both to the effects and costs of the single interventions and to the key factors for the success of the interventions of prevention, also noted in these countries are dynamics similar to those found in the OECD countries considered in the OECD study *Fit not Fat*.

In particular, the interventions that influence prices and tax measures prove, in the short term, to produce the highest savings in terms of health expenditure. Nonetheless, it would be necessary to implement systems evaluating the effectiveness of the interventions not only from a merely economic viewpoint or the costs linked to the implementation of such interventions, but also the effects in the medium-long term, considering these interventions as true and real investments having long-term effects.
4. THE BCFN RECOMMENDATIONS
The BCFN has identified seven priority recommendations for dealing with the obesity epidemic.

1. **Inform and rally public opinion.** Make the public more aware and proactive regarding the consequences to health, social impact, and economic and environmental costs of obesity.

2. **Plan joint commitment of governments and the private sector.** Activate integrated and coordinated medium-long term plans for the fight against obesity which involve all the main parties.

3. **Spread the culture of prevention.** Educate people regarding the concept of limitation and transmit the culture of prevention so that healthy behavior becomes an increasingly more conscious choice.

4. **Teach healthy habits as early as childhood.** Reinforce supervision in education and information for young people.

5. **Use price leverage in a balanced manner.** Carefully assess the pros and cons of introducing tax disincentives such as taxes on junk food.

6. **Encourage the commitment of industry and distribution.** Involve the food industry and distribution in initiatives regarding public health promoted and led by governments.

7. **Fight the obesogenic environment.** Combat the factors leading to the assumption of incorrect lifestyles and eating habits making it hard to make healthy choices.

### Recommendations to deal with the obesity epidemic

- **Inform and rally public opinion**
  - The actual obesity epidemic which is affecting Western countries – and also emerging countries to an increasing extent – has serious consequences on the health of people who are affected by it, heavy implications on their social and working sphere, and a significant economic and environmental impact on all of society. Even more worrying is the fact that this phenomenon is also increasingly involving children.
  - Nonetheless, this problem is often more linked to the individual - to aesthetics instead of to health - rather than to collectivity as a societal health problem, as is the case with smoking and pollution, for example.
  - There is a lack of awareness of the problem and its social-economic consequences in public opinion. At institutional level, in particular, there does not seem to be that sense of urgency which is necessary to deal with the problem of obesity in a systematic way.
  - It is, therefore, necessary to produce widespread information to promote an effective activation of public opinion for requesting interventions of prevention at all levels (social, environmental, food related, etc.).

- **Plan joint commitment of governments and the private sector**
  - In order to effectively handle a multifactorial phenomenon like obesity, it is essential to operate in a coordinated manner on several fronts, using actions which involve institutions, companies, consumers, and informative bodies, and through the use of instruments and various initiatives inserted into an integrated program.
  - We expect government institutions (national and international) to conceive and lead the plans of action, actively involving all the players in a forceful, proactive, and tangible manner.
  - Reliable systems of measurement must also be actuated, in order to assess the true efficiency of the actions, both in the short term and, above all, in the medium-long term.
  - In particular, this type of plans of action must foresee a medium-long term temporal horizon and commitment, because the results of the prevention activity can only be seen several years after the relative action was implemented and in order to limit delays and suspensions due to government’s normal political alternation.

- **Spread the culture of prevention**
  - Healthy eating choices and lifestyles should not be imposed by turning to new forms of “prohibitionism,” but should be the result of conscious choices stemming from better education and accurate information concerning the negative consequences to health deriving from incorrect habits.
  - In particular, in the specific case of eating, the greatest cause of overweight and obesity is not so much the assumption of certain specific foods, but the quantity (portions) and the frequency with which these foods are eaten, besides, of course, the lifestyle adopted.
  - For example, people must be educated to undertake healthy behaviors with a certain continuity, as opposed to extemporaneous actions dictated by current trends (as in the case of some diets, particularly advertised by the press), to constantly be aware of simple measures by which it is possible to combat sedentary lifestyles, etc.
  - Educating beforehand seems much more effective than forbidding afterward, therefore cases which convincingly demonstrate how prevention represents the main strategy for fighting obesity must be identified, as has been done for other pathologies (consider the screening campaigns for certain types of tumors).

- **Teach healthy habits as early as childhood**
  - That against obesity must begin with education and information concerning the young, in that habits, lifestyle, and eating models are learned during adolescence and development and it has been scientifically proved that an obese child/adolescent is likely highly likely to remain so in adulthood.
  - The spreading of correct eating habits and physical education in children and adolescents should necessarily be the result of a collective attempt, the outcome of the contribution of several subjects (school, family, doctors, pediatricians, sporting associations, etc.) representing a point of reference for children during the various moments of the day.
  - In particular, family and school seem to be the main ways for effectively teaching the correct way to eat. Children “learn” to eat in the family and internalize the eating behavior which they will naturally be led to adopt afterward. On the other hand, schools could and should perform a truly active role in promoting balanced eating styles.

- **Use price leverage in a balanced manner**
  - If on the one hand, the anticipated result of the “junk food taxes” is to reduce the consumption of food considered responsible for overweight and obesity, the introduction of taxes on certain foods, besides the uncertainty of which foods should be considered, might also generate unexpected effects that could limit the successful achievement of the objectives set by the legislators.
  - For example, some consumers reduce the consumption of more healthy foods in order to compensate the higher expense of taxed foods; others re-address their preferences toward equally damaging substitute foods; and lastly, a certain number of people (having a medium-high income) are able to absorb the increase in price easily and do not change their habits at all, whereas others (having a low income) suffer a significant drop in their buying power.
  - Apart from the aforesaid activities, it is also necessary to re-balance initiatives regarding the effects mentioned above, financed (at least in part) by the new collected tax revenue.
  - For example, together with a tax which affects some types of food, incentives or instruments could be foreseen (for example vouchers) for buying fruits and vegetables by certain categories of consumers.
  - The use of price leverage on certain foods, without other interventions favoring healthier alternatives and their concrete accessibility for the consumer, does not seem capable of influencing behavior to a significant extent.
**Encourage the commitment of industry and distribution**

In order to make government programs more effective, the involvement and close collaboration of manufacturing and distribution companies operating throughout the food chain are required, considering the important role played by the latter in creating the offer of products and the ability of communication, which can influence end demand and the composition of food consumption.

In recent years, with the progress obtained by nutritional science and with their social role, companies have already implemented policies of placement, range development, marketing, and promotion of food-related education, and sponsorship of sporting and physical activities aimed at supporting the commitment of governments in the fight against overweight and obesity.

Private operators must therefore continue their social commitment by means of promoting and realizing activities of communication aimed at increasing awareness in people’s choices and, at the same time, they must also continue to pay the right attention to the realization of communication campaigns aimed at sensitive targets.

It is necessary to facilitate the usability and comprehension of information concerning the product through the use of nutritional labels and providing advice on consumption and daily guidelines. In addition, it is important to facilitate an understanding of health claims, together with implementing marketing campaigns for promoting the consumption of products which can significantly contribute to eating correctly.

Furthermore, there is hope in the continuous implementation of self-regulation and independent methods of assessment.

With regard to the food industry, in particular, it is necessary to continue with reformulating existent products in relation to progressive technological ability and new products must be developed which can offer an increasingly wide range to people in relation to individual nutritional requirements.

**Fight the obesogenic environment**

The wide availability and easy access to food having high caloric density and an increasingly sedentary lifestyle represent the two main factors upon which an environment favoring overweight and obesity is based (so-called “obesogenic environment”).

Every individual can easily adopt certain behaviors able to limit these aspects. For example, people can follow the guidelines for a correct diet, which are easily found in the websites of official institutes and organizations, favor more healthy ways to prepare food (cooking by steam, grill, oven, etc.) and spreading this habit among the family, and avoid eating high caloric snacks between meals, etc.

With regard to sedentary lifestyles, it is important to try and take a walk every day, avoid using the car for short journeys and reaching the city center, parking the car at a distance from the destination, always using stairs instead of elevators, playing with children, etc.

It is important to stress, nonetheless, that people should be put in the condition to effectively make these choices and adopt this behavior. In order to do so, actions are required which depend on a set of public and private subjects: we are referring, for example, to schools and employers concerning the availability of foods coherent with the nutritional guidelines in vending machines and refectories; to local public administrations concerning urban policies and transport, which define the availability of public means and safe cycling and pedestrian routes etc.; to the media, which should provide correct and balanced information, putting the emphasis on medical-scientific institutional sources rather than trendy diets.
Obesity: the impacts on public health and society


1. The experiment identified six physical exercises to determine the ADL level in individuals who were of different weights: a quarter-mile walk, climbing ten stairs without stopping, stopping/crouching/kneeling/carrying 10 pounds, walking inside a room, standing on a chair with no arms, and meeting a chair with no arms. The higher costs of transportation attributable to obese and overweight persons and the higher costs in terms of the development of human capital were not taken into account, because, according to the latest scientific studies, these two cost categories must still be explored in-depth from a quantitative point of view.


1. The experiment identified six physical exercises to determine the ADL level in individuals who were of different weights: a quarter-mile walk, climbing ten stairs without stopping, stopping/crouching/kneeling/carrying 10 pounds, walking inside a room, standing on a chair with no arms, and meeting a chair with no arms. The higher costs of transportation attributable to obese and overweight persons and the higher costs in terms of the development of human capital were not taken into account, because, according to the latest scientific studies, these two cost categories must still be explored in-depth from a quantitative point of view.


1. The experiment identified six physical exercises to determine the ADL level in individuals who were of different weights: a quarter-mile walk, climbing ten stairs without stopping, stopping/crouching/kneeling/carrying 10 pounds, walking inside a room, standing on a chair with no arms, and meeting a chair with no arms. The higher costs of transportation attributable to obese and overweight persons and the higher costs in terms of the development of human capital were not taken into account, because, according to the latest scientific studies, these two cost categories must still be explored in-depth from a quantitative point of view.


CHAPTER 2

1. Among the OECD countries, this trend has not always been confirmed, since there are cases where the prevalence of obesity in men is slightly higher than in women.
7. Sassi F. (2010), Obesity and the economics of prevention. Fit not for OECD.


43. Factors which contribute to the loss of productivity such as the time lost between the moment of arrival at the workplace and the start of activity on days when the worker does not feel well, the lack of concentration, the repetition of a task, working more slowly than normal, feeling tired in the workplace, etc.


55. It is estimated that in total, full-time employees who are overweight and obese number 74,197, 306, or 65.9% of the total (112,590,754).


58. BCFN (2012), Lo spreco alimentare: cause, impatti e proposte [Food Waste: Causes, Impacts and Proposals].


61. In Edwards’ and Roberts’ study, two samples were compared: a billion normal weight people with a BMI index equal to 24.5 and a billion obese people with a BMI index equal to 29.

CHAPTER 3


4. Sass F. (2010), Obesity and the Economics of Prevention, OECD.

5. OECD (2009), Survey on National Policies.

6. Sass F. (2010), Obesity and the Economics of Prevention, OECD.


17. http://www.epode-european-network.com


19. Mc Donald’s, PepsiCo, Coca Cola, Nestlé, Unilever, Kraft Foods, Cadbury Schweppes.

21. The sampling of countries selected for the study includes some countries with the highest obesity rates in the OECD area (such as Mexico and England), the country with the lowest obesity rate (Japan) and another two countries with a moderate level of obesity (Italy and Canada).


CHAPTER 4


BIBLIOGRAPHY


Sandhu J., Y. Ben-Shlomo, T. J. Cole, J. Holly and G. Davey Smith (2006). The impact of childhoo-
Water management

The importance of policies, models and integrated management tools to ensure the availability of fresh water for people and agricultural productivity

Climate change, Agriculture & Food

Analysis of the impact that climate change will have on agricultural production and hence, on the availability of food and fresh water and the evaluation of individual and collective behavior to be implemented

Healthy growth and nutrition in children

Healthy growth and nutrition in children

Relationship between the development of good eating habits during childhood and adolescence and the prevention of diseases in adulthood

Measuring people’s well-being: the BCFN Index

Construction of a multi-dimensional index designed to measure the level of people’s well-being from the consideration that their well-being depends on several variables, not attributable only to the economic aspects

Is GM agriculture sustainable?

Analysis of the current debate on the role of GMOs in solving the problem of access to food while ensuring safety for people and the environment

The cultural dimension of food

The relationship between food and religion, the conviviality and the identity of the populations within the great culinary traditions and its role in influencing lifestyles and productive and economic factors

Double Pyramid: healthy food for people, sustainable food for the planet

Illustration of the model that relates nutritional balance with the protection and preservation of the environment

The excellence of the Mediterranean Way

In-depth study on the dual dialectical relationship between the Mediterranean people and the food they eat, as to quantity and how to eat, which converge into a single system of values and traditions
Food waste: causes, impacts and proposal

A presentation of the food loss and waste phenomenon and its main causes, possible solutions and paths to reduce food waste during industrial processing, distribution and final consumption.