

## **THE MEDITERRANEAN DIET**

THE ECONOMIC, SOCIAL AND  
ENVIRONMENTAL REFLECTIONS OF  
HEALTHY NUTRITIONAL STYLES



Authors

*Antonia Acquafredda*

*Felice Adinolfi Riccardo*

*Fargione Lucrezia*

*Modesto Carmela Riccio*

Contacts

*segreteria@fondazionealetheia.it*

Publication month

*July 2023*



## Abstract

The Mediterranean Diet is an actual lifestyle that produces multiple benefits: from health to the environment, from health spending to sociability, from seasonality to territoriality, from tourism to social relations.

The Report, prepared by the Aletheia Foundation with the contribution of the Divulga Study Centre, shows how the dietary model proposed by the Mediterranean Diet offers a multidisciplinary approach to address the increasingly urgent issues related to health and environmental and social challenges.

The dictates of the Mediterranean Diet take shape in the well-known food pyramid and among the most authoritative reproductions is that of the Mediterranean Diet Foundation. The pyramid is divided into various levels in which, together with the healthy lifestyle and eating habits, the concept of portion and regularity of consumption are introduced in order to place the different foods on varying levels depending on their nutritional value. The indications are not only nutritional but also concern regular physical activity, adequate rest, conviviality, respect for biodiversity and seasonality, the consumption of traditional, local and ecological products.

The Report highlights the different positive effects of the Mediterranean Diet in a variety of areas. The health benefits and positive impact on healthcare spending are analysed. Particular reference is made to the prevention and lowering of the risk of the onset of pathologies closely related to incorrect nutritional styles such as cardiovascular diseases, obesity and diabetes. Furthermore, the value of food in its identity, social, cultural, territorial and environmental value is highlighted.

A healthy model which, by balancing consumption, would allow the perfect distribution of food among the entire world population. In fact, an important aspect highlighted by the Report concerns the consumption indications proposed by the Mediterranean Diet which, in terms of nutrients and energy, allow current agri-food production (cereals, vegetables, meat and potatoes) to largely satisfy the food needs of a ever-growing world population.

Finally, the alarm against the increasingly widespread access to junk food and ultra-processed foods which, in addition to overshadowing the social and convivial value of food, seriously threaten health and the environment.

The Mediterranean Diet therefore represents a precious tool for social relations which, thanks to its elements of connection with the territory, with seasonality and with biodiversity and due to the prevention and health aspects, allows for the dissemination of greater food and social awareness and responsibility.

# Index

Preface.....	6
1. Not just a diet...but a lifestyle.....	8
2. The food pyramid, what to eat.....	9
3. The health benefits.....	11
Cardiovascular diseases.....	11
Obesity.....	12
Diabetes.....	14
Immune system and cognitive system.....	15
4. Prevention is better than cure.....	17
Box 1:4 season diet, environmental impact.....	20
5. The value of food.....	21
6. There is food for everyone.....	22
7. From junk food and ultra-processed foods to the Mediterranean model.....	25
Bibliography.....	28

## Preface

*By Antonio Moschetta, Tenured Professor of Internal Medicine, University of Bari "Aldo Moro"*

In recent decades, the link between nutrition and health has influenced numerous aspects of modern society. The scientific literature is in agreement in confirming that a sedentary lifestyle and incorrect eating habits can increase the risk of various numerous pathologies. The Mediterranean Diet, an intangible cultural heritage of humanity since 2010, can be considered a lifestyle inspired by the eating habits of Italy and Greece in the 1960s. It is more than a simple list of foods: it is, in fact, about a lifestyle that is handed down from generation to generation and which sees the ritual consumption of the meal as a socio-cultural event of collective sharing. The diet is based on the usual consumption of foods such as cereals, fruit, vegetables, seeds and extra virgin olive oil, compared to a moderate consumption of fish, white meat (poultry), legumes, eggs, dairy products, red wine, sweets. The concept of the Mediterranean Diet was initially introduced and studied by the American physiologist Ancel Keys, who investigated its effects on the incidence of cardiovascular diseases in a famous study on seven nations, the Seven Country Study, observing that Mediterranean dietary models directly contributed to improving the health of the population. Today we know that the intake of nutrients with antioxidant and anti-inflammatory properties, combined with a high consumption of dietary fibre, typical of the Mediterranean Diet, is able to even promote a balanced composition of the intestinal bacterial flora, preserving the metabolism of the entire organism. Numerous studies have shown that adherence to the Mediterranean Diet is able to protect against the risk of cardiovascular diseases, tumours, neurodegenerative diseases, diabetes and early death. In particular, the study of the European Prospective Investigation into Cancer and nutrition, commonly called Epic, has shown that adherence to the Mediterranean Diet, rich in extra virgin olive oil, can also reduce the onset of some tumours (see breast, prostate and colorectal) and that avoiding smoking and drinking alcohol, doing physical activity and regularly eating fruit and vegetables increases life expectancy by 14 years on average. Currently it is of fundamental importance to understand how much and if we really adhere to the Mediterranean Diet. The measurement of the individual's adherence to the Mediterranean Diet represents the most adequate numerical evaluation to allow all the economic evaluations described in this report and to design a detailed program for improving living, social and environmental conditions, which can include in the quantification of adherence to the Mediterranean Diet the biomarker for population selection and study of the effectiveness of the intervention itself. A questionnaire that evaluates adherence to the Mediterranean Diet such as the Chrono Med-Diet Score<sup>1</sup> associates the food parameter with the subject's lifestyle and can guarantee in just a few minutes the calculation of a number (a score) that correlates with the

---

<sup>1</sup> Chrono Med-Diet Score: [www.chronomeddiet.org](http://www.chronomeddiet.org)

cardiovascular and abdominal obesity risk, therefore representing an effective tool in the metabolic, but at this point also overall economic and social evaluation of the individual themselves. This interesting report then talks about ultra-processed foods, obesity, diabetes mellitus, cardiovascular, immune and cognitive risk. The Mediterranean diet, in fact, is the paradigm of longevity and quality of life, but it should always be remembered that diet derives from the Greek "*δίαιτα*" which means rule and therefore lifestyle which also involves times of food intake, quantity and quality of nutrients and personal care through physical exercise. The watchword remains "tailoring", that is, the individualisation of paths because we are not all the same, nor are we always the same at all ages. And this is why the future plan must take into account the individualisation of objectives which can only be based on anthropometric data such as waistlines above all, as well as body weight and biohumoral parameters such as blood sugar, cholesterol, triglycerides. The future will depend on our ability to inform the population of the economic, social and environmental impacts of disease prevention and improvement of the ability to pharmacological treatment when following a diet that adheres to the Mediterranean Diet, finally remembering that diet has the same suffix as "*dies*" Latin which means day and which we could understand as a stimulus to everyday life (not to be followed occasionally, but every day) and above all, with a little creativity. It should be a stimulus to eating food during the daily or solar hours because the diurnal "chronotypes" of the Mediterranean Diet (i.e. those who eat food during solar hours, like the centenarians of Cilento) are longer-lived and are less prone to pathologies than the nocturnal chronotypes, i.e. those who dine very late. The chronobiology of the Mediterranean Diet is, without a doubt, the most important decision-making crossroads for health on the one hand and for the economic, social and environmental implications on the other.



## 1. Not just diet...but a life style

In recent years the debate on food and health has taken on an unprecedented centrality, fueled by a large scientific literature focused on the link between correct nutrition and health. Today, diets represent a key element not only for their impact on health, but also for a multiplicity of consequences that derive from them, starting, precisely, from the environmental sphere.

The term "diet" comes from the Greek, *δίαιτα*, which means "way of life". A first clear piece of evidence that demonstrates how food is closely connected to a series of further elements such as conviviality, sharing, social exchange, identity and much more besides. All this takes shape in the definition of the concept of the Mediterranean Diet of the United Nations Organisation, the most virtuous nutritional model on the planet according to extensive scientific literature<sup>2</sup> (1).

Although the origin of the term "Mediterranean diet" can be attributed to the American epidemiologist and physiologist Ancel Keys<sup>3</sup> and dates back to the late 1950s, in fact the actual origin precedes the genesis of its name. In fact, if we look at the classic model, derived from the Greco-Roman world, we will discover that the Mediterranean Diet has a historical, mythological and anthropological dimension, as well as a nutritional one, which revolves around three key foods: oil, the result of the transformation of the fruit of the olive tree, donated by Minerva together with democracy; bread, produced from cereals offered by Ceres (from which the name also derives) and wine, brought by Bacchus, the foreign god who creates ferment, from the Latin term *fèrvere*, that is "to boil" (2), the same fervour that we can find in the process that transforms the grape juice in wine.

This premise serves to guide the reader through the pages of this work in which we will discuss the role assumed by the Mediterranean Diet in the international panorama and above all the social, health, environmental and economic benefits related to this nutritional model.

---

<sup>2</sup> According to the United Nations Organisation, the Mediterranean Diet refers to a series of skills, knowledge, rites, symbols and traditions regarding crops, harvesting, fishing, animal husbandry, conservation, processing, cooking and in particular sharing and consuming food. Eating together is the foundation of the cultural identity and continuity of communities throughout the Mediterranean basin. It is an event of social exchange and communication, affirmation and renewal of family, group or community identity. The Mediterranean Diet highlights the values of hospitality, closeness, intercultural dialogue and creativity, and is a way of life guided by respect for diversity.

<sup>3</sup> Ancel Keys, author of one of the most emblematic texts entitled: 'The Mediterranean diet. How to eat well and feel well', in which the expression Mediterranean Diet appears for the first time. Seven Countries Study (1954) is the first longitudinal epidemiological study in which Keys compared the diets of seven different countries (Italy, Greece, the Netherlands, Japan, Finland, Yugoslavia and the United States) demonstrating the relationship between diet and the onset of cardiovascular diseases.



## 2. The food pyramid, what to eat

The guidelines of the Mediterranean Diet are summarised in the graphic representation of the food pyramid, a depiction that is used to quickly understand the recommended consumption for individual food products.

Thirty years after its creation by the United States Department of Agriculture (USDA) in 1992 (3), the food pyramid has been the subject of numerous reworkings, also taking on values other than the nutritional one. Just think, for example, of the environmental pyramid (2010).

In Italy the first food pyramid was created at the beginning of the new century by the Institute of Food Science of the University of Rome "La Sapienza" and introduced the concept of "well-being" as a preview. It was drawn up based on the definition of Well-being Quantity (Qb), i.e. the quantities of food, but also of physical activity, which should be considered to maintain a condition of well-being (4).

The most authoritative reproductions undoubtedly include the one from the Mediterranean Diet Foundation (image 2.1) created in 2010 (5) and divided into eight rows. At the bottom there are a series of habits, anything of a nutritional nature, such as regular physical activity, adequate rest, conviviality, respect for biodiversity and 'seasonality' or the consumption of traditional, local and ecological products. This is followed by the seventh row which sees an inclusive novelty: the consumption of herbal teas in addition to water. From the sixth level onwards the pyramid becomes more complex as it introduces the concept of portion and establishes a regularity of consumption (per main meal, every day and weekly). From this point of view we have a schematisation that remains the same as the other pyramids, but the foods take on different positions with the necessary precautions: fruit and vegetables marry together with cereals and olive oil. At the fifth and fourth level we find on the one hand oily fruits, such as walnuts and olives, accompanied by the use of aromatic herbs, onion, garlic and spices - advice recently introduced to limit the use of salt as a flavouring - and by other, dairy products to be consumed on a daily basis. The top is represented by three levels for weekly consumption: white meat, fish, eggs and legumes; potatoes, red meats and processed meats; finally, the desserts.

Image 2.1: Mediterranean Diet Pyramid



Source: Mediterranean Diet Foundation

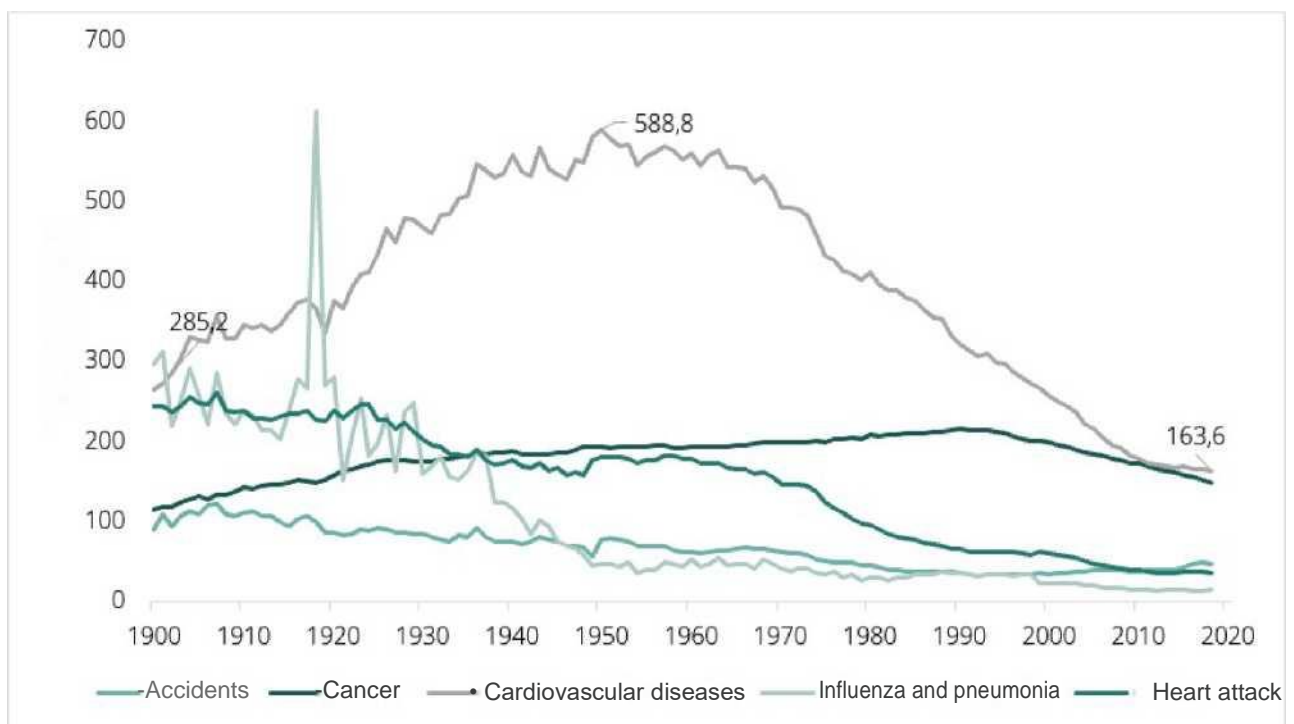
### 3. The health benefits

In recent years, numerous epidemiological studies have been performed on the correlation between nutrition and health. The results are clear and concern a variety of pathologies, which fall into the category of chronic non-communicable diseases, which over time have represented an important portion of deaths worldwide. Starting from cardiovascular diseases up to those of the immune system, passing through disorders of the cognitive system, obesity and diabetes.

#### 3.1 Cardiovascular diseases

The idea of developing a food guide was born, in fact, from the final step of the enormous research carried out by Ancel Keys regarding the correlation between diet and cardiovascular diseases, in 1954. Today the correlation between nutritional styles and cardiovascular diseases is at the centre of numerous analyses and scientific studies in consideration of the concerns that have consolidated over time regarding heart diseases. The latter from 1902 to 2018 (graph 3.1) represented the main cause of death in the United States with a value in 1902 equal to 285 cases per 100 thousand inhabitants, which reached its peak in 1950 (588.8), and then decreased in the following years, up to 163, 6 in 2018 (-72%) (6).

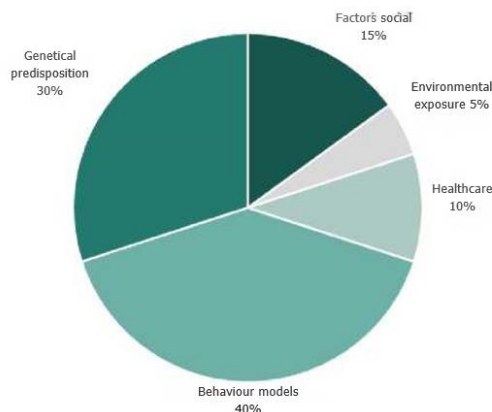
Graph 3.1: Main causes of death in the United States from 1900 to 2018  
Deaths per 100 thousand inhabitants



Source: Elaboration by the Divulga Study Centre on Nchs data 1902-2018

In this context, it is estimated (graph 3.2) that choices relating to lifestyle can influence the incidence of premature deaths from cardiovascular diseases by up to 40%, especially among subjects affected by obesity or nicotine addiction, who rarely engage in physical activity (7).

Graph 3.2: Factors influencing premature deaths



Source: Elaboration by the Divulga Study Centre (7)

Therefore, from a nutritional point of view, the useful interventions are precisely those recommended by the Mediterranean Diet: eating fruit (even dried) and vegetables, preferring whole grains to refined ones, consuming fish two or three times a week, reducing sweets and sugary drinks, limiting salt consumption and, last but not least, prefer extra virgin olive oil as a condiment.

Just to give some examples regarding the products just mentioned, the consumption of four portions of legumes per week helps to reduce the risk of developing coronary heart disease by 20% compared to those who, however, do not consume them at all (8). This is because legumes are a food rich in fibre, a food component which, if taken in the correct quantities, is able to reduce low-density lipoprotein (LDL) cholesterol levels and insulin resistance.

A further example of preferable foods is represented by whole grains: a daily portion reduces the risk of cardiovascular diseases by 20% (9).

### 3.2 Obesity

Obesity is a complex multifactorial disease characterised by an excess of adipose tissue in terms of both absolute quantity and distribution in specific points of the body which represents a significant risk factor for many non-communicable diseases (10). According to Istat data, in EU countries, on average, almost one in eight children between the ages of 7 and 8 is obese.

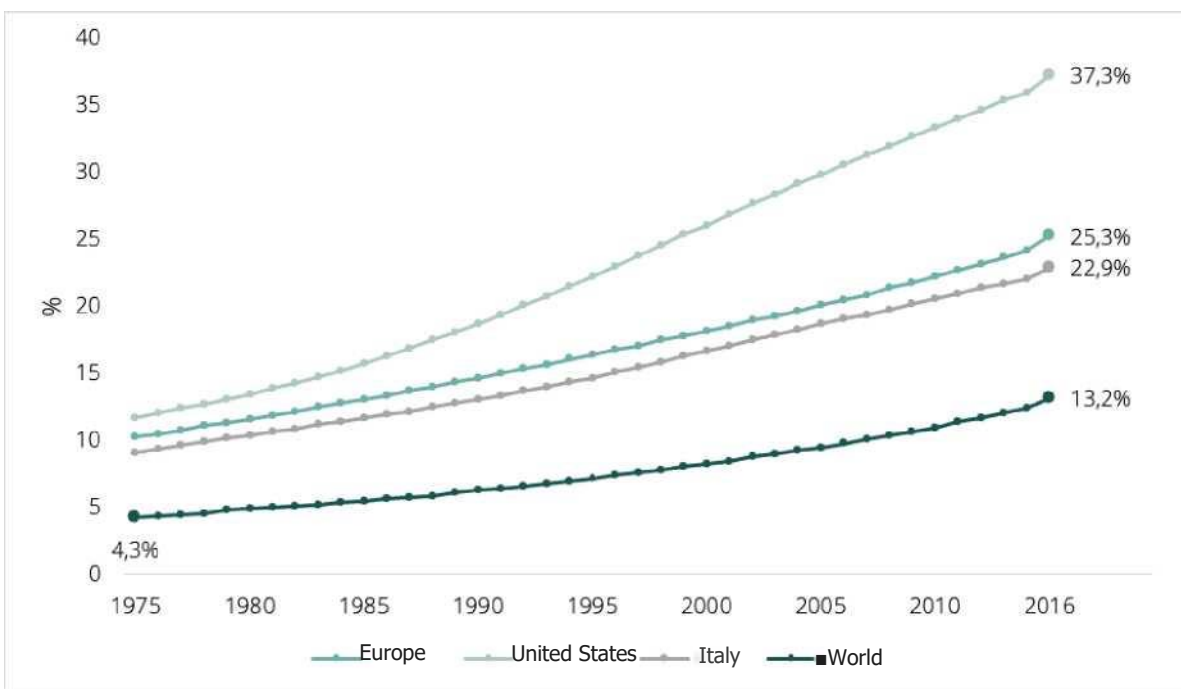
Italy (18%), together with Spain (18%) and Greece (17%) shows the highest values, while Denmark (5%), Norway (6%) and Ireland (7%) the lowest. In Italy, excess weight among minors increases significantly in the southern areas of the country (32.7%) and in the Islands (30%) compared, however, to the values recorded in the Centre (24%), North-East ( 22.5%) and the North West (19%). Among the most affected regions we find Campania (35.4%), Calabria (33.8%), Sicily (32.5%) and Molise (31.8%) (11).

The situation appears even more serious if we look at the global data. According to the latest estimates from the World Obesity Federation, the share of children and adolescents aged between 5 and 19 affected by obesity in 2020 takes on a value of 10% for males and 8% of females. The prevalence of obesity in that age group has increased in all WHO regions since 2000, but remained highest in America where it reached 36% in 2020. In the United States, obesity is one of the most impactful problems on healthcare in general and not just for adolescents.

In fact, according to Our World in Data (graph 3.3), the percentage of adults aged 18 and over in 2016 affected by obesity is equal to 37%. Decidedly high, if compared to the Italian value, equal to 23% (12).

And it is precisely due to the rapid spread of the disease that in 1997 the WHO officially recognised the global epidemic nature of obesity.

Graph 3.3: Incidence of obesity from 1975 to 2016



Source: Processing by the Divulga Study Centre on Our World in Data data

From a socioeconomic point of view, there are various factors associated with obesity. The WHO data show that its incidence increases as economic conditions improve (5.9% in the richest countries; 0.5% in the poorest ones) (13). Therefore, the high-income population is more affected by this problem due, probably, to a greater orientation towards ultra-processed foods.

We are usually led to think that the cause of the high incidence of obesity in the American continent is linked to the equally high consumption of fats. In reality, the major cause is not represented so much by the fats consumed through diet, but by the consumption of sugars, especially refined ones.

According to the USDA Dietary Guidelines, an individual who consumes 2,000 calories a day should reserve a maximum of 7% of total calories for added sugars. In 2020 this share for Americans took on an almost double value (13%), equal to 270kcal/d deriving from desserts and sweet snacks for 19%, from sweetened coffee and teas for 11%, from sweets for 9%, but above all from sugary drinks for around a quarter of the total (14). The latter in Italy, however, have decidedly more moderate consumption: only 1 in 4 consumers uses them. In detail, a variable frequency is observed: 5.5% consume it at least once a day, 15% from one to three times a week and 4.5% report consumption equal to four or six times a week (15). A rather virtuous scenario, considering that in Italy, until 2017, 94% of the population was below the threshold recommended by the WHO for the consumption of added sugars (16).

### 3.3 Diabetes

One of the most important long-term metabolic effects related to obesity is represented by the onset of diabetes mellitus. This concerns, in particular, type 2 diabetes, which represents 90% of cases, with numbers constantly increasing in recent decades according to the WHO.

Diabetes is a chronic disease characterised by high levels of glucose in the blood (hyperglycaemia) due to a defect in insulin secretion or impaired functionality thereof.

According to estimates by the International Diabetes Federation (IDF), there are 537 million adults (between 20 and 79 years old) in the world who suffered from diabetes in 2021. Numbers destined to increase, according to some forecasts, by 20% in 2030 with around 644 million cases and by 45% in 2045 with 783 million cases. China (140.8 million) and India (74.2 million) represent the countries most affected in absolute values, while the African continent (23.6 million) appears to be the least affected. In Europe the disease affects 61.4 million adults (9.2% of the population) with over 1.1 million diabetes-induced deaths in 2021, the fourth highest cause of death in the European Union (17).

In Italy, according to Istat data, in the two-year period 2020-2021, 4.7% of the population between 19 and 69 years old reported a diagnosis of diabetes. At a regional level, Valle d'Aosta (10.2%) and Calabria (6.8%) record the highest incidence; while Molise (3.3%), Puglia (3.3%) and Tuscany (2.6%), the lowest (18).

Nutrition, in this context, is not only an integral part of therapy, but also has an active role in the prevention of diabetes itself. One of the key works that has contributed to shedding light on the potential of nutrition, in particular the Mediterranean Diet, is "Predimed", a large study on the primary prevention of cardiovascular diseases and diabetes mellitus published in The New England Journal of Medicine in 2011. This research required the subjects involved to switch from the conventional diet to the Mediterranean Diet, that is, replacing saturated fats with unsaturated fats,

regular consumption of fruit, vegetables, legumes, replacement of refined starch products with a high glycemic index with whole grains, reduction of processed foods, introduction to the moderate consumption of wine and coffee.

The results showed some really interesting effects with 30% of participants at risk of diabetes not developing the disease. A percentage that rose to 60% if the intervention took on a multifactorial nature, i.e. aimed at weight loss accompanied by physical activity. Therefore, the incidence of diabetes in the group that followed the Mediterranean Diet was reduced by 52% compared to the group that followed a conventional diet (19).

### 3.4 Immune system and cognitive system

The last few decades have been characterised by enormous research on the impact of diets on the microbiota. The latter represents the set of microorganisms that populate the digestive tract (20) and is often nicknamed the "second brain" thanks also to the dense bidirectional communication network between the gastrointestinal tract and the nervous system.

Also in this case, scientific literature highlights a strong correlation between diet and microbiota. In particular, it has been estimated that changes in diet can influence up to 57% on the composition of the microbiota, a rather high share compared to the 12% of genetic variations (21). When compared with each other, a Mediterranean-style diet and a Western-style diet influence the composition of the microbiota and, consequently, the individual's state of health in different ways. Too often, new and incorrect nutritional styles lead to a limited consumption of fruit and vegetables which determine a relative decline in prebiotics with clear consequences in terms of an exponential increase in inflammatory diseases, anxiety, stress and other lifestyle disorders. Conversely, the Mediterranean model encourages the intake of vegetables such as asparagus, leeks, chicory and encourages the assimilation of dietary fibre, the consumption of which leads to the consequent production of metabolites, including, for example, short-chain fatty acids (Scfa) . The latter are in fact essential for the functioning of the microbiota-intestine-brain network.

It has recently been demonstrated how the Mediterranean Diet is related to the immune system through the influence it exerts on the activity of microglia, the cells of the immune system responsible for defending the central nervous system, and on the production of anti- and pro-inflammatory cytokines, the protein molecules with the task of regulating any inflammatory states.

In fact, therefore, the consumption of foods such as fermented products derived from milk or human milk itself during childhood, rich in prebiotics called galacto-oligosaccharides, in addition to fruit and vegetables, rich in fructo-oligosaccharides, can encourage the production of anti-inflammatory cytokines and reduce pro-inflammatory ones, improving the response of the immune system.

Inulin also has an important influence in this context. This is the prebiotic element that is currently being most studied as it stimulates the growth of a specific bacterium: *Faecalibacterium prausnitzii*, whose finding within the intestinal microbiota has been associated with

antidepressant and anxiolytic, thanks to its ability to produce butyrate, an important short-chain fatty acid also present in milk and its derivatives (butter and cheese) (22).

The Mediterranean Diet, in addition to providing for the intake of high quantities of fibre, also includes, with adequately weighted consumption, foods rich in components such as resveratrol (wine, raspberries, blueberries), caffeine and polyphenols, which have been shown to have neuroprotective capabilities. Thanks to these properties, these components are associated with a decrease in the risk of the onset of neurodegenerative disorders such as, for example, Parkinson's disease (23, 24).





## 4. Prevention is better than cure

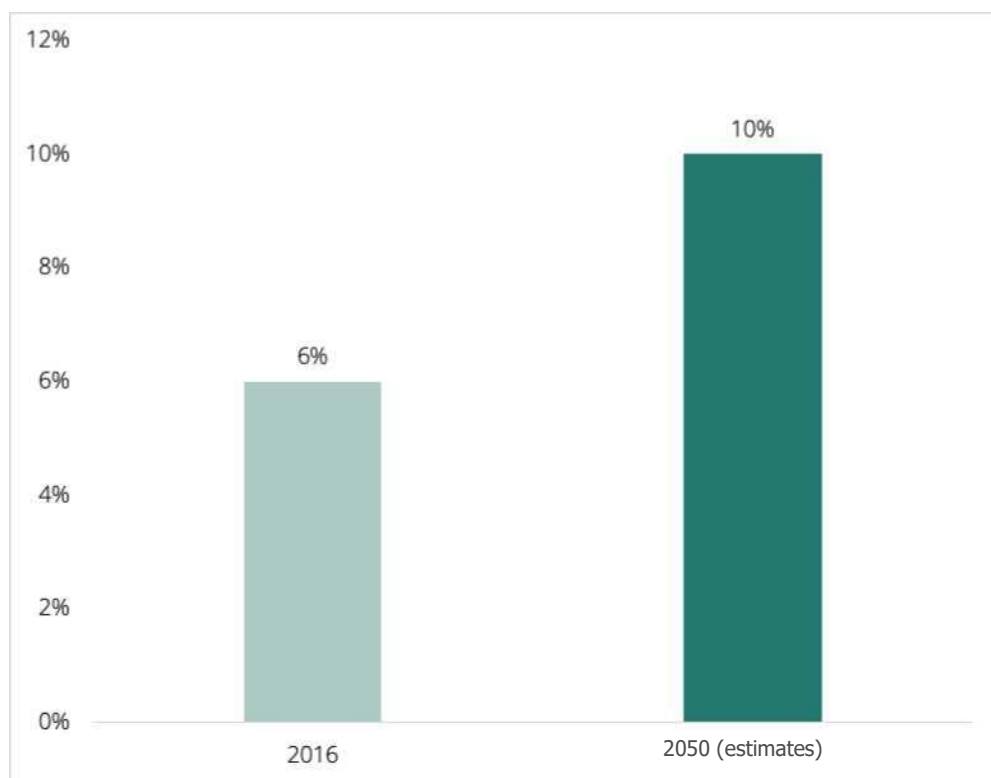
As already analysed in the previous chapters, the Mediterranean Diet is much more than an eating style or a mere nutritional table. It is, in fact, an actual lifestyle that produces positive externalities in various areas: from the environment to health, from tourism to social relations. This chapter focuses on the positive impacts that affect the economic dimension.

An initial area of analysis concerns the evident impact of healthy and balanced nutritional styles on public spending on healthcare.

Although in the last 50 years we have witnessed a notable improvement in living standards, on the other hand there has been an increase in chronic diseases often linked to unhealthy eating habits and a decrease in physical activity. This is because in recent decades eating styles have become increasingly enriched with foods with high levels of saturated fats and simple sugars and impoverished with foods based on vegetables, fruit and fibre, becoming one of the main risk factors for the onset of chronic non-communicable diseases (MCNT). If we add to this the afore-mentioned sedentary lifestyle and environmental pollution, the repercussions on public health spending appear clear.

Both private and public spending due to chronic non-communicable diseases (graph 4.1) could exceed 70 billion Euro in 2028 and cover over 10% of total health spending in 2050 (in 2016 it was 6%) (29).

Graph 4.1: Health expenditure for chronic non-communicable diseases out of the total

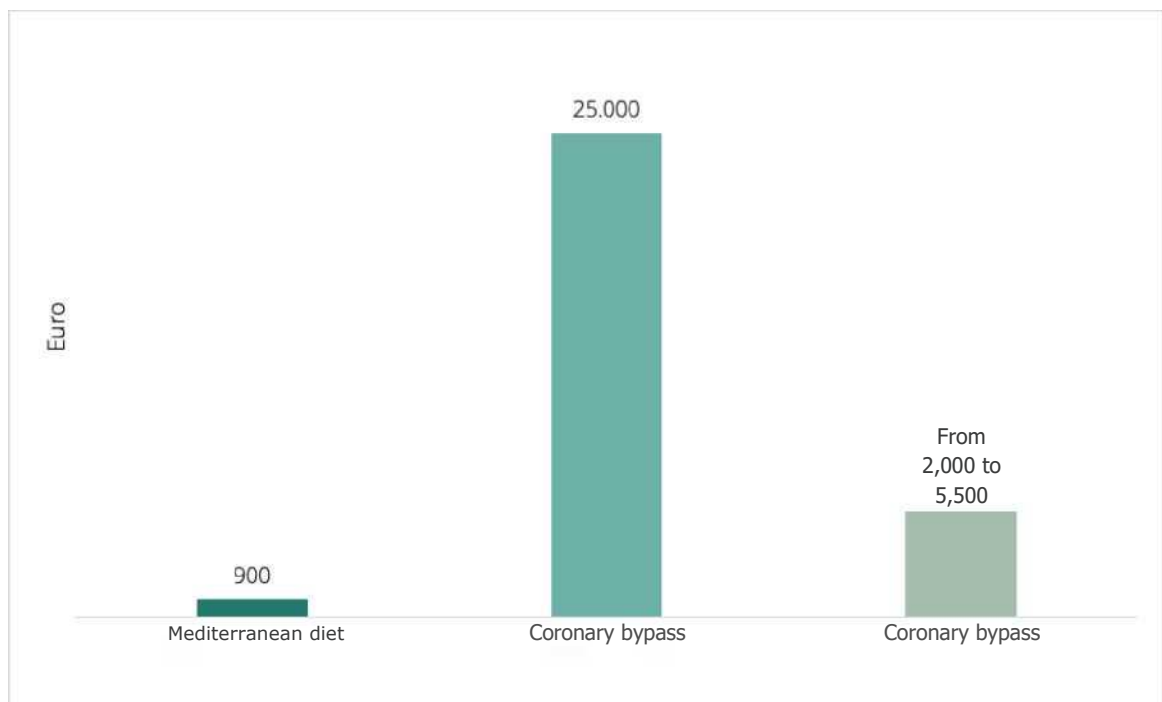


Source: Elaboration by the Divulga Study Centre (29)

As mentioned in the previous paragraphs, diabetes mellitus is one of the pathologies closely related to incorrect nutritional styles. For this pathology alone, a significant healthcare burden is estimated with costs equal to 6.7% of Italian healthcare spending. Specifically, this is almost 3 thousand Euro per year per person, equal, overall, to just over 13 billion Euro per year (30, 31). A large part of these resources could in fact be saved by following healthy nutritional models such as the Mediterranean Diet, with the latter unquestionably representing a key point for prevention.

Just to cite a few further examples regarding the treatment of cardiovascular diseases, it has been shown that preventive interventions with the Mediterranean Diet are decidedly cheaper when compared to curative therapies. A cost of 900 Euro for preventive interventions with the Mediterranean Diet corresponds to a cost of 25 thousand Euro for the installation of a coronary bypass following heart failure often attributable to unhealthy nutritional styles (graph 4.2). This is an expense that is 28 times higher (32).

Graph 4.2: Cost of cardiovascular disease prevention interventions



Source: Elaboration by the Divulga Study Centre (32)

The Mediterranean Diet is therefore one of the main prevention methods against the aforementioned diseases and represents an effective method for reducing healthcare costs linked to many of the problems resulting from incorrect dietary habits. Without forgetting the more serious cases that lead to deaths. In this regard, it has been estimated that if Italian adults aged between 20 and 59 years reduced the consumption of saturated fats and adhered to the Mediterranean Diet, mortality from cardiovascular events could be reduced by 18% in 25 years (33).

In the analysis of the economic benefits attributable to the Mediterranean Diet, the extreme potential it has in the affirmation of a development model based on the strong link between food, territories and tourism cannot be underestimated. The richness of Mediterranean cuisine, based on the dictates of its counterpart diet, today also plays a crucial role in the tourism development of some territories. According to what is reported in Paper 11 of the Divulga Study Centre "Outside the pandemic and inside the war", in the pre-Covid years the estimate of the expenses faced in Italy by international tourism fluctuated between 25 and 30 billion Euro (34). Assuming, prudentially, that at least 10% of said expenditure concerns nutrition with national products, we can imagine agri-food exports 5% higher than the current level (overall of 60.7 billion Euro) with a further gain of 3 billion Euro.

The link between tourism, food and the Mediterranean Diet, therefore, represents a crucial strategic asset on which to focus for the promotion of Italian excellence.

### **Box 1: 4 seasons diet, the environmental impact**

*In recent decades, food has become increasingly important from an environmental point of view. The so-called concept of dietary sustainability fits into this perimeter, i.e. that type of diet that guarantees the possibility of nourishing the current generation without degrading the environmental resources necessary to meet the needs of future ones.*

*Recently, food consumption has seen an increase in foods recognised as "food miles", a term coined by Sustainable Agriculture Food and Environment (Safe), to indicate the distances from the place of production of the food to the place of consumption.*

*Compared to the past, food handling creates at least three times more greenhouse gas emissions. According to the study conducted in 74 countries and regions and on 37 different types of food, food miles are responsible for approximately 6% of global greenhouse gas emissions with the richest countries accounting for 46% of emissions due to excessive distances between place of production and place of consumption (27). Of these, approximately 1.7 billion tons of CO<sub>2</sub>and<sup>4</sup> come from the transportation of food within countries, while 1.3 billion tons come from international transportation.*

*The study published in Nature Food "Global food-miles account for nearly 20% of total food-systems emissions", highlighting concerns about emissions linked to the excessive distances that often exist between producers and consumers, also highlights how a change in paradigm increasingly oriented towards local consumption can bring clear environmental benefits on a large scale. According to this study, in fact, transportation is responsible for 19% of the total emissions of the food system with the fruit and vegetable sector contributing to 36% of food mile emissions. Although distances travelled by food represent only 18% of total transportation miles, researchers found that the emissions they produce make up 27% of total transportation emissions, mostly due to international trade (28).*

*These data lead us to argue that in the global challenge against climate change, the adoption of a diet such as the Mediterranean Diet, based on the consumption of local and seasonal products, represents a crucial element in impacting the carbon footprint at a global level and in protecting biodiversity.*

---

<sup>4</sup>Carbon dioxide equivalent; combination of pollutants that contribute to climate change (EPA).

## 5. The value of food

In recent decades 'food' has been at the centre of a significant transformation which today allows us to distill a series of meanings and values in this word. Today food does not only have a purely nutritional function, as was often the case in the past for the majority of the population with the exception of restricted niches, but has been enriched with a series of functions. These include the identity, social, cultural and territorial one that can be appreciated in the simple act of choosing and consuming food. The environmental function is also gaining recognition with a growing focus on the impact on ecosystems associated with its production and consumption. In addition to price and health safety, in fact, food consumption is increasingly being influenced by concerns for environmental sustainability, animal welfare and, last but not least, workers' rights.

In this evolution, Italy represents the country that more than others expresses the values of food with a food and wine tradition envied throughout the world, based on the values of 'distinctiveness'. It is the result of a series of optimal soil and climate conditions associated with an advanced culture in the sector which today gives Italy important records. Starting from the numbers on quality production with Italy which, with 845 recognised products, represents the first country in the world for the number of PDOs, PGIs and TSGs. At a considerable distance from France (698), Spain (349), Greece (261) and Portugal (184). Records which are also recorded on the organic production front with the country ranking among the top in the EU for the incidence of organic agricultural land (17.5%) out of the total.

Italian agri-food is today considered the spearhead of the country's economy and additionally represents an important driving force for growth and development also for food and wine tourism which combines the undisputed beauty of the country with the extraordinary culinary heritage that can be appreciated by visiting the Italian territories.

## 6. There is food for everyone

The topic of food security, or the ability to feed a world population, which according to UN estimates will reach 10 billion in 2050, has always been a central issue in the international debate. And this is why it is more crucial than ever to try to clarify what is today the real distance between food supply and demand at a global level, also highlighting the opportunities that derive from a greater orientation towards the principles of the Mediterranean Diet.

A simple analysis gives us interesting results on the distance between production and food needs.

In fact, what appears to be a global production problem is denied by data analysis. The latter provide us with some reassurances and confirm that the current global agricultural production would be sufficient to satisfy, for the main productions, the food demand of the entire population following the guidelines of the Mediterranean Diet. Therefore, it would not be so much a production issue as a problem of food redistribution.

If we take, for example, the quantities recommended within the Mediterranean Diet as a reference, following the indications of the reference intake levels of nutrients and energy for the Italian population (Larn), it appears evident that the main productions available today in the world are sufficient to feed the entire world population which has reached 8 billion people. Cereals, vegetables, meat and potatoes today would therefore be largely adequate for global needs. Going into detail (graph 6.1), for cereals, compared to an average consumption suggested by the Mediterranean style of around 320 grams per day, the current production would guarantee around 470. A surplus of 47% if production were distributed according to the actual needs of individuals<sup>5</sup>. In absolute terms, the overall surplus generated would be 435 million tons, equal to over 54 kg per capita per year.

The situation is also similar regarding meat with a production surplus of 155%. In absolute values, this represents over 207 million tons of additional meat available worldwide compared to the actual needs of the Mediterranean Diet. Compared to a suggested per capita consumption of around 45 grams per day, availability is just under triple (115 grams). A production surplus of over 25 kg per capita per year.

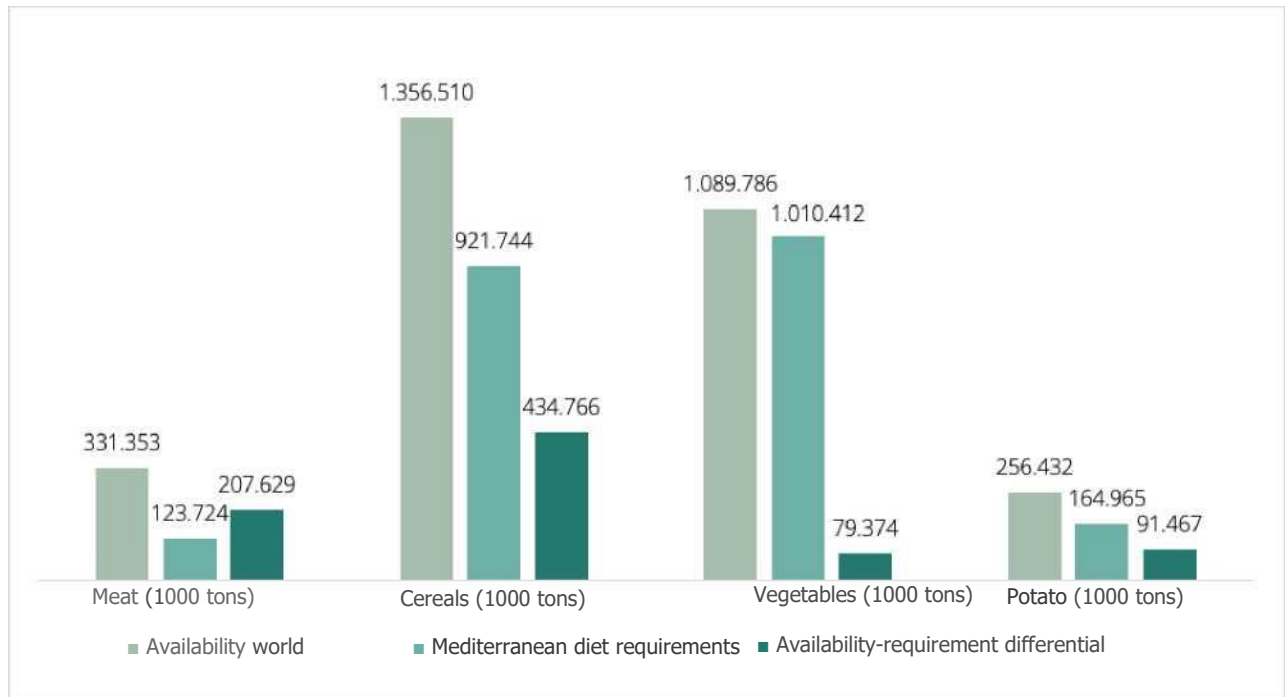
While these numbers provide reassurance on the production sphere on the one hand, on the other they prompt a number of reflections on the consumption recorded in some areas of the globe. Compared to an average annual consumption of meat at a global level of 40 kg per capita, in North America the average consumption per capita presents triple values, with 124 kg, while in Europe they stand at 75 kg. African countries have the lowest value with 17 kg per capita immediately after the Asian area with 29 kg. But the real paradox is that despite these countries recording the lowest per capita consumption in the world

---

<sup>5</sup> Only cereal production for human consumption was considered in the analysis, reducing the quantities intended for livestock feed.

at the same time they are the only ones to suffer a production deficit compared to apparent consumption. Regarding the other components of the Mediterranean Diet, further production surpluses are found in horticultural production with an estimated global surplus of 80 million tons of products, 10 kg per year per capita. Or again for potatoes, with a production surplus that exceeds 91 million tons, 12 kg per year per capita. However, some deficits are highlighted, in particular regarding the availability of milk and derivatives.

Graph 6.1: Demand calculated on the entire world population in 2021



Source: Elaboration by the Divulga Study Centre on Faostat data

However, it is important to point out that these estimates derive from a prudential calculation, as they consider the needs - greater than 2 thousand calories - of the entire world population for all age groups, therefore not taking into account an important segment of the population, such as children for example. up to 2 years (roughly 3% of the world population) or children up to adolescence (approximately 30% of the world population) who naturally need very different caloric intakes from those of adults.

In short, a reassuring picture on the production front which highlights the need for an ever stronger approach to healthy nutritional models for health and the environment such as the Mediterranean Diet, but also calls for an important effort in the direction of a more effective redistribution of food worldwide.

On this theme, the extension of the Mediterranean Diet model to the whole world has been the subject of various studies on a national and international scale, such as the "Planeterranea" project of the UNESCO Chair of Health Education and Sustainable Development and by the Federico II University of Naples. The initiative aims to identify a healthy eating model, based on the nutritional properties of the Mediterranean Diet, but calibrated on foods available locally in different areas of the world. So far, the results are quite encouraging. In fact, after having created a nutritional pattern and a food pyramid based on the local products of each of the macro areas examined including North America, Latin America, Africa, Asia and Australia, the researchers concluded that although it is not a priority to transfer the dictates of the Mediterranean Diet onto a global level, it is essential to encourage and develop local zero-mile production along the lines of healthy eating models, such as the Mediterranean Diet.



## 7. From junk food and ultra-processed foods to the Mediterranean model

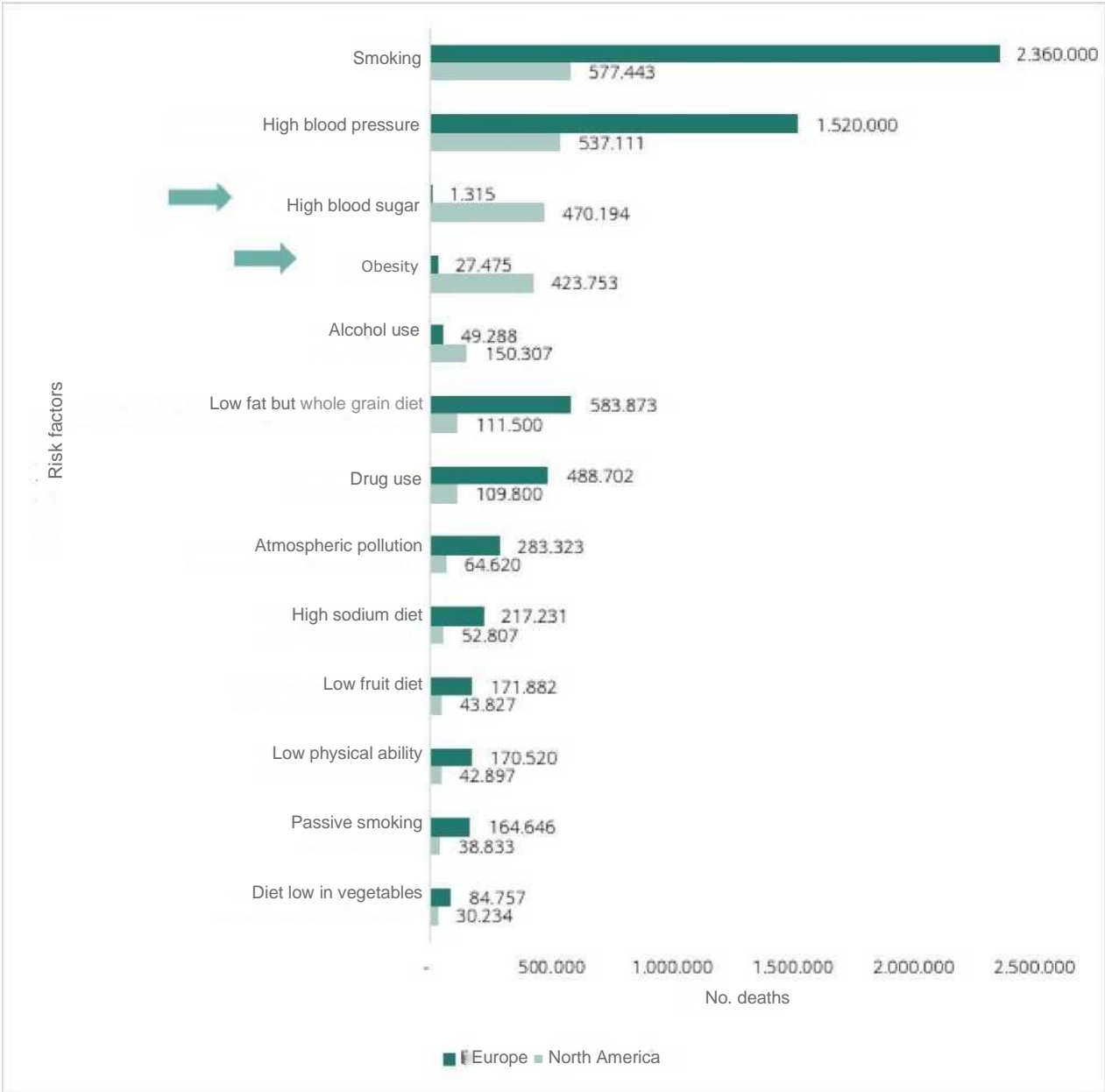
There are many threats that undermine the affirmation of healthy nutritional models such as the Mediterranean Diet. These include the so-called ultra-processed foods which have seen a rapid rise in recent years.

These are products that are manipulated through a variety of processes and technologies and with the addition of synthetic sweeteners, flavouring agents, thickeners, colourants, structuring substances, to name just a few. The main additives used include gums, hydrogenated oils, emulsifiers, colourants and synthetic acidifiers with the ultimate aim of transforming food into a product constructed with the desired flavour and consistency. In recent years, particularly in Western countries, there has been a transformation in the habits of consumers in the age group between 5 and 30 years towards the consumption of ultra-processed foods (35).

The rise of these products is uneven on a global level with a less worrying affirmation in the countries closest to the Mediterranean nutritional model and vice-versa more marked in the American countries. In fact, Italy holds the lowest value in Europe for consumption of ultra-processed foods in terms of calories consumed, with 14% well below the European average of 25%. Conversely, in the United States these values grow exponentially to reach 60% of the average calorie intake in adults and up to 70% for adolescents (36).

The repercussions on health are highlighted by the study of the "Global Burden of Disease", in which it clearly emerges that in North America obesity and high blood sugar levels represent significant factors in the causes of deaths, while in Europe the same risk factors have a decidedly lower impact (graph 7.1).

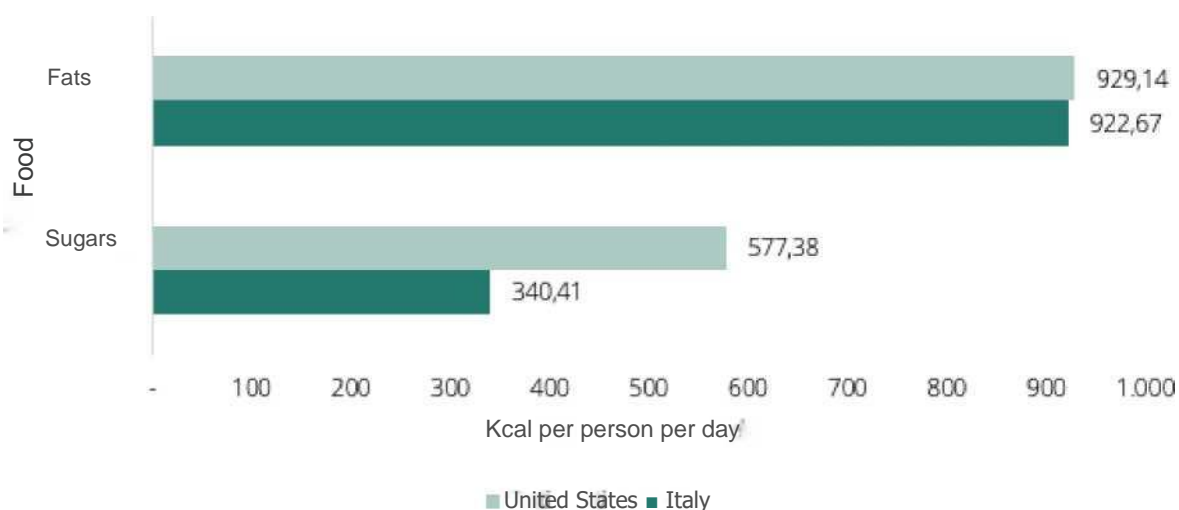
Graph 7.1: Number of deaths by risk factor (2019)



Source: Processing by the Divulga Study Centre on Our World in Data data

The existing dichotomy between nutritional models based on the Mediterranean Diet and those more oriented towards the consumption of ultra-processed foods is also crystallised in the analysis of the caloric intake of fats and sugars (graph 7.2).

Graph 7.2: Food composition by fats and sugars (2020)



Source: Elaboration by the Divulga Study Centre on Our World In Data data

If we analyse the quantities of calories attributable to sugars in different eating styles we notice a well-marked distance with the sugar composition of American diets which takes on a value that is almost double that of the Italian one (USA: 577,38 kcal; Italy: 340.41 kcal). The basis of this differential is evidently an excessive consumption of ultra-processed products and sugary drinks (37).

As indicated by numerous studies, ultra-processed foods are often unhealthy and are associated with a high risk of cancer and cardiovascular diseases and also have negative effects on cognitive functions, contributing to their decline (38). However, in addition to the impact on health, the social consequences of two highly divergent nutritional models should not be underestimated. The orientation towards a healthier and more sustainable diet - such as the Mediterranean Diet - represents a precious socio-cultural passage based on conviviality, daily ritual, social and gastronomic practices and celebrations. In the Mediterranean Diet, food is a tool for social relationships. Furthermore, thanks to the link with the territory, seasonality and biodiversity, it allows us to disseminate greater food awareness and responsibility (39).

Conversely, through the instant and rapid use of fast-food and ultra-processed foods, the social and convivial role of food takes on a completely secondary position.

## Bibliography

- (1) UNESCO (2013) Nomination file no. 00884 for inscription in 2013 on the representative list of the intangible cultural heritage of humanity. <https://ich.unesco.org/en/RL/Mediterranean-diet-00884>
- (2) Redzepi, R., & Zilber, D. (2019). Noma – The fermentation guide. Giunti Editore. [https://www.giunti.it/extracts/giunti/77876J/77876j\\_noma\\_la\\_guida\\_alla\\_fermentazione\\_estratto.pdf](https://www.giunti.it/extracts/giunti/77876J/77876j_noma_la_guida_alla_fermentazione_estratto.pdf)
- (3) United States Department of Agriculture (1992), Home and garden bulletin. N. 252 – The food guide pyramid. <https://naldc.nal.usda.gov/download/CAT40000642/PDF>
- (4) Istituto Superiore di Sanità (Iss). <https://www.issalute.it/index.php/la-salute-dalla-a-alla-z-menu/p/piramide-alimentare#link-approfondimento>
- (5) Mediterranean Diet Foundation. <https://www.fondazionedietaediterranea.it/dieta/>
- (6) Centres for Disease Control and Prevention.
- (7) Schroeder, S.A. (2007). We can do better—improving the health of the American people. *New England journal of medicine*.
- (8) Bazzano LA et al. (2001) Legume Consumption and Risk of Coronary Heart Disease in US Men and Women: NHANES I Epidemiologic Follow-up Study. *Arch Intern Med*.
- (9) Wu H et al. (2015). Association Between Dietary Whole Grain Intake and Risk of Mortality: Two Large Prospective Studies in US Men and Women. *JAMA Intern Med*.
- (10) Istituto Superiore di Sanità (Iss).
- (11) <https://www.istat.it/it/archivio/234930>
- (12) Our World in Data, Share of children and adolescents that are overweight or obese, 1975 to 2016.  
Our World in Data, Share of adults that are obese, 1975 to 2016
- (13) World Health Statistics 2022, WHO.
- (14) Dietary Guidelines for Americans, 2020-2025.
- (15) Frequency of drinking sugar-sweetened soft drinks by sex, age and educational attainment level, Eurostat.
- (16) Marangoni, F., Brignoli, O., Cricelli, C., & Poli, A. (2017). Lifestyle and specific dietary habits in the Italian population: Focus on sugar intake and association with anthropometric parameters—The LIZ (Liquids and Sugars in the Italian population).
- (17) International Diabetes Federation.
- (18) Istituto superiore di sanità, ISTAT data.
- (19) Salas-Salvadó, J., Bulló, M., Babio, N., Martínez-González, M. Á., Ibarrola-Jurado, N., Basora, J., ... & PREDIMED Study Investigators. (2011). Reduction in the incidence of type 2 diabetes with the Mediterranean diet: results of the PREDIMED-Reus nutriti.
- (20) Istituto Superiore di Sanità (Iss)
- (21) Baothman, O. A. et al. (2016). The role of gut microbiota in the development of obesity and diabetes. *Lipids in health and disease*.
- (22) Cryan, J. F. et al. (2019). The microbiota-gut-brain axis. *Physiological review*.
- (23) Szczechowiak, K. et al. (2019). Diet and Alzheimer's dementia—Nutritional approach to modulate inflammation. *Pharmacology Biochemistry and Behaviour*.

- (24) Jackson, A. et al. (2019). Diet in Parkinson's disease: critical role for the microbiome. *Frontiers in Neurology*.
- (25) Stefania Maggi, Domenico Rogoli, Fiona Ecartot, Healthy ageing in the context of the Mediterranean diet–health–environment trilemma
- a. Elliot M Berry, Sustainable Food Systems and the Mediterranean Diet
  - b. Oliver Milman, Meat accounts for nearly 60% of all greenhouse gases from food production, study finds, *The Guardian*.
- (26) Alessia Germani, Valeria Vitiello, Anna Maria Giusti, Alessandro Pinto, Lorenzo Maria Donini, and Valeria del Balzo, Environmental and economic sustainability of the Mediterranean Diet
- c. Istat, Use and quality of water resources in Italy, 2019.
  - d. <https://www.wwf.it/area-stampa/report-wwf-un-pianeta-allevato/>
  - e. Garnet, 2011; Edwards-Jones et al, 2008; Weber e Matthews, 2008; AEA Technology Environment, 2005.
- (27) <https://www.theguardian.com/environment/2022/jun/21/climate-impact-of-food-miles-three-times-greater-than-previously-believed-study-finds#:~:text=So%20called%20%E2%80%9Cfood%20miles%E2%80%9D%20are,for%20human%20consumption%20each%20year>
- (28) [https://environment.ec.europa.eu/news/field-fork-global-food-miles-generate-nearly-20-all-co2-emissions-food-2023-01-25\\_en](https://environment.ec.europa.eu/news/field-fork-global-food-miles-generate-nearly-20-all-co2-emissions-food-2023-01-25_en)
- (29) De Lorenzo, “The reference Italian diet” p.19.
- (30) Passi Indicators: diabetes, ISS.
- (31) Diabetes-related health expenditure per person, USD. IDF
- (32) De Lorenzo, “The reference Italian diet” p.22.
- (33) <https://osservatoriosullasalute.it/wp-content/uploads/2019/05/ro-2018.pdf> p.546.
- (34) Divulga Study Centre. Paper 11 “Outside the pandemic and inside the war”, 2023.
- (35) Justyna Godos, Francesca Giampieri, Wahidah H. Al-Qahtani, Francesca Scazzina, Marialaura Bonaccio, Giuseppe Grosso, Ultra-Processed Food Consumption and Relation with Diet Quality and Mediterranean Diet in Southern Italy.
- (36) Divulga Study Centre. Paper 7 “Zombie Food”, 2022.
- (37) Our World In Data: Dietary composition by commodity group, 2020. <https://ourworldindata.org/grapher/dietary-compositions-by-commodity-group?time=earliest..2020&country=USA~ITA>
- (38) <https://www.lifegate.it/cibi-ultra-processati-declino-cognitivo>
- (39) <https://www.iss.it/en/-/dieta-mediterranea-oggi>
- a. FAO - News Article: Trade and consumption of cheap junk food are an obstacle for healthy diets





