

CONSENSUS DOCUMENT AND CONCLUSIONS

Obesity and sedentarism in the 21st century: what can be done and what must be done?

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Background, justification and goals

At the present time, six out of the seven main risk factors for premature death in Europe (high blood pressure, cholesterol inadequate, Body Mass Index, insufficient intake of fruits and vegetables, physical inactivity, and alcohol abuse) are related with lifestyles, especially with dietary habits, alcohol abuse and physical inactivity and/or sedentarism.

From a public health perspective, the increase in overweight and obesity is of particular concern throughout all of Europe. To approach this issue, both the World Health Organization (WHO) and the European Commission advocate for an integral approach with the implication of all the parties at a European, national, regional, and local level. A good example of this is the recent *Vienna Declaration on Nutrition and*

Non Transmittable Diseases that the WHO promulgated after the Ministerial Conference celebrated in Vienna on the 4th and 5th of July of 2013, in the setting of the “Health 2020” Program, in which it was reaffirmed that a multidisciplinary approach is essential.

Obesity is defined as a disease risk factor characterized by an excessive accumulation of fat leading to a body composition with a fat content higher than a standard that is predefined by the height, age, and gender. In the adult population, obesity is typified as the presence of a *Body Mass Index (BMI)* value higher or equal to 30 kg/m² (an overweight with values higher than 27), whereas in the pediatric population BMI curves specific for the age and gender are used: if the 95th percentile is exceeded there will be a clinical situation of obesity (being the 85th percentile for overweight).

The pathogenesis of obesity is multifactorial and based on a predisposition mediated by the genetic characteristics of an individual implying a greater personalization of the problem, with the confluence of an excess of energy intake and essentially a decrease in the energy expenditure in relation to an optimal balance between intake and demand. In addition to this thermodynamic expression, in the obese individual

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there are impairments in the balance of the molecular processes and the harmony of the functioning of the different regulatory centers of hunger, appetite, and satiety, located at central (which include attention, cognitive, and reward processes), hypothalamic, and peripheral levels. From the genetic viewpoint, there is no doubt that a considerable progress has been achieved in the scientific knowledge, which is, by instance, manifested by the fact that, nowadays, it is estimated that more than 450 genes, markers and chromosomal regions related with the phenotypes of human obesity are implicated. This Multidisciplinary Forum certainly believes that *individualization* is no more a future challenge but something necessary at present.

Independently of the genetic characteristics, in the process of obesity development determinant exogenous factors converge collaboratively, such as consumption of foods and beverages with high energy density, sedentarism, low intake of fruits and vegetables, weight impairments at birth, lack of breastfeeding, etc., together with a series of conditioning environmental factors such as low sociocultural and/or socioeconomic status, unfavorable environment, and other environmental aspects that directly or indirectly influence on feeding behaviors and on the body physiological response to physical activity.

As risk factors, overweight and obesity clearly induce the occurrence of important comorbidities such as metabolic syndrome, cardiovascular diseases, diabetes, osteoarticular pathologies, certain kinds of cancers, depression, and impairment of the cognitive function. We may not forget the relationship between overweight/obesity and body image disorders, the difficulty in human relations and socialization, including the daily basic problems associated with walking, sleeping, travelling, the size of the seats, beds, etc.; this problems not only imply a poorer quality of life for the individual but also higher personal, social, and health expenses.

According to the WHO, approximately 1,200 million people have overweight/obesity problems nowadays and approximately the same number of people still suffers from malnourishment. Should this trend of ponderal overload continue, by the year 2040 the whole European population would be overweighted. The *US Centers for Disease Control and Prevention* (CDC) have alerted that the increase in pediatric obesity could make the children of the next generations live shorter than their parents for the first time in History. In Spain, the problem is not deniable according to the data from the *National Health Survey* (NHS, 2013): 27.8% of the Spanish population aged 2-17 years is obese or overweighted, manifesting equally in both genders. In the adult population, obesity already affects 17.0% of the population aged 18 years and over (18.0% in males and 16.0% in females). Since the first *National Health Survey* in 1987, obesity has led an ascending curve in both genders, being more pronounced in males than females. Whereas in 1987 a roughly 7.4% of the population aged 18 years and over had a BMI equal or higher than 30 kg/m² (the limit for obesity), in 2012 this percentage was higher than 17%.

But more alarming is the fact that 53.7% of the population older than 18 years is overweighted or obese. Obesity is more prevalent with increasing age except in the people older than 74 years. Educational, social, and economical factors are also having a different impact on the Spanish figures: so, obesity increases as the social scale decreases and the educational level is lower. On the other hand, and also a matter of concern, the NHS highlights the prevalence of insufficient weight in females 18-24 years old (12.4%) as compared to 4.1% in males. Regarding the physical activity habits, the NHS shows that four out of ten persons (41.3%) state being sedentary (they do not perform any kind of physical activity during their leisure time): one out of three males (35.9%) and almost one in two females (46.6%). Considering both their main activity and their leisure time, 40.9% of the adults (aged 15-69 years) perform hard to moderate physical activity, being 49.4% in males and 32.4% in females. Not only the physical activity or the obesity data are alarming, but the results also reveal an increase in risk factors and/or chronic pathologies such as high blood pressure, high cholesterol, high plasma triglycerides, low HDL-cholesterol levels, glucose intolerance, and diabetes.

From the health care perspective regarding the management of overweight and obesity, a red flag has been raised many years ago on the limited capacity of nutritional intervention on the patients due to the lack of qualified professionals that may collaborate with dietary and therapeutic education, which translates in low adherence to the therapies; there is another red flag on the lack of effective and safe pharmacological treatments. Besides, among the list of factors that could be improved, poor psychological support is detected for this pathology that includes approximately a 30% rate of eating behavior disorders, as well as shortening of the waiting lists for specific obesity surgery. Of course, the efforts should more intensely be focused on prevention, although it is also true that many aspects of the clinical management are being updated and it is becoming urgent to adopt solutions in this regards at a time when there is some *stagnation* in R&D&I and in the outcomes of pharmacological treatment, particularly regarding the disappointing weight regain approximately two years after the end of treatment for most of the patients, together with higher health care loads at all levels.

The epidemiological evidence supporting the beneficial health effects of the *Mediterranean lifestyle* (MLS) is abundant. Although the evidence is not conclusive, it suggests a clear protective effect of the so-called *Mediterranean Diet* (understood as a true *philosophy of live*) on overweight and obesity and for a higher level of an active life. Our preceding cultural and anthropological substrate favored the acceptance of eating with the family and lifestyle practices, although the current trends have facilitated partially abandoning them.

The rapid social and lifestyle changes that have taken place in the last decades have led to a progressive abandoning of the traditional profile characteristic of the *Mediterranean lifestyle* (MLS) in Spain and other

Mediterranean countries, particularly in younger populations of importance, the MLS considers not only “what I eat” and “what I drink” but also “how do I eat it” and “how do I move”, that is to say, the social aspects of the MLS. There have been important changes in other lifestyles, such as the performance of physical activity in our Mediterranean area. With no doubt, technological advances and improvement of the socioeconomic conditions are closely linked to this transformation. Better acclimatization conditions in the houses and workplaces (the so-called *thermal comfort* and its impact on energy expenditure), the mechanization of labor tasks that require less physical effort in most of the cases, the improvement in public transportation, a great increase in the use of private motorized transportation, etc. There have also occurred important changes in the leisure time activities that have notably contributed to increase the time spent on sedentarism and reduce the amount of physical activity. In this sense, it should be reminded that the energy consumed during the physical activity is the component that varies the most in the total energy waste. It includes the energy consumed during voluntary physical activity as well as that consumed involuntarily in other activities and for postural control. The energy cost of physical activity depends on factors such as the body composition, the intensity and duration of the physical exercise, as well as the net efficacy of the work. On the other hand, physical activity usually negatively relates with age and adiposity.

Knowledge on the energy requirements is essential to correctly establish the nutritional recommendations for the different population groups. It is also important to keep in mind that it is not feasible to measure the total energy consumption or the energy waste while resting in all the cases where this information is required. On the other hand, the recommendations on energy intake are mainly based on estimations of the foods consumed, recorded or notified by the individual, factorial methods and balance studies. It is currently believed that these methods do not provide sufficient accurate and objective estimations of the energy consumed by an individual. There is definitively a consensus on the pressing need to develop studies that would allow adequately quantifying the so-called “energy balance” according to the characteristics of the individual of the 21st Century and the several conditioning factors.

The *sedentary lifestyle*, or better said, the *inactive lifestyle* is a common characteristic of the lifestyle of developed societies and is even more pronounced in the Mediterranean countries of Southern Europe. Regarding the pediatric population, situations such as lower level of road and civic safety has made that the percentage of children commuting to schools by foot or by bicycle or playing on the streets, or parks or public spaces is lower. This fact could be included in the so-called “protective kangaroo effect” that many parents adopt preventing their children to play and run on the streets “by their own”. Besides, the advances in new technologies make the people engaging more and more in very low energy wasting activi-

ties during their leisure time (games console, video games, Internet, etc.).

We should remind that the sedentary behavior is not just lower physical activity, but a set of individual attitudes in which the fact of being *seated and/or laying down* becomes the predominant postural behavior implying a very limited energy waste. On the other hand, sedentary behaviors are present in many places and situations: the workplace, the school environment, transportation, or spare and leisure times. The issue is that a number of studies carried out in the last years have shown that sedentarism or physical inactivity are a risk factor *per se* for the development of many chronic diseases. On the one hand, it has been shown that leading a physically active life implies many health benefits: it decreases the mortality risk from cardiovascular diseases, it prevents and/or delays the development of high blood pressure, it improves the blood lipid profile (it reduces triglycerides and increases HDL-cholesterol), it decreases the risk of suffering from type 2 diabetes, and even certain types of cancers (colon, breast cancer), it improves the body weight control (prevention and treatment of overweight and obesity), it helps optimizing and maintaining the strength and muscle endurance, etc. Moreover, it should also be considered that competition sports represent one of the cultural phenomena interesting most our society. Thanks to basically the mass communication media and private initiatives and sponsoring, many sports events have become big entertainments. In this sense, proper feeding and hydration and mass social entertainments are essential to adapt to the trainings, optimize the physical performance, and accelerate the recovery process. And always keep in mind that a sport will be practiced by anybody liking it, whereas leading an active live is an unavoidable principle for every citizen.

One the other hand, and not less important, the organization of the family and work contributes to spending less time in buying, cooking and consuming the foods, selecting other more readily accessible and cheaper options that require less time to prepare them or that are ready to use. The culinary skills have been declining and the family meals tend to occur during the weekends whereas during the labor days each member of the family unit usually eats at the workplace, the canteen or at some restaurant. Little time is spent for the main meal. So, these social trends lead to new forms of eating, both at home and outside, and to new lifestyle behaviors. This implies a great collective effort to recuperate and/or maintain our dietary habits and lifestyles and also to strengthen the responsibility (“autonomy”) at an individual level, which would allow us making the proper choice of our feeding pattern and global lifestyle; at the end, deciding on our quality of life by promoting the education and information at all levels and prioritizing the issues on prevention over treatment, without discrediting the latter.

All of the above has to be considered in our country, with a current situation of economic crisis, with some individual and collective disappointment that implies that the consumers’ behaviors have also been affected. The current economic situation, on the one hand, gives

preponderance to the financial criteria on the consumers' individual choices and, on the other hand, renders more difficult public and private investments in the development, implementation and assessment of initiatives for monitoring, implementing preventive strategies, and promoting healthier feeding and physical activity attitudes. Besides, there is little communication and coordination that would favor the synergism between the different efforts made to achieve higher efficiency. We should not forget, of course, the principle recently established by the Health Administrators of the European Union stating that *economic crisis* should not equal *public health crisis*.

Both the WHO and the DG SANCO ("Directorate General for Health & Consumers") of the European Commission, as well as other competent authorities in the fields of public health, scientific, academic, and health provision, agree and share the concern and goal of approaching the issue of weight excess and sedentarism from a multifactorial setting, with the implication of all the parties and sectors with some responsibility. The *Global Strategy on Nutrition and Physical Activity* approved by the WHO in the year 2004 set the standard that triggered in Spain the development of the NAOS Strategy at the national government level. Within this frame, several initiatives have already been developed, mainly at the local and school levels, which is in agreement with the recommendation of the *WHO Vienna Declaration* of the present year. Therefore, the *WHO Global Strategy on Feeding and Physical Activity* and the Spanish *NAOS Strategy*, or the most recent creation of the *Observatory for the Study of Obesity and Nutrition (AESAN)* as well as the *European Union Platform for Nutrition and Physical Activity* are reference frames for the design of prevention and intervention strategies from the strictly public or strictly private settings, as well as mixed models of public and private initiatives. Besides, the *Food and Nutrition Safety Law* passed in Spain, although still not fully developed, together with other laws affecting the Secondary and somehow the Primary Educational levels, endorse the implementation of projects promoting healthy dietary and physical activity habits. In the setting of physical activity and sports, there is a *Registry of Sport Habits in Spain* since 1980, carried out by the *Center for Sociological Studies (CIS)* and the *High Council for Sports (CSD)*. Besides, the Spanish Government, in close collaboration with other competent organisms, has reached a consensus with the *Integral Plan*, which is being fully developed and contains specific programs on training of experts in physical activity, sports and health, and aimed at health professionals and physical education and sports professionals. Thus, it may be affirmed that in recent years there is greater awareness on the issue of obesity and physical inactivity and also very diverse community initiatives have been put in place, with heterogeneous results (basically because of the lack of monitoring of the mid-term and long-term impact or insufficient financial support); these results should be analyzed, but

with no doubt they represent a considerable progress. So, the acknowledgement and valorization of the experiences performed, the existing capacitation and the available resources represent a motivational substrate that would allow maintaining the different strategies and increasing their efficacy, as well as updating and renovating them. This would require a limited financial effort, given the current circumstances, by seeking synergies. Therefore, a coordinated intervention between the different sectors and parties implicated at a national, autonomic, and local level is paramount, as well as between the different strategies proposed that assess the experiences and the capacitation accumulated.

These strategies should include a broad range of proposed measures aimed at a more correct choice of foods; the regular practice of physical activity; promoting the creation of proactive environments from both the family and the school and the community that would favor the adoption of correct or proper food and physical activity habits by means of consensus and evaluable programs based on the better evidence available and on local studies, with special emphasis on the recovery and preservation of our Immaterial Humanity Patrimony: the *Mediterranean Diet* as a global philosophy of quality of life.

Based on the thoughts and considerations stated above, a *Multidisciplinary Scientific Forum* met with the objective of reviewing and discussing the following *topics* and *questions* with the aim of elaborating the present *Consensus Document and Conclusions*:

- The "main" topics regarding *energy balance* such as diet and physical activity.
- The "other" emergent factors: genetics, chronobiology; sleep; consumption of medicines; energy waste and baseline metabolism; decrease of cigarette smoking; age at first maternity, etc.
- Do we really know the so-called *energy balance* at the present time? Is it necessary to review the Recommended Energy Intakes in Spain? Would it be convenient to establish *Maximum Tolerable Energy Intakes* according to the different age groups?
- Obesity predictors: are the tools and/or biomarkers adequately defined? The power of omics, their strengths and weaknesses.
- Should the excess of sedentarism and physical inactivity also be considered as risk factors? How should be defined and measured? Are there reliable biological markers for the different ages and physiological conditions?
- Overweight and obesity and the excess of sedentarism and physical inactivity at the different life stages and physiological conditions: are indicators and growth curves equally valid in the pediatric and juvenile populations or the BMI (elder people, sportive people vs. adult population)? Is generalized interventionism recommended in the elderly?
- Foods and daily feeding: Do we sufficiently know the composition of our foods? Are there any *cul-*

prits in our feeding and would they be justified from the perspective of scientific knowledge? What is more important, the “quantitative” or the “qualitative” aspects when relating diet and health? Hydration, physical exercise, and body weight control.

- Physical activity, physical exercise and sports today: strengths and weaknesses.
- Common errors and myths about overweight and obesity, and sedentarism/physical inactivity.
- Current challenges in the research of obesity and sedentarism.
- Ethics of prevention and treatment of overweight and obesity and sports practice.

The *main conclusions, recommendations and proposals* reached are presented below and constitute the “*Segovia Consensus Document on Obesity and Sedentarism in the 21st Century: What can be done and what must be done?*”

- The periods of *economic crisis should not and must not imply a public health crisis* regarding the prevention of overweight and obesity and sedentarism and physical inactivity.

- *Health not only means the lack of disease*, but a state of physical, psychological and social wellbeing.

- The *severity of the problem of overweight and obesity* is reaffirmed, although in some aspects some encouraging data are foreseeing, more significantly in the world population and not so easily identified in Spain.

- The *problem of excessive sedentarism and physical inactivity* of the Spanish population is also reaffirmed, and not only in association with overweight and obesity, but also with other disorders, pathologies which evidence and impact are just in their emergent phase.

- *Prevention of overweight and obesity and sedentarism* should be included in the “*services portfolio*” of the Spanish Healthcare System, throughout its different models.

- *We still do not sufficiently know the origin and causes, and sometimes there is a tendency “to believe more than to know”*. They are not only just two factors (feeding and sedentarism); the multifactorial etiology makes that other factors such as hours of sleep, abusive use of some medications, the decrease in cigarette smoking, the global phenomenon of migration/immigration, or the excessive “thermal control”, among others, should be analyzed. Unfortunately, in many aspects related to obesity and sedentarism the *unknown or poorly known* surpasses the scientific evidence. A significant example of this is the national integrated survey on nutrition and physical activity, which is considered a fundamental tool to be implemented in the short term. In this sense, there is a clear geographical *asymmetry* regarding the level of instruction, the economic status, the gender, etc., which allows focusing future efforts in the targets derived from these asymmetries, especially during this era of scarce financial resources.

- *The need of carrying out systematic reviews, and when appropriate meta-analyses*, of the studies and programs performed in Spain in recent years on different issues relating to overweight and obesity and/or sedentarism and physical inactivity is proposed.

- It is paramount to *better define which are the barriers to prevention and/or treatment of overweight and obesity and sedentarism and physical inactivity*.

- *We currently have not available a proper nor sufficient therapeutic armamentarium to treat obesity*. The need of counting on effective drugs helping to treat obesity when other types of interventions (diet, physical exercise, dietary behavior habits) are insufficient is confirmed. Generally speaking, pharmacological therapy is seen as an *alternative* and not as the first choice. The drugs currently used or that are about to be marketed seem to be effective in diminishing the cardiovascular risk or progression of diabetes, but they do not seem to adequately cope with the needs of losing weight. Therefore, novel pharmacological targets are needed. This renders prevention more relevant as well as *personalization* as a strategic priority.

- In the case of morbid or extreme obesity, *bariatric surgery* is consolidating as an effective and verified treatment with important therapeutic results within the setting of a multidisciplinary team.

- In the prevention of overweight and obesity and the excess of sedentarism and physical inactivity, the *social aspects* become relevant. This means that the statement of *what you eat and what you drink is important but also how you eat it and how you move* should be promoted trying to recuperate and/or preserve all that pertaining to the socialization of food or shared social life. There exists the unanimous opinion to consider the *family*, in its different structures, as the best model to learn proper and healthy dietary and lifestyle habits. Therefore, policies on prevention should mainly focus on reaching and communicating with the family core, although the institutional canteen (school, university, company, nursing home), is also an adequate frame for action through education.

- Regarding the *family environment*, it is recommended in the first place to avoid the presence of the television in the bedroom of the child / young. In the second place, eating while watching television should be avoided, at the same time that exposing the child-adolescent to inadequate advertisements related with the topics of this Document should be minimized. Besides passive electronic entertainment should not be promoted by public administrations or the community. Finally, and given the already mentioned multifactorial origin of obesity, this *minor* actions will not be successful if main obesogenic factors are not controlled.

- *Special attention should be paid to certain ethnic groups or immigrant populations recently installed in Spain, with a follow-up on feeding transitions*.

- All the actions leading to *social equity* should be promoted so that we may prevent or decrease the fact that the prevalence of overweight and obesity or the

excess of sedentarism and physical inactivity is more pronounced as the educational level decreases and the inequities in the socioeconomic environment increase.

- It is paramount that the *message* given to the population will be that these problems may be prevented and even treated; the professionals implicated being the first believers. We advocate the “yes we can” statement as the fundamental principle to be transmitted individually and collectively.

- *Many errors are recognized in the auto-perception of eating, body weight, and physical activity, etc.*; since nutrition is many times nutrition is individually perceived as “how it works on me” and not based on scientific evidence. This leads to many errors, myths and magic in the topics of nutrition, physical activity and sports. It is proposed to fight more diligently against these errors and myths, from the public administration and the educative, scientific, healthcare, or mass communication media settings.

- There exist a *great number of prevention programs, interventional studies, etc.*, but there is a *lack of coordination and follow-up*, many times due to the dependence on the public administrations and the lack of budgets or the existence of long-term criteria to be achieved successfully. In this sense, programmed and bound implication of governmental, autonomic and mainly local administrations in obesity prevention is paramount. In agreement with the *WHO Vienna Declaration* of July of 2013, local powers should be prioritized since their managerial range is more efficient and closer to the citizenship and it allows adapting the programs to each population peculiarities. Effective changes require continuous, unified, sustainable, and close actions that cross-sectionally implicate all the community, the family being the core where most of the behaviors related to diet and physical activity reside.

- Similarly, the Administrations should decide if they want and they can have financial models strictly public, or “mixed” public/private models, as occur in countries with similar problems.

- There is a *real need for adopting not only a nationwide consensus but also an international consensus in order to have homogenous criteria for gathering and analyzing the data* from the studies targeting with overweight and obesity and/or sedentarism and physical inactivity.

- Many observational and interventional studies generally lack well defined study samples and the “*obese*” and/or “*sedentary*” individual has usually been considered as one single typology from both the physiological and pathological perspectives. This methodological bias is no longer acceptable thanks to the ever growing knowledge coming from the *omics* that allows us accurately differentiating the typologies and how to approach them from the prevention and treatment viewpoints. There is a current scientific consensus that “obesity” does not exist as a unitary phenomenon, but that there are several types of “obesities” requiring innovative approaches in prevention and/or treatment, investigating etiological factors and specific biomarkers for each particular

condition. Thus, new possibilities for action emerge in the sense of greater individualization of the interventions. This concept of *diversity* should translate to the experimental models and clinical situations, being the starting point for the study of new pharmacological targets by means of studies on genomics, proteomics, etc. In this way, the dilution and excessive homogenization of many studies in this field would be prevented. Finally, the efforts in basic and translational research should be pursued in order to progress in the pharmacological treatment of obesity.

- Regarding *research*, the need for a *multidisciplinary approach* is reinforced, and more specifically we should insist in the development of:

- a) New models based on the possibilities that offer the imaging techniques.
- b) Identification and validation of new biomarkers of inflammation and metabolic risk associated to the comorbidities of obesity.
- c) Epigenetic models that certainly require lots of time for their validation and potential success since many times it seems that much is being demanded from them and in a very short time.
- d) New *omics* technologies.
- e) New methods to register food consumption and physical activity, as well as other associated factors (i.e chronobiological aspects). The new technologies offer tremendous possibilities in this regards for greater accuracy, both quantitative and qualitative.
- f) More intense studies on the bacterial flora (“microbiota”)
- g) Efforts to link more basic and/or applied research with the so-called “consumer science” in the topics considered in the present document.

- *Diet and food composition and consumption still is a big unknown* in many of its aspects, and even more as it has become more complex in its production, availability, gastronomy, etc. All of this in a consumer’s environment with less time and rational capacity for a proper choice of the foods and many times without solid culinary skills, by contrast with what occurred less than one generation ago. In this sense, we should promote the idea of *the individual being “autonomous”, promoting individual responsibility*, which is not clearly understood nowadays.

- Knowledge on nutrition of the whole population, assuming the methodological weaknesses still present, is essential to be able to draw a picture of its nutritional status. With regards to the *usual consumption pattern* of the Spanish population, low consumption mainly of grains and their derivatives, greens and vegetables, and legumes are being observed, as compared to the recommendations. By contrast, there is high consumption of fat meats, cold meats, and in the upper limit for simple sugars. This implies an unbalanced caloric profile given that the relative contribution of fats is higher and that of carbohydrates is lower than the percentages recommended. Regarding the fat quality, the contribution of saturated fatty acids to

total energy exceeds the recommendations. Analyzing these data and their evolution from the 1960s, it may be observed that the diet of the Spaniards has been notably modified in the last 40 years, moving away from the traditional model of the Mediterranean Diet (MD). Therefore, all the efforts should be focused on recovering and/or maintaining the characteristics and properties of the MD, always considered together with our lifestyle.

- The *Mediterranean lifestyle*, considered in all its aspects (diet, physical activity, socialization), that is to say as an optimal *philosophy of life*, is the best model for prevention and treatment of overweight and obesity and the excess of sedentarism. Besides, it should be highlighted that it is not only that the density of nutrients and quality of life-associated factors in relation to costs is more favorable to the MD as compared to other kinds of diets, but also that models of adherence to this diet are cost-saving, which is particularly relevant in the current situation of economic crisis.

- The *Mediterranean lifestyle (MLS)* is not just a dietary pattern that has cumulative evidence in the prevention of chronic diseases; it represents a lifestyle as the original Greek term means, “*diaita*”, which also comprises the combination of foods, cultural elements and lifestyle in the process of selecting, processing, and consuming, giving priority to fresh, local and seasonal foods; the culinary activities and social aspects of meals; regular physical activity; resting in the form of a nap; and all the way of living that is part of the cultural inheritance of the Mediterranean countries. These countries share a series of geographical and climatic factors that have favored this common cultural and agro-alimentary frame. However and spite of an acceptable degree of knowledge by a majority of the population on the concept and principles of the MD, there exist big difficulties to follow and adhere to it since many times there is a lack of knowledge, skills and attitudes.

- Monitoring the *MLS pattern* reveals that the *Mediterranean populations*, especially those from the Mediterranean Europe, are progressively moving away from it, which menace the adherence to this pattern among the younger populations. Paradoxically the Northern European countries and other regions of the World far away from the Mediterranean area are those that are increasingly and positively adopting several characteristics of the MD. This is a robust example that “positive” intervention policies in public health are a very good tool for the consecution of the short-term and/or mid-term goals.

- It has repeatedly been observed in a number of epidemiological studies that a *good adherence to the MLS pattern* is systematically associated with a significantly lower risk for several chronic diseases (cardiovascular diseases, diabetes, and metabolic syndrome, neurodegenerative pathologies such as Parkinson’s disease, Alzheimer’s disease or depression, some types of cancers, overweight and obesity, bronchial asthma, etc.), and globally to better nutritional adequacy, longevity and quality of life. Also important in the current and

future contexts, the MLS implies low costs and environmental impact and could be included among the most sustainable agro-alimentary systems worldwide. We may add to these unquestionable strengths that, in the Spanish setting, the MLS is adapted to our tastes and customs and there is the possibility of using locally produced foods with a low dependence on foreign markets.

- In Spain, the *agro-alimentary industry* has played an essential role (and still does so) in improving the food offer, food safety, or eradicating situations of general and/or specific malnourishment. However, at the same time, we call for better support and collaboration, essentially and urgently, from the part of the industry related with the food chain, but also from the part of the industry related with entertainment, leisure, physical activity, and sports. This would allow modifying or adapting their products, processes and marketing and advertising strategies to the Dietary Guidelines and Nutritional Goals for the Spanish population, and also fulfilling with the recommendations for leading an active life.

- Many of the so-called functional foods and nutraceuticals in the field of body weight control have focused on the target of inhibiting the food intake (by interfering with the feeling of hunger, stimulating satiety, or limiting the bioavailability of certain nutrients), the energy content of the foods (by including less caloric ingredients or substituting fats and sugars), and the body composition and/or energy waste (through stimulation of thermogenesis). The dramatic advance of disciplines such as nutrigenomics or nutrigenetics will certainly allow adopting new strategies for the development of these products, although the outcomes are still scarce and emergent.

- It is essential to *unify the messages in the field of diet, nutrition and physical activity* coming from the different actors (administrations, scientific societies and foundations, professionals), always counting on the collaboration of the mass communication media and the new technologies. We propose the *elaboration of Consensus Guidelines/Recommendations regarding prevention of overweight and obesity and the excess of sedentarism*, with the possibility of association models in view of the scientific knowledge. At the same time, we postulate the importance of better defining the “clusters” in nutrition and physical activity that would allow more specific and effective actions.

- Regarding the *information* on Diet and/or Nutrition, there is no sufficient scientific evidence showing that better information on the foods (composition, nutritional information, etc.) will positively impact on a better choice and adherence to the dietary pattern. The concurrence of new information technologies with more traditional ones seems indispensable given the different skills of the different population groups, and anyhow, it will be necessary to monitor them regarding a real improvement in dietary habits and lifestyles.

- There are *intervention models that have been proved and work well*. When planning and monitoring

interventions in the pediatric and juvenile populations, one should be alert not to increase the prevalence of children with low weight and associated behavior disorders, as it has already been observed in studies conducted in Spain. The population-based obesity prevention projects carried out in Spain, although scarce and many times lacking a follow-up, have described positive results in changes in the eating habits and lifestyles, but also in body composition and biological markers. We are clearly convinced that these prevention systems should be implemented in the long run and be integrated in the socio-occupational dynamics of the collectivities mentioned.

- The so-called *energy balance is not well defined* for the Spanish population and it is essential to approach it with the aim of being able to properly establish the energy requirements for our population and the subsequent Reference Intakes. *Integral studies of all the elements comprised in the energy balance equation* should be done given their interrelationship. Long-term longitudinal studies on the energy balance and body weight/composition are urgently needed. It seems essential to improve the tools for studying the energy intakes and losses of “free living” independent subjects. In this regard, the tools such as databases of the composition of quality foods, especially regarding energy and serving sizes, should be improved.

- *The knowledge for the different age groups on the impact of the different levels of physical activity should be increased.* In the same way, more studies should be carried out in the different population groups and physiological conditions in order to be able to assess the recommendation of the level of physical activity necessary: either moderate, intense or more vigorous. In this sense, the value of the so-called muscle strength should be reinforced as a very useful tool with a clear positive impact at all ages. The important effort done in Spain in the last years regarding the different kinds of sports facilities should not be wasted, even during difficult times as the present one, so that the above mentioned challenges and needs could be met. Sports professionals, in the broadest sense, should increasingly be involved.

- *We should try to answer the following questions:* Is inactivity a “normal” response to an “abnormal” environment? This would imply changing the environment, modifications at the educational level, awareness on the importance of being active giving the highest importance to the expression “to practice what one preaches”, at all levels: the administrations, the community, the schools, the families, etc.; Or is it an “abnormal” response to a “normal” environment? This would imply a behavioral change, as well as taking into account the chronobiology of overweight and obesity. *We should consider not only the physical activity performed but also the physical inactivity.* Sedentarism is not necessarily equivalent to physical inactivity, and it is becoming more and more important to assess the different sedentary behaviors, their health impact, and their correlation with the forms of feeding and other lifestyles.

- Independently of the genetic factors, etc., there is sufficient scientific evidence showing that *regular physical activity through sports decreases the percentage of body fat* and decreases the risk factors associated to cardiovascular disease, diabetes, or certain types of cancers. There exists scientific agreement in considering the practice of physical activity as a useful tool for the prevention of obesity, so that spontaneous physical activity, practicing sports, active commuting, etc., should be promoted.

- *Special attention should be paid to projects and organizations that incorporate in the physical activities the greatest number of people* with programs such as “physical exercise for everyone”, “physical activity and physical exercise as a leisure activity”, “move on”, “activate yourself”, etc. Therefore, sports organizations represent a unique potential in the promotion of physical activity and healthy living habits, which should be better used in the future.

- *The data on physical activity should be included in health monitoring systems at a national scale.* Besides, physical education professionals, health professionals, trainers, managers of sports and leisure centers, and mass communication media professionals, should have available during their studies, professional training and specialization all the information regarding physical activity, the best way to incorporate it in daily living, the dietary characteristics of the active, moderately active or very active person.

- The active person practicing physical activity, physical exercise or sports should know that in order to provide an adequate daily energy intake and maintain an optimal performance, the caloric expenditure should be considered individually since the amount of energy consumed varies according to the individual’s characteristics, the kind of physical activity performed (kind of sport, intensity, duration etc.), and the environmental conditions in which the activity takes place. It is also important to have a proper intake of water, that is to say hydration, as well as macro and micronutrients and other non-nutritive components with a nutritional interest. *We propose to increase the education and information of both the professionals related with physical activity, physical exercise and sports, and the people practicing them as amateurs or professionals.*

- *Health and educational programs prescribing physical exercise and preventing sedentarism should be created and promoted,* as well as assessing this situation in certain risk conditions such as chronic diseases, as well as other related pathologies.

- Leading an *active life* should be associated not only with a better health state but also with *enjoying time and higher sociability*, at all ages, but especially in the pediatric/juvenile population and the elderly. Therefore, intervention programs should consider these principles, strongly giving the message that *it is never late to start leading a more active life.* Similarly, we urge to better promote the investigation that will allow determining more accurately the optimal amount of physical exercise (time, duration, intensity), in combination with the usual sedentary behaviors of our society.

- *Mass communication media and the new technologies* should be used to sensitize the population to be more active and informing on the benefits of leading an active life and practicing physical exercise and the risks of sedentarism and physical inactivity for health and the quality of life in general.

- *Obesity prevention has not been considered as a priority goal in the context of physical activity and sports sciences* until very recently. Therefore, we urgently propose the inclusion of investigators from the sports and educational fields in the multidisciplinary teams that carry out preventive and interventional strategies.

- *The lack of multidisciplinary units* including professionals from the fields of physical education and sports, as well as nutrition and dietetics *is alarming*. A decisive and urgent action is needed to rectify this situation.

- We insist in the need for *promoting investments in infrastructures* for transportation by foot or by bicycle, together with information campaigns aimed at explaining the benefits on health and quality of life.

- *Regular practice of physical activity at school age* is an essential tool for proper integral development of children and adolescents. We must try to increase the performance of physical activity, physical exercise and sports by all the pediatric and juvenile populations as a tool of social cohesion since the habits learnt at childhood usually live on at adulthood.

- *In children, growth and development should be guaranteed, and not only emphasize the energy intake*. Physical activity has to be enjoyable and include the children in decision-making; all of it integrated in the indispensable public health policies. On the other hand, treatment of overweight and obesity through physical exercise is a much more complex topic, it requires some caloric restriction in the adult, and is even more complex in pediatric ages. The approach of this latter situation is more clinical and less related to the school environment. It should be desirable to reach a *consensus at a national level on the reference curves and the cut-off points* for the studies assessing and monitoring the body weight in pediatric populations so that international comparisons could be made.

- *Prevention of diabetes* is essential in order to decrease the incidence of this disease. As compared to the general population, at the time of diagnosis, approximately 50% of the patients have microvascular complications (retinopathy, neuropathy or nephropathy) and twice the risk for macrovascular complications. Obesity is considered as the main modifiable factor, to which approximately half of the new cases may be attributed. We may insist by any means in communicating that even a modest weight loss has a favorable effect on risk and that physical exercise, either combined or not with diet, also contributes to decreasing the risk. Therefore, diabetes should be prevented through different interventions given the fact that:

- Its prevalence is already overwhelming and it is a public health concern.

- There exist markers that allow measuring the progression of the disease.
- “Pre-diabetic” subjects already present cardiovascular risk.
- Once diagnosed, the treatment of diabetes is expensive and difficult.

- Obesity is associated with *greater risk for cardiovascular disease and chronic inflammatory state*; however, many aspects need to be studied in a combined way since they directly impact on the adolescents’ health, although not exclusively in this age group. Sedentarism is associated with poorer cardiorespiratory condition, independently of the BMI. Sedentarism is also associated with cardiovascular risk factors in adolescents, especially in those with excessive abdominal adiposity. All of the above implies the need for an action strategy that takes into account all of these factors.

- *Moderate exercise stimulates certain aspects of the immune response* whereas intense physical exercise may lead to unwanted side effects. Once again, the need for personalization of dietary habits and the practice and prescription, if indicated, of physical exercise is reaffirmed.

- *Weight control schedules* should be based on the approximation to the diet, physical activity, and lifestyle, the so-called “theoretical ideal”, with a special emphasis on those aspects where the difference with the theoretical ideal is bigger:

- Increasing physical activity.
- Decreasing sedentarism, with a special emphasis on the so-called TICs.
- Promoting breastfeeding and control of the diet and the lifestyle in general of the childbearing mother.
- Improving the dietary pattern through the promotion of consumption of those foods eaten with a frequency below the recommended amount: vegetables, whole grains, fruits, legumes, and fish.
- Being vigilant in the timing and environment of meals, with a special emphasis on breakfast.
- Decreasing the stress at work, family, and the general environment.

- *The NAOS Strategy should keep on integrating and promoting actions* in the most diverse settings, looking for collaborations and synergisms with the different public and private administrations, research centers, universities, and with the different social players implicated in this field. The philosophy of the NAOS Strategy is based on a positive image avoiding stigmatizing and forbidding certain kinds of foods, and stimulating the participation, implication and commitment of all the social and financial players, promoting their proactivity, and trying to promote a coordinated response of all the agents implicated, with the final goal of reverting the obesity trend and, thus, social sedentarism. Therefore, in order to the NAOS Strategy becoming consolidated and definitively recognized, it must face and correct its develop-

mental weaknesses: lacking a budget linked to an action plan; the promotion of physical activity has been less developed; the evaluation and follow-up of the actions have been very limited. However, its inclusion in the *Food and Nutrition Safety Spanish Law* conferred it a legal endorsement and currently it counts with the necessary political endorsement for its development and progression in the coming years, in harmony with the policies of the European institutions (WHO and EU), the very recent Vienna Declaration of the Health Ministers and European Health Administrators (4-5th July of 2013).

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Many 21st century classrooms still use what can best be described as a "broadcasting" method to teaching: one authority figure speaking out to a group without the group interacting back. Unfortunately, students too often "turn off" the teacher broadcast and valuable educational opportunities are lost as a result. We are now living in an interactive world in which two-way communication is the minimum expectation. So why is it that many of the same age-old teaching strategies are still abundantly in use today, such as lectures and worksheets? Though these approaches were relevant as long ago as in Think: How do people communicate with each other in the 21st century? Critical analysis. Employers want workers who are able to recognise the difference between information that can be believed and false information. Think: Use the internet to find out three facts about a celebrity or famous figure. Can you verify the information by checking other websites? Decision making. Individual workers have a growing amount of responsibility. It is important to be able to evaluate a situation and be confident in making a decision. Think: Which three things could you do to (a) be healthier (b) do better