



Southern European initiatives to reduce obesity | An overview

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WHAT IS EIT FOOD?

European Institute of Innovation and Technology (EIT) Food is a pan-European consortium that focuses on entrepreneurship and innovation in the food sector. The members of the EIT Food community are world-class players in the international food domain: over 50 partners from leading businesses, research centers and universities across 13 countries. EIT Food officially started in November 2016.

What is EIT Food CLC South?

As one of EIT Food Co-Location Centers, CLC South was established in the second half of 2017 to build bridges among leading businesses, universities and research centers. It began its construction with partners from Italy, Israel and Spain reinforced with local innovation hubs in Lisbon, Athens, Bari and Istanbul, and today has partners in every country from southern Europe, including Portugal, Greece, Malta, Cyprus and Turkey. With a consumer-centric approach, our main goal is to deliver a healthier lifestyle for citizens by enhancing high-value-added cooperation and integration in order to stimulate innovation, talent development and consumer involvement.

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CLC South facilitates activities in the four EIT Food functional areas:

1 BUSINESS CREATION:

CLC South identifies, supports and ensures the success of agrifood startups who have the power to transform the food system. We work with all stages of startup - from just an idea to global expansion - and support them by offering training, funding, access to infrastructure and our network of EIT Food partners.

2 INNOVATION:

CLC South targets societal challenges through technology-based products and services with breakthrough potential by organising matchmaking events to support individual partners and provide them with the appropriate tools to draft robust proposals.

3 COMMUNICATION:

CLC South actively promotes and supports a shift in engagement from consumers as passive recipients to citizens as enthusiastic change agents by encouraging them to cause an impact in the food ecosystem. We therefore support multiple initiatives, such as consumer-led innovation campaigns and a digital platform (Food Unfolded) which will be a reference point for Europe and the globe.

4 EDUCATION:

CLC South supports capacity building by offering workshops, summer schools and online educational programmes such as MOOCS (Massive Open Online Courses) and SPOCS (Specialized Private Online Courses) for students, entrepreneurs and food professionals.

OBESITY, OVERWEIGHT— WEIGHT AND BMI

According to the World Health Organization, overweight and obesity are defined as abnormal or excessive fat accumulation in the bodyⁱ. For adults, a simple indicator used in detecting overweight and obesity is the body mass index (BMI): a person's weight (in kilograms) divided by the square of their height (in meters). For adults, a BMI range between 25 and 29.99 is considered overweight, a range between 30 and 39.99 obese, while a value equal to or more than 40 is considered severely obese.

In children, on the other side, overweight is defined as one standard deviation higher, and obesity is defined two standard deviations higher than BMI for age and sex according to the WHO growth references for children and adolescents (between 5 and 19 years of age)ⁱⁱ. In children under 5 years of age, overweight is weight-for-height greater than 2 standard deviations, and obesity is weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards medianⁱⁱⁱ.

Although BMI is a useful indicator, it is not considered sufficient to diagnose obesity. Moreover, individuals with high muscular mass have a high BMI without being obese. Another tool for measuring excess body fat and obesity related metabolic risk is waist size. Generally, men with a waist size equal to or higher than 94 cm and women with a waist size equal to or higher than 80 cm are more prone to health complications related to obesity^{iv}.





What makes people obese and what does this mean for their health?

A

lthough obesity occurs when calories taken exceed the calories burnt through daily activities leading to excess calories being stored as fat, there exist some risk factors which can lead to obesity. These factors include lifestyle, genetic predisposition, comorbidities, certain medications and age.

It has been demonstrated that lifestyle habits such as

consuming fast food, having late night meals, consuming big portions, drinking sugar sweetened beverages and not engaging in adequate levels of physical activity leads to weight gain and ultimately to obesity^v.

Mutations or variants in genes that play a role in food-energy conversion, appetite regulation or calorie burning during exercise may contribute to

obesity. One of these genes is MCR4 which encodes for melanocortin 4 receptor. Decreased function of this receptor has been observed in obese people making them feel continuously hungry leading to excess food intake^{vi}.

In some people, obesity can develop due to medical conditions, such as Prader-Willi syndrome^{vii} and Cushing syndrome^{viii}. Use of medication for the treatment of other conditions such as antidepressants, anti-seizure medications, diabetes medications and steroids may also lead to weight gain if calorie intake is not adapted or level of activity is increased^{ix}.

The risk of obesity increases with age due to hormonal changes, decreased muscle mass and a less active lifestyle. Thus, recommended caloric intake needs to be adapted to avoid excess weight gain^x.

On the other hand, obesity has very serious consequences. For example, obesity has been associated with premature mortality (reduced life expectancy) at all ages, for both men and women. For the age group of 20-29 years, it has been estimated that obesity reduces life expectancy by 5.6–7.6 years for men and 8.1–10.3 years for women, compared to normal-weight counterparts^{xi}. Obesity has been linked with poor quality of life, shortness of breath, reduced mobility, back pain, and increased psychological diseases^{xii}.

Obesity has also been associated with many diseases. The most common chronic conditions associated with obesity include diabetes, cardiovascular diseases, cancer, osteoarthritis, anxiety and depression^{xiii}. For example, it has been shown that women with a BMI of 35 kg/m² have 93-times higher risk of developing diabetes compared to women with normal BMI^{xiv}. Diabetes complications on the other hand include congestive heart disease, blindness, kidney failure, stroke and osteoarthritis, among others.

Obesity is an independent risk factor for cardiovascular disease, including hypertension, coronary heart disease and heart failure and has been associated with an increased risk of morbidity and mortality^{xv}. A 10-kg weight gain has been reported to lead to an increase of 3.0 mmHg in systolic and 2.3 mmHg and diastolic blood pressure as well as to an estimated 12% increase in the risk for coronary heart disease and a 24% increase in the risk for stroke^{xvi}. The prevalence of hypertension has also been shown to increase progressively with increasing BMI: from 15% for a BMI<25 to 38-42% for a BMI>30^{xvii}. Furthermore, the risk of heart failure increases by 5% for men and 7% for women for each unit increase in BMI^{xviii}.

Obesity is also considered an avoidable cause of cancer^{xix} and has been linked to higher risks of developing gastric, cardiac, liver, pancreas, oesophagus, kidney, colorectal,

breast, gallbladder, thyroid and ovarian cancers^{xx}. For individuals with BMI ≥ 40, mortality from all types of cancer was 52% higher in men and 62% higher in women compared to those with a normal BMI^{xxi}.

Since overweight and obesity subjects some joints (knees, hips and lower back) to excess load, it can contribute to the acceleration of cartilage degeneration, thus leading to osteoarthritis^{xxii}. Interestingly, obesity has also been associated to osteoarthritis in non-weight-bearing joints^{xxiii}.

Finally, with respect to mental health, research has shown that obese people are 1.3-2.7 times more likely to suffer from major depressive disorder, anxiety and post-traumatic stress disorder compared to non-obese individuals^{xxiv}.

Obesity rates are increasing worldwide

The global prevalence of obesity has been increasing over the last decades both among adults and among children. Despite the great efforts by many public and private entities, no visible improvement has been achieved and obesity is still one of the principal health concerns worldwide and among many European countries.

In a comprehensive analysis of almost 1700 measurements in 200 countries reflecting data from 19.2 million participants, it has been shown that age-standardized prevalence of obesity increased from 3.2% in 1975 to 10.8% in 2014 in men, and from 6.4% to 14.9% in women. Globally, in 2016, 13% of adults aged 18 years and older were obese. More strikingly, when the overweight population was

included in this analysis, 39% of adults were overweight or obese.

Similarly, while under 1% of children and adolescents aged 5-19 were obese in 1975, 6% of girls and 8% of boys (a total of 340 million children) were obese in 2016. More recently, in 2019, 38.2 million children under the age of 5 years were estimated to be overweight or obese.

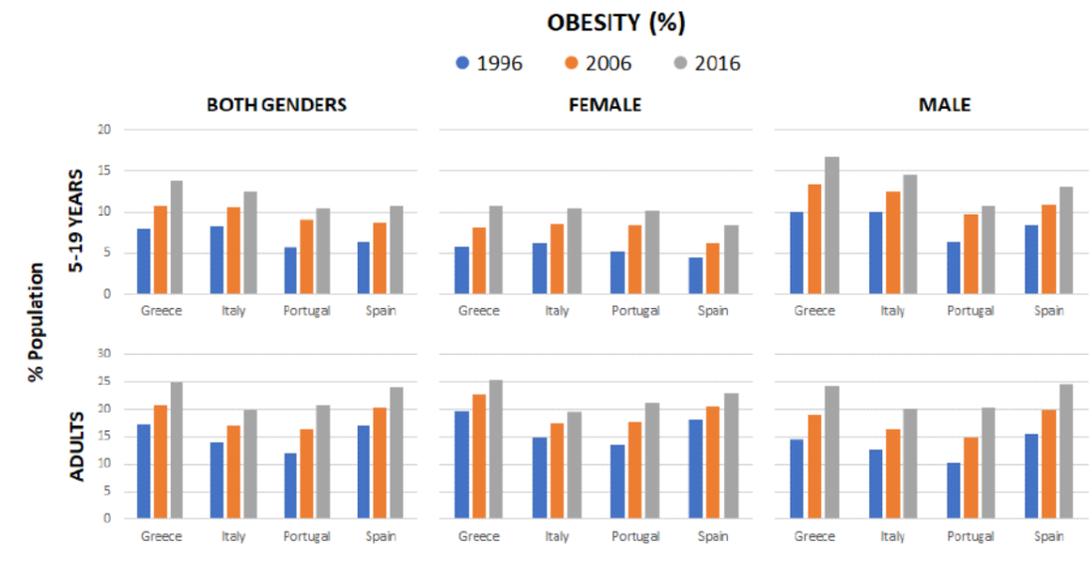


Figure 2: Percentage of obesity in the reported countries. Data source: World Bank.

A snapshot of southern european countries

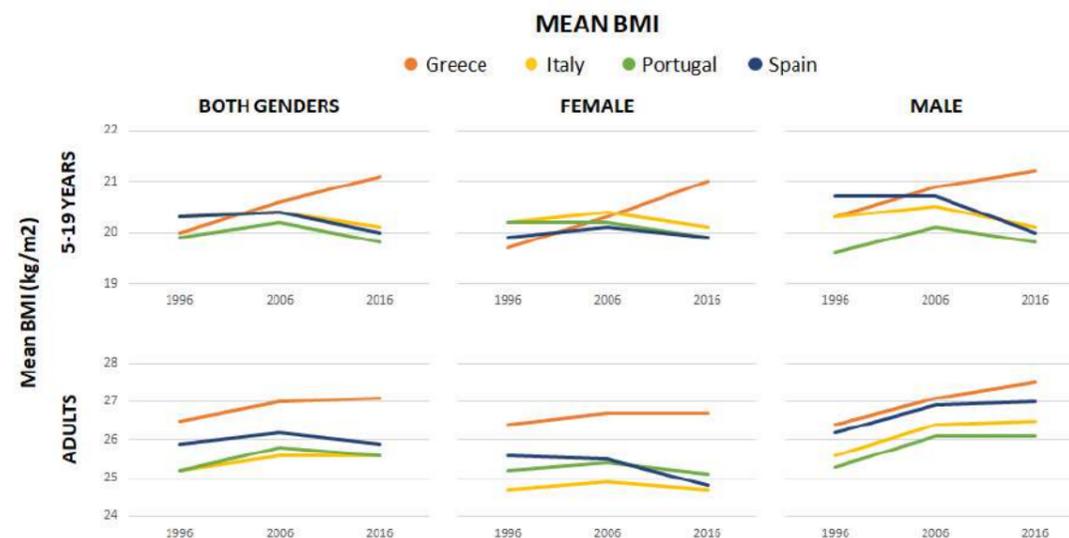


Figure 1: Mean BMI of the reported countries. Data source: World Bank.

In Southern European countries (such as Spain, Portugal, Italy and Greece), in terms of the mean BMI of the population, despite a decrease in some of the countries over the last two decades, values remain above overweight and obesity thresholds (Figure 1).

Indeed, the percentage of obese and overweight population has been in continuous increase in all these countries (Figures 2 and 3). For instance, in Spain,

in 1996 only 6.4% of children and adolescents were obese (4.4% of girls and 8.3% of boys) compared to 10.8% in 2016 (8.4% of girls and 13.1% of boys). Similarly, 17.0% of adults were obese (18.1% of females and 15.6% of males) in 1996, compared to 23.6% in 2016 (22.6% of females and 24.8% males). More dramatically, considering the overweight population rates in 2016 reached 34.1% for children and adolescents and 61.6% for adults.

The reason behind the rise of obesity is excess caloric intake (compared to caloric output) due to different components/factors. The first component is the consumption of foods high in refined grains, added sugars and added fats. Consumption of food with high energy-density (energy density is the amount of energy per gram of food) has been shown to increase obesity rates. In a cross-sectional survey it was shown that obese individuals have energy dense diets compared to normal-weight individuals^{xxv}.

The second component of this caloric surplus is the insufficient level of physical activity at work, at home and during leisure time (i.e., below 150 minutes of moderately intense or 75 min of vigorous physical activity per week, or any equivalent combination of the two). In a recent systematic analysis reflecting outcomes of 358 surveys in 168 countries with a total of 1.9 million participants, it was shown that, globally, 27.5% of adults were physically inactive, with a gender distribution of 23.4% for men and 31.7% for women^{xxvi}.

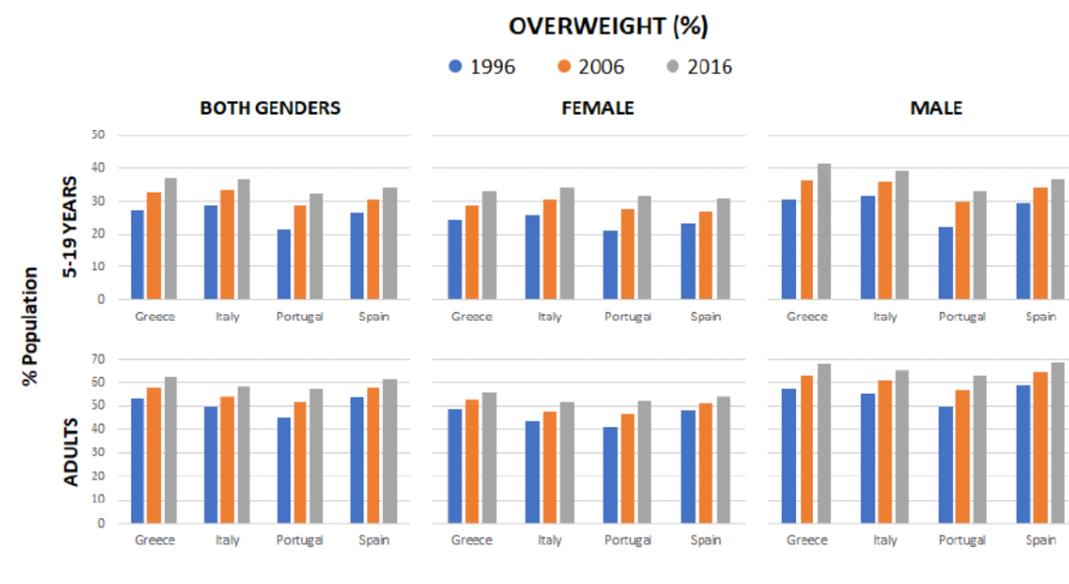


Figure 3: Percentage of overweight population in the reported countries. Data source: World Bank.

Dietary and lifestyle approaches for prevention and management of obesity

Dietary and lifestyle (exercise and cognitive behaviour therapy) approaches are recommended as preventive measures for obesity.

Dietary approaches which mainly focus on decreasing

energy density of foods and drinks, decreasing the size of food portions, avoiding snacking between meals and night-time eating, not skipping breakfast and reducing episodes of binge eating have been shown to be effective

for weight loss^{xxvii}. A 5–15% weight loss over a period of 6 months is an achievable goal to reverse obesity^{xxviii}.

Exercise contributes to weight reduction as it increases calorie expenditure. Resistance/

strength training (3 times a week) and moderate aerobic exercise (>150 minutes/week) are recommended. Increasing physical activity has been reported to reduce intra-abdominal fat, blood pressure anxiety and depression, increase fat-free body mass, and improve glucose

tolerance, insulin sensitivity, lipid profile, perception of well-being and self-esteem²⁷. A meta-analysis has reported that the optimal approach to promote weight loss in obese individuals in the short term is the combination of exercise and diet, compared to exercise or diet alone^{xxix}.

Cognitive Behavioural Therapy is another effective tool for overweight/ obese individuals as it can help them modify the way they perceive their condition and adapt their lives to achieve their weight-reduction goals^{xxx}.

What did we set out to do?

At EIT Food we are working to improve the health and sustainability of diets across our communities, by helping children understand where their food comes from and encourage them to eat healthy, among others. We truly believe that now is the time to tackle childhood obesity together! Today's children are tomorrow's workforce and the parents of future generations. If we act now to preserve their health, this could provide a prosperous and healthy future for all of us. As part of the new EIT Food Strategy, we have set the reduction of the incidence of childhood overweight and obesity in Europe as one of our social impact indicators. The ultimate aim is to combat malnutrition in Europe by delivering healthy food systems.

We are fully aware that addressing childhood obesity is an immense task. It starts with choosing our battles carefully by identifying and prioritizing the most promising focus points in this area. To be successful, we are currently working together with our partners to identify and understand how EIT Food can better contribute to this big challenge that we are currently facing in order to develop the right path to address the main challenges that currently prevent reducing the incidence of childhood obesity.

Tackling nutritional challenges such as the childhood obesity crisis requires long term commitment and intervention, and while EIT Food is making progress on the development of strategies towards the reduction of childhood obesity, more needs to be done. By working together, we can continue to improve the diets of our youngest generations.

For this purpose, EIT FOOD has partnered with SPRIM FOOD a brand of the SPRIM HEALTH GROUP formed by a multidisciplinary team of experts in Food Science, Nutrition, Marketing, Health, Sustainability, Food Technology, Food Security, Digital Strategy and Regulatory Affairs. Together we performed an analysis of some of the most recent (2017-2020) initiatives undertaken in Southern European Countries with the aim of reducing obesity rates and set out to evaluate their impact as well as to identify the reasons behind the overall lack of desired success. This analysis could serve as a starting point for identifying elements for a strategic design of more impactful initiatives to tackle obesity especially in vulnerable populations and in children.

HOW DID WE DO IT?

Initiatives with the generic aim of raising awareness for and reducing rates of obesity were identified in four Southern European countries: Spain, Portugal, Italy and Greece. For this purpose, websites and public databases of national/regional authorities (such as ministries, municipalities and health councils), scientific societies, newsletters, associations, foundations have been screened. In addition, clinical trial databases and the MEDLINE database of the U.S. National Library of Medicine® (NLM) have been screened to identify publications on relevant initiatives. The search has been extensive but not exhaustive: key words such as *“obesity”*, *“overweight”*, *“initiative”*, *“activity”*, *“plan”* and various combinations thereof in the native languages of the 4 countries have been used to retrieve most relevant available results.

All initiatives with the objective of reducing obesity, raising awareness or increment knowledge on the epidemiology or impact of obesity were targeted. No specific target populations were considered. Initiatives from both the private and public sector have been screened. Regarding the time frame, initiatives with activity since the beginning of 2017 have been included in the analyses.



**WHAT
DID
WE
FIND?**

Distribution of main initiatives identified

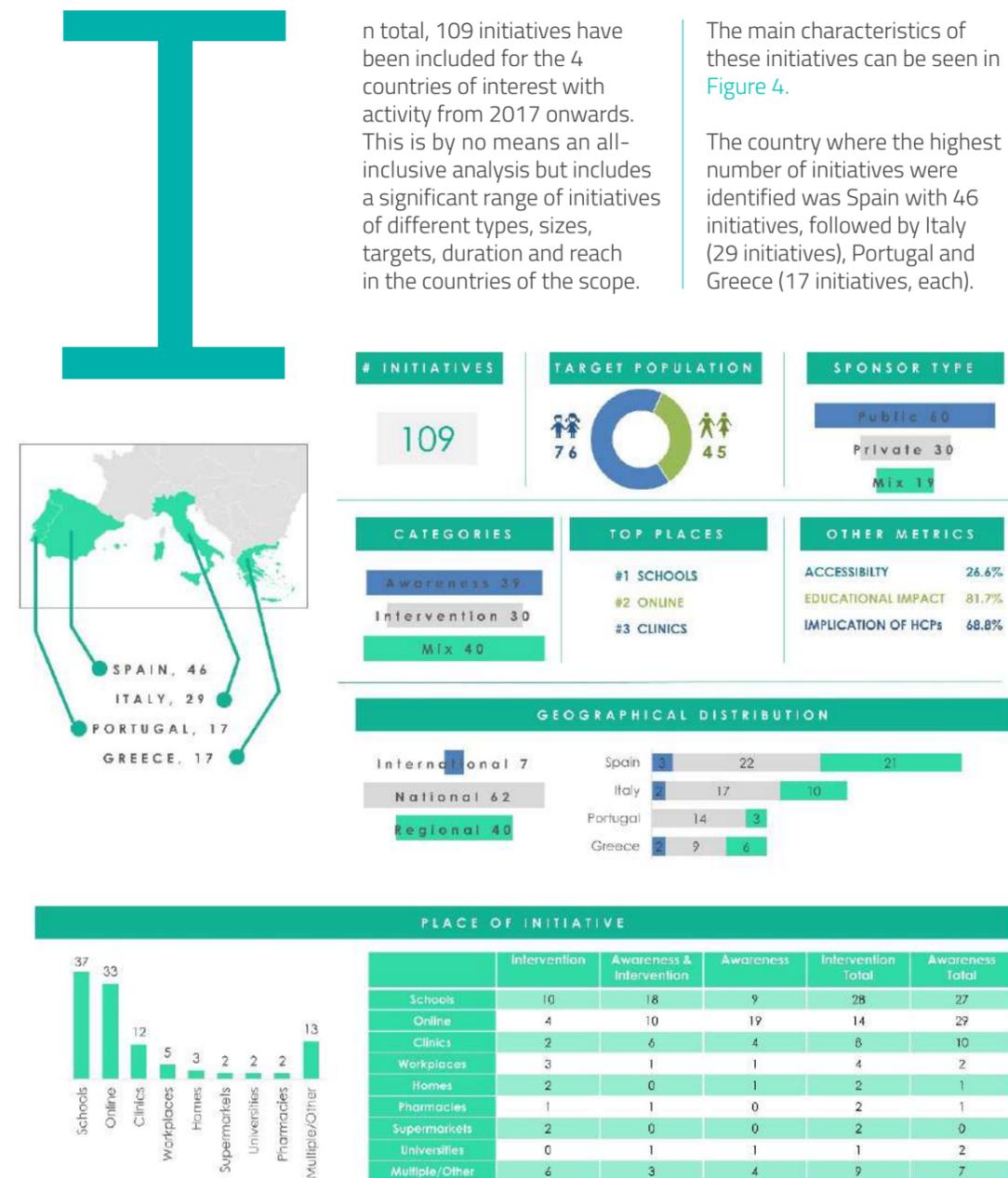


Figure 4: Characteristics of the initiatives recovered from the countries of the scope.

The majority (n=62, 57%) of these initiatives were conducted at national level. Another 37% (n=40) were conducted at regional level e.g. municipal or autonomous community (for Spain) level.

When the distribution of these initiatives within the different countries was analysed, a remarkable difference was observed in the number of initiatives conducted at regional level: Spain, with

a strongly decentralised administration structure had the highest number of regional initiatives (n=21), where the second country was Italy with 10 initiatives at regional level.

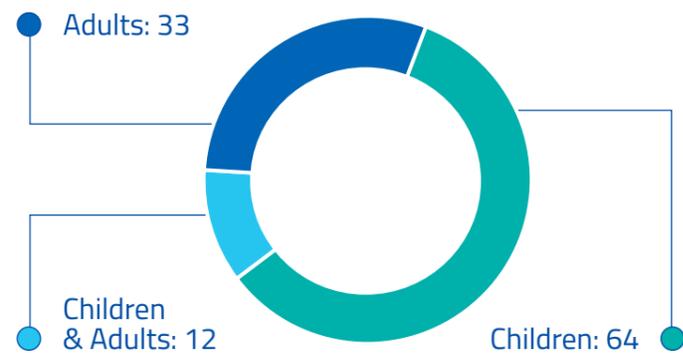


Children: the main target group

Children were the main target population of the retrieved initiatives. Sixty-four of the initiatives targeted only children while 12 initiatives targeted both children and adults. The remaining 33 initiatives targeted adults only.

One of the most comprehensive initiatives targeting children is the ALADINO study (Spain). The ALADINO Study is the national study of prevalence of overweight and obesity in Spanish 6-9-year-old children, which forms part of the COSI

(Childhood Obesity Surveillance Initiative) promoted by the European Office of the WHO. The weight of participating children was recorded, and their parents were surveyed about their socioeconomic background, food habits and



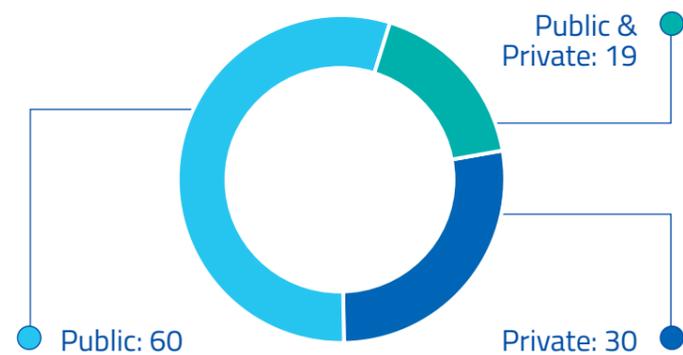
physical activity. Although results for 2020 have not been published yet, the comparison between 2011 and 2015 has shown promising results with the prevalence of obesity slightly improving (18.3% in overweight in 2011 compared to 18.1% in 2015).

Public entities are behind most initiatives

Public entities such as governments, municipalities, universities etc., were the sponsors of most initiatives. Sixty initiatives were sponsored by public entities alone, while 19 initiatives were co-sponsored by public and private institutions. On the other hand,

30 initiatives were sponsored by private entities only. A good example of public-private collaborative initiatives is the Plenufar Campaign which was sponsored by the Spanish General Council of Official Associations of Pharmacists,

Cinfa Laboratories, Ferrer Pharma, and Coca-Cola Iberia. This initiative aimed at training pharmacists to collect physical activity levels and eating habit information from the general public. The most recent report was the result of the collaboration with 4200 pharmacists who performed more than 11000 survey results. These results showed that 21.5% of the Spanish population is sedentary (sitting more than eight hours a day). When exercising, men opt for vigorous physical activity (57.6%), while women prefer light or moderately adequate physical activity (56.3%). Related to eating habits, it has been revealed that 23.4% of the population eats a diet considered inadequate (men, 25.1%; women, 22.0%).



Awareness VS Intervention initiatives

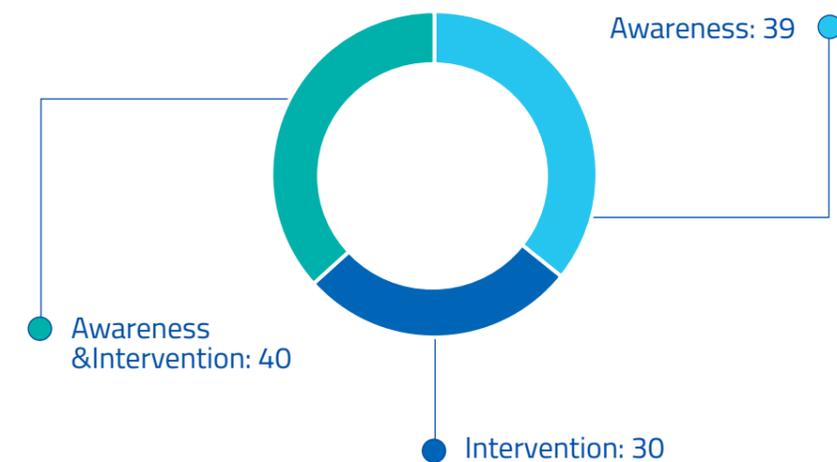
Out of the 109 identified initiatives, awareness and intervention studies were equally represented: 39 initiatives were of awareness only, 30 initiatives included some type of intervention, while 40 initiatives covered both awareness and intervention. In total, 79 initiatives had an awareness component, whereas 70 initiatives had an interventional component.

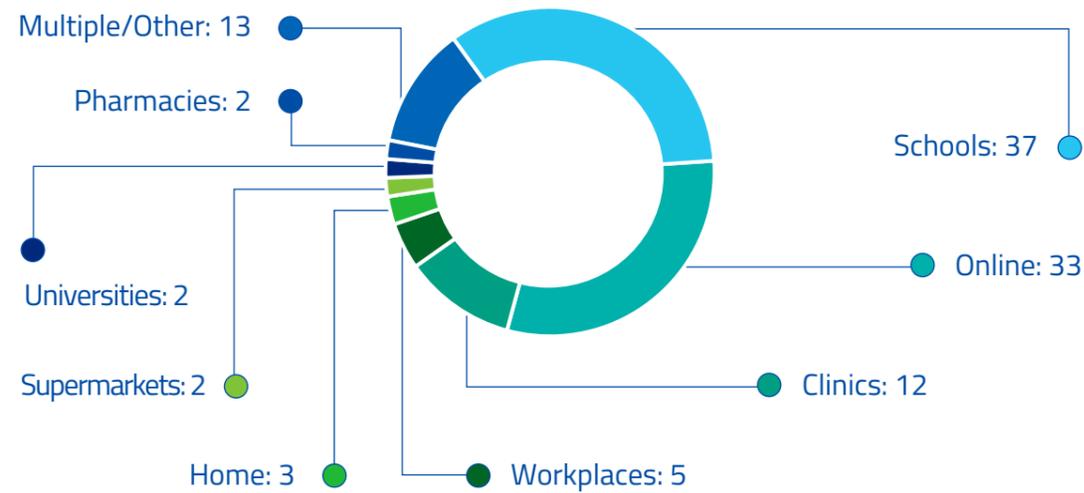
which would be continuously updated in order to monitor trends in obesity risk factors and preventive measures. The results of this initiative indicated that 10.8% of the Italian population between 18-69 years old are obese. Having excess weight was correlated with increasing age, male gender, lower income and lower education level. Overweight or obese people have been reported not to be aware of their state of excess weight as less than half of the overweight people thought they had excess weight while 10% of the obese people believed that their body weight

was just right. Generally, women were more aware of the problem than men.

Another intervention programme, with a significant reach, was the "Sport di Classe" initiative (Italy) which aimed to encourage students to engage in physical education 2 hours a week and to promote the educational value of sports as a means of growth and individual as well as collective expression. In 2018-2019, this initiative successfully achieved to reach 542460 children (27123 classrooms in 3171 schools) across the country.

One of the most important awareness campaigns was the PASSI initiative (Italy) with the objective to establish a specific database at local level





Schools as the main intervention settings

Initiatives were conducted in different settings, mainly related to the target population. In this regard, schools (a total of 37 initiatives) were the most frequent setting followed by online activities (33 initiatives). Other settings included hospitals/clinics, workplaces, homes, supermarkets, universities, and pharmacies. Looking at the distribution of awareness or interventional initiatives in the different settings, schools were most frequently hosting interventional studies (28 initiatives) while the online environment was most frequently selected for initiatives aiming at

raising awareness (29 online awareness initiatives). Interestingly, schools were also the second most frequent setting for awareness activities (n=27).

One of the interventional initiatives in school settings was DIATROFI from Greece. The objective of this initiative was providing better nutrition options to school children through a free, small, healthy meal and to encourage children and their families to promote the adoption of healthy eating habits. In the school year 2017-2018, at the beginning and the end of the program, questionnaires were given to parents regarding

eating habits of the children and their families. The results showed that the percentage of families facing food insecurity had decreased, and children's weight and eating habits improved. In the school year 2018-2019, the reach of the programme included 100 schools, 6127 children and 656186 meals; however, the results for 2018-2019 program are not available yet.

Another important initiative was the Observatory of Nutritional and Lifestyle Habits of Spanish Families sponsored by Nestlé. By collecting information online, this initiative shed light on the situation in Spanish

households. For instance, although only 8% of the parents consider their children overweight, in fact more than 30% of Spanish children are overweight or obese. Additionally,

more than 50% of parents with obese children were concerned about their children eating less than they needed to. The percentage of parents who gave their children the recommended daily amount

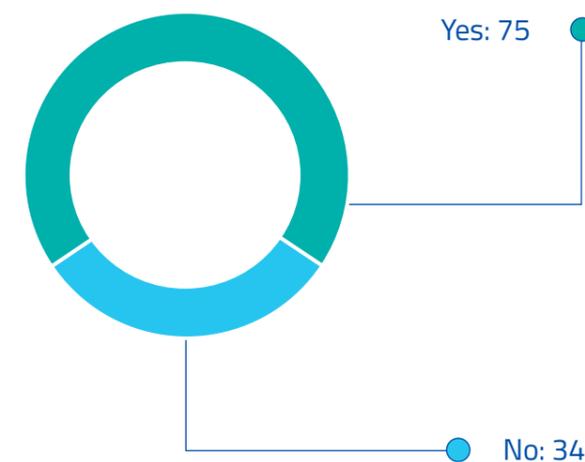
of fruit (3 servings a day) and vegetables (2 servings a day) was only 17% and 54%, respectively. These results show the misperception of many parents regarding nutritional habits of their children.

Impactful initiatives for all with HCP support

Accessibility, educational impact and involvement of healthcare professionals (HCPs) in the initiatives were also assessed. "Accessible to All" refers to initiatives addressed to any participant within the target population. In this regard, 29 initiatives (26.6%) of the initiatives were

accessible for all. Among the identified initiatives, 89 (81.7%) had some educational impact. "Implication of HCP" refers to involvement of HCPs in the design, execution or analysis of the outcomes of the initiative: Seventy-five initiatives (68.8%) involved HCPs.

One of the initiatives which included HCPs was performed by Red Eléctrica (a corporation which operates within the national electricity grid in Spain) which created Health and Welfare programs for the prevention of labour risks, among others. In order to reduce overweight and obesity rates, physical activity activities to reduce sedentarism have been developed within the working environment for more than 1600 employees distributed across Spain. A pre- and post-intervention evaluation was carried out and the results showed that the evolution of the BMI and blood pressure followed a downward trend, reflecting the positive impact of programs promoting healthy living habits. The absenteeism rate has also decreased during the intervention.



Schools as the main intervention settings

In order to rate the reach and success of the initiatives in a combined manner, a new score, "Potential Impact & Measurability Indicator" (PIMI), was defined, which enabled a further categorization of the initiatives.

To this end, initiatives were classified in a scale of 1 to 4 with respect to measurability as defined in the declaration of their goals:

1. Initiatives aiming at reaching people through different channels without intention to measure;
2. Initiatives aiming at generating and distributing training/educational material, tools and creating platforms;
3. Initiatives with an aim of identifying risk factors, perform surveys/questionnaires and generate touchpoints with HCPs;
4. Initiatives aiming at evaluating biometric and clinical parameters including BMI.

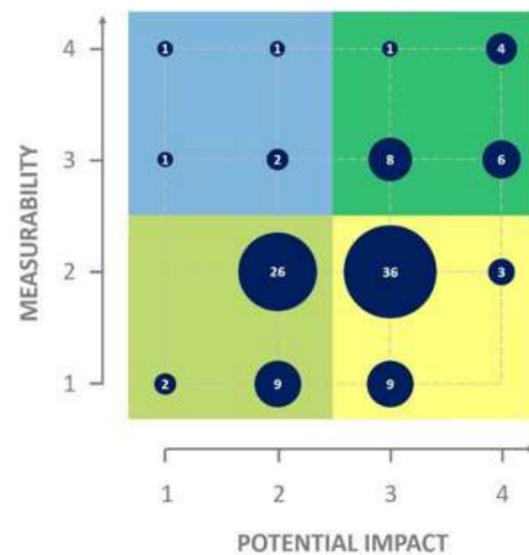


Figure 5:

Potential Score-Measurability Scores matrix of identified initiatives. The numbers represent number of initiatives. Measurability scores: 1: reaching people through different channels without intention to measure; 2: generating and distributing training/educational material, tools and creating platforms; 3: identifying risk factors, perform surveys/questionnaires and generate touchpoints with HCPs; 4: evaluating biometric and clinical parameters including BMI. Potential impact scores: 1: collecting metric data for scientific and public health purposes; 2: increasing short-term awareness; 3: increase long-term awareness; 4: achieving a decrease in BMI, overweight or obesity rates.

Additionally, initiatives were also classified in a scale of 1 to 4 based on their potential impact, as defined in their goals:

1. Collect metric data such as prevalence of obesity for scientific and public health purposes;
2. Increase awareness (short-term, through initiatives that were active for less than or equal to two years);
3. Increase awareness (sustained, through initiatives that were active for longer than two years);
4. Achieve a decrease in BMI, overweight or obesity rates of the target population.

By scoring initiatives as described above an impact-measurability matrix was generated (Figure 5). In this matrix, initiatives gathering both a high potential impact and measurability score (based on their design) are located on the top right quadrant of the matrix.

It can easily be seen that most of the initiatives accumulate in the central part of the graph, indicating that they have medium values (scores of 2 or 3) for both potential impact and measurability. With respect to measurability more than half of the initiatives had a score of 2, while on the axis of potential impact most initiatives were given a 2 or 3 score. This indicates that most initiatives aimed to increase awareness both in the short-term (≤ 2 years, $n=26$) and in a longer-term (>2 years, $n=36$) by generating and distributing training/educational material, tools and platforms, mainly in schools ($n=29$). Only 22% of the initiatives ($n=24$) had a high measurability score (3 or 4), whereas 61.5% of the

initiatives ($n=67$) had a high potential impact score (3 or 4). Finally, there were only 19 initiatives (17.4% of the total) with high scores (3 or 4) both for measurability and potential impact.

One of these studies was The WHO European Childhood Obesity Surveillance Initiative (COSI), which is a unique surveillance system that produces comparable data across European countries for over 10 years and which has measured trends in overweight and obesity among primary school children. COSI (Portugal) was implemented by the Regional Health Authorities (ARS) in all Portuguese Regions. The main goals of COSI was to monitor nutritional status of children aged 6 to 8 years, every 2-3 years, to measure trends in children overweight and obesity. This is particularly important to have a correct understanding of the progress of the obesity epidemic, to perform inter-country comparisons within the WHO European Region, to

identify groups at risk and to evaluate the impact of obesity prevention interventions. The COSI data collected over the past 10 years have been valuable for policy initiatives and resulted in numerous international and country-specific scientific publications and reports. The results of this initiative have shown that, between 2008 and 2019, Portugal recorded an 8.3% reduction in the prevalence of overweight (37.9% in 2008 to 29.6% in 2019) and obesity (15,3% to 12.0%).

Another example is the ALAS study from Spain. The ALAS Programme creates awareness, information and training activities in the community. This program offers workshops aimed at the general population to inform and raise awareness of how healthy diet and activity habits improve health and quality of life measured via the reduction of BMI of the Madrid population. To this end, data on weight, physical activity levels, BMI, abdominal circumference, to

blood pressure and glycaemic data are collected. An initial report based on the data collected from 1629 people indicates that the interventions are beneficial: 85% of the participants in the high-risk group managed to lose weight, and 35% of the participants classified as prediabetic managed to normalize their blood sugar levels. Participants will be re-evaluated this year (2020) to establish whether they have fewer risk factors for diabetes as a result of the programme.

Sanitas (part of the BUPA group of private health providers) launched in Spain the mobile application "Smile" to collect information on health parameters of their employees and measure their evolution

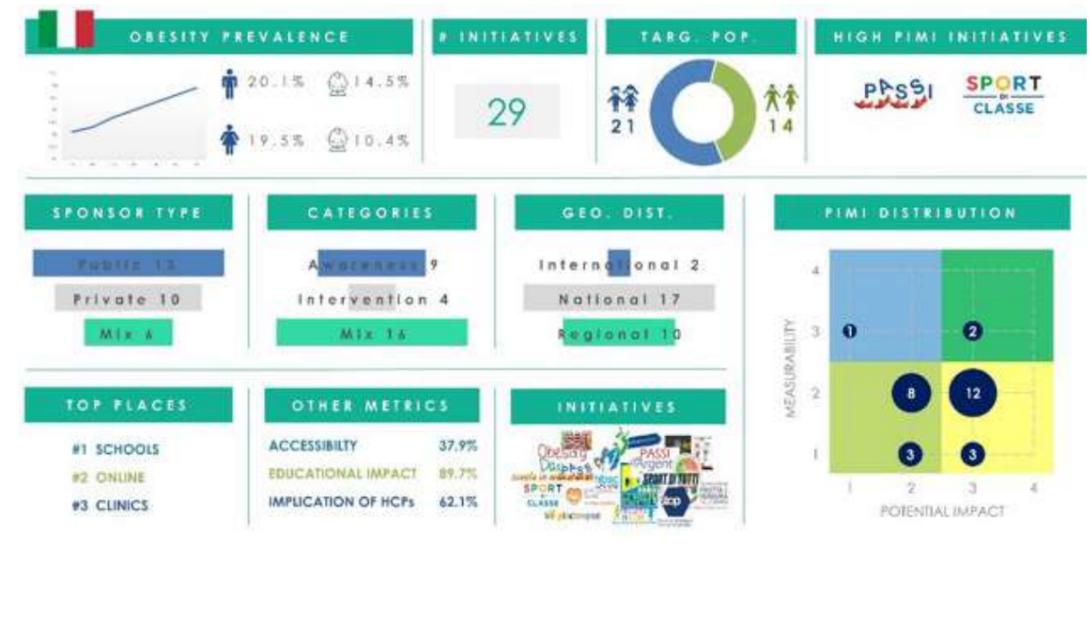
over time. This application allowed a bidirectional communication between the company and its employees. The app offered activity options and content around four main areas: healthy mind, healthy body, healthy environment, and healthy community. In 2018, the program was designed around 12 topics integrated into a '12 months, 12 causes' calendar. The results of this initiative indicated that the health parameters (body mass index, weight, blood pressure or cholesterol) improved for employees. There was a significant decrease in overweight levels which affected 35% of the study participants. Regarding BMI, program participants presented better data than the average of the Spanish

population. The mean BMI of program participants dropped 1.13 points since the first intervention in 2011 (24.10 kg/m² compared to 25.23 kg/m²). Likewise, mean cholesterol has decreased from 185.20 mg/dL to 182.40 mg/dL and the maximum and minimum blood pressure has decreased by 11.64% and 3.22%, respectively. In addition, triglyceride levels have dropped from 92.27 mg/dL to 85.20 mg/dL.

Another public-sponsored initiative from Spain, Predimed Plus, aimed at assessing the effect of an intensive lifestyle intervention based on a low-calories Mediterranean diet and physical activity on long-term weight loss, weight maintenance and the incidence of cardiovascular events. This initiative is planned to take place until 2025, however a previous stage of the initiative (Predimed) has already had successful outcomes. The Predimed study recruited 7447 participants at high risk for CVD. Approximately 50% of these participants had T2DM, 83% hypertension, 72% hypercholesterolemia and 95% were overweight or obese. With a follow-up of 4.8 years, it was observed that the risk of developing a major cardiovascular event was 30% lower in participants of the Mediterranean diet group supplemented with extra virgin olive oil and 28% lower for the Mediterranean diet group supplemented with nuts compared to the control group. Therefore, the Predimed Plus study may also be expected to also have positive results.



Details of initiatives per country are presented in the next figures:



WHAT DID WE FIND? >





WHAT DO DATA TELL US?



Impact and measurability

O

besity prevalence has been increasing in the last decades and continues to do so. Although there have been attempts both by public and private entities to control and reduce this burden, increasing obesity rates indicate that initiatives over the years have not yet succeeded in significantly reducing the prevalence of obesity. This implies a need for improvement both in the design and execution of this type of initiatives. In this report, 109 initiatives with activity between 2017 and 2020 were identified in 4 Southern Europe countries (Spain, Portugal, Italy and Greece) through a non-exhaustive search from publicly available sources and their scope, design (in terms of measurability and potential impact), target population and other characteristics were examined.

Of the 109 initiatives included in the analysis, 68.8% (n=75) had low measurability scores (1-2). As can be seen in Figure 5, there is a mild correlation between measurability and potential impact: as measurability increases, there is a trend for increase in the potential impact which may imply that initiatives with measurable outcomes may have greater chances in achieving the desired effects. There were few initiatives (17.4%) in the upper right part of the matrix indicating a high measurability a high potential impact score (see Figure 5).

Another important aspect to consider was the lack of communication of obtained results. Among the identified initiatives, almost one third (32.1%) did not communicate or publish any results making it hard to evaluate their impact.

Target population, settings and HCP participation

The main target population in the identified initiatives were children (76 out of 109 initiatives). For this reason, several initiatives have taken place at schools involving children, their parents and paediatricians. This is important as it has been reported that overweight and obese children are more likely to stay obese into adulthood and to develop diseases such as diabetes and cardiovascular diseases at a younger age^{xxxI}.

Thus, interventions targeting children may prevent health problems in adulthood.

In terms of the setting of the intervention, workplaces were involved in only 4.6% (n=5) of all the identified initiatives. Considering the fact that 39% of the European population carries out their work while sitting^{xxxII}, it can be concluded that there is a space for growth for initiatives at the work environment.

68.8% of the initiatives were observed to involve HCPs. However, there were 34 initiatives (31.2%) with no HCPs participation. Involvement of HCPs allows to design better programs and can improve adherence and communication so increasing the rate of their participation could improve outcomes.

Educational programmes

81.7% of initiatives aimed to have an educational impact. Most of them failed to deliver results on sustainable or any measurable impact. Of those with an educational impact, 81.3% were not accessible to all, especially to those

with low socioeconomic status and limited access to internet. There is, thus, an opportunity to rethink the way educational programs are designed and delivered to the more vulnerable targets from a socioeconomic standpoint.

It has been shown that in high-income countries, lower socioeconomic status is indirectly associated with higher BMI^{xxxIII, xxxIV}. Thus, it is important to offer affordable and sustainable solutions when considering this population.



Initiatives in other Mediterranean countries

We have next searched for examples of similar activities in other countries of the zone such as Malta, Israel and Turkey. 5 initiatives were identified in Malta, 3 in Israel and 2 in Turkey. Although these examples are not meant to be representative of the situation in these countries, among these 10 initiatives, 7 did not communicate any results, 9 had an educational impact, 6 had HCPs involved and 4 were widely accessible. The mean measurability score was 2.5 and mean potential impact score was 3.2, in line with what was found for Italy, Spain, Portugal and Greece.

Another initiative with a high potential impact is "A Healthy Weight of Life: A National Strategy" from Malta. The objective of this initiative is to curb and reverse the growing rates of overweight and obese children and adults in order to reduce the health, social and economic consequences of excess body weight. In order to measure the effectiveness of this strategy, the Government of Malta aims to demonstrate the following improvements in children and adults by 2020 (results still not communicated): 33-36% and 18-22% reduction in the self-reported overweight and obesity among adults respectively; and 27-32%

reduction in the overweight and obese rates of children below 7 years of age.

Another example is the "Cities Changing Diabetes Program" from Turkey a country where 32.1% of the adults and 11.2% of children between 5 and 19 years has obesity. These numbers are expected to rise rapidly over the coming years. Cities Changing Diabetes Program in Istanbul, a major contributor to the high prevalence of obesity, aims at slowing down the increase in childhood diabetes by combating obesity. Since the initiative started in 2020, the results are not available yet.

Among these 10 initiatives, "Healthy Israel 2020" had high measurability and potential impact score. In this recent initiative which aimed at creating a preventive blueprint to improve the quality of life, increase overall longevity and maximize health equity among Israelis, the following results are expected: a 11.2% reduction in the proportion of obese adults, a 10% reduction in the proportion of obese Jewish adults, a 15% reduction in the proportion of obese Arab adults, a 10% reduction in the proportion of obese children and a 10% increase in the proportion of healthy weight adults.



Initiatives during the Covid 19 Pandemic

Despite the accessibility issues, under the circumstances of the COVID-19 pandemic, online interventions are essential. Indeed, a survey by the International Food Information Council revealed that 85% of

participants changed the food they ate or how they prepared food, while 41% of participants reported snacking more than normal during the pandemic ^{xxxv}. Moreover, it has been estimated ^{xxxvi} that COVID-19

will have an impact on mean BMI by an increase of between 0.056-0.198 kg/m². Thus, it can be suggested that there is a need for well-designed initiatives while occasional lockdowns are expected to occur.

LEARNINGS ON HOW TO *DESIGN BETTER* INITIATIVES FOR THE FUTURE

From the analysis of the results, it becomes evident that there is a need for improvement in the design of initiatives with a particular focus in the inclusion of measurable parameters and a reinforcement of consequent communication of the outcomes to increase their impact at societal level and see reproducible outcomes.

Another important learning is that well-targeted programmes in a well-defined context with a clear target population may give better results than complex, all-inclusive initiatives. *"Pilot-and-Learn"* approaches with a small, well-defined target population can be a useful initial approach as they can be then scaled-up in a more controlled way.



Overall, the results of the analysis show that there is an opportunity to define key success factors and create a credible, reproducible and measurable framework for innovation in obesity reduction initiatives by:

- **Defining robust objectives,** endpoints, target populations, place of intervention and intervention models (affordable, accessible and educating),
- Guaranteeing a **good execution,**
- Opting for a **pilot-and-learn** approach, and
- **Reinforcing the communication of the results** and the key learnings to maximise impact.

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