



SAÚDE.COME

PROMOTING —
FOOD SECURITY



FINAL REPORT



ACHIEVED RESULTS

a) Describe the relevance of the project within the national Public Health context.

In Portugal, the aim of the National Health Plan (pns.dgs.pt) is to maximize health gains by involving all social partners at national, regional and local levels in the promotion of healthy policies and to improve health in all individuals, reducing inequalities. Specifically, the Portuguese Program for the Promotion of Healthy Eating (PNPAS) (Graça et al. 2013) considers the reduction of inequalities in diet as one of its main challenges.

Our project, Promoting Food Insecurity, is totally aligned with these principles, either contributing to increase the knowledge and identifying vulnerable groups with food insecurity as well as intervening modifying life styles, promoting better health.

Defining the concept of food insecurity attributes include uncertainty or worry about food, inadequate quality of food, inadequate quantity of food, food acquired through socially unacceptable means, and lack of consistent access to adequate food (Coats. 2004). Rates of food insecurity have been rising worldwide (Coats. 2004)¹. In fact, while the United States is one of the wealthiest nations in the world with a rich and abundant supply of food and resources, 14.3% of U.S. households were food insecure at some point during 2013 (Coleman-Jensen.2014). Indeed, Food insecurity has received much attention in recent years, even in high-income countries due to the increasing trend of poverty and social inequalities indicators, as a result of the global financial crisis. In fact, nutritional status is a key indicator of poverty and hunger, poor health, and inadequate education and social conditions (http://www.fao.org/ag/agn/nutrition/Contribution_of_Nutrition_to_Achieving_the_Millennium_Deve.pdf). As said before, in Portugal, the aim of the National Health Plan (pns.dgs.pt) is to maximize health gains and the improvement of health to all individuals, reducing inequalities. Specifically, the Portuguese Program for the Promotion of Healthy Eating (PNPAS) (Graça et al. 2013) also consider the reduction of inequalities in diet as one of its main challenges. However, the lack of epidemiological information, valid and useful to support decision-making, constitutes a major public health challenge. Moreover, there is also lack of efficient programs on lifestyle changing in target vulnerable groups. Taking into account the principles above, Promoting Food Security study have developed a robust registry on food insecurity, their socioeconomic determinants and their health impact in Portuguese households. Moreover, we have characterized unhealthy food patterns and associated them to other risk factors of chronic non communicable diseases in the Portuguese population. In addition, we have looked particularly to a vulnerable population stratum which is the elderly. We have characterized food lifestyles in elderly in Portugal and compared with the

ones of Norway. Considering this information on elderly and their major fragilities regarding lifestyles, we have developed an ICT tool – TV interactive application - with a motivational and literacy program on healthy lifestyles. We have also conducted a pilot intervention study with a personalized and sustainable nutritional and physical exercise program that aimed to improve food insecurity in elderly using the added value of the interactive TV application. The TV application allowed experts (medical doctors, nutritionists, physical therapists) to follow and work with subjects, outside the clinical appointment room. The TV application had an excellent acceptance among the ones who accepted to be part of this pilot study.

Finally, we have characterized food patterns and lifestyles in youngsters and then build an Internet application and a smartphone app that aimed to improve eating and exercise behaviors in adolescents. Because of Promoting Food Security Project, we are now able to fully know the lifestyle habits and dietary patterns in our country. Using a sample representative of the adult Portuguese population we identified two distinct dietary patterns through cluster analysis, the “meat dietary pattern” dietary pattern- unhealthy; and the “fruit & vegetables dietary pattern- healthy”.

In our study we found that the “unhealthy” dietary pattern – the “meat dietary pattern” is independently associated with young age, lower years of education, male gender and being in a situation of unemployment, part-time employment and domestic working. Furthermore, individuals from the *Azores* and *Madeira* were more likely to report this kind of dietary pattern, given their high frequency of consumption of meat. Regarding lifestyle behaviours, smoking and being physically inactive were significantly and independently associated with having this type of dietary pattern. With our results vulnerable strata was identified (male, young age, lower years of education, and being in a situation of unemployment, part-time employment and domestic working and island residents). Also, we have identified a health-concerned profile among the population that will help decision-making in public health policies. The “unhealthy” dietary pattern characterized by a lower frequency of consumption of soup, vegetables, fruit, fish, milk/dairy, less water intake and a higher frequency of consumption of meat were associated with other unhealthy lifestyle behaviours, such as physical inactivity, smoking and alcoholic habits and also with health related outcomes, such as depression symptoms.

We have analysed data from Portuguese elderly and we have showed that a higher proportion of Portuguese elderly have low literacy, live alone and spend at least 3hours/day watching TV, but do not use internet. More than one half of the Portuguese elderly have at least one chronic disease and 32% have depressive symptoms. The majority of Portuguese elderly are overweight or obese, 66% are physical inactive and 82% have an inadequate water intake. When we compare data from Norway elderly we found that elderly in Norway have higher literacy and are

more physical active than elderly from Portugal. The consumption of vegetables is similar in Portugal and Norway; however, fruit consumption was higher among the Portuguese. The majority of elderly from Norway also have inadequate intake of water. Finally, the same association with “unhealthy food pattern” were found in Norway data- Elderly from Norway who are less educated, smokers and less physical activity presented more frequently inadequate fruit and vegetables consumption

Promoting Food Security project results reinforced the idea that behavioural changes interventions should target more than one lifestyle domain (eat habits, physical exercise, alcohol, smoking habits). Finally, we also have showed that health education should be a priority in order to improve Portuguese health status.

Regarding Portuguese adolescents, other population strata that we were interested in study, our results pointed also to the influence of family routines on healthy lifestyles and wellbeing during adolescence. In fact, we found a mediation effect of depressive symptomatology and nutritional habits in the relationship between weekly frequency of family meals and disordered eating. These results reinforce the importance of family participation in any intervention that involves lifestyle changing in adolescents.

Other very important aim of Promoting Food Security study was to developed a national base survey on food insecurity households and to generated evidence regarding food insecurity prevalence in Portugal, its sociodemographic and economic determinants and its health and health related characteristics. Indeed, our study showed that in 2015-2016, 20.7% of Portuguese households experienced some level of food insecurity during the previous 3 months. A majority of food insecure households were in the low level (milder) of food insecurity (14.1%). But 3.5% and 1.8% had moderate and severe food insecurity respectively. Regarding the socioeconomic factors associated with food insecurity, we observed that women (OR=1.73; 95% IC: 1.37-2.18), less educated (10-12 years vs <12 years: OR=3.10; 95% IC 1.89-5.07; 5-9 years vs <12 years: OR=4.35; 95% IC 2.75-6.90; 0-4 years vs <12 years: OR=7.11; 95% IC 4.49-11.26) and individuals aged between 40-49 years (OR=2.28; 95% IC 1.05-4.97) and individuals aged between 50-59 years (OR=2.42; 95% IC 1.10-5.33) had a higher risk to be food insecure. When comparing to individuals in a situation of full-time employment, households of the individuals part-time employed, domestic workers and unemployed were more likely to be food insecure (OR=1.68; 95% IC 1.23-2.30). Households living in Azores (OR=1.57; 95% IC 1.12-2.20) and Madeira (OR=1.94; 95% IC 1.32-2.85) had also higher odds of being classified as food insecure. Difficulties in living with the present income reported by the participants were independently associated with food insecurity (finding difficult in the present income vs living

comfortably in the present income (OR=14.17; 95% IC 7.15-25.91) and (finding it very difficult in the present income vs living comfortably in the present income (OR=45.35; 95% IC 23.98-85.76) The adherence to Mediterranean Diet was inversely associated with household food insecurity (OR=0.44; 95% IC 0.31-0.62), after the adjustment for age, gender, educational level, employment status and Nuts II. Household food insecurity was inversely associated with the consumption of some typical food or food groups of the Mediterranean Diet, in particular olive oil, vegetables and fruit, fish/seafood, nuts. Individuals from the food insecure households had a lower tendency to use olive oil as principal source of fat for cooking (OR=0.63; 95% IC 0.46-0.87), to have a consumption of vegetables ≥ 2 servings per day (OR=0.77; 95% IC 0.61-0.97), a consumption of fruit ≥ 3 servings per day (OR=0.68; 95% IC 0.47-1.00), a consumption of fish/seafood ≥ 3 servings per week (OR=0.71; 95% IC 0.54-0.93) and a consumption of nuts ≥ 3 servings per week (OR=0.48; 95% IC 0.34-0.68). However, household food insecurity seems to be positively associated with other some characteristics of the Mediterranean Diet, in particular to a higher tendency to have a consumption of red meat, hamburger or sausages < 1 per day (OR=1.91; 95% IC 1.45-2.53) and to have a consumption C of butter, margarine or cream < 1 per day (OR=1.10; 95% IC 0.85-1.42)

Regarding the self-reported noncommunicable diseases, after adjustment for age, gender, educational level, employment status and NUTII, diabetes (OR=1.69; 95% IC 1.20-2.40) and pulmonary disease (OR=1.67; 95% IC 1.14-2.45) is independently associated with household food insecurity. Diagnosed rheumatic disease is also independently associated with household food insecurity (OR= 1.67; 95% IC 1.07-2.60).

The individuals of the food insecure households had on average a lower quality of life EQ5D score (OR=0.18; 95% IC 0.11-0.31) and a higher physical disability HAQ score (OR=2.59; 95% IC 2.04-3.29). Individuals of the food insecure households showed a higher risk of having depression symptoms (OR=1.50; 95% IC 1.09-2.06).

. Considering healthcare resource consumption, individuals from the food insecure households had been more often hospitalised (OR=1.57; 95% IC 1.18-2.07) and had gone more often to medical appointments (OR=1.48; 95% IC 1.12-1.94) since the last contact and presented a higher number of medical appointments (OR=1.07; 95% IC 1.04-1.11).

Individuals of the food insecure households were also more likely to have reported that stop medication due to economic constrains (OR=5.13; 95% IC 3.86-6.82), as well as, that reduced the doctor visits due to economic constrains (OR=4.23; 95% IC 3.09-5.78)

We also have studied food insecurity among adolescents. Significant differences were found between adolescents living in food insecure and in food secure households regarding their body

mass index, the consumption of soft drinks (e.g., coke), the low frequency of having breakfast, and body perception. In general, our data suggest that, based on their potential impact on health determinants, adolescents who are living in food insecure households may experience increased difficulties in their developmental pathways. The study showed that adolescents living in food insecure households were 2.61 times more likely to have a higher BMI than adolescents living in food secure households. Furthermore, our data suggest that adolescents living in food insecure households had eating-related risk factors for overweight because they consumed a greater quantity of soft drinks and they did not have breakfast on a regular basis.

Importantly the identification of vulnerable population strata namely adolescents and elderly, as well as regional disparities and the development of interventional measures fitted and targeted to these populations stands as a major achievement for the fight of food insecurity in Portugal. Indeed, in this project we not only have generated data regarding food insecurity and lifestyle patterns but also, based on the evidence that we have gathered, we have developed interactive ICT tools, as an inexpensive and easy way to disseminate for the promotion of a healthy diet and an active lifestyle among those vulnerable groups.

We have developed a TV application specially designed for the elderly. This intervention program, whose aim was to promote healthy lifestyles and reduce food insecurity was theoretically conceived from scratch by a multidisciplinary team, based on robust scientific data collected in Work package 1. After validating and discussing this concept with experts on nutrition, psychology, culinary chefs, physiotherapists and personal trainers, we progressed to the actual construction of the contents themselves. Thus, a motivational and teaching program for healthy lifestyle promotion that uses an interactive TV application for diffusion was developed. The TV application was designed to allow experts (medical doctors, nutritionists, physical therapists) to follow and work with subjects, beyond) the clinical appointment room. Finally, we have tested the efficacy and receptivity of this sustainable and personalized nutrition and exercise program fitted to elderly and the results are very promising. Data analysis is also ongoing. This educational and motivational program that promotes healthy lifestyles for elderly was also developed in a book that will be release in March 2017.

In Promoting Food Security project, an Internet platform, a smartphone application and a Facebook page with an educational program that aimed to promote healthy lifestyles among adolescents was also design and tested. The e-platform, app and Facebook page included a set of resources, posted everyday according to five major themes: Interviews (every Monday); How to buy and store (every Tuesday); Do you know that...? (every Wednesday); Physical activity

(every Thursday); Healthy recipes (every Friday). Each post favored the stimulation of discussion forums. The clinical endpoints were improvement in nutritional and physical status, well-being, and attitudes regarding eating. Data analysis is also ongoing.

In conclusion, Promoting Food Security project not only provided strong and robust evidence regarding food insecurity and lifestyles in Portugal but also, using the knowledge acquired, developed solutions to promote healthy lifestyles in vulnerable population. In fact, food Insecurity (uncertain access to adequate food) is a public health problem in Portugal that leads to obesity, chronic diseases, poor disease control and monitoring. Moreover, food insecurity leads to higher health resources consumption and hospitalizations. Old adults, island inhabitants, subjects with lower literacy and with precarious jobs or unemployed are the ones that are most affected by food insecurity. Food Security project provided valuable data to increase awareness to the Food insecurity problem in Portugal, being a strong argument to encourage policy makers to increase the resources allocated to reduce social inequalities and poverty. Our results also showed that unhealthy food choices are associated with other unhealthy lifestyles, which demonstrates that interventions in lifestyles should include all domains and not only food behaviors. Finally, considering this valid information that we have gathered regarding lifestyles among vulnerable population, this project has developed a high quality, cheap and easy to disseminate multidisciplinary program that aims to promote health among the most needed using ICT tools.

b) Describe the main implemented actions until the project's conclusion.

The Promoting Food Security Project occurred between April 2015 and September 2016 and consisted in three core activities or work packages: WP1 - Data integration for nutritional and physical activity population stratification; WP2 - National survey to assess household food insecurity; WP3 - Interventional pilot studies on two vulnerable groups (teenagers and elderly).

In a transversal manner to all core activities, WP4 enclosed management and support activities. In this sense a vast spring of activities were taken in order to provide financial management, overall scientific support, liaison with ethics and legal authorities, communication and promotion of external affairs.

WP1: Data integration for nutritional and physical activity population stratification

The goals were to characterize food frequency habits in the Portuguese and Norwegian population; determine food patterns according to age, gender and other socioeconomic and demographic subgroups; investigate associations between food patterns and body mass index,

lifestyle habits, health resources consumption, depression, anxiety, quality of life, and with non-communicable chronic diseases.

For this purpose, data from the Portuguese cohorts EpiDoC (SPR), EpiTeen and EpiPorto (ISPUP), and the Norwegian cohort, HUNT study III (NTNU), were analyzed individually. On a second phase, we integrated the main results and were able to compare this two populations regarding food intake and patterns, and also its associations with lifestyle habits, health resources consumption, depression, anxiety, quality of life, and with non-communicable chronic diseases.

After data analysis, we delivered 4 scientific reports (WP1 SPR, WP1 ISPUP, WP1 NTNU and Altogether / Join report, this last one in attach), and 2 papers were written and submitted (one is already published): “Dietary patterns in the adult Portuguese population and its association with health” submitted to Public Health Nutrition. And “Is there an association between food patterns and life satisfaction among Norway's inhabitants ages 65 years and older? André B, Canhão H, Espnes GA, Ferreira Rodrigues AM, Gregorio MJ, Nquyen C, Sousa R, Grønning K. *Appetite*. 2016 Dec 14. pii: S0195-6663(16)30931-X. doi: 10.1016/j.appet.2016.12.016

The work developed in the WP1 was also presented through several posters and oral communications in multiple scientific events around the world (detailed below @ DISSEMINATION).

WP2: National survey to assess household food insecurity

i) Construction of the food insecurity questionnaire for data collection: the scientific team, which included doctors, nutritionists, physical therapists, epidemiologists and statisticians developed a structured questionnaire to collect relevant data on this problem, including the gathering of scales already validated for the Portuguese population on health, mental health, nutrition and food intake, function and quality of life, but also the construction of forms with questions about the consumption of health resources, financial resources and a very detailed sociodemographic characterization. This action enclosed the huge task of validation study of PREDIMED questionnaire to the Portuguese population.

The whole questionnaire was systematically tested and targeted for improvement actions before it was implemented.

ii) Development of the datalogging platform: After the questionnaire for the Food Insecurity National Survey was completed, the team of computer scientists developed a computer platform to support the interviewers in data collection. This platform works online, has the ability to prevent human errors on data collection and allows the management of the

contacts to be made, allowing the immediate monitoring of this huge task. Also this platform required an important work of testing and improvement, to minimize all errors and bugs.

iii) Establishment and training of the research assistants team: the process of setting up the research assistants team for the crucial task of implementing the National Food Insecurity Survey was quite delicate, as it entailed thorough recruitment, thorough training in health concepts and soft skills regarding this sensitive matter which is food insecurity, and thorough monitoring of interview quality procedures.

iv) Data collection of Portuguese cohorts (EpiDoC, EpiTeen and EpiPorto): after completing the preparation of the questionnaire, platform and team, data were collected simultaneously in the three cohorts involved, in a total of about 12 thousand contacts made. Finally, it was possible to collect valid data for 6,400 adults, a representative sample of the Portuguese population.

v) Data analysis: databases were cleaned and data analysis was carried out. This culminated in 2 scientific reports, and a paper on the prevalence of food insecurity in Portugal, its determinants and impact, is being prepared.

WP3: Interventional pilot studies on two vulnerable groups (elderly and teenagers)

Elderly

Intervention program: specially designed for the elderly, this intervention program, whose aim was to promote healthy lifestyles and reduce food insecurity was theoretically conceived from scratch by a multidisciplinary team, based on robust scientific data collected in WP1. After validating and discussing this concept with experts on nutrition, psychology, culinary chefs, physiotherapists and personal trainers, we progressed to the actual construction of the contents themselves. Thus, a motivational and teaching program for healthy lifestyle promotion that uses an interactive TV application for diffusion was developed. For this purpose, 12 healthy and low cost recipes were recorded on video, as well as 12 exercise programs adapted for the elderly to carry out in their homes, and 12 nutrition tips. In addition, interactive questionnaires and reminders and all the graphic animation of this interactive smart television program have been developed. The TV application was designed to allow experts (medical doctors, nutritionists, physical therapists) to follow and work with subjects, beyond the clinical appointment room.

This educational and motivational program that promotes healthy lifestyles for elderly was also developed in a book that will be release in March 2017.

- 1) Technological development: it was necessary to develop the innovative technology that would grant the dissemination of the intervention program through smart TV. Thus, the entire Content Management System and television broadcast language was developed. Partnerships were also established with the three main Portuguese television operators (MEO, Vodafone and NOS) that agreed on the diffusion of this program through its channels and TV applications. After the application was finished a Focus Group was done with elders with similar socioeconomic strata as our target population in order to capture information about our TV application program usability, interest, added value and limitations. We also have captured intention to use impressions.
- 2) Recruitment of participants: after the establishment of the partnership with the entities coordinating primary care centres and their ethical approval obtained, the recruitment of participants was carried out in 21 health units in the Lisboa e Vale do Tejo area by the team of research assistants. 2,207 people were interviewed, and 330 were considered eligible participants.
- 3) Baseline assessment: The team of specialists developed a medical, nutritional and physical activity-related evaluation protocol for baseline assessment of the participants, which was adapted to an electronic data collection platform. In a total of 21 health units, almost 300 appointments (medical, nursing, nutrition and physiotherapy) were conducted to 97 participants, which included blood analyses.
- 4) Pilot study - Intervention program implementation and monitoring: after the baseline assessment, the intervention program was broadcasted to 45 individuals, on their televisions at their homes, and the project team performed systematic monitoring regarding the quality of the dissemination and also to the adherence of the participants to the presented tool. 39 individuals had access to the intervention tool.
- 5) After intervention-assessment: after the intervention program, all participants were invited to repeat the clinical appointments (medical, nursing, nutrition and physiotherapy). 32 participants concluded this assessment.

6) Qualitative assessment of perceptions and expectations towards technology intervention in health: this work package also enclosed a qualitative study on perceptions and expectations towards technology intervention in health. The TV application had an excellent acceptance among the ones who accepted to be part of this pilot study. (paper in preparation)

The protocol of the study was already submitted as a paper: "Home-based intervention program to reduce food insecurity in elderly using a TV app – the study protocol of the randomized controlled trial Saúde.Come Senior" submitted to JMIR.

Data analysis is ongoing and results from WP3 elderly will be written as a scientific paper that will be submitted in 2017.

The work developed in this task allowed several communications (described in detail @ DISSEMINATION) but also to enter new networks and new partnerships (e.g AAL, EIP AHA) and to participate in several applications to H2020.

Examples:

Health Promotion Research Forum, Trondheim, 29th September 2016

2^o Seminário Internacional de Segurança Alimentar e Nutricional, Brasília (Brasil) 29th September 2016

Ageing Well with technology - AAL Forum 2016, St Gallen, 27th September 2016

"Intervention program on diet and physical activity to reduce food-insecurity in elderly – a study protocol" at Advancing Food Insecurity Research in Toronto, Canada 17th November 2016 (oral communication)

Festival das Leguminosas; Educational and motivational tool for the promotion of healthy lifestyles in the elderly; 16th October 2016 – Lisbon

Health Innovation Day, Microsoft; Telemedicina e monitorização remota de doentes; 23rd November 2016 – Lisbon

Challenges in the Management of patients with multi-morbidities, School of Pharmacy of the University of Lisbon; 21st November 2016 - Lisbon

Partilhar a inovação, Ministério defesa nacional; Inovação em alimentação e saúde; 4th November 2016 - Lisbon

III Jornadas Científicas NOVA Saúde – NMS | CMUL | ENSP; 16th September 2016- Lisbon

Defesa Roadshow; Partilhar Inovação; 3rd October 2016 - Lisbon

Teens:

1) Qualitative study: Prior to the development of the intervention, a qualitative study was conducted. Focus groups were used for data collection as they are a particularly useful method for exploratory research. The objective was to fully understand, through the different ideas that emerge, how the use of new technologies may act as a facilitator in the promotion of healthy lifestyles among adolescents. The interaction enabled them to express, in their own words, their views on their own life contexts, beliefs and attitudes. Thus, three focus group interviews with adolescents aged between 12 and 13 years took place. Each focus group was based on open-ended questions developed for that purpose. The following topics were investigated: (1) the relevance of the proposed topic for adolescents about their age; (2) factors and topics to be considered in the development of the e-platform, app and during the intervention; (3) factors associated to adherence.

2) Baseline activities: (a) group sessions with the adolescents at school in order to present the team and the project and to collect data (questionnaires and anthropometric measures); (b) individual sessions with the adolescents to introduce the e-platform and its potentialities. All the participants were invited to access the e-platform and to discharge an app to the cell phone. The project also promoted sessions with teachers in order to introduce the e-platform and its potentialities, to discuss strategies for translating some of the topics covered in the e-platform into the curriculum and to increase the adherence to the project.

3) Intervention program implementation: The intervention length was 24 weeks and the program had the direct support of an interdisciplinary team (including pediatrician, nutritionist, exercise physiologist, psychologist, and designer). The teachers were also involved in this program.

4) Parallel activities during the intervention program implementation: (a) four parental group sessions at school in order to stimulate healthy lifestyles and to increase adherence by transforming the e-platform into a family tool; (b) adolescents' group sessions to stimulate adherence, including delivery of materials related to the Project. The project also proposed individual and group competitions for the adolescents, namely, "healthy recipes" and "healthier classes". Posters promoting soup consumption were developed and posted in strategic places at school, including at the canteen and bar. The e-platform, smartphone app and Facebook page included a set of resources,

posted everyday according to five major themes: Interviews (every Monday); How to buy and store (every Tuesday); Do you know that...? (every Wednesday); Physical activity (every Thursday); Healthy recipes (every Friday). Each post favored the stimulation of discussion forums.

5) After intervention-assessment: a wrap-up group session was conducted with the adolescents and another with their parents.

The data was analyzed and 2 papers were submitted:

. "Family meals and disordered eating in adolescence: The mediating role of depression and diet" Ana Prioste, Helena Fonseca, Helena Canhão submitted to Child: Care, Health & Development - Account Created in Manuscript Central

. "How does parents' perception of food insecurity impacts on adolescents' nutritional status, diet, and psychological wellbeing?" Ana Prioste, Helena Fonseca, Maria João Gregório, Helena Canhão.

i) Describe the partner(s) contribution towards the achieved project results.

Project's consortium composed by NOVA Medical School (NMS), CATÓLICA Lisbon School of Business and Economics (CLSBE), Public Health Institute from University of Porto (ISPUP), and the Centre for Health Promotion Research of Norges Teknisk-Naturvitenskapelige Universitet (CHPC|NTNU) and led by Portuguese Society of Rheumatology (SPR), had an excellent performance in what was the technical and physical execution of the project. Although being numerous and multidisciplinary, it was possible to obtain a very positive coordination and articulation, and all the partners showed a strict respect for the jointly designed objectives, as well as the action plan established at each crucial moment of the project. To detach their activities by WP is a near impossible task and we would transgress by unfair.

SPR, as project promoter, was the main player in this project, having become deeply involved in all WPs and coordinating all and all the partners. SPR participated in a central manner in the analysis of dietary habits and its association with the health of the Portuguese population; organized and implemented the National Survey on Food Insecurity in the EpiDoC cohort; developed the intervention programs with the adolescents and the

elderly and closely followed all the evaluations to all the participants. In addition, SPR was responsible for all management, communication and support activities.

NMS involved teachers and researchers in the task of analysing WP1 data and shared responsibilities with regard to the National Survey on Food Insecurity (team of research assistants, survey development, data analysis, etc.). It was also fundamental in WP3, with regard to the design of the participant evaluation protocol, resources for the implementation of the consultations.

In addition, it was also the resources of this entity that developed the WP3_teens (with respect to program development, technology, and implementation).

CLSBE was decisive in WP3_elderly when it came to creating content for the program (videos, infographics, and all audio-visual work), but also in the task of developing the entire innovative and technological part of the program, responsible for CMS, the liaison with Portuguese TV operators and television broadcasting of the intervention program for the elderly.

ISPUP worked on all data from the EpiTeen and EpiPorto cohorts for WP1 and WP2 enabling to provide detailed regional data on food patterns and food insecurity being an added value to the EpiDoC cohort findings. In particular, ISPUP enriched Food Insecurity project by given data on adolescents' reality

CHPC | NTNU did all the work of analysing the data of the HUNT study that allowed to the analysis and comparison of the two countries regarding food patterns and their associations in elderly.

As said before all partners worked together in a perfect networking, participating in all activities, helping in the project's scientific production, management and dissemination.

j) Description of activities carried out under the project execution that are not eligible for funding.

The present project has a very complex and multifaceted nature, with each one of the tasks unfolding in others. Being a project of so much complexity, it could not simply close after the final dates of eligibility of expenses. Thus, all further processing and data analysis are out of eligibility. In addition, all technical and scientific execution reporting work, but also the financial reports, which requires large allocation of human resources, time and economic resources are done after the project's closure, and by this, is not supported by the funder.

Data analysis will produce evidence and generate scientific knowledge to be published. But the process of submission, acceptance and publication is long. The fee charged after acceptance by open access scientific journals will come after the project's date of conclusion and again these costs will not be eligible.

As the activities were being carried out, we had the need of new materials and equipment that had not previously been budgeted, and for that reason could not be eligible. This is the case with two laptops and cell phones, a must-have for the WP2 research assistant team and also for the elderly WP3 medical appointments.

The overheads of outsourcing expenses were not eligible. But in fact all institutions charge the overhead for all money that entry in the institution. It's not possible to pay an outsourcing service without having the expense through the institution, thus we paid for the correspondent overhead, without being supported by the funder.

Finally, 15% of all expenses were not eligible, because the funding was 85% of total expenses.

k) Describe the contribution of the achieved results towards the objectives set for the programme sub-area

Objective: To improve information on the prevalence and socio-economic determinants of poor food security in the Portuguese population – 2 nd sub-area		
Results	Outputs	
Evaluation and characterization of Food Insecurity and its determinants in Portugal, through a National Survey on Food Insecurity.	Report “Food Insecurity and its determinants in Portugal” resulting of EpiDoC cohort	
	Report “Food Insecurity and its determinants in Portugal” resulting of EpiTeen cohort	
Development of two a sustainable and personalized program using innovative tools, easy to disseminate, contributing to reduce food insecurity, inequalities in eating habits and improve nutritional standards in vulnerable groups	Intervention program on dietary and physical activity using new technologies in food-insecure elderly	
	Intervention program for promotion of food security in adolescents using new technologies	
	Resultados adolescents	

Objective: To improve information on food intake and physical activity on a national level – 3 rd sub-area		
Results	Outputs	Files
Description and characterization of dietary patterns in Portugal and its association with lifestyles behaviours and health outcomes	Report “Determinants of food intake and its association with lifestyles behaviours and health outcomes – EpiDoC II study”	
	Report Determinants of food intake and its association with lifestyles behaviours and health outcomes – EpiTeen and EpiPorto cohorts	
Description and characterization of dietary	Report Determinants of food intake and its association	

patterns in Norway and its association with lifestyles behaviours and health outcomes	with lifestyles behaviours and health outcomes – HUNT III study	
Comparison of Dietary patterns and its association with lifestyles behaviours and health outcomes in Portugal and Norway	Report Determinants of food intake and its association with lifestyles behaviours and health outcomes in Portugal and Norway	

l) Justify the contracted results that were not achieved

Not applicable: all contracted results were achieved.

m) Changes made to the contracted project

The Promoting Food Security project was planned and budgeted for a duration of 12 months, beginning in April 2015. However, in June 2015, the Program Operator invited promoters to extend the duration of the projects to a maximum of 2 years, maintaining the initial budget. Facing this suggestion, and given the enormous complexity of the present project, this promoter considered the possibility of carrying out the activities in a more careful, cautious and weighted way, increasing the scientific robustness of the instruments and procedures.

As so, and without raising the budget, the consortium decided to extend the project to 18 months, starting in April 2015 and finishing on 30th September 2016.

The new and final chronogram is the following:

TIMELINE			2015										2016									
WP	Task Denomination	partners involved	Apr	Mai	jun	jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Mai	Jun	jul	Aug	Sep		
1	Data integration of several data sources		[Blue shaded area]										[Blue shaded area]									
1A	Identification of vulnerable nutrition population		[Light blue shaded area]																			
1A	Description of "nutritional patterns" from each large cohort populations		[Light blue shaded area]																			
1B	Determination of associations between "dietary patterns" and obesity, sedentary quality of life and non-communicable diseases	SPR, ISPUP, NMS, NTNU	[Light blue shaded area]																			
1B	Cross validation of data between EpiDoC study and EpiPorto		[Light blue shaded area]										[Light blue shaded area]									
1B	Comparison of food patterns and its determinants between Portugal and Norway		[Light blue shaded area]										[Light blue shaded area]									
2	National based survey on Food insecurity (EpiDoC & EpiTeen)		[Pink shaded area]										[Pink shaded area]									
2A	Survey design	SPR, ISPUP, NMS	[Light pink shaded area]																			
2A	Survey computer software development		[Light pink shaded area]																			
2A	Follow-up team constitution		[Light pink shaded area]																			

2A	Survey pre-test			
2A	National based survey implementation - data collection			
2A	Data Analysis			
3	Development of the new technologies. Intervention - pilot studies			
3	Identification and development of the new technologies	SPR, CLSBE, NMS		
3	Intervention: pilot studies (teens and elderly) development			
3	Recruitment			
3	Follow-up			
3	Data analysis			
4	Project Management	SPR, ISPUP, NTNU, CLSBE, NMS		

DISSEMINATION

Implemented Publication Measures

List all the events, activities and materials developed for the dissemination of the project. It is possible to attach the promotional elements, photos, videos and other evidences of the implemented measures (max. 10 MB).

- . Public Presentation, Lisbon, 14th October 2015
- . Website: under www.saudepontocome.pt online in Portuguese and English and is updated permanently.
- . Social network: the project is on Facebook and counts 1,070 followers, in <https://www.facebook.com/saude.come>. Posts are about this project or relevant news around health and food security. Also the intervention pilot study pilot with teenagers is on Facebook <https://www.facebook.com/saude.come.teens/> with 884 followers.
- . e-Newsletter: Sent monthly, since June 2015, to a set of 1,152 relevant contacts.
- . News in Press: 38 news in the media, print media, television and radio programs. http://www.rtp.pt/noticias/pais/grupo-de-investigadores-desenvolve-aplicacao-televisiva-para-idosos_v944427
- . Presentations in several events and conferences:
 - Health Promotion Research Forum, Trondheim, 29th September 216

2º Seminário Internacional de Segurança Alimentar e Nutricional, Brasília (Brasil) 29th
September 2016

Ageing Well with technology - AAL Forum 2016, St Gallen, 27th September 2016

Festival das Leguminosas, Lisbon 16th October 2016

. Book “Viver com saúde... depois dos 60”: in preparation

MONITORING

a) External monitoring actions and technical-scientific monitoring

List the follow up visits and audits performed by National Focal Point (NFP) or other entities on behalf of the NFP. If there were any additional actions needed to face any possible risks to the good execution of the project that were identified during the visits, they must also be listed in this area.

Dates	Conclusions	Implemented Measures
18/12/2015	<p>There were some limitations in the financial report related to poor quality of copies of proof of expenditures.</p> <p>No technical-scientific observations or recommendations.</p>	<p>The project promotor provided new copies of the expenses and always verified the scans in the following reports.</p>
05/07/2016	<p>The physical file of the financial file was incomplete.</p> <p>There were a set of General Expenses and HR that are not registered in the account of the Promoter, but in the Partners', and the Promoter did not present evidence of the payment of the expenses submitted to the EEA Grants to the Partners.</p> <p>The Promoter did not present a daily log sheet of time allocated to the projects and their activities, together with each HR Expense.</p>	<p>The project promotor printed all files and gathered them in the physical file.</p> <p>The project promoter provided proof of the transfers to the partners immediately after the visit.</p> <p>The promoter presented all HR expenses submitted accompanied by time sheets, where the values considered for the purpose of calculating the project attribution rate are the same.</p> <p>The promotor asked for copies of this</p>

	<p>The Promoter did not submit copies of the contracts of the Grantors selected by the Partners, as well as the documentation related to the publicity of the opening notices and the decision to contract them.</p> <p>No technical-scientific observations or recommendations.</p>	<p>documentation and allocate them in the financial process of the Project.</p>
--	--	---

c) **Internal mechanisms effectively established throughout the project ensuring the supervision and evaluation of the Project.**

The project coordination team implemented the following project monitoring and quality control measures:

- Submission of the project to two Ethics Committees, one academic (EC NMS) and another from health scope (EC ARS Lisboa Vale Tejo). The project was also submitted to the national data protection committee (CNPD). All three authorities approved the project.
- Weekly meetings with principal investigator, scientific coordinator, main researchers and project manager, with minutes writing. Monthly or tri-monthly (face-to-face and skype), other project partners were invited to share the evolution of activities, but also to discuss strategies and activities. In these meetings, it was also discussed financial issues.
- Three main face-to-face meetings (June 2015, May 2016 and Sept 2016) and skype meetings with Norwegian partners to discuss strategies and activities.
- Peer review of reports and papers.
- Elaboration of periodic reports requested by Program Operator.
- Elaboration of reports of research assistants' performance, assessing each one carefully in terms of effectiveness and quality of data collected.
- All research assistants' performances (in terms of quality of data) were evaluated regularly and discussed with the team.
- All members involved in clinical appointments to WP3_elderly were carefully trained and prepared so that the data collected were reliable.
- The process of TV programs and online platform development implied several meetings with the whole team and other elements involved, such as companies and partners.
- Along the pilot study, the central team was able to monitor the compliance of participants involved taking measures to assure the participation.

PROJECT IMPACT

a) Evaluation of the project effectiveness compared with the submitted application

Submitted application: 3 papers in international journals

This target was fully achieved: the project already submitted not only 3 as expected but 5 papers to different international journals (one already published).

“Association between food patterns and life satisfaction in Norwegian inhabitants over 65 years of age” published in “Appetite”: “Is there an association between food patterns and life satisfaction among Norway's inhabitants ages 65 years and older?”

André B, Canhão H, Espnes GA, Ferreira Rodrigues AM, Gregorio MJ, Nguyen C, Sousa R, Grønning K. Appetite. 2016 Dec 14. pii: S0195-6663(16)30931-X. doi: 10.1016/j.appet.2016.12.016

“Dietary patterns and its association with socioeconomic factors, lifestyles behaviours and health status in Portugal: results from EpiDoC cohort” submitted to Public Health Nutrition

“ Home-based intervention program to reduce food insecurity in elderly using a TV app – the study protocol of the randomized controlled trial Saúde.Come Senior” submitted to JMIR Research Protocols

“Family meals and disordered eating in adolescence: The mediating role of depression and diet” submitted to Child: Care, Health & Development - Account Created in Manuscript Central

“How does parents’ perception of food insecurity impacts on adolescents’ nutritional status, diet, and psychological wellbeing?”

Submitted application: 1 paper in national journal

This target was fully achieved: the project submitted the following paper to a national journal. This paper was already published.

“Do rheumatologists have a role in health promotion among elderly?” Rodrigues AM, Branco JC, Canhão H. Acta Reumatol Port. 2016 Jul-Sep;41(3):181-182.

PMID: 27770753

Submitted application: 6 Communications in International meetings

This target was fully achieved: the project was present in several international meetings in Switzerland, Norway, Canada, Brazil, and Spain, as follows:

“Is TV really a devil?” Ageing well with technology – at AAL Forum 2016, in St Gallen, Switzerland, 27th September 2016 (seminar)

“Promoting healthy lifestyles and literacy in health using ICTs” at Health Promotion Research – an International Forum in Trondheim, Norway, 28th September 2016 (seminar)

"Dietary patterns and its association with socioeconomic factors, lifestyles behaviours and health status in Portugal: results from EpiDoC cohort" at Health Promotion Research – an International Forum in Trondheim, Norway 29th September 2016 (oral communication)

“Intervention program on diet and physical activity to reduce food-insecurity in elderly – a study protocol” at Advancing Food Insecurity Research in Toronto, Canada 17th November 2016 (oral communication)

“Segurança alimentar: experiência e realidade portuguesa” at 2º Seminário Internacional de Segurança Alimentar e Nutricional in Brasília, Brazil, 28th September 2016 (oral communication)

“Dietary patterns and its association with socioeconomic factors, lifestyles behaviours and health status in Portugal: results from EpiDoC cohort" at XXXIV Reunião Científica da SEE and XI Congresso da APE – Seville, Spain, 14th September 2016 (poster presentations)

Submitted application: 5 Communications in National meetings

This target was fully achieved: the project was present in more than 7 national meetings, conferences and other events.

Festival das Leguminosas; Educational and motivational tool for the promotion of healthy lifestyles in the elderly; 16th October 2016; Lisbon

Health Innovation Day, Microsoft; Telemedicina e monitorização remota de doentes; 23rd November 2016; Lisbon

Challenges in the Management of patients with multi-morbidities, School of Pharmacy of the University of Lisbon; 21st November 2016; Lisbon

Partilhar a inovação, Ministério defesa nacional; Inovação em alimentação e saúde; 4th November 2016; Lisbon

III Jornadas Científicas NOVA saúde – NMS | CMUL | ENSP; 16th September 2016; Lisbon

Reunião Anual, Ordem dos Médicos; Estudos longitudinais de seguimento; 28th October 2016; Coimbra

Defesa Roadshow; Partilhar Inovação; 3rd October 2016; Lisbon

Submitted application: 2 Reports

This target was fully surpassed, since the project delivered 11 reports.

The project developed three individual reports WP1 (EpiDoC, EpiTeen and EpiPorto, and HUNT study) regarding Dietary Patterns. These three individual reports have resulted in a joint report integrating and comparing dietary patterns of the Portuguese and Norwegian populations.

Also, a main report on Food Insecurity in Portugal and its determinants was elaborated.

In addition, on Food insecurity, a report of EpiPorto and EpiTeen Cohorts was elaborated, as well as a report on Intervention program dedicated to adolescents.

Finally, the project elaborated four reports on technical and scientific execution.

Submitted application: Organization of 2 seminars and conferences

This target was fully achieved. We have now completed two seminars, but are preparing two others.

The project organized a session on October 14 for the presentation of the project, but this meeting also consisted of a conference on the concepts of Food Insecurity and technological programs for health intervention. This session included communications of renowned guests: Prof. Dr. Pedro Graça, Prof. Dr. João Eurico Fonseca, among other prominent personalities in the health area. This event took place in NOVA Medical School, Lisbon.

In 31st May and 1st June, another seminar was organized to debate mainly the dietary patterns in Portugal and Norway, with the presence of our partners from NTNU, in Lisbon.

Finally, we are preparing a final seminar to present project results and debate the problematic of Food Insecurity in Portugal. This will happen in 9th February and 21st March 2017 at NOVA Medical School.

Submitted application: 2 PhD Thesis

Nélia Gouveia (Pharmacist), NMS concluded

Ana Rodrigues (MD), FMUL

Pedro Laires (MSc) – Health economics, FMUL, scheduled

Maria Alexandra Pinto (MSc) Statistician, ENSP

Submitted application: 2 Master Thesis

This target was fully achieved.

Frederico Baptista, Physiotherapist, is developing his master on “Evaluation of effectiveness of the lifestyle modification program in the physical fitness of the elderly”, using the intervention pilot study with elderly (WP3_idosos).

Inês Babo, Nutritionist, is developing her master on “Validation study of the PREDIMED questionnaire for the Portuguese population”.

Submitted application: 1 Advanced Training

This target was fully achieved, since the project involved two advanced trainees.

The project hosted an international internship from Poland, Aleksandra Blazica, for 1 month. She was particularly involved in WP3_elderly data on perceptions and expectations towards technology intervention in health.

The project hosted a Medicine undergraduate, Mariana Trindade, for 3 months. She participated in the medical appointments of elderly participants for WP3_elderly.

Submitted application: 2 softwares

This target was fully achieved.

This project developed a specific software to support National Survey on Food Insecurity data collection (saúde.come). Also a new software was developed to support all the appointments made in the scope of intervention pilot study with elderly.

Submitted application: 2 prototypes

This target was fully achieved, since we count three prototypes.

The project developed and successfully tested two intervention programs using three technological devices and prototypes: intervention program for elderly through smart TV application and intervention program for teenagers through smart phone application and website.

Submitted application: 1 patent

On February 2016, the coordination team promoted a meeting with THT, www.triplehelixtechs.com, a recognised enterprise in charge of supporting in patenting process. The prototype of Intervention program for elderly was evaluated and the conclusion was to reserve the copyright instead of pursuing the patent. The project promotor proceeded in accordance with this.

b) **Project's contribution for Programme's transversal objectives implementation.**

A major public health challenge in Portugal relates to the lack of epidemiological information, valid and useful to support public health decision-making. The major national population health surveys (health interview survey, serological survey and food and nutrition survey) have been conducted on irregular basis and have not recent data. Health inequalities between different population groups worldwide and in Portugal exist due to differences in factors that influence health, such as health related-behaviors, occupational class, education and income (EU (COM(2009) 567 final 2009)(Marmot et al.2012). Besides the health impacts of such disparities, issues are even higher from an economic standpoint. Considering that the broad aim of this EEA Grants area of the Public Health Initiatives Program is to improve national health registries, health information and data management capabilities, contributing to improve current knowledge on health status of the Portuguese population and the use of this knowledge for development of evidence-base public health practices. More specifically, this area intends to improve information on prevalence and determinants of food insecurity in Portugal. Our Consortium, have developed the Food insecurity project that is totally aligned with the overall objectives of the program. Promoting Food Security project not only provided strong and robust evidence regarding food insecurity and lifestyles in Portugal but also, using the knowledge acquired, developed solutions to promote healthy lifestyles in vulnerable population. In fact, food Insecurity (uncertain access to adequate food) is a public health problem in Portugal that leads to obesity, chronic diseases, poor disease control and monitoring. Moreover, food insecurity leads to higher health resources consumption and hospitalizations. Old adults, island inhabitants, subjects with lower literacy and with precarious jobs or unemployed are the one that are most affected by food insecurity. Food Security project provided valuable data to increase awareness to the Food insecurity problem in Portugal, being a strong argument to encourage policy makers to increase the resources allocated to reduce social inequalities and poverty. Our results also showed that unhealthy food choices are associated with other unhealthy lifestyles, which demonstrates that interventions in lifestyles should include all domains and not only food behaviors. Finally, considering this valid information that we have gathered regarding lifestyles among vulnerable population, this project has developed a high quality, cheap and easy to disseminate multidisciplinary program that aims to promote health among the most needed using ICT tools.

Promoting Food Insecurity project assembled robust data to inform policy makers and to support the development of better health policies in Portugal. This ultimately contributes to reduce economic and social disparities across the country (and between the country and other more advanced economies, such as Norway).

Outstandingly, the identification of vulnerable population strata namely adolescents, elderly, and lower socio-economic level individuals, as well as regional disparities and the development of interventional measures fitted and targeted to these populations represents a major achievement for the fight of food insecurity in Portugal.

This project had an important role strengthening the relationship between Portugal and Norway. NTNU, Norway's second largest university, participated in the project via the Research Centre for Health Promotion Research (CHPR-NTNU), and also involves four leading academic institutions in Portugal, Portuguese Society of Rheumatology, NOVA Medical School, CATOLICA Lisbon School of Business and Economics, and Public Health Institute – University of Porto.

Norway has a very high standard of living compared with other European countries, and a strongly integrated welfare system. It is also the country that systematically ranks first in terms of Human Developed Index (HDI). Moreover, Norway's economic growth, and the health system in particular, have been fuelled by an abundance of natural resources. Portugal have, through this project, learned some best practices with Norway. For example, The Nord-Trøndelag Health Study (HUNT) is one of the largest health studies ever performed and its data were analysed within this project.

The HUNT study is a unique database of personal and family medical histories collected during three intensive studies with high participation rates. There is enthusiastic public and political support for HUNT and of the HUNT Research Centre. This has created a good basis for further health surveys in the county and an excellent research environment. HUNT Databank contains information on the health and samples from participants. The study was conducted in three waves of data gathering, HUNT1 (1984-1986), HUNT2 (1995-1997) and HUNT3 (2006-2008). In addition to the main studies, many additional studies were performed which also are a part of HUNT Databank today. Data collection was done with questionnaires, interviews, clinical studies and analyses of blood and urine samples. In addition, HUNT Databank contains blood and urine samples stored in HUNT Biobank, which can be picked and defrosted for genetic analyses and other biological markers.

NTNU shared with our group the information described above in order to identify determinant of nutrition patterns in Portugal and in Norway. NTNU collaborated with the Portuguese team to develop novel algorithms integrated with robust and efficient statistical methods for the analysis of multiple layers' epidemiologic data from the large datasets of the WP1. Knowledge

and experience exchange with Norway is one of the major aspects of the project and provided an added value to Portuguese researchers. The existing ties between the Norwegian and Portuguese institutions are now significantly strengthened via this collaboration, namely by the exchange of knowledge, the comparison of cohort study design and analysis, the study of similarities and differences on food and exercise habits and the co-authorship in publications.

c) Innovative features incorporated by the Promoter in its activity and resulting from the project's execution and from the partnerships established with partners from national and / or from donor countries

1. In particular at WP3_elderly, the project was a real stone in the pond with regard to health intervention using affordable new information technologies for dissemination. The concept of health intervention, with a personalized environment focusing on prevention, is innovative. But even more: the way this tool was built, with an interactive interface which allows the instrument to provide information to the subjects, but also to receive information from them (through their answers to the questionnaires) is an important step forward on how we think intervention in health. ICT will allow experts to be close to subjects, outside the clinical appointment room.

The use of pop ups during the transmission of other television programs, drawing attention to the intervention program and allowing the subject to access directly, was used for the first time in Portugal by Promoting Food Security project. Also, this tool used a cutting-edge technology on Content Management Systems.

2. Regarding the Intervention program for teenagers (WP3_teenagers), the information and communication technologies were present in a transversal manner, through the development of the website, but also the application for Smartphone (Android).

3. This project developed a software to not only register the data collected, but they have also the faculty to manage contacts obeying to rules of randomization, time lapses, etc., with very low error rate. (WP2)

4. Book – the transformation of the intervention program for the elderly into a book, in Portuguese and English, accessible to the entire population.

d) Measures taken to ensure the sustainability of the project at medium and long term

Sustainability is a very dear theme to the consortium of Promoting Food Security project and this concern was always on the table to be discussed in the meetings throughout the project.

Thus, several essential measures were implemented so that this project and what was achieved with it could continue to evolve and make a difference not only in scientific and academic field, but also in its application to health care connected to people.

First, we took actions to be included in relevant European networks in these areas, such as:

AAL - The Active and Assisted Living (AAL) (<http://www.aal-europe.eu/>) program's general goal is to improve the quality of life of elder while consolidating the industrial base in Europe through the use of ICT. Since 2008, it sponsors projects in public-private collaboration in the field of ICT for active and healthy ageing. We presented a seminar in Switzerland in the end of September with the results of our work, to the group members, having in mind our availability to develop new projects. We are developing a European project proposal integrated in this consortium.

EIP AHA - The European Innovation Partnership in Active and Healthy Ageing (EIP on AHA) (http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing) is a pilot initiative hurred by the European Commission to nurture innovation in the field of active and healthy ageing. The notion of European Innovation Partnerships (EIPs) is a new attitude to EU research and innovation. It brings together all pertinent players at EU, national and regional levels through different policy areas to handle with specific societal challenges and includes all the innovation chain stages. We are developed a European project proposal integrated in this consortium.

Apart from this European networks, this consortium developed important national partnerships with:

DGS, The Directorate-General of Health (DGS) (<https://www.dgs.pt/>) is a public organization of the Ministry of Health that constitutes a reference for all those who reflect and work in the healthcare field. We developed our partnership with the Division of Healthy Lifestyles and together we are developing a book. This book includes the intervention content developed for TV application dedicated to elderly, and adds new themes such as cognitive aging, cognitive stimulation exercises, sleep, visual and auditory acuity, sexuality, the importance of socialization, among other themes of interest to this population. And,

ENSP, National Public Health School provides post-graduate teaching and research in health related areas, namely in public health and health policy and management. The School provides relevant services to the community, including public and private institutions who seek its faculty and researchers to support the resolution of specific problems of health and health care in Portugal. Several professors and graduates occupy important positions in the health system. In addition to protocols and agreements established with its peers both nationally and internationally for the development of studies and projects in the area of Public Health, ENSP is a member of several important associations in the health field.

The mobilization of graduate students is another way to keep developing activities that spin off this particular project. We opened, in our website, the possibility to students and researchers to submit projects using data obtained by this project. After a careful scientific and ethical assessment, this projects may be accepted. Presently we sum 4 spin off projects.

In order to attract more financial resources, which are indispensable for the continuation of the project's actions, the consortium has prepared several national and international applications, among which we can count on: BPI senior, European health award, Pfizer award, Janssen Innovation Award, Everis Award, Sociedade de Ciências Médicas/MSD award, APE award, Assunção Teixeira Award, among others.

Finally, it is important to mention the effort that this consortium is performing to achieve the translation to the market, using partnerships with strategic companies in Portugal such as Innowave, Microsoft, Ocidental, among others.

e) **Local and regional impact of the project execution.**

From a regional point of view, it is important to stress that our project analysed food insecurity prevalences according to regions. In this sense, we found that the prevalence of food insecurity was higher in Madeira (29.0%), Azores (28.8%) and Algarve (22.4%). For the most severe levels of food insecurity, higher levels were also found for Algarve (9.7% - 4.7% of moderate food insecurity and 5.0% of severe food insecurity), Madeira (9.3% - 4.4% of moderate food insecurity and 4.9% of severe food insecurity) and Azores (8.6% - 6.1% of moderate food insecurity and 2.5% of severe food insecurity). Furthermore, Lisboa showed the lowest food insecurity prevalence (16.4%).

We are also in position to describe, lifestyle habits food intake and dietary patterns in a regional way. For instance, individuals from the Azores and Madeira were more likely to report a dietary pattern with a lower frequency of consumption of soup, vegetables and fruit and a higher frequency of meat consumption given their high frequency of consumption of meat.

It should also be noted that around 600 individuals (teenagers and elderly) from the region Lisboa e Vale do Tejo took part in the pilot study and experienced an intervention program aimed at reducing food insecurity by promoting healthy lifestyles, through healthy eating and encouraging physical activity.

In addition, and perhaps less tangibly, 2,000 elderly individuals in this region came into contact with the project, becoming aware of the concepts of food insecurity.

Regionally, this project mobilized 21 primary care centers, belonging to 3 different regional health administrations.

On a national level, this project raised two important red flags: dietary patterns and lifestyles habits of Portuguese population and the national prevalence of Food Insecurity. In 2015-2016, 20.7% of Portuguese households experienced some level of food insecurity during the previous 3 months. A majority of food insecure households were in the lower level of food insecurity (14.1%). But 3.5% and 1.8% had moderate and severe food insecurity respectively.

This project also found a high prevalence of overweight and obesity (52.5% - 37.1% for overweight and 15.4% for obesity). Regarding to lifestyle habits, a high proportion of individuals were classified as inactive (58.7%). Moreover, regarding to dietary habits, fresh fruit and dairy products were reported to be consumed on a daily base consumption by a large proportion of the individuals. Furthermore, meat meals were consumed with greater frequency than fish

meals. A high proportion of the participants seem to not meet the recommendations for daily water intake.

We have also identified two major groups considering differences in food patterns: a cluster including individuals with a reduced number of meals per week, lower frequency of consumption of soup, vegetables, fruit, fish, milk/dairy, less water intake and a higher frequency of consumption of meat; and another with a higher number of meals per week, higher frequency of consumption of soup, vegetables, fruit, fish, milk/dairy, high water intake, and a lower frequency of consumption of meat.

Subjects with “lower fruit and vegetables intake and higher meat intake” dietary pattern (DP) had a lower quality of life and a higher physical function. There were more individuals with depression symptoms in the “lower fruit and vegetables intake and higher meat intake” DP group than in the “higher fruit, vegetables and fish intake” DP group. Regarding the noncommunicable diseases self-report, subjects in the “lower fruit and vegetables intake and higher meat intake” DP had a tendency to present less diabetes, neoplastic disease, hypogonadism, and renal colic; in contrast, the later presents more pulmonary disease. Additionally, they presented the lower number of medical appointments. The “lower fruit and vegetables intake and higher meat intake” DP had more current smokers than individuals that never smoked, in comparison with the other dietary pattern, and more daily alcohol intake versus occasionally intake. The “lower fruit and vegetables intake and higher meat intake” DP group also presented a lower number of members with an active physical activity in contrast with inactive than the “higher fruit, vegetables and fish intake” DP group. Finally, subjects from “lower fruit and vegetables intake and higher meat intake” DP less commonly presented less than five hours a week searching for information about health when comparing to not spending any time at all than the “higher fruit, vegetables and fish intake” group.

The identification of determinants of a dietary pattern with a lower frequency of consumption of soup, vegetables and fruit and a higher frequency of meat consumption, showed that being a man, a decreased age, a lower years of education and being in a situation of unemployment, part-time employment and domestic working were significantly and independently associated with the adoption of such dietary pattern. Individuals with self-reported diabetes were less likely to report this “unhealthy” dietary pattern. Depression symptoms were less often reported by individuals with the “lower fruit and vegetables intake and higher meat intake” DP. Smoking and being physically inactive were significantly and independently associated with having this type of dietary pattern. These results can help identifying a health-concerned profile among the population.

These results are crucial to have an effect on public health policies and to support and influence decisions at social, economic and healthcare levels.

SWOT ANALYSIS

<p>Strengths</p> <p>Vast experience of partners with appropriate knowledge, resources and skills;</p> <p>The multidisciplinary and highly complementary team;</p> <p>Positive communication between the teams.</p>	<p>Weaknesses</p> <p>Difficulty in inclusion (by the requirement of inclusion and exclusion criteria) and involvement (because they are elderly with food insecurity, a very vulnerable population) of participants in WP3_elderly;</p> <p>Differential losses of follow-up within the population-based cohorts studied</p>
<p>Opportunities</p> <p>Issues such as food security, related to socioeconomic factors, chronic noncommunicable diseases, and elderly population in the centre of media attention.</p> <p>To expand the research line to other population-based cohorts, covering other age strata, in a transgenerational approach</p> <p>Multi-systemic intervention</p>	<p>Threats</p> <p>Impossibility of the project to fund equipment, in a project whose essence falls on the new information technologies;</p> <p>Sustainability of the conclusions of the project taking into account the temporal dynamics of food insecurity, which are largely determined by changes in macroeconomic factors</p> <p>The limited timeframe of the intervention</p>

FUNDS FOR BILATERAL RELATIONS

Funds for Bilateral Relations (FBR)

Activities undertaken within the FBR:

- a. *Health Promotion Research – an International Forum*, Trondheim, Norway, September 2016, with the seminar entitled “Promoting Health literacy and healthy lifestyles using ICTs”
 - b. *Results presentation and Closing Ceremony*, Lisbon, Portugal, March 2017, organized in close cooperation between Portuguese and Norwegian partners, with presentations from NTNU.
- 2)** Communications
- a. *Health Promotion Research – an International Forum*, Trondheim, Norway, September 2016, with an oral communication “Dietary patterns in the adult Portuguese population and its association with health”
- 3)** Book – edition of a book synthesizing all the contents developed for the intervention program for elderly with food insecurity in a strategic way, underlining the partnership between Portugal (SPR, NMS, CLSBE, and ISPUP) and Norway (NTNU). This book, in Portuguese and English, would be for free distribution, both in Portugal and Norway.
- 4)** Other meetings in order to expand into new partnerships with University of Stavanger (Norway) regarding ICTs applied to well-being and health in elderly. (December 2016 and 2017)

These activities resulted in partnership projects with organizations from donor countries?

Yes, some examples are a new COST application, around the theme of healthy workplaces in healthcare systems, but also new studies in collaboration with NTNU (Norway) and with University of Stavanger (Norway).

University of Stavanger, in the name of Tatiana Iakovleva, is now coordinating the project “Digitalize or Die” and is very interested in the qualitative analyses of WP3_elderly.

OTHER CONSIDERATIONS

Additional Considerations

Regarding the project nomenclature, we found relevant to adapt it so it could be understandable for our specific target groups and general population. In this sense, when in Portugal we referred to this project using a nickname for Promoting Food Security – Saúde.Come, which means literally *Health.Eat* and has a pun regarding “.com” (linked to web) and “.come” (meaning “eat”) and stressing the relation with food intake and food security associated to health.

Also the name of the two pilot interventional studies also derived from this: Saúde.Come.Senior, for the elderly, and Saude.Come.Teens, for the adolescents.

When we communicated this project internationally, we used the original name: Promoting Food Security, or ProFooSe.