# European Innovation Partnership on Active and Healthy Ageing


# ACTION PLAN

on ***'Prevention and early diagnosis of frailty and functional decline, both physical and cognitive, in older people'***

Date and place: 6 November 2012, Conference of Interested Partners, Brussels

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*Please note: this is an updated version of the Final Action Plan based on comments received after 6 November 2012.*

## 1. OVERVIEW

Demographic ageing is a global trend. In the European Union (EU), the number of people aged 65+ will almost double over the next 50 years, from 85 million in 2008 to 151 million in 2060. While increased longevity is a great achievement, it is also a formidable challenge for both public and private budgets, for public services and for older people and their families. New approaches are needed urgently.

Innovation should play a key role in rethinking and changing the way we design and organise our society and environment and organise, finance, and deliver health and social care services to face challenges posed by ageing trends. However, many barriers and bottlenecks stand in the way of successful innovation.

European Innovation public-private Partnerships (PPP) were proposed in the Europe 2020 Strategy to tackle innovation barriers for major societal challenges. The first pilot of these PPP was the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) launched by the European Commission (EC) at the end of 2011.

The EIP on AHA aims to identify and remove persisting barriers to innovation for active and healthy ageing, through interdisciplinary and cross-sector approaches. It identifies a set of actions that can start as early as 2012 and deliver measurable outcomes within the 2012-2015 timeframe.

The Strategic Implementation Plan of the Partnership (SIP), adopted by a Steering Group (SG) of representatives from industry, regional and local public authorities, NGOs, EU member States and civil society, set out the vision as well as an operational plan focused on 13 priority areas to achieve the aim of an increase of two years in the number of healthy life years of EU citizens. The SG structured the work needed in three pillars reflecting the 'life stages' of the older individual in relation to care processes; A: Prevention, screening and early diagnosis; B: Care and cure and C: active ageing and independent living.

Under pillar A, an Action on "implementing integrated programmes for prevention, early diagnosis and management of functional decline, both physical and cognitive, in older people" was identified and ready to start in 2012.

The partners involved in this Action (group) commit to the following:

1. The area to be addressed: "Prevention and early diagnosis of frailty and functional decline, both physical and cognitive, in older people".

2. The following actions to be launched:
   - Increase understanding around frailty and the prevention, early diagnosis and management of functional decline, both physical and cognitive, in older people.
   - Shift the approach from reactive disease management to screening, triage, anticipatory care and prevention of functional decline. This shift is to be brought about through innovative, coordinated and comprehensive community based prevention, assessment and integrated case management systems delivered within an integrated health and care system.
   - Develop and implement early diagnosis and screening programmes for selected conditions that are associated with functional decline – eg cardiovascular disease, diabetes, dementia, osteoarthritis and osteoporosis.

- Where dementia is diagnosed, define an optimal approach for the support of caregivers and older people with dementia.
- Where physical problems related to functional decline and frailty are diagnosed, solutions for optimal treatment will be used.
- Validate programmes to prevent functional decline and frailty, focusing on nutrition, physical activity and cognitive impairment in older people.
- Develop tools, networks and information to support these programmes to reach at least 1000 care providers across the EU.
- Create a functional capacity evaluation tool for active ageing in the workplace which could help establish synergies/ fit between capabilities and workload.

This document is the agreed Final Action Plan to be presented on the occasion of the Conference of Partners of the European Innovation Partnership on Active and healthy Ageing, on 6th November. It is based on the objectives, activities, timing and deliverables specified in the commitments sent in by a group of stakeholders in reply to an invitation for commitments launched by the European Commission. It also takes on board the results of 2 meetings held in Brussels on the 2nd -3rd of July and on the 25 September of 2012 in Brussels.

It has been further developed by the Action Group, via e-mail interactions and contacts among Action Group members and the European Commission, which facilitated the discussions.

Ownership of the document rests with the members of the Action Group. The Action Group members are expected to "sign-up" to the objectives and deliverables of the present plan, re-affirm their commitment and work collaboratively to implement the present actions, as relevant for their organisation.

## 2. INTRODUCTION TO THE ACTION GROUP AND THE ACTION PLAN

### 2.1. The Action Group

In response to the SIP, the EC launched an invitation for commitments at the beginning of 2012 to contribute to the Partnership. The Action Group on "Prevention and early diagnosis of frailty and functional decline, both physical and cognitive, in older people", formed on June 2012 following this invitation. The complete list of partners and countries involved can be consulted in Annex 2.

This Action Group brings together partners representing 41 multi-stakeholder commitments from national, regional and local authorities, research centres, academia, industry, enterprises and existing consortiums across the EU. (See Figure 1 and figure 2)

Figure 1 and figure 2 represent the commitments received for the Action on prevention of frailty and functional decline.

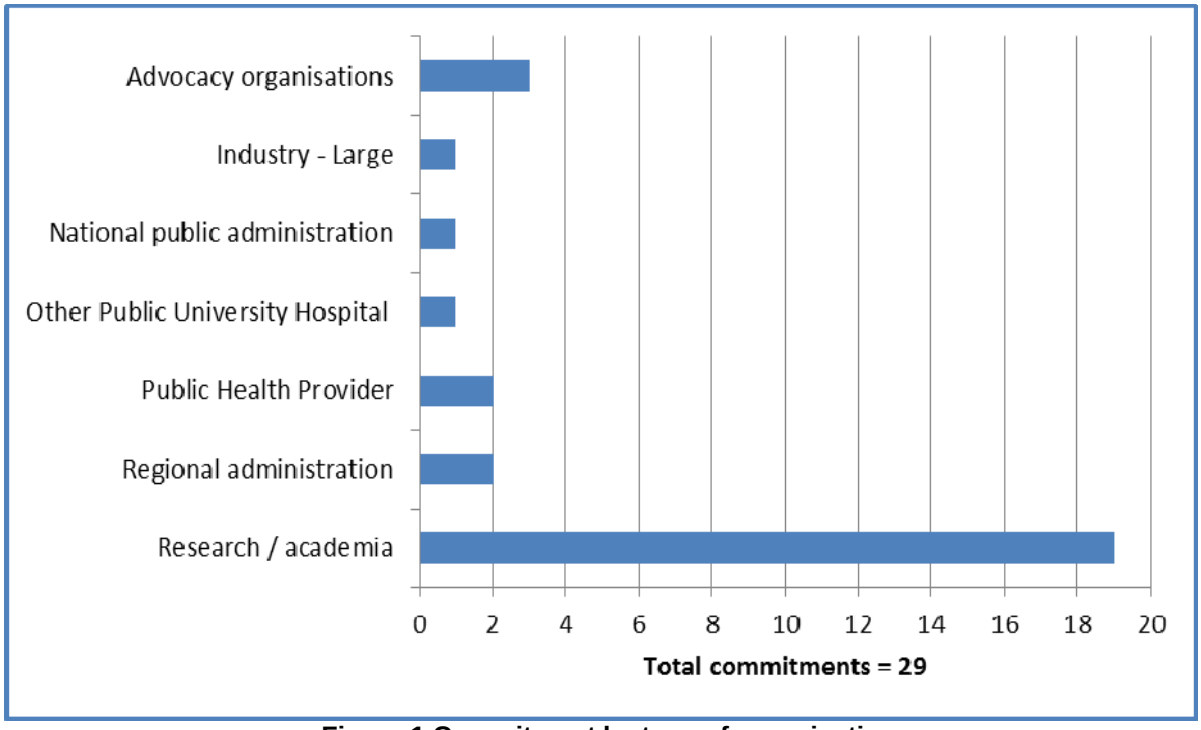


**Figure 1 Commitment by type of organisation**

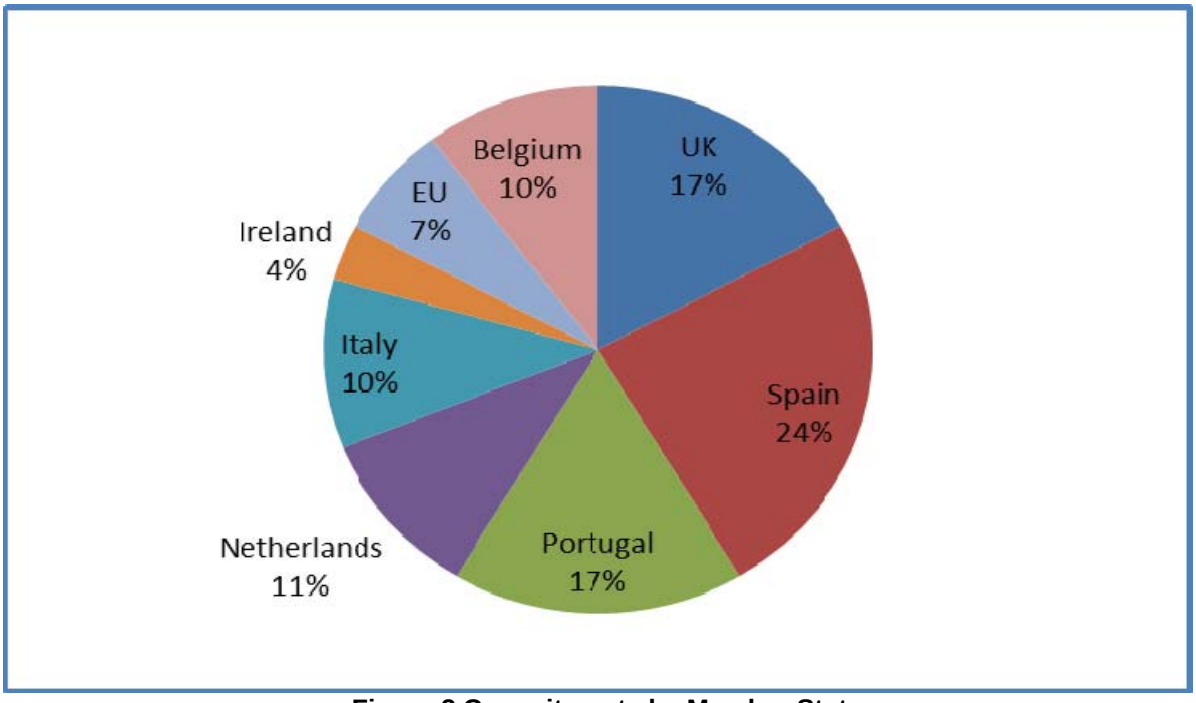


**Figure 2 Commitments by Member State**

### 2.2. The Action Plan

A number of common terms are used in this document to refer to the act of seeking health and care services by different professionals, to refer to clinical status or for risk situations such as functional decline, frailty, undernutrition, vulnerability…. These common terms sometimes can be used interchangeably but some other times they imply different views about the relationship between the patient and the professional or about different stages of evolution in the clinical status of a patient. Discussion in this regard is far beyond the scope of this document and, although some dialogue has taken place among the group, on this issue, it was agreed that the best course of action would be to incorporate a glossary with

standard definitions on the key concepts introduced on the text to share a common ground on which to build the document (Cf. glossary in Annex).

This Action Plan and its activities are structured according to 7 broad *general objectives*, which have been further detailed in a set of *specific objectives*. The 7 broad objectives constitute the core areas of work, under this Action Plan, and all the *deliverables* are organised accordingly. The Action Plan also details the expected (broad policy) *outcomes* which will result from the activities and deliverables identified. Finally, the deliverables throughout the Action Plan have also been allocated to each individual partner (per general objective).

The Action Plan will be used as reference for those new stakeholders that would like to contribute to the Partnership after the 6th November Conference. Their potential actions and projects should fit into the objectives and expected outcomes or cover any of the identified gaps of action display on this document.

### 2.3. Rationale for prevention of frailty and functional decline at regional

- Research has shown that poor health, disability and dependency do not have to be an inevitable consequence of ageing. Older adults who practice healthy behaviours, take advantage of clinical preventive services, and continue to engage with family and friends are more likely to remain healthy, live independently, and incur fewer health and social care related costs.
- Functional and cognitive decline are major health problems. Their prevention, including among people who are not older yet, should be taken into consideration to start and follow healthy lifestyles in early and midlife in order to prevent frailty onset and its sequel.
- Frailty is a common and growing multidimensional health and social care challenge across the EU, associated with an increased risk of physical, cognitive and functional decline and adverse health outcomes.
- Both frailty and functional decline are major health problems. They are multidimensional and functional decline can be due to physical and cognitive impairments, alone or in combination.
- Frail older people are vulnerable and at high risk of a range of adverse health outcomes and increased use of community resources, hospital and long-term care institutions.
- Frail older adults require a proactive, multimodal, coordinated multi-disciplinary and multiagency approach, preferable delivered in an integrated health and care system.
- Frail people are at increased risk for hospitalization. Those episodes of hospitalization that are not indicated must be avoided.
- Social, environmental and behavioural factors have a relevant role in some chronic illnesses and conditions experienced by older people.
- Understanding the risk factors for frailty is a prerequisite for implementing programmes for early detection, prevention and management to reduce future demand, improve outcomes and enhance vitality and quality of life.
- Malnutrition (including undernutrition and sarcopenic obesity) and dehydratation are common and prevalent in the older adult population. Malnutrition is one of the key determinants of frailty, and is both a cause and an effect of frailty.

- Malnourished older people are at risk of experiencing falls, prolonged hospitalisation, institutionalisation, postoperative complications and infections, pressure ulcers, delayed and complicated wound healing and death.
- There is a pressing need to understand challenges underpinning malnutrition in older people.
- There are different hypotheses to explain the causes of malnutrition; It is not clear whether malnutrition is due to behaviour, possibly impacted by poverty, motivation or flavour sensation or whether nutrient requirements are affected by changes related to biological ageing and nutrition absorption, distribution around the body, metabolism and excretion.
- Successful prevention of frailty and functional decline requires more knowledge about the risk factors. The ability to stratify is particularly needed. Eventually it will result in better definitions of risk groups and therapies and interventions that can be offered earlier, more specific and more tailored.
- According to the basic determinants of the Action Plan, attention should also be paid to "Prevention, screening and early diagnosis". This implies the considered inclusion of a sufficiently broad and varied target population, which should range from individuals at the mid-life stage (from 55-60 years of age) to much older individuals.
- Innovative organisational approaches and technical solutions that screen, identify and target frail older people for evidence-based interventions could achieve a more efficient use of resources, skills and technology, improve the health and quality of life of older people and caregivers, delay disability, slow the progression of the disease, avoid unnecessary hospitalization and institutional care and increase the sustainability of health and care systems
- Applying ICT and e-health to services is expected to be effective in the prevention and treatment of frailty and functional/cognitive decline, and to increase the independence and self-reliance of older people. This may result in better quality of life and a reduction in the use of health care services due to increased independent living.
- Computer gaming and virtual reality might play a role in improving, maintaining or recovering cognitive and physical function capacity via preventive and rehabilitation programming outside the clinic.
- The workplace is one of the social environments with a clear impact on the individual's quality of life: impairing, maintaining or even improving health (physically, cognitively or socially). The impact of organizational practices and policies has the potential to prevent or delay functional/cognitive decline and frailty in older workers, and increase the sustainability of social systems.
- Genderrelated ageing patterns should also be considered. Data from the EU confirms the well-established consensus that women live longer than men, but accumulate fewer healthy life years than men. Gender, consequently, deserves specific attention.

### 2.4. Target population

The target population referred as the individuals or the group of people who will be served and benefit from the different commitments of this Action Plan vary widely. They can nonetheless be grouped in the following broad categories:

| CATEGORIES | TARGET POPULATION |
|---|---|
| **Older people in general population** | Healthy and independent old people<br>Older people in risk of dependency, frailty, undernutrition, dehydration, obesity, cognitive impairment |
| **Independent Patients** | Polimedicated patients<br>Multi-morbidity patients<br>Chronic diseases patients in general and for specific diseases (e.g. diabetic, Alzheimer, renal cancer )<br>Patients in general (eg during hospitalisation periods due to acute diseases or major surgical procedures) |
| **Dependent patients** | Disabled people<br>Nursing home patients<br>Terminal patients |
| **Caregivers** | Formal carers, Informal Carers<br>Health professionals: Health professionals: hospital and primary care doctors and nurses, pharmacists, dieticians, physiotherapists<br>Patients' groups |

Settings for action also vary from community places (houses, pharmacies, social-networks), to hospital, primary care centres, long term institutions or research and academic venues.

## 3. OBJECTIVES

To support the overall goals of the EIP to improve quality of life, increase systems and services sustainability and increase the EU economy's competitiveness, this Action Group has identified a set of objectives that will be pursued (structured in headline objective, general objectives and specific objectives). They represent the building blocks of this Action Plan and serve the purpose of helping to structure the work to be carried out by partners. All the activities, as well as deliverables, identified in this Action Plan, should help fulfil the objectives of this Plan. The objectives are described below and represented in Apendix 2.

### 3.1. Headline Objective

Develop and implement sustainable multimodal interventions for the prevention and comprehensive management of functional/cognitive decline and frailty.

### 3.2. General Objectives

1. Manage functional decline and frailty through targeted intervention in physical fitness, nutrition status, cognitive function, chronic conditions and diseases and on the social or psychological wellbeing of older people.
2. Enhance the participation and independence of older people and their carers by empowering and enabling them to remain involved in meaningful activity and in a healthy lifestyle
3. Promote systematic routine screening for pre-frailty stages in at-risk patients and older people.

4. Create integrated pathways of care, while encouraging a systematic and integrated approach to implementing strategies for the secondary and tertiary prevention of frailty to reduce the associated physical, functional and cognitive disability.
5. Contribute to research and methodology on frailty and active and healthy ageing and contribute to knowledge generation concerning the mechanisms for ageing and the progression of frailty.
6. Contribute to managing demand and increasing the sustainability of health and social care by reducing the personal, systemic and societal costs associated with ageing.
7. Promote cooperation, including cross-sector international collaboration, between university research groups and companies dedicated to ageing issues in order to support competitive translational research and development

### 3.3. Specific Objectives

The general objectives have been further detailed in a set of specific objectives, which can be consulted in Appendix 2.

## 4. ACTIONS

To achieve the above five general objectives, and closely align the different committed deliverables of the partners in this Action group, the activities of partners have been organised in the following Actions:

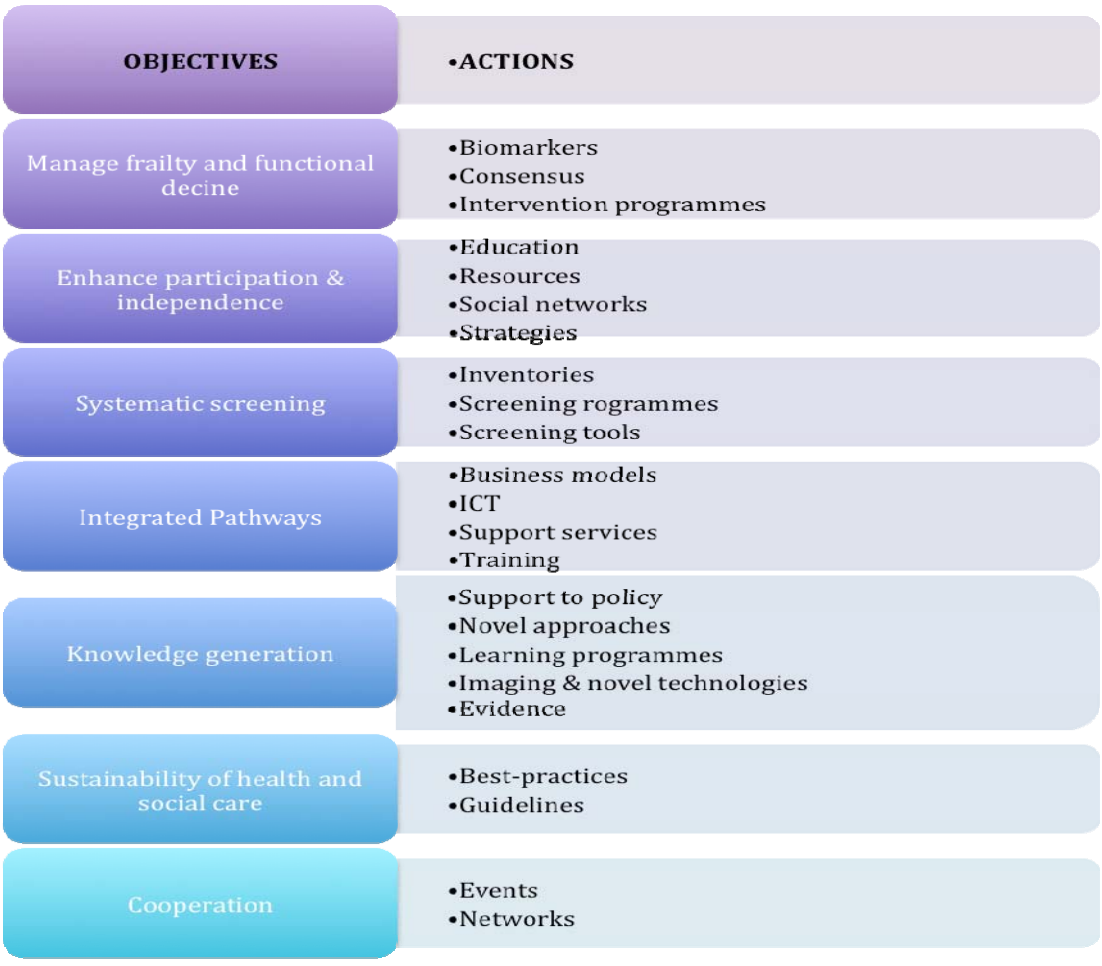


**Figure 3: Actions of the A3 Strategic Plan**

## 5. ACTIVITIES, SPECIFIC DELIVERABLES AND OUTCOMES

Activities to be undertaken to progress the Action Plan are numerous, will involve different resources and actors and will be common to different objectives. They cannot be displayed to their whole extent in this document. As a result of these activities several deliverables will be achieved. What follows is a list of key activities that will be carried out by the partners to implement the plan and a list of the expected tangible results that different partners have committed to obtain.

In Appendix 1 a complete list of deliverables for each commitment with information on starting dates and deadlines.

### 5.1 Objective: Manage frailty and functional decline through targeted intervention

**Contributing Partners:** AUSL Parma; Chesi Group; CIBERDEM; CIBERER; ENHA; Emilia Romagna region; FIHCUV-INCLIVA; FIVI; Food Circle – Food for Healthy Ageing; HANNN: Hanze UAS; I2-FRESCO Consortium (CED - Council of European Dentists; Consoft–Caretek; CPME - Comité Permanent des Médecins Européens; CSIC; EFORT - European Federation of National Associations of Orthopaedics and Traumatology; EMSA - European Medical Students' Association; EUGMS - European Union Geriatric Medicine Society; EULAR - European League Against Rheumatism; FAU - Friedrich-Alexander-Universität Erlangen-Nürnberg; Toulouse Gerontopole; CRNH - Centre de Recherche en Nutrition Humaine; INRCA - Istituto Nazionale di Ricovero e Cura per Anziani Italia Longeva; Mensana - Medical Center for Sports, Business and Related Research; Sanofi; UGent - University of Ghent; UNICATT - Università Cattolica del Sacro Cuore; Université Paris Descartes; UTT - Université de Technologie de Troyes); inCHIANTI consortium; IRCCS Reggio Emilia; IRCCS Scienze neurologiche AUSL Bologna; MID-FRAIL CONSORTIUM; PROVIDE consortium; Regional Authority of the Emilia Romagna Region, Italy; SERMAS; Universidad Miguel Hernandez (UMH); University Jaume I, Castellon; University Medical Centre Groningen: Dept. of Rehabilitation and Dept. of General Practice; University of Bologna; University of Valencia; University of Valencia (FRESHAGE)

| **Activities** | **Deliverables** | **Outcomes** |
|---|---|---|
| Develop physical exercise training programs and physical activities tailored to older frail people and with functional decline.<br>Develop nutritional and hydration plans, and cognitively, physically and intellectually stimulating social activities to improve | Innovative cognitive function stimulation tools and games.<br>Software programme and ICT devices for feeding and food related tasks.<br>A tailored functional training programme, tested | Raise public and professional awareness on the risk of functional decline and frailty.<br>Integrated interventions to prevent or delay the onset of physical frailty. |

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| independent daily living and mental wellbeing in target populations.<br>Develop programs to timely evaluate frailty in older people at risk (those 75+ and those with chronic diseases/ conditions)<br>Develop programs to detect frailty in some target populations according to the setting (community, primary care, hospital, long-term care or social facilities).<br>Support meal-time companions programmes.<br>Define better tools for prevention of cognitive decline, drawing on a global index (e.g. the e-vital).<br>Develop awareness programs for promotion of active and healthy ageing specifically for each of the involved stakeholders, the general population and health professionals.<br>Develop frailty comprehensive treatment guidelines based on objective evaluations (clinical status, cognitive functions, executive functions, psychological functioning).<br>Integrate balanced nutrition and hydration as part of the self-care delivery system.<br>Stratify solutions and telehealth applications supporting the feeding and food preparation process (eg. alarms / telecare devices) and for promoting and coaching physical activity at home and in the local community (eg. telerehab, Wii).<br>Develop and implement technology supported services like serious games, robotics and ICT supported services.<br>Asses the role of existing dietary supplements in | and validated in several settings (group, at home) and supervised by physio/ergotherapists and by sports teachers.<br>Protocol for analysing the effects of the interaction between aging and stress on cognitive function.<br>Multimodal intervention - Prevention and early treatment of undernutrition, sarcopenia and pre-frailty status.<br>Evidence based telemedicine service<br>Training courses.<br>Living it Up Assisted Living programme.<br>Identification of support needs for managing medication and promoting improved individual performance and active ageing.<br>Clinical interventions<br>Scientific and regulatory appraisal<br>Web-based test for monitoring Parkinson<br>Biomarkers<br>Nutritional programme<br>Implement protocols for a pilot validation of a more personalized nutrition for healthy ageing based on genetic and non-genetic markers.<br>Implementation of e-health assistance to communicate on the benefits of functional foods and follow up of individual drug treatment<br>A set of evidence based interventions that prevent or postpone onset of frailty.<br>Development and pre-clinical evaluation of new imaging tools for early diagnosis of age-related diseases, particularly neurodegenerative | Early identification, prevention and treatment of undernutrition, dehydration, sarcopenia and pre-frailty risk conditions.<br>Evidence based multimodal intervention for preventing and treating undernutrition, sarcopenia and prefrailty status.<br>Implementation of scientifically validated approach to maintain physical activity and training to promote healthy ageing.<br>Establish and disseminate a consensus definition on physical frailty, sarcopenia and regulatory guidelines. |

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| filling dietary gaps and supporting sound nutrition | disorders and cancer | |

***5.2:*** **Objective: Enhance participation and independence**

| **Contributing Partners:** AECES - Asociacion Espanola para el Estudio Cientifico del Envejecimiento Saludable; ANCESCAO; ASL Bologna; Asociacion Salus Vitae; ASPHI; Bologna Province; Coimbra Municipality; CopenRehab and Healthy Ageing, Institute of Public Health University of Copenhagen, Denmark; CSIC; DHSSPS NI; European Health Nutrition Alliance; European Hydration Institute; Exploratório D. Henrique, University of Coimbra; Faculdade de Ciencias - Universidade de Lisboa Consortium (FFCUL; CQB-FCUL; INSA; Université de Provence/SiamedXpress; CIB-CSIC; Sheffield University; IST; FCM-UNL; IP Santarem; CIPAN); Faculty of Medicine of Coimbra; Faculty of Sport Science, University of Coimbra; HANNN: Hanze UAS; Health & Social Care Trusts; I2-FRESCO Consortium; Lithuanian Academy of Physical Education, Lithuania; Luso Municipality (Wiluso); Museu de Ciência, University of Coimbra; NHS Scotland; Nijmegen health care providers; Nurses School, University of Coimbra; Radboud University; Sport Sciences School of Rio Maior - Polytechnic Institute of Santarém, Portugal; University of Bath/Department for Health, UK; University of Coimbra; University of Coimbra Hospital; University of Coimbra, CSIC; University of Valencia; Valentian health Service; Volunteer Now Northern Ireland | | |
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| **Activities** | **Deliverable** | **Outcomes** |
| Connect older people with local community resources to help them remain active and involved.<br>Develop interventions aiming to improve the work and social context from the perspective of employers, employees, and policy makers.<br>Detect social isolation and build capacity for peer support, buddying and befriending, and voluntary sector community support, to enhance participation and mental wellbeing.<br>Develop innovative web based and digital applications that provide intellectually/cognitively, and physically stimulating social activities/programs to improve physical, social and cognitive function and healthy ageing, and prevent or delay frailty.<br>Design and develop ICT solutions to enable older people and caregivers to have personal | Public awareness materials and events about healthy and active ageing, nutrition, physical activity and self-management.<br>Implementation of social networks to promote communication between aged/frail people, their relatives, care givers and health professionals.<br>Internet mediated personalised communities to prove autonomy in pre-frail elderly.<br>Innovative multimodal strategy to improve social competences and healthy lifestyle in elderly living independently.<br>Linguistic and cultural adapted validated tool for elderly people to assess and manage properly their own medication and follow up.<br>Smart Aging Serious Games Software Platform for pre-symptomatic and early- | Educational programmes for patients and caregivers on understanding physical frailty and the need to prevent progression of functional status from robust to pre-frail or frail by adopting preventive behaviour to improve physical and cognitive activity as well as good oral care and nutrition.<br>Empower patients and caregivers for self - management of undernutrition<br>Implementation of a scientifically-validated approach for monitoring health status and identification of frailty risk factors and determinants.<br>Implementation of solutions to provide support and assistance to frail patients, including in their own homes. |

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| care plans, and self-management plans and access and input to their own health records.<br>Provide support to caregivers and remote monitoring to reduce caregiver stress.<br>Develop and implement education programmes for patients and caregivers to take more control of their own health and care and enhance their personal independence.<br>Develop and spread public information on active and healthy ageing. | symptomatic assessment of cognitive impairments.<br>Health literacy programme and educational programmes for patients and caregivers.<br>Implementation of an interactive website to promote healthier food habits, to educate on the valorization of functional foods for disease prevention, targeting the general public<br>Assessment of the functional ability of the European elderly people to manage their own medication, using the validated tools.<br>e-learning modules to present the benefits of functional foods and dietary supplements.<br>Implementation of self-assessment, diagnostic, monitoring and support technologies in primary care practices. | |

***5.3:*** **Objective: Promote systematic-routine screening for pre-frailty**

| **Contributing Partners:** C. Mondino National Neurological Institute Foundation - Pavia, Italy; CBIM Pavia, Italy; CCTR, Netherlands; CENSTIMCO Paris, France; CHARGE-UCC IRL; CQB-FCUL; DHSSPS NI; Division of Mental Health, General Direction of Health, Ministry of Health; European Nutrition for Health Alliance; European InterRAI researchers / KULeuven, Belgium; Faculdade de Ciencias - Universidade de Lisboa; FCG; Federico II-Campania-Undernutrition; FFCUL; Food Circle – Food for Healthy Ageing; GAIN - Guidelines and Audit Implementation Network; Government; HANNN: Hanze UAS; HANNN: Hanze UAS (Quantified Self Institute); Health & Social Care Trusts, Northern Ireland; Health Research Board of Ireland; Health Service Executive of Ireland; Healthcare Improvement Scotland; Hospital de Braga, Braga; Hospital de Guimarães, Guimarães; HSC Trusts; IK4, Spain; INSA; Nestlé Health Science; NHS Scotland; Nutricia Danone; PCCC - Primary, Community and Continuing Care, Ireland; Pfizer Consumer Healthcare; RAPCOG - RAPid Community COGnitive screening programme; TNO; Trinity College Dublin; Tyndall (ICT research); UNIFAI/ ICBAS University of Porto; Universitat Politecnica de Catalunya, Spain; University College Cork, Ireland; University Medical Center Groningen: Dept. of Rehabilitation and Dept. of General Practice; University of Limerick; University of Minho; University of Minho, Life and Health Sciences Research Institute (ICVS); Vascular Cognitive Impairment (VCI) Program - University Medical Center Utrecht | | |
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| **Activities** | **Deliverable** | **Outcomes** |
| Screen for communication disorders (hearing, vision and speech) which increase isolation.<br>Develop specific lifestyle questionnaires for older people taking into account the international context and data standardisation and harmonization.<br>Develop risk scores to identify individuals with pre-symptomatic diseases potentially triggering cognitive decline and dementia.<br>Develop programs to timely screen for frailty in older people at risk (those 75+ and those with chronic diseases/conditions)<br>Develop programs to detect frailty in some target populations according to the setting (community, primary care, hospital, Long-term | Validated global short screening, triage and assessment tools to prevent, detect and delay frailty among older people state of the art update.<br>Screening program to identify food habits for disease prevention (including functional food consumers)<br>New software programmes and ICT applications to enable population screening and rapid triage in community settings.<br>A policy instrument for municipalities to anticipate for future needs (e.g. housing, care, social services) of the older population.<br>Screening program to identify nutrient intake practices for disease prevention | Clinical validation of ICT applications and tools for cognitive status and pre frailty screening.<br>Development of user-friendly, minimally time consuming, sensitive and specific screening tool which enables the early diagnosis of functional decline.<br>Development of new tools to measure risk of adverse outcomes in community dwelling older adults (hospitalisation, institutionalisation and death).<br>Design of specific clinical packages and integrated programs of individual screening (portable instruments for non-invasive ambient assessment of signs/symptoms), providing stratification of |

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| care or social facilities)<br>Establish an agreed holistic set of pre-frailty screening for risk factors (including health conditions such as vascular disease and diabetes, health behaviours, social circumstances and presence of communication impairments).<br>Use existing risk prediction algorithms and case finding methodologies to identify/test cohorts of frail adults.<br>Develop and standardise the use of simple and reliable short frailty screening tools to identify risk factors for frailty in older adults, including nutritional status, physical function and screening.<br>Validate short screening tools for standard use by a variety of different health professionals; workplace and housing staff.<br>Develop mobility status screening.<br>Establish better and more specific definitions of risk and stratify screened as high, medium and low risk.<br>Create gender-specific profiles for each of the three main areas, physical fitness, nutrition and hydration status and mental wellbeing.<br>Promote vision and audition screening as they prevent people of being active by making difficult to communicate with others and participate in society | Community based screening programme for mild cognitive impairment and dementia hospital based screening program to detect prevalence of dementia, delirium, mild cognitive impairment among older adult admitted to hospital.<br>Smartphone/tablet app for self-assessment of risk for undernutrition and (pre-)frailty and monitoring of diet and physical activity (NutrEx project)<br>Validation of a user-friendly, minimally time consuming, sensitive and specific screening tool which enable the early diagnosis of functional decline.<br>Improvement Programme for Older People in Hospital - screening and intervention for frailty and nutrition.<br>Inventory of existing programmes including case studies on screening and assessment.<br>Screening of mental pathologies and managing of multi-morbidity in elderly patients.<br>Screening of depressive symptoms in elderly outpatients | frailty risk for each individual.<br>Develop and implement guidelines for screening, assessment and intervention Alzheimer patients.<br>Implement routine nutritional status screening and follow up for all people aged 65+.<br>Implement routine detection programmes of pre-frailty stages in older people and prevalence of cognitive impairment in the community.<br>Reduced complications and hospitalizations due to inappropriate approach of undernutrition and frailty. |

***5.4:*** **Objective: Realise integrated pathways of care**

| **Contributing Partners:** Agenzia Sanitaria Emilia Romagna; CCTR, Netherlands; CCTR, Netherlands; CCTR, Netherlands; CCTR, Netherlands Consortium; CCTR, Netherlands Consortium; CETOC Belgium; CHARGE-UCC IRL; Critical Health; CUP2000; DHSSPS NI; ENEA; European Health Nutrition Alliance; Faculdade de Ciencias - Universidade de Lisboa (plus partners); Faculty of Medicine of Coimbra; Federico II-Campania-Undernutrition; HANNN: Hanze UAS; HANNN: MCL; Health Institute Carlos III, National School of Public Health, Spain; Heartcycle; Hospital de Braga, Braga; Hospital de Guimarães, Guimarães; I2-FRESCO Consortium; INK Canada; Intelligent Sensing Anywhere (ISA), University of Coimbra; IPN business incubator, University of Coimbra; Municipality of Bologna; Neuroeye; NHL University of Applied Sciences; NHS Scotland; Nijmegen health care providers; NIVEL; Northern Health and Social Care Trust, Northern Ireland; Nurses School, University of Coimbra; Patient/Client Council, Northern Ireland; Radboud University; Regional health care centres; Stenden University of Applied Sciences, Netherlands; Take the Wind; Tice.healthy; TNO; UK Enterprise and International Digital / IT community; UM; UNIFAI/ ICBAS University of Porto; University of Bologna; University of Coimbra; University of Coimbra Hospital; University of Minho; University of Minho, Life and Health Sciences Research Institute (ICVS) and other research units; University of Newcastle; UTT - Université de Technologie de Troyes; Van Hall Larenstein University | | |
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| **Activities** | **Deliverable** | **Outcomes** |
| Coordinate the spread and scale up of an effective integrated delivery model for evidence based interventions within and across the participating regions to maximise reach and impact.<br>Promote the coordination between the different levels of health care and between them and social care<br>Create a centralized, open, standard data base for collection, data management and analyses.<br>Provide facilities with skilled personnel to assess, diagnose, treat and monitor older people with frailty, with special attention to the settings where the risk of quick progression to functional decline and disability is higher | Clinical decision-making protocols/guidelines/ algorithms for the management of frail people.<br>Basic packages of integrated approaches [of care of older people] with e-support.<br>Integrated care pathway and delivery model that supports implementation of the STAT Frailty prevention programme at scale.<br>Business models.<br>An integrated and tested modular, 'intelligent' service platform that enables delivery of various end-to-end solutions for secondary prevention and chronic care.<br>Mealtime companions programme in hospital as part of personal care plan.<br>Improved facility for older persons in need of | Provide an integrated intervention (along care pathway) to prevent and delay the onset of physical frailty.<br>Supporting actions to promote older people participation in clinical trials.<br>Assessment of the reliability, validity and effectiveness of available food apps for assessment and monitoring of food intake.<br>Assessment of agreement and validity of the several available diagnostic criteria for undernutrition, sarcopenia and pre- frailty.<br>Assessment of correlates of physical performance in geriatric patients admitted to hospital.<br>Explore the aspects for a better economic |

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| (emergency departments, major surgery, oncological treatments, acute medical diseases).<br>Develop and test e-learning modules to train health and care professionals and delivery partners to apply the tools and interventions.<br>Develop guidelines for integrated care pathways involving a wide variety of different health and social care systems for the management of frailty and decline.<br>Develop and implement ICT solutions and assistive devices to monitor and coach the patient in their everyday activities and remaining independent as long as possible. | meals on wheels.<br>Training module on active and healthy ageing (screening, prevention and treatment of sarcopenia, undernutrition and (pre-)frailty) for dieticians, physiotherapists and nurses.<br>Reshaping Care for Older People Programme and Improvement Network - integrated care pathway, range of education and improvement tools.<br>Use of the inter RAI-instrument for the assessment of needs and wishes.<br>Training of professionals on cognitive evaluation. | understanding of frailty.<br>Development of research and methodology on frailty<br>Trained dieticians, physiotherapists and nurses on screening, prevention and treatment of sarcopenia, undernutrition and pre-frailty. |

***5.5:*** **Objective: Contribute to research and methodology on frailty and active and healthy ageing**

| **Contributing Partners:** Aston University, Birmingham, UK; Bioengineering Institute, Spain; CCTR, Netherlands; Center for Neuroscience and Cell Biology; CIBER OBN, Spain; CIBERER; CNA Bologna; Congregation of Sisters Hospitallers of the Sacred Heart of Jesus (Mental Health NGO); Consortium on eCare, malnutrition and elderly (including amongst others: Laurea University of Applied Sciences, Finland; Leuven University College, Belgium); CQB-FCUL; CSIC; Emilia Romagna region/University of Bologna; European Health Nutrition Alliance; European Hydration Institute; Faculdade de Ciencias - Universidade de Lisboa (plus partners); Faculty of Medicine of Coimbra; Faculty of Psychology - University of Lisbon; Faculty of Sport Science; Nurses School; FCM-UNL; Federico II-Campania-Undernutrition; FFCUL; FICLIT University of Bologna; FRAILOMIC CONSORTIUM; HANNN: Food Circle - Food for Healthy Ageing; HANNN: Hanze UAS; HANNN: Hanze UAS (Quantified Self Institute); HANNN: MCL; HST-ICIR; IdiPAZ; IDOCAL University of Valencia; IPN business incubator; IRCCS S. Maria Nuova; IST; Malnutrition Task Force / Age UK; MAP - Metropolitan Area of Porto, Portugal; National Institute for Rehabilitation - Ministry of Solidarity and Social Security; NHL University of Applied Sciences; Pfizer Consumer Healthcare; Puleva BioFoods; Sahlgrenska Academy at Gothenburg University, Sweden; Salerno University; SERMAS; Stenden University of Applied Sciences, Netherlands; UNIFAI/ ICBAS University of Porto; University Jaume I, Castellon, Spain; University Miguel Hernández; University of Bologna; University of Coimbra; University of Coimbra Hospital (CHUC); University of Fordham (US); University of Heidelberg, Germany; University of Valencia (FRESHAGE); University/Hospital Agency Bologna; Van Hall Larenstein University; Vascular Cognitive Impairment (VCI) Program - University Medical Center Utrecht | | |
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| **Activities** | **Deliverable** | **Outcomes** |
| Support action encouraging older people to participate in clinical trials.<br>Research on use of ICT and social media application in pilot programs before promoting general implementation.<br>Research in human culture cell lines and in animal models for well-defined, specific purposes. Define scales capable of establishing thresholds and measure progression (very basic milestones with well-supported clinical evidence) and validate them.<br>Test web based and digital solutions to enable rapid move to scale in screening and to extend | A roadmap for the development of new technological applications based on the needs and demands of end users, care professionals and other stakeholders.<br>Assessment and prevention of frailty state of the art update.<br>Benchmarking analysis of different European countries. Comparative analysis among countries on different retirement trends and policies and how organizational management affects the maintenance of seniors in the workforce in different societies.<br>Design, development and validation of a set of specific questionnaires, risk factors and | Changes in biomarkers of metabolic disease including insulin resistance, free fatty acid levels and oxidative stress markers<br>Elaboration of guidelines and recommendations for application in rehabilitation and mental health interventions.<br>New molecular entities with new mechanisms of action for age-related diseases (in particular diabetes, neurodegenerative diseases and cancer)<br>Determine mechanisms of action of functional food ingredients.<br>Determine new methodologies for early diagnosis for neurodegenerative diseases |

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| application to non-care settings – e.g. retail and leisure settings.<br>Conduct research on the impact of social networking as an efficient tool to improve physical and psychological autonomy.<br>Conduct research on the impact of different care models on the incidence and evolution of frailty.<br>Research on chemical and biological approaches towards innovative molecular entities and functional foods.<br>Support research into the understanding of the mechanisms of frailty and ageing from a multidimensional point of view, including genetics, chemistry, biochemistry, systems biology, neurosensory, neurophysiological and cognitive behavioural aspect into account.<br>Molecular approaches into the prevention and the understanding of ageing and related pathologies.<br>Research on novel high added-value products from biomass including algae, and on novel bioproducts by biochemical conversion of lignocellulosic biomass for healthy ageing<br>Develop diagnostic tools to detect food fraud<br>Define an integrative score, which should include:<br>o Definition of the main determinants of frailty at each crucial area, physical, mental and nutritional status.<br>o A corresponding integrative index.<br>o Validation of this integrative score in | research methodology.<br>Determine effects of a healthy diet such as the Mediterranean diet pattern in determining a healthy phenotype in older people.<br>Develop new nutritional supplements tailored to meet the specific dietary requirements and desired health benefits of this population.<br>Effects of cognitive stimulation in early stages of dementia, without or with previous chronic mental disease<br>E-learning course on glycol-sciences focused on frailty and functional decline<br>Elucidation of the molecular mechanisms by which natural products retard the onset of frailty and functional decline<br>European (as a whole or by regions) map of frailty in older persons: who, where, how.<br>Evidence on reliability, validity and effectiveness of available food and nutrition apps for assessment and monitoring of nutrient intake.<br>Implementation of functional foods and food ingredients for the prevention of age related diseases and for pain release<br>Individual feedback and engagement in healthcare (prototypes for monitoring of biological/biometric signs and symptoms).<br>Insight in (correlates of) physical performance in patients.<br>Insight in the relationship between gene-diet interactions in health status.<br>Literature review and analysis on food | and cancer.<br>Establish relationship between familial longevity and frailty ageing.<br>Establish relationship between body composition and measures of frailty.<br>Make the better use of generated longitudinal data to share with regulators the innovative methodological approach to physical frailty prevention/treatment and overall validate it. |

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| European populations.<br>Develop interoperable national and international databases to model factors that place older adults at risk of developing frailty and functional impairments.<br>Use these databases to recruit older adults for participation in well-designed randomized trials of interventions (e.g. activity, diet, medications, socialization, supplements etc.) to prevent or delay the onset of frailty, promote health, increase functional independence and quality of life.<br>Perform pilot studies in different regions and in different settings to test effectiveness and sustainability of the designed tools for assessment and awareness measures.<br>Perform research clinical trials to assess multimodal interventions in frail people, with outcomes centred in physical and/or cognitive functional and quality of life issues.<br>Basic research on homocysteine as a risk factor for age-related sensory impairments.<br>Basic research on oxidative stress in age-related sensory impairments. | consumption and interventions.<br>Literature review of the existing molecular biomarkers of functional decline and frailty.<br>Master programme on active and healthy ageing.<br>Novel delivery systems for molecular entities against frailty and functional decline<br>Report on social and organizational retirement predictors and effects on health and welfare.<br>Research on chemical and biological approaches to new molecular entities with new mechanisms of action for age-related diseases.<br>State of the art update on how organizations and workplaces may help prevent functional decline and guidelines to improve job design related to age.<br>Studies of middle-age in relation to familial longevity: clues for intervention on frailty ageing.<br>Valorisation of biomass for novel and high added-value bio product | |

***5.6:*** **Objective: Contribute to managing demand and increasing the sustainability of health care and social care**

| **Contributing Partners:** CIBERSAM; CQB-FCUL; DHSSPS NI; ENHA; EU Hydration Institute; European Region of the World Confederation for Physical Activity (ER-WCPT); Faculdade de Ciencias - Universidade de Lisboa; Federico II-Campania-Undernutrition; FFCUL; Food Circle – Food for Healthy Ageing; HANNN: MCL; HANNN: Hanze UAS; IAGG; IDOCAL University of Valencia; IDOP; INSA; Malnutrition Task Force / Age UK; Salerno University; SERMAS; TNO; University Medical Center Groningen: Dept. of Rehabilitation and Dept. of General Practice; University of Valencia, Teaching Unit of Psychiatry and Psychological Medicine; VLC Campus | | |
|---|---|---|
| **Activities** | **Deliverable** | **Outcomes** |
| Determine strategies, business models and practices that contribute to the maintenance of older workers in the workforce.<br>Evaluate the clinical and economic impact of the programme through evidence for effectiveness, cost-effectiveness, accessibility, experience and user friendliness.<br>Describe the economic case and business models for stakeholders.<br>Undertake pilot studies in different regions and settings to test the effectiveness and suitability of screening and triage tools and methodologies in different settings across the care pathway from community to hospital (inpatient / clinic ) or care home-practices.<br>Determine strategies to reduce inappropriate hospital admissions of frail people.<br>Determine strategies to reduce functional impairment during hospitalization periods due to acute-disease. | Amendment to the rules for registration and commercialization of new drugs to be used by older people, which underlines the need to evaluate drugs in older populations, including the treatment of those at risk of developing functional independence and frailty;<br>Deliver the STAT frailty prevention programme across the EU by 2015 - a comprehensive evidence based programme to Screen, Triage, Assess and Treat risk factors for frailty to prevent physical and cognitive decline.<br>Defined guidelines for multidimensional interventions including exercise and nutritional aspects (healthy eating).<br>English version of Dutch consensus based guideline on causes, identification and management of undernutrition in geriatric patients<br>e-learning tools and modules on prevention of frailty and functional decline that are tailored to train health professionals in caring for frailty patients. | Increase sustainability of health and social care.<br>Explore the aspects for a better economic understanding of frailty.<br>Reduced complications and hospitalizations due to inappropriate approach of under-nutrition and frailty.<br>Implementation of scientifically-validated approach for monitoring health status and identification of frailty risk factors/determinants. |

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| Determine strategies to reduce inappropriate nursing home admissions and permanent institutionalization of frail people.<br>Reduce the reliance on long term institutional care<br>Shift health and care resource spend towards greater investment in preventative care and support in the community including support for carers and building capacity of the voluntary sector<br>Reduce unnecessary pharmaceutical expenses | Guideline on the management of frailty and functional decline.<br>Guidelines on cost-effective prevention of frailty in chronic health conditions.<br>International evidence based guideline on undernutrition management.<br>Elaboration of clinical guidelines to professionals for the assessment of cognitive impairment in patients with psychiatric symptoms.<br>International evidence based guideline on sedentariness management (exercise protocols). | |

***5.7:*** **Objective: Promote cooperation, including cross-sector international collaboration**

| **Contributing Partners:** Federico II-Campania-Undernutrition; Pfizer Consumer Healthcare; Faculdade de Ciencias - Universidade de Lisboa (plus partners); Salerno University | | |
|---|---|---|
| **Activities** | **Deliverable** | **Outcomes** |
| Set up a European frailty knowledge network as collaboration for the promotion of new research and innovation on prevention, detection and decline of frailty and associated frailty conditions.<br>Support the network through a knowledge platform, portal and social media.<br>Implement a new interdisciplinary PhD program on ageing (open to psychologists, sport sciences, engineers, biomedical scientists, nurses, dieticians/nutritionists, medical doctors), to promote scientific research and advanced training of health care personnel.<br>Create consortia and centres of innovation to encourage cooperation and collaboration between business, research centres, healthcare, the voluntary sector, educational programs, hospitals and local government, insurers and private provider organisations. | International research collaboration and knowledge network on the prevention, detection and/or Facebook to disseminate healthy dietary habits.<br>Implementation of an advanced interdisciplinary European PhD program on Ageing.<br>European geriatric database with information on nutritional status, nutritional interventions and outcomes.<br>Organization of a conference on Innovative Therapeutics, Diagnostic Tools and Biomarkers to prevent Frailty and Functional Decline<br>Organization of a European conference in the field of screening for pre- delay of frailty. | Implement seminars, round tables and exhibition for living independence and adherence to medical/care plans<br>Promote interactive and cooperative learning.<br>Dissemination of guidelines to all geriatricians in Europe<br>Provide training and research experience for the prevention of frailty and functional decline<br>Provide cooperation between Education Providers and Industries, involving experts and young researchers.<br>Advanced interdisciplinary PhD courses; Network of PhD programs/modules on Ageing at European EIP-AHA partners/consortium |

## 6. KEY GAPS IDENTIFIED FOR POTENTIAL FUTURE ACTIONS

The following topics have been identified as gaps that still need to be address to improve adherence in a comprehensive approach but, important as they may be, none of the commitments included in this AP specifically tackle them.

### 5.1. On empowerment of patient and carer issues

- Shortage of quality research in this area.
- Shortage of validated short tools to screen, triage and assess people who are at risk of frailty and those who are frail.
- Shortage of reliable and valid tools to measure the impact of what we want to do.
- Shortage of studies of interventions in people with multimorbidity.
- There are very few good quality studies in the community that have assessed the effectiveness of interventions to prevent functional decline and support older people to remain at home and avoid admission to hospital or nursing home.
- Shortage of direct patient access to personal health folder and care plan.
- Shortage of referral of undernourished elderly from GP to the dietician.
- Shortage of training in the use of GPs to screen for frailty new communication and risk factor leisure technologies.
- Shortage of training of GPs and community nurses to screen for frailty and its risk factors and for communication impairment.
- Shortage of training of GPs to screen for under-nutrition.
- Shortage of information, awareness and training of other specialists (non-geriatricians) in screening frailty.
- Shortage of information, awareness and health literacy strategies for older patients and their families.
- Shortage of patient empowerment and engagement in self-managing their health.
- Shortage of health literacy programmes and interventions to promote patient empowerment and patient-health professional partnership.
- Shortage of patient access to advance care directives (living wills) to inform others of their wishes in the event of serious illness, incapacity or disability.

### 5.2. On research & methodology on ageing issues

- Shortage of quality research in this area.
- Shortage of validated short tools to screen, triage and assess people across Europe who are at risk of frailty and those who are frail.
- Shortage of reliable and valid tools to measure the impact of what we want to do.
- Shortage of studies of interventions in people with multi-morbidity.
- Shortage of good quality studies in the community that have assessed the effectiveness of interventions to prevent functional decline and support older people to remain at home and avoid admission to hospital or nursing home.
- Shortage of representation of older people in clinical trials.
- Shortage of a critical mass of competitive interdisciplinary research groups dedicated to frailty.
- Shortage of a critical mass of competitive interdisciplinary research groups dedicated to translational medicine (from bench to bedside).

- Shortage of identified biomarkers to monitor health status and defects on cell pathways that must be corrected to guarantee health longevity.
- Shortage of standardise procedures to identify ageing matched biomarkers and genetic defects that would eventually lead to frailty and functional decline.
- Shortage of a clear definition of frailty and its determinants.
- Shortage of knowledge on nutritional requirements for the elderly to prevent sarcopenia.
- Shortage of knowledge on the effect of multimodal interventions for the prevention and treatment of undernutrition, sarcopenia and frailty.

### 5.3. On health services improvement and sustainability issues

- Need for implementation of new organisational models for comprehensive, pro-active integrated care.
- Need to bring together key players across the health care patient associations, professional organizations and technological sectors.
- Lack of awareness of the relevance of detecting and treating frailty as a means of avoiding and decreasing the progression to disability in older people.
- Need of cultural sensitive tools, taking in consideration behaviours and different development at country level.
- Shortage of awareness of availability and usefulness of screening tools.
- Shortage of awareness about the need of re-build the Health and Social Systems thinking in their main user (older people, and especially the frail and disabled), and allocating them at the central part of the Systems as one of the principal strategies to reach its sustainability.

### 5.4. Others

- Shortage of system quality improvement capacity and capability to rapidly spread and scale interventions to maximise impact.

## 7. MONITORING PROCESS AND INDICATORS

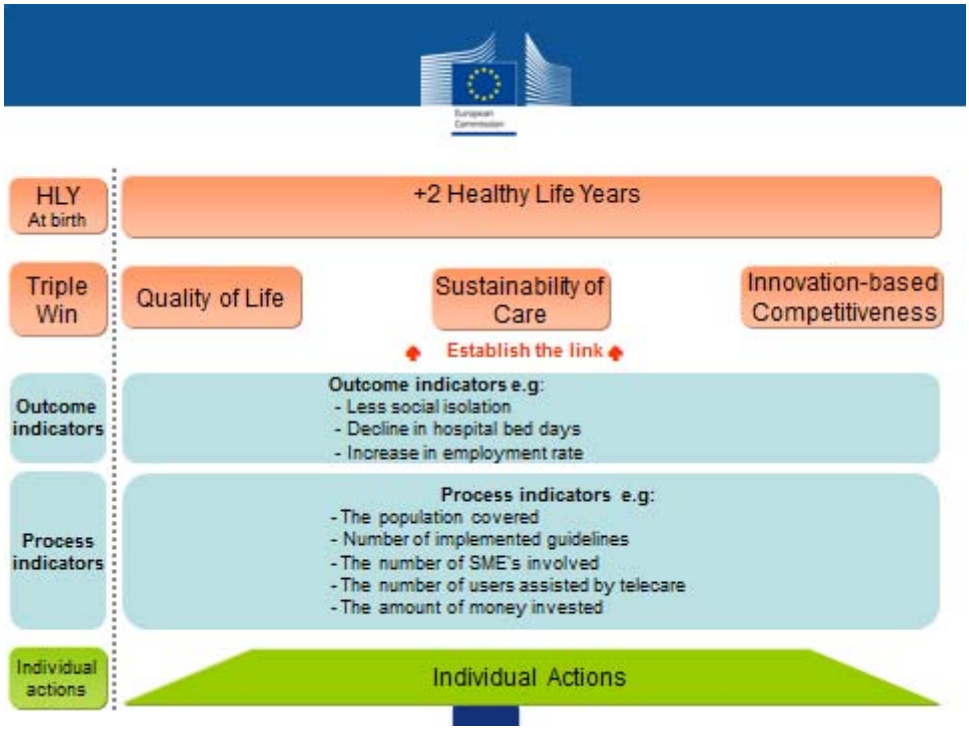
The measuring of the progress will be ensured by the general monitoring and evaluation framework of the EIP on AHA currently being developed by the European Commission and Joint Research Centre in collaboration with experts and members of the six action groups. The monitoring process will be guided by a group consisting of experts and two members of each action group.

The monitoring process is divided into two steps. The first step will deal with the monitoring of the EIP on AHA process. The EIP on AHA process will monitor different aspects: the involvement of stakeholders, the creation of synergies, knowledge transfers and the absorption of innovation by the health systems, and the added value for the participating organisations.

The second step is on monitoring the outcome of the EIP on AHA. This step will facilitate the overall monitoring framework of the activities and outcomes of the six action groups, linking them to the overall target of the EIP on AHA, namely, to add two healthy life years[1] (HLY) to

[1] The EU structural indicator Healthy Life Years (HLY) is based on limitations in daily activities and is therefore a disability-free life expectancy, one of the most common health expectancies reported.

the average healthy life span of European citizens by 2020 and equally to ensure the triple win: improved Quality of Life, improved sustainability of care systems and improved innovation based competitiveness. It should be emphasised that this framework is not about the evaluation of the individual actions.




The input of the action group members together with the input from experts has been the basis for the monitoring framework. The action group members were asked to deliver input about the methodology and indicators they are using and which kind of data they gather. In addition, experts were asked to provide input, among others, on the factors influencing the Quality of Life and about WHO, OECD and Eurostat data.

The monitoring framework consists of a set of outcome indicators for each of the six action groups based on the objectives of the action groups and on process indicators. The selection of these indicators for the final draft of the monitoring framework has been an interactive process between the six action groups, the experts, EC and the JRC. More specific outcome indicators will be developed in close cooperation with the action group members.

The objective of the outcome indicators is to monitor the factors influencing the triple win, namely:

- the Quality of Life of patients/users , for instance, nutrition and physical activity
- the sustainability of the health systems, for instance, are there less hospital admissions, is there a shift from cure to care
- the innovation and growth possibilities, for instance, the employment rate

Of course, not all action groups and all individual actions will contribute to all of the above mentioned factors. As such, the outcome monitoring framework consists of building blocks. For action group A3, the relevant building blocks are marked in green. The individual action should contribute to at least one building block of the action group.

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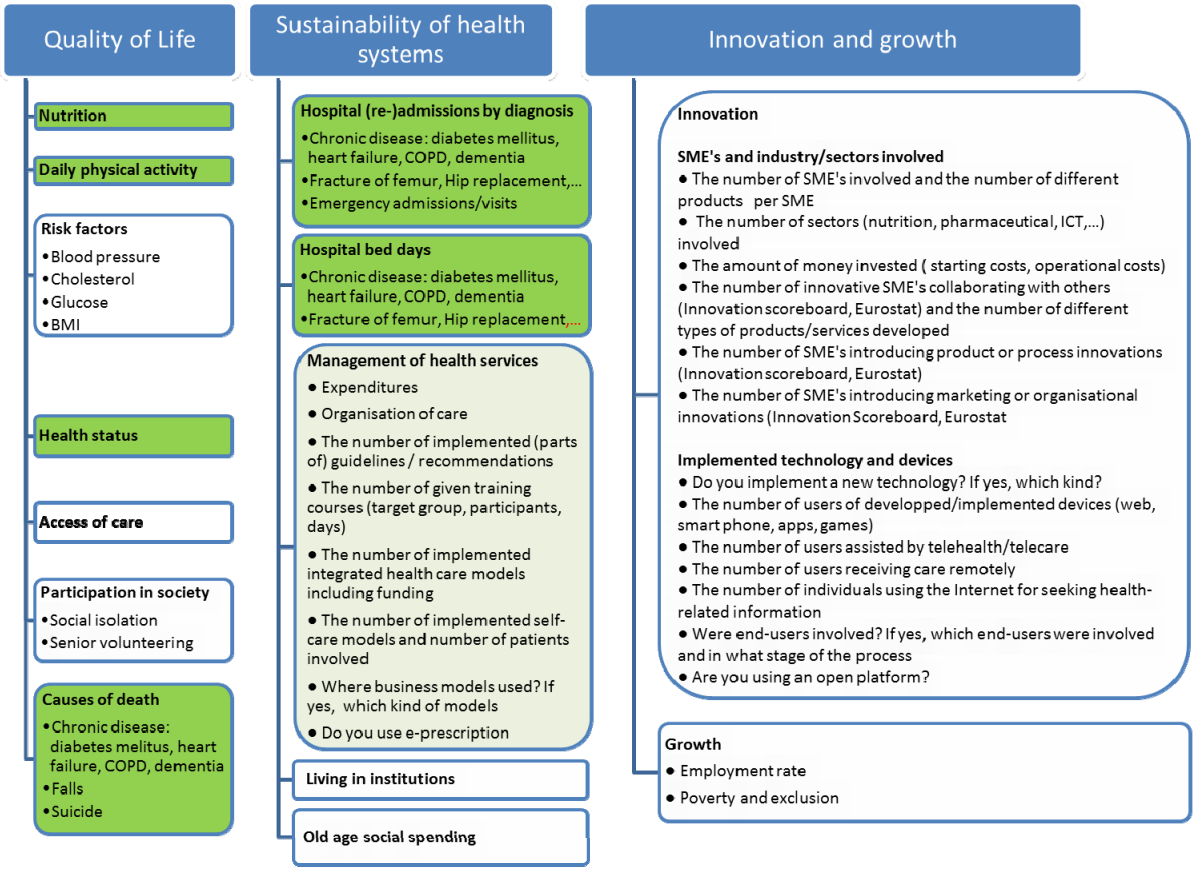
Healthy Life Years at a particular age are the number of years spent free of activity limitations. They are calculated by Eurostat. The target of the partnership is to increase, by 2020, by two healthy life years at birth.




In addition to the outcome monitoring framework, desk research will also be conducted alongside most probably a questionnaire which will be sent to patients/users about, among others, their Quality of Life and mental well-being.

Governance and coordination

## 8. GOVERNANCE PRINCIPLES

Action Groups establish their own working methods and governance, with the EC acting as a facilitator. There are three components to governance structure: the partners, the action group coordinators and the EC. The governance structure will ensure timely development of the AP and the incorporation of new interested partners. Overall, the rules of engagement between the parties are based on the following principles:

- Openness and partnership – common willingness of all partners to cooperate with other relevant partners.
- Coordination – participation of a representative(s) in the coordination meetings of the Action Group
- Reporting – regular reporting from the Action Group's meetings, progress of actions and deliverables to be made public
- Evaluation – outcome of actions to be evaluated, and results made public

***Role & responsibilities of partners:***

- Implementing the agreed Action Plan to the agreed standards and deadlines
- Ensuring the effective preparation and delivery of all WG products
- Evaluation of WG performance and reporting on progress

***Role & responsibilities of coordinators:***

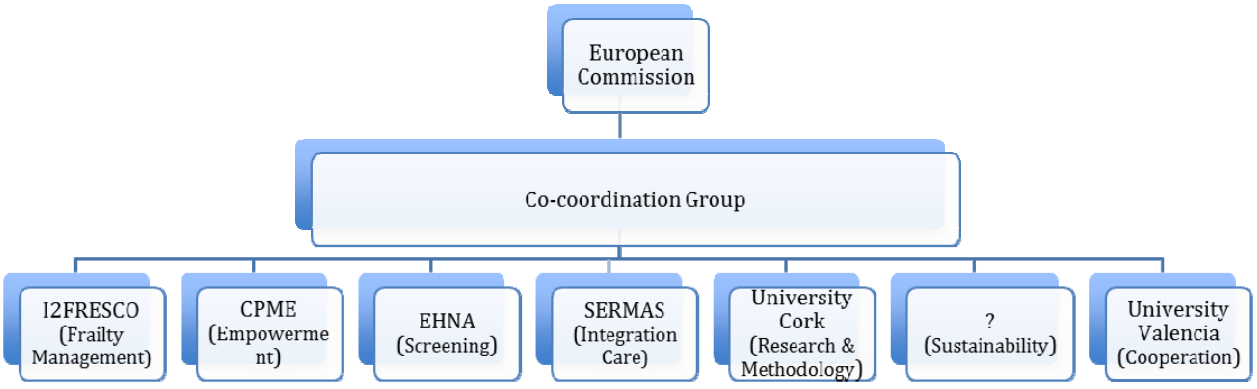
- Implementing the agreed Action Plan to the agreed standards and deadlines
- Leading the WG team and coordinating all matters of the commitment contents
- Regular liaison with the EC and facilitator on all AG related matters
- Ensuring the effective preparation and delivery of all AG products
- Participation at meetings and in discussions
- Taking responsibility for the effective flow of information between AG
- Supporting evaluation of AG performance and reporting on progress
- Submission of the final results of the Action Plan based on data provided by all AG

***Role & responsibilities of the European Commission:***

- Representation of the Action Group
- Handling of external communication
- Monitoring framework
- Ensuring regular communication among partners
- Taking responsibility for the effective flow of information and interactions between working groups
- Facilitate process to achieve headline objective
- Seeking opportunities to consolidate EIP

***A3 Action Group Coordinators***

The following institution members of the A3 group will act as coordinators for each of the general objectives of the AP. They will be responsible for maintaining all of the procedural and administrative aspects of the group work, and will serve as the designated point-of-contact within the group and with the Commission for procedural issues during the implementation phase of the action plan.



## Glossary

**Assessment**: In clinical medicine, evaluation of the patient for the purposes of forming a diagnosis and plan of treatment. In research, evaluation of a treatment or diagnostic test through experiment and measurement. *Citation: Jonas: Mosby's Dictionary of Complementary and Alternative Medicine. (c) 2005, Elsevier.*

**Chronic disease / condition**: Chronic diseases are diseases of long duration and generally slow progression. Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 63% of all deaths. Out of the 36 million people who died from chronic disease in 2008, nine million were under 60 and ninety per cent of these premature deaths occurred in low- and middle-income countries. *Citation: http://www.who.int/topics/chronic_diseases/en/*

Chronic diseases are complex and varied in terms of their nature, how they are caused and the extent of their impact on the community. While some chronic diseases make large contributions to premature death, others contribute more to disability. Features common to most chronic diseases include:

- complex causality, with multiple factors leading to their onset
- a long development period, for which there may be no symptoms
- a prolonged course of illness, perhaps leading to other health complications
- associated functional impairment or disability.

*Citation: http://www.health.gov.au/internet/main/publishing.nsf/Content/chronic*

**Cognitive Decline**: A deterioration in cognitive function. There is a normal process of age related cognitive decline across the life-span characterised by increasing difficulties with memory (new learning) speed of information processing, language and other cognitive functions. This normal process of age related decline is often termed primary ageing. Secondary ageing is the rapid deterioration in function due to a pathological process such as dementia, stroke or acquired brain injury. *Citation: Disabled World News (2012-01-10) - Clinical studies demonstrate correlation between presence of amyloid plaques in the brain and severity of cognitive decline: http://www.disabled-world.com/health/aging/decline.php#ixzz29RbX0kM2*

**Cognitive Function**: Any mental process that involves symbolic operations– e.g., perception, memory, creation of imagery, and thinking; CFs encompasses awareness and capacity for judgment. *Citation: McGraw-Hill Concise Dictionary of Modern Medicine. (2002).*

**Cooperation**: Cooperation is the central feature of social life. Cooperation ranges from unity existing among members of a family or friends, to the bond found among nations as shown in the treaties of friendship drawn among them such as the treaty of cooperation in scientific, technical and cultural matters between countries and organizations. Interaction between the different stakeholders in an action.

**Commitment**: measurable and specific engagement from stakeholders, in support of a specific action and aiming to deliver first outcomes within the 2012-2015 timeframe. Citation: SIP of EIP on AHA.

**Efficiency**: The production of the desired effects or results with minimum waste of time, effort, or skill. A measure of effectiveness; specifically, the useful work output divided by the energy input in any system. *Citation: The American Heritage® Medical Dictionary Copyright © 2007, 2004 by Houghton Mifflin Company*.

**Efficacy**: The extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions. *Citation: Stedman's Medical Dictionary. Copyright © 2006 Lippincott Williams & Wilkins.*

**Evidence** based interventions: Evidence-based interventions (EBI) are treatments that have been proven effective (to some degree) through outcome evaluations. As such, EBI are treatments that are likely to be effective in changing target behaviour if implemented with integrity. An intervention is an activity that is conducted to address a contributing factor that influences a problem or risk behaviour. Interventions can be in the realm of policy, programmes, practices and procedures. *Citation:* *http://ebi.missouri.edu/?page_id=52*

**Frailty**: Used in geriatric medicine to identify older adults who are at increased risk for future poor clinical outcomes, such as development of disability, dementia, falls, hospitalisation, institutionalisation or increased mortality. *(Of. Frailty. In Principles of Geriatric Medicine and Gerontology, 4th; Hazzard W.R., Bierman R.L., Blass J.P., Ettinger W.H. & Halter J.B., eds; McGraw Hill, New York, NY USA, pp. 1119-1156), going beyond the 'classical', ie phenotype concept of Fried (Fried L.P. (1994).*

**Functional decline:** gradual deterioration or waisting away of physical and mental faculties. The progression of functional decline may be accelerated by personal conditions, possibly influenced by a genetic background, and by chronic processes that affect crucial systems (cardiovascular, bone or cognition), and that initiate years prior to the occurrence of clinical episodes. *(Dorland's Medical Dictionary)*

**Health determinants**: Determinants of health include the range of personal, social, economic and environmental factors which determine the health status of individuals or populations. The factors which influence health are multiple and interactive. Health promotion is fundamentally concerned with action and advocacy to address the full range of potentially modifiable determinants of health – not only those which are related to the actions of individuals, such as health behaviours and lifestyles, but also factors such as income and social status, education, employment and working conditions, access to appropriate health services, and the physical environments. These, in combination, create different living conditions which impact on health. Achieving change in these lifestyles and living conditions, which determine health status, are considered to be intermediate health outcomes. *Citation: http://www.definitionofwellness.com/dictionary/determinants-of-health.html*

**Independent living**: Independent living means that any practical assistance people need, should be based on their own choices and aspirations. Independent living entails a right to practical assistance and support to participate in society and live an ordinary life. Central to this definition are the principles of freedom, choice, dignity and control. *Citation: 'An Essential Guide to Independent Living in Scotland': Independent Living in Scotland (Ilis) http://www.volunteermoray.org.uk/resources/independent_living.pdf*

**Malnutrition**: Malnutrition is a state of nutrition in which a deficiency or excess (or imbalance) of energy, protein, and other nutrients causes measurable adverse effects on tissue/body form (body shape, size and composition) and function, and clinical outcome. *Citation: Stratton RJ, Green CJ, Elia M. Disease-related malnutrition: an evidence-based approach to treatment. Oxon, UK: CABI Publishing; 2003 (p. 3).*

***P*hysical fitness**: A state of physiologic well-being that is achieved through a combination of good diet, regular physical exercise, and other practices which promote good health. *Citation: Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing, and Allied Health, Seventh Edition. © 2003 by Saunders, an imprint of Elsevier, Inc.*

**Physiological wellbeing**: Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. This includes the ability to lead an economically and productive social life. Citation*: WHO, http://www.who.int/suggestions/faq/en/index.html*

**Pre-frailty**: Frailty is a multisystem dysregulation leading to decreased physiological reserve and increased vulnerability to stressors. According to the Cardiovascular Health Study (CHS) index definition, an individual is classified as frail if he/she meets three or more of the following five criteria:

- Weight loss (>5% in last year)
- Exhaustion
- Weakness (decreased grip strength)
- Slow walking speed (>6 to 7 seconds for 15 feet)
- Decreased physical activity (males <383 kilocalories); females <270 kilocalories)

Pre frailty is when one or two of these characteristics are met. Otherwise, the person is classified as robust. *Citation: http://now.aapmr.org/med-rehab/geriatrics/Pages/Geriatric-Frailty.aspx*

**Prevention (Primary, secondary and tertiary prevention)**

**Primary prevention**: Here the goal is to protect healthy people from developing a disease or experiencing an injury in the first place. For example:

- education about good nutrition, the importance of regular exercise, and the dangers of tobacco, alcohol and other drugs
- education and legislation about proper seatbelt and helmet use
- regular exams and screening tests to monitor risk factors for illness
- immunization against infectious disease
- controlling potential hazards at home and in the workplace

**Secondary prevention**: These interventions happen after an illness or serious risk factors have already been diagnosed. The goal is to halt or slow the progress of disease (if possible) in its earliest stages; in the case of injury, goals include limiting long-term disability and preventing re-injury. For example:

- telling people to take daily, low-dose aspirin to prevent a first or second heart attack or stroke
- recommending regular exams and screening tests in people with known risk factors for illness
- providing suitably modified work for injured workers

**Tertiary prevention**: This focuses on helping people manage complicated, long-term health problems such as diabetes, heart disease, cancer and chronic musculoskeletal pain. The goals include preventing further physical deterioration and maximizing quality of life. For example:

- cardiac or stroke rehabilitation programs
- chronic pain management programs
- patient support groups

*Citation: http://www.iwh.on.ca/wrmb/primary-secondary-and-tertiary-prevention*

**Sarcopenia:** Sarcopenia is a syndrome characterised by progressive and generalised loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death. The European Working Group on Sarcopenia in Older People (EWGSOP) recommends using the presence of both low muscle mass and low muscle function (strength or performance) for the diagnosis of sarcopenia. *Citation: Cruz-Jentoft J et al. Sarcopenia: European consensus on definition and diagnosis. Age and Ageing 2010; 39: 412–423*

**Quality of life**: The WHO defines Quality of Life as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment. *Citation: http://www.who.int/mental_health/media/68.pdf*

**Risk Stratification**: A statistical process to determine detectable characteristics associated with an increased chance of experiencing unwanted outcomes. By identifying factors before the occurrence of an event, it is possible to develop targeted interventions to mitigate their impact. Citation: Miller CC, Reardon MJ, Safi HJ. Risk stratification: A practical guide for clinicians. *Cambridge University Press, Cambridge, UK. 2001.*

**Sustainability of Health Care Systems**: Effective health services at acceptable costs for society.

**Sustainable interventions**: Effective and acceptable (to the target groups) interventions at acceptable costs (for society and the individual)

**Target Population:** Target population refers to the group of individuals or objects to which researchers are interested in generalizing the conclusions. The target population usually has varying characteristics. It is used in this document to denote the individuals or the group of people who will be served and benefit by the different commitments.

**Translational research and development**: Translational research includes: the process of making discoveries in the research laboratory or in preclinical studies that will have an impact on human health and may lead to the development of studies in humans; the process of applying discoveries generated during research in the laboratory, and in preclinical studies, to the development of trials and studies in humans; and research aimed at enhancing the adoption of best practices in the community. Cost-effectiveness of prevention and treatment strategies is also an important part of translational science. *Citation: Based on Institutional Clinical and Translational Science Award (U54)* *http://grants.nih.gov/grants/guide/rfa-files/RFA-RM-07-007.html#SectionI1*

**Triage tools**: A process in which a group of patients is sorted according to their need for care. The kind of illness or injury, the severity of the problem, and the facilities available govern the process, as in a hospital emergency department. *Citation: Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier*.

**Under-nutrition**: Undernutrition is primarily used in the context of deficient energy or protein intake or absorption and is often described as protein energy malnutrition. It is frequently accompanied by multiple or single micronutrient and/or mineral deficiencies, although these may occur in the absence of macronutrient depletion and give rise to specific deficiency syndromes. Undernutrition may be due to a failure of food supply or intake, to deliberate fasting, or to disease and is characterized by weight loss and changes in body composition, which include loss of body fat, loss of lean mass (proportionately greater in disease compared to starvation alone) and a relative increase in extracellular fluid volume. *Citation: Lochs H et al. Introductory to the ESPEN Guidelines on Enteral Nutrition: Terminology, Definitions and General Topics. Clin Nutr 2006; 25; 180–186*

**Appendix 1: Deliverables by Partners**

| **Objective 1: Manage frailty and functional decline through targeted intervention in physical fitness, nutrition status, cognitive function, chronic conditions and diseases and social or psychological wellbeing of older people** | | | | |
|---|---|---|---|---|
| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | **Domain** |
| **AUSL Parma**<br>• inCHIANTI consortium<br>• www.inchiantistudy.net | Integrated biomarkers for frailty. | On-going | | Biomarkers |
| **IRCCS Reggio Emilia**<br>• University of Bologna | New models for biomarkers integration in Alzheimer disease. | On going | | |
| **SERMAS**<br>• FRAILOMIC CONSORTIUM (19 members from 8 European countries plus WHO)<br>• Austrian Academy of Science (OEAW)<br>• Azienda Ospedaliero-Universitaria di Parma (AOU PR)<br>• Azienda Sanitaria di Firenze (ASF)<br>• Cardiff Metropolitan University (CMUniv)<br>• Evercyte GMBH<br>• Friedrich-Schiller-Universitaet Jena (JENA)<br>• IDETRA<br>• Institute of Diabetes for Older People, University of Bedforshire (IDOP)<br>• Italian National Research Centres On Aging (INRCA)<br>• Life Length<br>• Mosaiques Diagnostics GmbH (MD)<br>• Niche Science and Technology (NST) | Statement of biomarkers of clinical utility in general older population and in some specific ones<br>Prognostic value of frailty in older people with cardiovascular risk factors and diseases and in those with cancer. | 2013 | 2015 | |

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| • Research Center National Institute of Health 'Epidemiology and Biostatistics' U897, University of Bordeaux 2 (INSERM)<br>• Servicio Madrileño de Salud (SERMAS)<br>• Sistemas Genómicos (SG)<br>• Universidad Autonoma de Madrid (UAM)<br>• Universidad de Valencia (UV)<br>• University of Toulouse (CHUT)<br>• World Health Organization (WHO)<br>• YouHealth (YH) | | | | |
| **University of Bologna**<br>• Chesi Group<br>• Emilia Romagna region | New biomarkers for cognitive frailty. | On going | | |
| **University of Valencia**<br>• CIBERER<br>• CIBERDEM<br>• FIVI<br>• FIHCUV-INCLIVA | Determination of epigenetic biomarkers in frailty | From 2013 | 2015 | |
| **Regional Authority of the Emilia Romagna Region, Italy** | Improve blood-based biomarkers. | | | |

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| **I2-FRESCO**<br>• CED - Council of European Dentists<br>• Consoft–Caretek<br>• CPME - Comité Permanent des Médecins Européens<br>• EFORT - European Federation of National Associations of Orthopaedics and Traumatology<br>• EMSA - European Medical Students' Association<br>• EUGMS - European Union Geriatric Medicine Society<br>• EULAR - European League Against Rheumatism<br>• FAU - Friedrich-Alexander-Universität Erlangen-Nürnberg<br>• Toulouse Gerontopole<br>• CRNH - Centre de Recherche en Nutrition Humaine<br>• INRCA - Istituto Nazionale di Ricovero e Cura per Anziani<br>• Italia Longeva<br>• Mensana - Medical Center for Sports, Business and Related Research<br>• Sanofi<br>• UGent - University of Ghent<br>• UNICATT - Università Cattolica del Sacro Cuore<br>• Université Paris Descartes<br>• UTT - Université de Technologie de Troyes | Scientific and Regulatory Appraisal - Consensus definition on physical frailty:<br>• Consensus definition on Physical Frailty / Sarcopenia<br>• Regulatory guidelines for Geriatric indications<br>• Regulatory Qualification of Adapted Clinical Trial Methodology including End Points | Q4 2012 | Q4 2015 | Consensus |
| **SERMAS**<br>• FRAILOMIC CONSORTIUM (19 members from 8 European countries plus WHO) | Diagnostic of frailty | 2013 | 2015 | |

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| **AUSL Parma**<br>• PROVIDE consortium<br>• University of Parma | Nutritional integration programme (proteins and vitamin A) | On going | | Intervention programmes |
| **ENHA /HANNN: Hanze UAS**<br>• University Medical Centre Groningen: Dept. of Rehabilitation and Dept. of General Practice<br>• Food Circle – Food for Healthy Ageing | Multimodal (combined diet and exercise) intervention programme (NutrEx project). | 2012 | Implementation realized in 2 institutions at July 2015 | |
| **I2-FRESCO Consortium** | Clinical Interventions:<br>• Integrated pathways defined and target populations defined<br>• Integrated interventions (physical activity, nutritional) identified and characterised<br>• Protocol of Clinical Trial, outcome measures, study design, number of arms, inclusion/exclusion criteria, geographical / regional catchment area described in an effectiveness study protocol, taking into account regional differences and suitability of screening practices, approved by local ethical committees<br>• Clinical trial implementation across various geographic areas<br>• Evaluation of results | Q4 2012 | • Q4 2014: 1st interim data<br><br>• Q3 2015: Final data<br><br>• Q3 2016 | |
| **IRCCS Scienze neurologiche AUSL Bologna**<br>• Chesi Group<br>• Emilia Romagna region | Development and clinical validation of at-home web-based objective tests for monitoring Parkinson's disease progression and related treatments effects. | On going | | |
| **SERMAS**<br>• MID-FRAIL CONSORTIUM (15 members from 7 European Countries):<br>• Bethesda Hospital Stuttgart (BHS)<br>• Cardiff University (CU)<br>• Centre Hospitalier Universitaire de | Effects of multimodal intervention (including exercise, clinical targets tailored to older population and educational program) on incident functional impairment and disability in frail and pre-frail patients with diabetes | 2012 | 2015 | |

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|---|---|---|---|---|
| Bordeaux (CHU-BORDEAUX)<br>• Centre Hospitalier Universitaire De Toulouse (CHUT)<br>• Centro Medicina Invechiamento Universita Cattolica Del Sacro Cuore (UCSC)<br>• Charles University, Prague (CUP)<br>• Ghent University Hospital<br>• HEXABIO<br>• Hospital Universitario de Getafe-SERMAS<br>• IGENbiotech (IGEN)<br>• Institute of Diabetes for Older People (IDOP)<br>• Niche Science and Technology (NST)<br>• Universidad de Castilla-La Mancha (UCLM)<br>• University of Naples-2 (UN)<br>Vrije Universiteit Brussel (VUB) | | | | |
| **SERMAS**<br>• FRAILOMIC CONSORTIUM (19 members from 8 European countries plus WHO) | Effects of exercise and nutrition in frail and pre-frail patients | 2013 | 2015 | |
| **University of Valencia (FRESHAGE)**<br>• University Jaume I, Castellon<br>• Universidad Miguel Hernandez (UMH) | Controlled exercise as an intervention to prevent frailty: definition of protocols and molecular and social biomarkers. | 2013 | 2015 | |
| **University of Valencia**<br>• University Jaume I, Castellon | Design, development and validation of a set of specific questionnaires to measure diet and other lifestyles variables in elderly people. | | | |

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| **Faculdade de Ciências - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• INSA<br>• Université de Provence/SiamedXpress<br>• CIB-CSIC<br>• Sheffield University<br>• IST<br>• FCM-UNL<br>• IPSantarem<br>• CIPAN | Identification of support needs for managing medication and promoting improved individual performance and active ageing. | 2013 | 2015 | |

| **Objective 2: Enhance the participation and independence of older people and caregivers by empowering and enabling them to remain involved in meaningful activity and in a healthy lifestyle** | | | | |
|---|---|---|---|---|
| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | **Domain** |
| **ENHA /European Hydration Institute** | Scientifically based educational materials, written in target friendly language which raise the importance of hydration for health and wellness and encourage improved hydration behaviours. | | 2013 -2015 | Education |
| **I2-FRESCO Consortium** | Health Literacy Programme: Educational programmes for patients and carers. | Q2 2013 | Q2 2014 | |
| **University of Coimbra**<br>• Faculty of Medicine of Coimbra<br>• Faculty of Sport Science<br>• Nurses School<br>• Exploratório D. Henrique<br>• Museu de Ciência UC | Programme of public lectures and round-table discussions in museums and other public spaces addressing healthy and active ageing. | January 2013 | December 2015 | |

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| **University of Coimbra**<br>• Faculty of Medicine of Coimbra<br>• University of Coimbra Hospital<br>• Faculty of Sport Science<br>• Nurses School<br>• Luso Municipality (Wiluso)<br>• Coimbra Municipality | Combined cultural and physical fitness/training medically-assisted tailored programs, targeting +65 old or patients suffering from chronic diseases, joining sport science faculty members, nurses and psychologists. | June 2013 | December 2015 | |
| **ASL Bologna**<br>• ASPHI<br>• Other social associations | Tablet touch-screen at home: compliance and familiarization | On going | | Resources |
| **DHSSPS NI**<br>• Patient & Client Council (Nutrition Coalition)<br>• Health & Social Care Trusts<br>• Volunteer Now Northern Ireland | Public awareness materials and events about healthy and active ageing, physical activity, self-management. | | End 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• INSA<br>• Université de Provence/SiamedXpress<br>• CIB-CSIC<br>• Sheffield University<br>• IST<br>• FCM-UNL<br>• IPSantarem<br>• CIPAN | Adaptation (linguistic and cultural) and validation of a tool for elderly people to assess and manage properly their own medication and follow up. | September 2013 | December 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa (ibidem)** | Assessment of the functional ability of the European elderly people to manage their own medication, using the validated tools. | September 2013 | December 2015 | |

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|---|---|---|---|---|
| **NHSScotland**<br>• Health and Social Care Alliance (voluntary sector)<br>• Health, social care and housing partners | Information and public awareness materials and events about healthy and active ageing, physical activity, self management and frailty. | April 2012 | On going | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Implementation of an interactive website to promote healthier food habits, to educate on the valorisation of functional foods for disease prevention, targeting the general public. | September 2013 | September 2014 | Social Networks |
| **Radboud University**<br>• Nijmegen health care providers | Internet mediated personalised communities to improve autonomy in pre-frail elderly. | January 2013 | | |
| **University of Coimbra**<br>• Nurses School<br>• Exploratório D. Henrique<br>• Museu de Ciência UC<br>• Faculty of Medicine of Coimbra | Implementation of social networks to promote communication between aged/frail people, their relatives, carers and health professionals. | December 2012 | December 2015 | |
| **University of Coimbra, CSIC** | Web based social network | December 2012 | | |
| **University of Valencia**<br>• Valentian health Service<br>• Asociacion Salus Vitae<br>• AECES - Asociacion Espanola para el Estudio Cientifico del Envejecimiento Saludable | Use of Social media (Facebook) to improve compliance and the kinect electronic tool to promote exercise. | From 2013 | | |
| **ASL Bologna**<br>• Bologna Province<br>• ANCESCAO<br>• Other social associations | Programs to increase socialization in elderly population. | On going | | Strategies |

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| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Strategies to prevent frailty and function degradation on ageing with metabolic diseases: focus on education and empowerment. | September 2013 | December 2015 | |
| **ENHA /HANNN: Hanze UAS** | Innovative multimodal strategy to improve social competences and healthy lifestyle in elderly independently living in a disadvantaged neighbourhood (DelfGoud). | 2010 | 2013 | |
| **ENHA /HANNN: Hanze UAS**<br>• Lithuanian Academy of Physical Education, Lithuania<br>• Sport Sciences School of Rio Maior - Polytechnic Institute of Santarém, Portugal<br>• CopenRehab and Healthy Ageing, Institute of Public Health University of Copenhagen, Denmark<br>• University of Bath/Department for Health, UK | Strategy for stimulating sport and physical activity in sedentary and underactive older adults (= The European Active Ageing Model - TEAAM) | 2013 | 2014 | |

| **Objective 3: Promote systematic-routine screening for pre-frailty stages in at risk patients and older people** | | | | |
|---|---|---|---|---|
| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | **Domain** |
| **ENHA /Pfizer Consumer Healthcare** | - Inventory of existing programmes including case studies on screening and assessment (literature review on individual vitamins and minerals).<br>- stakeholder map<br>- support with selected Key Opinion Leaders. | Q4 2012 | Q2 2013 | Inventories |

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| **ENHA /Federico II-Campania-Undernutrition** | Inventory of existing programmes including case studies on screening and assessment. | January 2013 | | |
| **ENHA /HANNN: Hanze UAS** | Prognostic value of each of diagnostic tools for sarcopenia (NutrEx project). | 2015 | July 2017 | |
| **ENHA /HANNN: Hanze UAS** | Gathered evidence regarding effectiveness of early screening and treatment of undernutrition, sarcopenia and (pre-) frailty (NutrEx project) | 2015 | July 2017 | |
| **ENHA /Nestlé Health Science** | Inventory of existing programmes including case studies and identification of best practices in: screening and assessment, intervention/care protocols/treatment pathways, programme implementation, monitoring of outcomes, training/education, awareness campaigns. | January 2013 | | |
| **CHARGE-UCC IRL**<br>• RAPCOG - RAPid Community COGnitive screening programme<br>• University College Cork, Ireland<br>• Multi-national pharmaceutical company (Sponsoring Computer app development)<br>• PCCC - Primary, Community and Continuing Care, Ireland<br>• Local authority<br>• GPs & Occupational therapists, carers,<br>• People with dementia | Community based screening programme for mild cognitive impairment and dementia, including the development of two new screening tools for use in the community (QMCI - Quick Mild Cognitive Impairment screen and Home Memeory Testing - Caregiver administer cognitive screen), project called RAPCOG - RAPid Community COGnitive screening programme<br>Note: Tool, guidance & Inter-rater reliability developed: Jan-July 2012. Validity testing in progress since Mar 2012 (800 tested to date; validity testing to be complete in Aug 2013). | January 2012 | July 2013 | Programmes |

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| **CHARGE-UCC IRL**<br>• University College Cork<br>• PCCC - Primary, Community and Continuing Care, Ireland<br>• Public health nurses<br>• Tyndall (ICT research)<br>• Tested by range of care providers in Action Group | Community Assessment of Risk Tool and Strategies (CARTS) programme: wide, community based, screening tool and programme for predicting and managing risk of adverse outcomes, frailty and functional decline in community dwelling older adults. | January 2012 | July 2015 | |
| **CHARGE-UCC IRL**<br>• University College Cork<br>• Trinity College Dublin<br>• University of Limerick<br>• Health Service Executive of Ireland<br>• Health Research Board of Ireland | Hospital-based screening programme to detect prevalence of dementia, delirium, mild cognitive impairment among older adults admitted to hospital. Project called ODCACS - Optimal Dementia Care in Acute Care Settings project. | November 2011 | April 2013 | |
| **DHSSPSNI**<br>• HSC Trusts<br>• GAIN - Guidelines and Audit Implementation Network<br>• NIPEC | Standards for screening programme for risk of malnutrition using Malnutrition Universal Screening Tool (MUST) within 24 hours of admission to hospital.<br>Future plans to roll out to Community and Nursing Homes in development. | March 2015<br><br>Development phase – no timeframe | | |
| **European Nutrition for Health Alliance** | Develop routine screening and nutrition policy including screening and follow up. | | 2013-16 | |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• INSA | Screening programme to identify food habits for disease prevention (including functional food consumers). | September 2013 | December 2014 | |
| **ENHA /HANNN: Hanze UAS**<br>• University Medical Center Groningen: Dept. of Rehabilitation and Dept. of General Practice<br>• Food Circle – Food for Healthy Ageing | Implemented screening program (NutrEx project) | September 2012 | Implementation realized: July 2015 | |

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| **ENHA /HANNN: Hanze UAS** | Development and implementation of screening programme for early recognition of under-nutrition and (pre)frailty in Northern Netherlands | 2014 | 2015 | |
| **NHSScotland**<br>• Healthcare Improvement Scotland<br>• Government<br>• NHS<br>• All tools and resources shared with Action Group partners | Improvement Programme for Older People in Hospital - screening and intervention for frailty and nutrition. | November 2012 | April 2014 | |
| **ENHA /Nutricia Danone** | (Support )Screening programmes and intervention/care to combat undernutrition in institutional and community settings, including protocols & monitoring, training/education and public awareness campaigns - esp. in UK (Malnutrition Task Force), BE (ENHA pilot), and NL (new KOL/patient network): and use Nutricia country organisations to raise awareness, build new networks and share best practice in esp. Eastern & Southern Europe. | January 2013 | | |
| **CBIM Pavia, Italy**<br>• C. Mondino National Neurological Institute Foundation - Pavia, Italy<br>• Universitat Politecnica de Catalunya, Spain<br>• CENSTIMCO Paris, France | Smart Aging Serious Games Software Platform for pre-symptomatic and early-symptomatic assessment of cognitive impairments. | On going 1/7/2012 | June 2014 | Screening Tools |

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| **CCTR, Netherlands**<br>• TNO | Screening tool to assess functional decline, to be applied in other settings than health care (e.g. social services, housing agencies). | 2012 | 2014 | |
| **ENHA /HANNN: Hanze UAS (Quantified Self Institute)** | Smartphone/tablet app for self-assessment of risk for undernutrition and (pre-)frailty and monitoring of diet and physical activity (NutrEx project). | 2013 | March 2015 | |
| **IK4, Spain** | Validation of a user-friendly, minimally time consuming, sensitive and specific screening tool which enables the early diagnosis of functional decline. | January 2013 | 2014 | |
| **KU Leuven, Belgium** | The use of the interRAI-instrument for the assessments of needs and wishes. | 2012 (BE, SE, FR, IT, PL and CZ). 2013/2014 Other regions | 1) on going | |
| **SERMAS**<br>• FRAILOMIC CONSORTIUM (19 members from 8 European countries plus WHO) | Statement of biomarkers of clinical utility to establish people at risk for pre-frailty and frailty in general older population | 2013 | 2015 | |
| **UNIFAI/ ICBAS University of Porto**<br>• Division of Mental Health, General Direction of Health, Ministry of Health<br>• FCG | Assessment Tool: short clinical protocol of needs of patients in different stages of dementia to be implemented at national level by the NHS; Data Base of around 5000. | October 2012 | December 2013 | |

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| **University of Minho**<br>• University of Minho, Life and Health Sciences Research Institute (ICVS)<br>• Regional health care centres<br>• Hospital de Braga, Braga<br>• Hospital de Guimarães, Guimarães | Stratification (identification) of risk factors (clinical, biochemical and socio-demographic) in cognitive decline. | From 2011 (on going project) | December 2014 | |
| **DHSSPS NI**<br>• Health & Social Care Trusts<br>• Primary Care | State of the art update instrument for assessment and prevention of frailty. | | 2015 | |
| **Vascular Cognitive Impairment (VCI) Program - University Medical Center Utrecht** | Develop risk scores to A) identify pre-symptomatic people at risk of VCI and to B) identify patients with established VCI at increased risk of poor outcome. | 2010 | A 2013; B 2016 | |

| **Objective 4: Create integrated pathways of care, while encouraging a systematic and integrated approach to implementing strategies for the secondary and tertiary prevention of frailty to reduce the associated physical, functional and cognitive disability** | | | | |
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| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | |

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| **I2-FRESCO Consortium** | Business Models:<br>• Value chain defined based on patients pathways & type of interventions<br>• Business models available for all stakeholders (subjects, their informal carers, health care professionals, insurers, providers, no-profit organizations), identifying who is paying, who is delivering, and adapted to different countries.<br>Results to be published in top ranked health economics journals for the first two objectives:<br>- The first paper will explore whether frailty is associated with greater resource use/costs or not.<br>- The second paper will show whether the clinical intervention is cost effective of not.<br>For the third objective, a formal detailed description of selected business models. | Q4 2012 | Q4 2013 | **Business models** |

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| **I2-FRESCO Consortium** | ICT:<br>• Supporting ICT solutions fit for purpose identified for Screening and Diagnostic tools of Frailty status, Physical Activity level & Nutritional Status<br>• Tele-consulting, tele-monitoring and tele-medicine network support available<br>• Interoperable, integrated, inclusive and unobtrusive digital platforms and terminals to integrate and fuse the various incoming signals from potentially diverse captors to promote continuity of care through interconnection with Personal Health Record.<br>• Database system to aggregate all information collected during the study up and running.<br>• Innovative tools for prevention of physical, nutritional and cognitive decline, including motivational coaching to sustain adherence identified and ready to be used in clinical study. | Q1 2013 | Q4 2015 | **ICT interventions** |
| **CCTR, Netherlands** | Evidence based telemedicine service for improvement of physical fitness and functional performance including web based exercises program for improvement and maintenance of physical fitness either remotely supervised or to be used as self-management tool. | This service is already in place in the Netherlands but will be continuously used for the target population mentioned | | |

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| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Implementation of e-health assistance to communicate on the benefits of functional foods and follow up of individual drug treatment. | January 2014 | December 2015 | |
| **Radboud University**<br>• Nijmegen health care providers | Remote monitoring of health status - Development and validation and effect testing of internet software and ICT devices of software and ICT devices. | January 2013 | | |
| **SERMAS** | Evidence base telemedicine service for frail patients with cardiac failure and/or diabetes mellitus | On going | 2016 | |
| **UNIFAI/ ICBAS University of Porto**<br>• Health Institute Carlos III, National School of Public Health, Spain | Surveillance of Potentially Unattended, Severe Disability Among the Elderly, and Social Service Response. | 2013 | 2016 | |
| **University of Coimbra**<br>• IPN business incubator<br>• Tice.healthy<br>• Take the Wind<br>• Heartcycle<br>• Intelligent Sensing Anywhere (ISA)<br>• Critical Health<br>• Neuroeye<br>• Nurses School | Implementation of ICT-based programmes for remote monitoring of health status +65 /frail people and chronic disease patients in their homes/institutions. | June 2013 | December 2015 | |

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| **Agenzia Sanitaria Emilia Romagna**<br>• ENEA<br>• CUP2000<br>• Municipality of Bologna<br>• University of Bologna<br>• University of Newcastle<br>• CETOC Belgium<br>• INK Canada | Home care monitoring platform for heart failure and diabetes. | From December 2012 | | **Support interventions** |
| **CCTR, Netherlands Consortium**<br>• TNO<br>• UT<br>• UM<br>• NIVEL | Integrated modular intelligent service platform that enables delivery of various end-to-end solutions for secondary prevention and chronic care. | 2013 | 2017 | |
| **CCTR, Netherlands Consortium** | Implementation of self-assessment, diagnostic, monitoring and support technologies in primary care practices. | 2013 | 2017 | |
| **CCTR, Netherlands**<br>• UTT - Université de Technologie de Troyes | Self-management support system for monitoring physical indicators in independent living frail elderly. | 2013 | | |
| **DHSSPSNI**<br>• Northern Health and Social Care Trust<br>• Patient/Client Council | Establish mealtime companions programme in hospital as part of personal care plan. | 2012-13 | | |
| **ENHA /Federico II-Campania-Undernutrition** | Intervention delivered by local/regional networks. | 2014 | | |
| **ENHA /HANNN: MCL** | Geriatric menu. | | 2013 | |
| **ENHA /HANNN: MCL** | Improved facility for older persons in need of meals on wheels. | | 2013 | |
| **ENHA /HANNN: MCL; Hanze UAS** | Multimodal intervention. | | | |

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| **NHSScotland**<br>• Collaboration of Health, social care, Government and Voluntary sector | Reshaping Care for Older People Programme and Improvement Network - integrated care pathway, range of education and improvement tools. | On going | 2011-2015 | |
| **NHSScotland**<br>• UK Enterprise and International Digital / IT community | Living it Up Assisted Living programme. | On going | 2014 | |
| **SERMAS**<br>• MID-FRAIL CONSORTIUM (7 European Countries) | Effects of multimodal intervention (including exercise, clinical targets tailored to older population and educational program) in frail and pre-frail patients with diabetes | 2012 | 2015 | |
| **University of Coimbra**<br>• IPN business incubator<br>• Intelligent Sensing Anywhere (ISA)<br>• University of Coimbra Hospital<br>• Faculty of Medicine of Coimbra | Development and implementation of vital signal alert scheme in elderly and chronic disease patients (with a focus on dementia and diabetes) in their homes/institutions. | On going | December 2015 | |
| **University of Minho**<br>• University of Minho, Life and Health Sciences Research Institute (ICVS) and other research units<br>• Regional health care centres<br>• Hospital de Braga, Braga<br>• Hospital de Guimarães, Guimarães | Individual feedback and engagement in healthcare (prototypes for monitoring of biological/biometric signs and symptoms). | From 2012 (on going project) | December 2014 | |
| **CCTR, Netherlands**<br>• TNO | Tailored functional training programme, tested and validated in several settings (group, at home) (supervised by physio/ergotherapists and by sports teachers). | On-going | 2013 | **Training** |
| **CHARGE-UCC IRL** | Implementing advance care directives and Palliative Care training programmes in Nursing Homes and in the Community. | 2012 | 2015 | |

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| **ENHA /HANNN: Hanze UAS**<br>• Van Hall Larenstein University<br>• NHL University of Applied Sciences<br>• Stenden University of Applied Sciences, Netherlands | Training module. | | September 2014 | |
| **ENHA /HANNN: MCL** | Web application/app based on guideline. | | 2014 | |
| **DHSSPS NI** | e-Learning tools and modules on prevention of frailty and functional decline that are tailored for to train health professionals on caring for frailty patients. | | Content available end 2013 | |

| **Objective 5: Contribute to research and methodology on frailty and active and healthy ageing and contribute to knowledge generation concerning the mechanisms for ageing and the progression of frailty** | | | | |
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| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | **Domain** |
| **CCTR, Netherlands** | User centric scenario based design methodology for designing innovative technology supported services. | | 2013 | **Support to policy** |
| **CCTR, Netherlands** | A roadmap for the development of new technological applications on the basis of the needs and demands of end users, care professionals and other stakeholders. | 2012 | 2014 | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Identification of support needs for managing medication and promoting improved individual performance and active ageing. | September 2013 | December 2015 | |

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| **University of Valencia**<br>• University Jaume I, Castellon, Spain | Contribution to the definition and design of an integrative knowledge repository of acquisition and management of gene-lifestyle interactions in elderly subjects within the framework of the FRAILOMICS EU-project. Special attention will be paid to prescription, evaluation and control of exercise. | | | |
| **Emilia Romagna region/University of Bologna**<br>• IRCCS S.Maria Nuova<br>• HST-ICIR<br>• FICLIT University of Bologna | Software for ecologic analysis of the language. | The validation on going; Dissemination at GP level from March 2014 (tentative) | | **Novel** |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL | Valorisation of biomass for novel and high added-value bio products. | September 2013 | December 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL | Novel delivery systems for molecular entities against frailty and functional decline. | September 2013 | December 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Implementation of functional foods for the prevention of age related diseases and for pain release. | September 2013 | December 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Chemical and biological approaches to new molecular entities with new mechanisms of action for age-related diseases. | September 2013 | December 2015 | |

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| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Elucidating the molecular mechanisms by which natural products retard the onset of frailty and functional decline. | September 2013 | December 2015 | |
| **ENHA /HANNN: Food Circle - Food for Healthy Ageing** | Approach to offer optimized/tailored food product range. | 2013 | December 2016 | |
| **IDOCAL University of Valencia** | Protocol for analysing the effects of the interaction between aging and stress on cognitive function. | October 2012 | March 2015 | |
| **SERMAS**<br>• FRAILOMIC CONSORTIUM (19 members from 8 European countries plus WHO) | Prognostic value of frailty in older people with cardiovascular risk factors and diseases and in those with cancer (5 years) Statement of biomarkers of clinical utility in general and in frail older population. | 2013 | 2016 | |
| **UNIFAI/ ICBAS University of Porto**<br>• Division of Mental Health/General Direction of Health - Ministry of Health<br>• National Institute for Rehabilitation - Ministry of Solidarity and Social Security<br>• Faculty of Psychology - University of Lisbon<br>• Congregation of Sisters Hospitallers of the Sacred Heart of Jesus (Mental Health NGO) | Effects of cognitive stimulation in early stages of dementia, without or with previous chronic mental disease. | January 2013 | December 2014 | |
| **University Miguel Hernández**<br>• Bioengineering Institute, Spain<br>• Ciber-bbn, Spain | Robotic-assisted tools for the aging and persons with disabilities. | November 2012 | October 2015 | |
| **University of Valencia (FRESHAGE)**<br>• SERMAS | Molecular signature of RNA expression in centenarians as individuals whose health span approaches their lifespan with low frailty and dependency. | 2013 | 2015 | |

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| **University of Valencia**<br>• University Jaume I, Castellon, Spain | Measure of the perception of different tastes by chemical test and completed by genetic analysis and association with age, food intake and different disease. | 2014 | | |
| **Vascular Cognitive Impairment (VCI) Program - University Medical Center Utrecht** | Test novel treatments to prevent cognitive decline in RCTs. | 2010 | 2018 | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | E-learning based on a training course on the intervention of glycosciences on ageing. | February 2013 | December 2015 | **Courses** |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Ph.D. programme on Medicinal Chemistry Addressing Frailty and Functional Decline. | September 2013 | December 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Master in Translational Research in Medicine. | September 2013 | December 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• IST<br>• FCM-UNL | Ageing as a metabolic stressor: B-learning courses for health care providers. | September 2013 | December 2015 | |
| **ENHA /HANNN: Hanze UAS** | Master Program on active and healthy ageing | 2012 | 2014 | |
| **ENHA /HANNN: Hanze UAS**<br>• Van Hall Larenstein University<br>• NHL University of Applied Sciences<br>• Stenden University of Applied Sciences, Netherlands | Course on nutrition & dietetics, physiotherapy and nursing, implemented in regular curriculum. | | September 2014 | |

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| **ENHA /HANNN: MCL** | Web based educational programme. | | 2015 | |
| **University of Coimbra**<br>• Faculty of Medicine of Coimbra (FMUC)<br>• Faculty of Sport Science; Nurses School<br>• University of Coimbra Hospital (CHUC)<br>• Social Studies<br>• IPN - business incubator<br>• Open to collaboration with other national and European PhD programs on Ageing | High-level interdisciplinary education and training of health care personal through the PhD programme on mechanisms of ageing and frailty. | On going | December 2015 | |
| **University of Coimbra**<br>• Faculty of Medicine of Coimbra<br>• Center for Neuroscience and Cell Biology<br>• IPN business incubator | New research unit on ageing and frailty. | On going | December 2015 | |
| **Aston University, Birmingham, UK** | Data on body composition, frailty scores, markers of metabolic disease. | January 2013 | January 2016 | **Evidence** |
| **CSIC**<br>• IdiPAZ<br>• CIBERER<br>• Puleva BioFoods | Quantification of the impact of life style and malnutrition in presbyacusis: measurements of hearing abilities, genetic analysis and IGF-I plasma levels, and possible correlation of the former with age and nutritional stage. Identification of prognostic factors, clinical guide for patients and health care professionals. | 2013 | 2015 | |
| **ENHA /European Hydration Institute** | Information about the relationship between dehydration, morbidity and mortality. | | Pilot study to be completed by June 2013 | |
| **ENHA /European Hydration Institute** | Consensus on appropriate methods for different settings. | | Complete by mid 2013 | |

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| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• IST<br>• FCM-UNL | Studies of middle-age in relation to familial longevity: clues for intervention on frailty ageing. | September 2013 | December 2015 | |
| **ENHA /Federico II-Campania-Undernutrition**<br>• Salerno University | Statistically significant data on the main local determinants of malnutrition in a Campania Region 65+ population. | November 2012 | March 2014 | |
| **ENHA /Federico II-Campania-Undernutrition**<br>• Salerno University | Statistically significant data on the effects and on the cost of specific nutraceuticals and food supplements on a sample of the Campania Region undernourished 65+ population. | April 2014 | April 2015 | |
| **ENHA /Federico II-Campania-Undernutrition/ENHA** | Assessment of evidence and indication of gaps requiring further research on undernutrition. | January 2013 | | |
| **ENHA /HANNN: Hanze UAS** | Insight in the relationship between nutritional status, dietary intake, health status and physical performance in community dwelling elderly. | 2012 | 2013 | |
| **ENHA /HANNN: Hanze UAS** | Insight in the dynamics of frailty | | 2013 | |
| **ENHA /HANNN: Hanze UAS** | Evidence for positive effect of physical activity on clinical outcome in chronic ill patients | | 2012 | |
| **ENHA /HANNN: Hanze UAS** | Systematic literature review/ meta-analysis on the prognostic value of undernutrition, sarcopenia and physical inactivity on the development of frailty. | 2013 | September 2014 | |

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| **ENHA /HANNN: Hanze UAS** | Systematic review/meta-analysis on the effect of a multimodal intervention to prevent undernutrition, improvement of muscle mass and strength and improvement in physical activity level on the decline in frailty status, compared to single interventions. | 2013 | September 2014 | |
| **ENHA /HANNN: Hanze UAS (Quantified Self Institute)** | Evidence on reliability, validity and effectiveness of available food apps for assessment and monitoring of food intake. | 2012 | 2013 | |
| **ENHA /HANNN: Hanze UAS**<br>• Consortium on ecare, malnutrition and elderly (including amongst others: Laurea University of Applied Sciences, Finland; Leuven University College, Belgium) | Systematic literature review on food consumption (patterns) of elderly in residential homes | | 2014 published | |
| **ENHA /HANNN: Hanze UAS**<br>• Sahlgrenska Academy at Gothenburg University, Sweden | Insight in phase angle and bioelectrical impedance vector analysis (BIVA) in community dwelling elderly | 2012 | 2014 | |
| **ENHA /HANNN: Hanze UAS**<br>• Sahlgrenska Academy at Gothenburg University, Sweden | Evidence for phase angle and bioelectrical impedance vector analysis (BIVA) as biomarkers for functional decline in geriatric patients | | 2013 | |
| **ENHA /HANNN: MCL** | European geriatric database with information on nutritional status, nutritional interventions and outcomes (morbidity complications, mortality, length of hospital stay, etc.). | | 2016 | |
| **ENHA /HANNN: MCL; Hanze UAS** | Insight in (correlates of) physical performance in geriatric patients admitted to hospital | | 2013 | |

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| **ENHA /HANNN: MCL; Hanze UAS** | Insight in agreement between CT scan and bioelectrical impedance analysis in the assessment of muscle mass in geriatric patients admitted to hospital | | 2013 | |
| **ENHA /HANNN: MCL; Hanze UAS** | Understanding of agreement between two accelerometers in assessing physical activity and energy expenditure in geriatric patients admitted to hospital. | | 2013 | |
| **ENHA /HANNN: MCL; Hanze UAS** | Understanding of the relationship between nutritional status, dietary intake and physical activity, and physical performance of community dwelling elderly using home delivered meals, and their satisfaction on the home delivered meals. | | 2013 | |
| **IDOCAL University of Valencia** | Report on social and organizational retirement predictors and effects on health and welfare. | | December 2012 | |
| **IDOCAL University of Valencia** | Benchmarking analysis of different European countries: comparative analysis among countries on different retirement trends and policies and how organizational management affects the maintenance of seniors in the workforce in different societies. | | January 2013 | |
| **IDOCAL University of Valencia** | State of the art up-date for how organizations and workplaces might contribute to the prevention of functional decline and frailty. | October 2012 | March 2015 | |
| **IDOCAL University of Valencia** | Report on cognitive and comparative analysis among healthy and pathological groups associated with exposure to stress. | | | |
| **ENHA /Malnutrition Task Force / Age UK** | Cost-benefit analysis. | February 2013 | | |
| **ENHA /Pfizer Consumer Healthcare** | Review data presented at conferences to inform body of evidence. | | Q4 2012 - Q4 2013 | |

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| **SERMAS**<br>• MID-FRAIL CONSORTIUM (7 European Countries) | Effects of multimodal intervention (including exercise, clinical targets tailored to older population and educational program) in frail and pre-frail patients with diabetes | 2012 | 2015 | |
| **UNIFAI/ ICBAS University of Porto**<br>• MAP - Metropolitan Area of Porto, Portugal | Frailty study: prevalence and predictors. | January 2013 | December 2014 | |
| **UNIFAI/ ICBAS University of Porto**<br>• University of Heidelberg, Germany<br>• University of Fordham (EUA) | PT-100 Oporto Centenarian Study. | On going | February 2014 | |
| **University of Valencia**<br>• CIBER OBN, Spain<br>• University Jaume I, Castellon, Spain | Effects of Mediterranean diet on primary prevention of chronic diseases / GWAs analysis of outcomes of interest for different biomarkers. | From 2013 | 2015 | |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• IST | Development and pre-clinical evaluation of new imaging tools for early diagnosis of age-related diseases, particularly neurodegenerative disorders and cancer. | September 2013 | December 2015 | **Imaging & novel technologies** |
| **University Miguel Hernández**<br>• Bioengineering Institute, Spain<br>• Ciber-bbn, Spain | Development of new technologies for early detection of neurodegenerative diseases in the elderly. | November 2012 | October 2015 | |
| **Vascular Cognitive Impairment (VCI) Program - University Medical Center Utrecht** | Develop novel sensitive MRI markers of VCI for etiological and intervention studies. | On going | | |
| **University/Hospital Agency Bologna**<br>• **University of Bologna**<br>• **CNA Bologna** | Clock drawing test on tablet. | June 2013 | | |

| Objective 6: Contribute to managing demand and increasing the sustainability of health and social care by reducing the personal, systemic and societal costs associated with ageing | | | | |
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| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | |
| **DHSSPS NI**<br>• Health & Social Care R&D and universities | A set of evidence based interventions that prevent or postpone onset of frailty. | | Mid 2013 | **Best-practices** |
| **ENHA /Malnutrition Task Force / Age UK** | Publication of "What Good Looks Like" with case studies on good practice. | December 2012 | | |
| **TNO** | A policy instrument for municipalities to anticipate for future needs (e.g. housing, care, social services) of the older population. | 2012 | 2014 | |
| **European Region of the World Confederation for Physical Activity (ER-WCPT)** | Collection of European Best Practices, campaigns and actions in which physiotherapists are involved promoting healthy ageing. | September 2012 | January 2014 | |
| **Faculdade de Ciencias - Universidade de Lisboa**<br>• FFCUL<br>• CQB-FCUL<br>• INSA | Define guidelines for multidimensional interventions including nutritional aspects (healthy eating). | January 2015 | December 2015 | **Guidelines** |
| **ENHA /HANNN: MCL** | International *evidence based* guideline. | | 2017 | |
| **ENHA /HANNN: MCL** | English version of Dutch *consensus based* guideline on causes, identification and management of undernutrition in geriatric patients. | | Mid 2013 | |
| **ENHA /HANNN: Hanze UAS**<br>• University Medical Center Groningen: Dept. of Rehabilitation and Dept. of General Practice<br>• Food Circle – Food for Healthy Ageing | Practical guideline to be used by the general population (NutrEx project). | 2014 | September 2016 | |

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| **IDOCAL University of Valencia** | Guidelines to improve older workers employment to support a better job design and improve human resource practices related to age. | October 2012 | March 2015 | |
| **SERMAS**<br>• FRAILOMIC CONSORTIUM (19 members from 8 European countries plus WHO)<br>• IAGG | Clinical guideline(s). | On going | 2016 | |
| **University of Valencia, Teaching Unit of Psychiatry and Psychological Medicine**<br>• CIBERSAM<br>• VLC Campus | Elaboration of clinical guides oriented to professionals for the assessment of cognitive impairment in patients with psychiatric symptoms.<br>Training of professionals on cognitive evaluation. Screening of mental pathologies and managing of multi-morbidity in elderly patients.<br>Screening of depressive symptoms in elderly outpatients. | From 2013 | 2015 | |
| **ENHA /Federico II-Campania-Undernutrition**<br>• Salerno University<br><br>**EU Hydration Institute** | Regional Guidelines on prevention of dehydration in 65+ | November 2012 | May 2014 | |
| **ENHA /HANNN: MCL** | Updated guideline | | 2016 | |
| **ENHA /Federico II-Campania-Undernutrition**<br>• Salerno University | Regional Guidelines on the prevention of malnutrition (Jointly with ENHA and the Undernutrition partnership). | November 2012 | March 2014 | |

| **Objective 7: Cooperation** | | | | |
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| **Partners** | **Deliverable** | **Starting date*** ** | **Deadline mm/yy** | |

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| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Organization of a conference on Innovative Therapeutics, Diagnostic Tools and Biomarkers to prevent Frailty and Functional Decline. | June 2014 | June 2015 | **Events** |
| **ENHA /Federico II-Campania-Undernutrition**<br>• Salerno University | Introduction of a dedicated gazebo for Active and Healthy Aging EU at the Health Village, starting with the America's Cup 2013. | | Start June 2013 through September 2014 | |
| **ENHA /Federico II-Campania-Undernutrition**<br>• Salerno University | Introduction of specific teaching lessons dedicated to undernutrition during the formal endocrinology specialist fellows, starting in Academic year 2013-2014. | | | |
| **ENHA /Pfizer Consumer Healthcare** | Organisation of 3-4 workshops | | 2013 | |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | European Network Program on Frailty and Functional Decline | January 2014 | December 2015 | **Networks** |
| **Faculdade de Ciencias - Universidade de Lisboa (plus partners)** | Marie Curie training network in the chemical and biochemical basis of frailty and functional decline. | January 2014 | December 2015 | |

**Appendix 2: Specific Objectives**

| General Objective | Specific Objective |
|---|---|
| **1. Manage frailty and functional decline through targeted intervention in physical fitness, nutrition status, cognitive function, chronic conditions and diseases and social or psychological wellbeing of older people** | 1. Create and market appropriate foods or diet supplements designed to reduce frailty risk in older people and to stimulate and maintain sensory perception.<br>2. Research currently available products in the market and review data that confirms dietary gaps in the older person and understand how existing dietary supplements are currently fulfilling these nutritional gaps therefore questioning why time and resource will be allocated to creating new products<br>3. Identify the population at risk and design targeted interventions for those factors that put people at risk, including in the workplace. Identify the population at risk for frailty and its adverse outcomes and design multimodal targeted interventions for those factors that put people at risk in different settings of care (community, primary care, hospitals, nursing homes, domiciliary long term care and social settings and the workplace.<br>4. Reach a consensus on the selection of validated quality of life assessment scales to track progress and to benchmark variation in outcomes achieved in different regions.<br>5. Increase opportunities for older people to be physically active at home and in the local community.<br>6. Create/develop special fitness programmes and appropriate (concrete) conditions for implementation (special fitness centres for physical activity, socializing and schooling on nutrition) for older and middle age people to prevent cardiovascular diseases and degenerative changes - as the most important cause of problems on locomotory system. |
| **2. Enhance the participation and independence of older people and caregivers by empowering and enabling them to remain involved in meaningful activity and in a healthy lifestyle** | 1. Engage with policy and advocacy groups for older people and adopt social marketing campaigns to raise public awareness around ageing well and frailty prevention.<br>2. Facilitate easy access to information, advice and support for older people in order to maintain healthy lifestyles.<br>3. Encourage health promotion and empower older people to take an active role in the practice of physical exercise and to know the benefits in terms of both prevention and treatment of frailty and functional decline<br>4. Empower older people to take an active role in their diet and to know the benefits of a balanced diet in preventing the main chronic diseases and improving quality of life: e.g. the Mediterranean diet.<br>5. Enable older people to access their personal health records and plans and to participate in decisions with regard to their conditions/diseases.<br>6. Stimulate self-participation in cognitive and physical exercise programs through sustainable computer interface systems in people at risk of/with functional decline. |

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| | 7. Use biomarkers and psychological indicators when developing adequate coping strategies for older people to deal with stress and slow/reduce cognitive impairment.<br>8. Support older people to develop adequate coping strategies to deal with stress and reduce cognitive impairment, using biomarkers and psychological indicators.<br>9. Empower older workers by keeping them active in the workplace and adapting their jobs to their abilities. |
| **3. Promote systematic-routine screening for pre-frailty stages in at risk patients and older people** | 1. Adapt and tailor screening tools for risk factors for functional/cognitive decline and frailty in older people.<br>2. Adopt common evidence-based validated tools to screen for pre-frailty risk factors and embedded within regional prevention programmes.<br>3. Use a common set of validated triage tools and protocols to direct those at greatest risk to further assessment.<br>4. Promote screening of frailty and functional decline in older people at risk and in different settings (community, primary care, hospitals, nursing homes, domiciliary Long Term Care and in social settings)<br>5. Promote screening for cognitive impairment and dementia in the population at risk.<br>6. Promote screening for taste and smell distortion or loss as an earlier stage of poor appetite in the older population at risk.<br>7. Standardise the practice of routine nutritional screening to identify their nutritional gaps of older patients in risk of under nutrition and sarcopenic obesity to identify their nutritional gaps, in primary care nursing homes and hospitals and receiving domiciliary support. |
| **4. Create integrated pathways of care, while encouraging a systematic and integrated approach to implementing strategies for the secondary and tertiary prevention of frailty to reduce the associated physical, functional and cognitive disability** | 1. Facilitate the organization of health and care systems to deliver a comprehensive, coordinated and integrated approach to secondary and tertiary prevention strategies for frailty and functional decline.<br>2. Facilitate the coordination of the different settings of health care (primary care, hospitals, nursing homes and domiciliary long term care) to detect risk situations, to provide continued care and to monitor the evolution of older frail patients and patients with functional decline<br>3. Prevent functional decline by providing skilled assessment of older frail people in situations of high risk. eg: medical and surgical emergency, major surgery, oncological treatments and acute medical diseases.<br>4. Provide facilities designed to give evidence based most effective attention to frail patients to prevent their functional decline and progression to disability.<br>5. Integrate frailty prevention in the primary and community care network underpinned by ICT.<br>6. Optimize the use of ICT to deliver screening, triage, assessment and treatment / rehabilitation interventions at scale. |
| **5. Contribute to research and methodology on** | 1. Set-up a cross-sector mechanism for an international study of the natural history of older adults at risk of frailty.<br>2. Support clinical and molecular research approaches to find frailty |

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| **frailty and active and healthy ageing and contribute to knowledge generation concerning the mechanisms for ageing and the progression of frailty** | biomarkers as well as innovative molecular entities and diagnostic tools to prevent frailty and treat age associated diseases.<br>3. Develop large datasets for modelling:<br>• The key nutritional requirements associated with improved health and reduced frailty.<br>• Clinical and functional parameters: body mass index, grip strength, etc.<br>• Bio-banks of biological material for genomic or other purposes.<br>• Model factors that place older adults at risk of developing frailty and its progress towards functional impairment.<br>4. Understand how work and social context contribute to cognitive functioning, psychological well-being, and performance.<br>5. Develop educational programs on active and healthy ageing. |
| **6. Contribute to managing demand and increasing the sustainability of health and social care by reducing the personal, systemic and societal costs associated with ageing** | 1. Decrease the number of unnecessary hospital visits, the days spent at hospital and the length of stay due to frailty and physical decline.<br>2. Decrease the rate of functional impairment after hospitalization in frail older people<br>3. Decrease the percentage of older people discharged to nursing homes or to permanent institutionalization after hospitalization.<br>4. Reduce the reliance on long term institutional care.<br>5. Shift health and care resource spend towards greater investment in preventative care and support in the community including support for carers and building capacity of the voluntary sector<br>6. Develop ICT-based proposals with a potential impact in prevention and early diagnosis and management of frailty. |
| **7. Cooperation** | 1. Promote cooperation between academic or non-academic research group, care providers and companies dedicated to ageing.<br>2. Support advanced PhD courses and competitive translational research. |


Objectives of the strategic plan to avoid and manage frailty and functional decline
Comprehensive Management
Empowerment
Screening
Integrated Pathways Care
Research and methodology
Sustainability
Cooperation
MANAGE FRAILTY AND FUNCTIONAL DECLINE
Intervention in: Physical fitness Nutrition status Cognitive function Social or psychological wellbeing of older people
ENHANCE PARTICIPATION AND INDEPENDENCE OF OLDER PEOPLE
Empowering meaningful activity and healthy life style
PROMOTE SYSTEMATIC ROUTINE SCREENING
Detection of pre-frailty stages in risk patients and older people
IMPLEMENT STRATEGIES
for secondary and tertiary prevention of frailty to reduce physical, functional and cognitive disability
CONTRIBUTE TO RESEARCH AND METHODOLOGY
on frailty and active ageing; and on mechanisms for ageing and progression of frailty
INCREASE SUSTAINABILITY OF HEALTH AND SOCIAL CARE AND MANAGE DEMAND
Reduction of personal, systemic and societal costs associated with ageing.
PROMOTE COOPERATION BETWEEN RESEARCH GROUPS AND COMPANIES DEDICATED TO AGEING
to support translational research and development
Specific Objectives
CREATE AND MARKET APPROPRIATE FOODS /DIETS SUPPLEMENTS
UNDERSTAND HOW (AVALABLE) SUPPLEMENTS FULFILL NUTRITIONAL GAPS
IDENTIFY POPULATION AT RISK AND DESIGN TARGETED INTERVENTIONS FOR RISK FACTORS
CONSENSUS ON SELECTION OF A VALIDATED QUALITY OF LIFE ASSESSMENT SCALES TO TRACK PROGRESS IN OUTCOMES ACHIEVED IN DIFFERENT REGIONS
INCREASE OPPORTUNITIES FOR ELDERLY TO BE PHYSICALLY ACTIVE AT HOME AND LOCAL COMMUNITY
ENGAGE WITH POLICY AND ADVOCACY GROUPS AND ADOPT SOCIAL MARKETING CAMPAIGNS
FACILITATE EASY ACCESS TO INFORMATION, ADVICE & SUPPORT TO MAINTAIN HEALTHY LIFESTYLES
ENCOURAGE HEALTH PROMOTIO AND EMPOWER THE ACTIVE ROLE IN PHYSICAL EXERCISE AND TO KNOW BENEFITS FOR PREVENTION
EMPOWER THE ACTIVE ROLE IN NUTRITION AND CONSIDER THE BENEFITS OF DISEASE PREVENTION
ENABLE ACCESS TO PERSONAL HEALTH RECORDS
STIMULATE SELF-PARTICIPATION IN COGNITIVE AND PHYSICAL EXERCISE PROGRAMMES THROUGH COMPUTER INTERFACE SYSTEMS
USE BIOMARKERS AND PSYCHOLOGICAL INDICATORS FOR STRATEGIES TO COPE WITH STRESS
SUPPORT OLDER PEOPLE TO DEVELOP ADEQUATE COPING STRATEGIES
EMPOWER OLDER WORKERS BY KEEPING THEM ACTIVE IN THE WORKPLACE
ADAPT AND TAILOR SCREENING TOOLS FOR RISK FACTORS FOR FRAILTY AND DECLINE IN OLDER EU ADULTS
ADOPT COMMON VALIDATED TOOLS TO SCREEN PRE-FAILTY RISK FACTORS AND EMBEDDED WITHIN REGIONAL PREVENTION PROGRAMMES
USE A COMMON SET OF VALIDATED TRIAGE TOOLS AND PROTOCOLS TO DIRECT THOSE AT GREATEST RISK TO FURTHER ASSESSMENT
PROMOTE SCREENING OF FRAILTY AND FUNCTIONAL DECLINE IN ELDERLY AT RISK AND DIFFERENT SETTINGS
PROMOTE SCREENING FOR COGNITIVE IMPAIRMENT AND DEMENTIA IN THE POPULATION
PROMOTE SCREENING FOR TASTE AND SMELL DISTORTION OR LOSS AS AN EARLIER STAGE OF POOR APPETITE IN THE OLDER POPULATION
STANDARDISE THE PRACTICE OF ROUTINE NUTRITIONAL SCREENING OF OLDER PATIENTS IN RISK OF UNDER NUTRITION
FACILITATE ORGANISATION OF HEALTH AND CARE SYSTEMS TO DELIVER AN INTEGRATED APPROACH TO SECONDARY AND TERTIARY PREVENTION STRATEGIES FOR FRAILTY
FACILITATE COORDINATION OF SETTINGS OF HEALTH CARE TO DETECT RISK SITUATIONS, PROVIDE CONTINUED CARE AND MONITOR FRAILTY EVOLUTION
PREVENT FUNCTIONAL DECLINE BY PROVIDING SKILLS ASSESSMENT OF ELDERLY IN HIGH RISK SITUATIONS
PROVIDE FACILITIES DESIGNED TO GIVE EVIDENCE BASED ATTENTION TO FRAIL PEOPLE
INTEGRATE FRAILTY PREVENTION IN THE PRIMARY CARE NETWORK UNDERPINNED BY ICT
OPTIMIZE USE OF ICT TO DELIVER SCREENING, TRIAGE, ASSESSMENT AND INTERVENTIONS AT SCALE
SET UP A CROSS-SECTOR MECHANISM FOR THE STUDY OF NATURAL HISTORY OF OLDER ADULTS AT RISK OF FRAILTY
SUPPORT CLINICAL / MOLECULAR RESEARCH FOR FRAILTY BIOMARKERS RELATED TO AGE AND ASSOCIATED DISEASES
DEVELOP LARGE DATASETS FOR MODELLING: KEY NUTRITIONAL REQUIREMENTS, CLINICAL PARAMETERS, BIO-BANKS, MODEL FACTORS
UNDERSTAND HOW WORK AND SOCIAL CONTEXT COTRIBUTE TO COGNITIVE FUNCTIONING AND PERFORMANCE
DEVELOP EDUCATIONAL PROGRAMMES ON ACTIVE AND HEALTHY AGEING
DECREASE UNNECESSARY HOSPITAL VISITS AND STAYS DUE TO FRAILTY AND FUNCTIONAL DECLINE
DECREASE RATE OF FUNCTIONAL IMPAIRMENT AFTER HOSPITALISATION IN ELDERLY PEOPLE
DECREASE PERCENTAGE OF ELDERLY DISCHARGED TO NURSING HOMES / PERMANENT INSTITUTIONALI-SATION
REDUCE RELIANCE ON LONG TERM INSTITUTIONAL CARE
GREATER INVESTMENT IN PREVENTATIVE CARE AND COMMUNITY (CARERS, VOLUNTARY SECTOR)
DEVELOP ICT-BASED PROPOSALS WITH POTENTIAL IMPACT IN PREVENTION AND EARLY DIAGNOSIS OF FRAILTY
SUPPORT ADVANCED PH. D. AND MASTER COURSES AND COMPETITIVE TRANSLATIONAL RESEARCH
PROMOTE COOPERATION BETWEEN RESEARCH GROUPS AND COMPANIES DEDICATED TO AGEING

**Appendix 3 List of contributing Partners**

| Partners' name | Country | Partners |
|---|---|---|
| Agencia Estatal Consejo Superior de Investigaciones Cientificas (CSIC) | Spain | • CIBERER<br>• CSIC<br>• IdiPAZ<br>• Puleva BioFoods<br>• University of Coimbra |
| Aston University, Birmingham | UK | |
| CBIM Pavia | Italy | • C. Mondino National Neurological Institute Foundation - Pavia, Italy<br>• CBIM Pavia, Italy<br>• CENSTIMCO Paris, France<br>• Universitat Politecnica de Catalunya, Spain |
| CCTR | Netherlands | • CCTR<br>• NIVEL<br>• TNO<br>• UM<br>• UT<br>• UTT - Université de Technologie de Troyes |
| CENTICH | France | |
| CHARGE-UCC | Ireland | • CHARGE-UCC, Cork<br>• GPs & Occupational therapists, carers, people with dementia.<br>• Health Research Board of Ireland<br>• Health Service Executive of Ireland<br>• Multi-national pharmaceutical company (Sponsoring Computer app development)<br>• PCCC - Primary, Community and Continuing Care, Ireland, including public health nurses<br>• RAPCOG - RAPid Community COGnitive screening programme, University College Cork, Ireland<br>• Trinity College Dublin<br>• Tyndall (ICT research)<br>• University College Cork<br>• University of Limerick |
| Department of Health, Social Services and Public Safety Northern Ireland (DHSSPS NI) | Northern Ireland | • DHSSPS NI<br>• Health & Social Care R&D and universities<br>• Health & Social Care Trusts<br>• Patient & Client Council<br>• Primary Care<br>• Volunteer Now NI |
| European Nutrition for Health Alliance (ENHA) | UK | • AIM<br>• EFAD - Federation of the Association of Dietitians<br>• EGAN<br>• ESPEN - European Society of Clinical Nutrition<br>• EUGMS<br>• European Hydration Institute<br>• European Nurse Directors Association |

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| | | • EPF - European Patient Groups<br>• HOPE<br>• IAGG<br>• Medical Nutrition Industries and European Pharmaceutical Society<br>• Nestlé Health Science<br>• Nutricia Danone<br>• Pfizer Consumer Healthcare |
| European Region of the World Confederation for Physical Activity (ER-WCPT) | Belgium | |
| Faculdade de Ciencias Universidade de Lisboa | Portugal | • CIB-CSIC - Centro de Investigaciones Biologicas del Consejo Superior de Investigaciones Cientificas, Spain<br>• CIPAN - Companhia Industrial Produtora de Antibióticos S.A.<br>• CQB-FCUL - Centro de Química e Bioquímica da Faculdade de Ciências da Universidade de Lisboa<br>• FCM-UNL - Faculdade de Ciências Médicas, Universidade Nova de Lisboa<br>• FFCUL - Fundação da Faculdade de Ciências da Universidade de Lisboa<br>• INSA - Instituto Nacional de Saúde Dr. Ricardo Jorge<br>• IPSantarem - Instituto Politécnico de Santarém<br>• IST - Instituto Superior Técnico<br>• Sheffield University<br>• Université de Provence/SiamedXpress |
| Healthy Ageing Network Northern Netherlands (HANNN) | Netherlands | HANNN:<br>• Consortium on e-care, malnutrition and elderly (including amongst others: Laurea University of Applied Sciences, Finland; Leuven University College, Belgium)<br>• Food Circle - Food for Healthy Ageing<br>• NHL University of Applied Sciences<br>• Hanze University of Applied Sciences (including Quantified Self Institute)<br>• Sahlgrenska Academy at Gothenburg University, Sweden<br>• Stenden University of Applied Sciences, Netherlands<br>• University Medical Center Groningen<br>• Van Hall Larenstein University<br>• Medical Center Leeuwarden (MCL) |
| Hanze University of Applied Sciences | Netherlands | |
| I2-FRESCO | EU | • CED Council of European Dentists<br>• Consoft–Caretek<br>• CPME Comité Permanent des Médecins Européens |

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| | | • CRNH - Centre de Recherche en Nutrition Humaine<br>• EFORT - European Federation of National Associations of Orthopaedics and Traumatology<br>• EMSA - European Medical Students' Association<br>• EUGMS - European Union Geriatric Medicine Society<br>• EULAR - European League Against Rheumatism<br>• FAU - Friedrich-Alexander-Universität Erlangen-Nürnberg<br>• INRCA - Istituto Nazionale di Ricovero e Cura per Anziani<br>• Italia Longeva<br>• Mensana - Medical Center for Sports, Business and Related Research<br>• Sanofi<br>• Toulouse Gerontopole<br>• UGent – University of Ghent<br>• UNICATT - Università Cattolica del Sacro Cuore<br>• Université Paris Descartes<br>• UTT - Université de Technologie de Troyes |
| IDOCAL University of Valencia | Spain | • IDOCAL University of Valencia |
| IK4 | Spain | |
| KU Leuven / European InterRAI researchers | Belgium | |
| NHS Scotland | UK | • Health and Social Care Alliance (voluntary sector)<br>• Health, social care and housing partners<br>• Healthcare Improvement Scotland<br>• International Digital / IT community<br>• NHS<br>• UK Enterprise |
| Northern Ireland and<br>Regional Health Authority of Emilia Romagna Region | Northern Ireland<br><br>Italy | • DHSSPSNI<br>• Guidelines and Audit Implementation Network (GAIN)<br>• HSC Trusts<br>• Northern Health and Social Care Trust<br>• Patient/Client Council |
| Radboud University Nijmegen Medical Centre | Netherlands | • Nijmegen health care providers |
| SERMAS | Spain | FRAILOMIC CONSORTIUM:<br><br>• Austrian Academy of Science (OEAW)<br>• Azienda Ospedaliero-Universitaria di Parma (AOU PR)<br>• Azienda Sanitaria di Firenze (ASF)<br>• Cardiff Metropolitan University (CMUniv)<br>• Evercyte GMBH<br>• Friedrich-Schiller-Universitaet Jena (JENA) |

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| | | • IDETRA<br>• Institute of Diabetes for Older People, University of Bedforshire (IDOP)<br>• Italian National Research Centres On Aging (INRCA)<br>• Life Length<br>• Mosaiques Diagnostics GmbH (MD)<br>• Niche Science and Technology (NST)<br>• Research Center National Institute of Health 'Epidemiology and Biostatistics' U897, University of Bordeaux 2 (INSERM)<br>• Servicio Madrileño de Salud (SERMAS)<br>• Sistemas Genómicos (SG)<br>• Universidad Autonoma de Madrid (UAM)<br>• Universidad de Valencia (UV)<br>• University of Toulouse (CHUT)<br>• World Health Organization (WHO)<br>• YouHealth (YH)<br><br>MID-FRAIL CONSORTIUM:<br><br>• Bethesda Hospital Stuttgart (BHS)<br>• Cardiff University (CU)<br>• Centre Hospitalier Universitaire de Bordeaux (CHU-BORDEAUX)<br>• Centre Hospitalier Universitaire De Toulouse (CHUT)<br>• Centro Medicina Invechiamento Universita Cattolica Del Sacro Cuore (UCSC)<br>• Charles University, Prague (CUP)<br>• Ghent University Hospital<br>• HEXABIO<br>• Hospital Universitario de Getafe-SERMAS<br>• IGENbiotech (IGEN)<br>• Institute of Diabetes for Older People (IDOP)<br>• Niche Science and Technology (NST)<br>• Universidad de Castilla-La Mancha (UCLM)<br>• University of Naples-2 (UN)<br>Vrije Universiteit Brussel (VUB)<br><br>• IAGG |
| UNIFAI/ ICBAS University of Porto | Portugal | • Congregation of Sisters Hospitallers of the Sacred Heart of Jesus (Mental Health NGO)<br>• Division of Mental Health, General Direction of Health, Ministry of Health;<br>• Faculty of Psychology - University of Lisbon<br>• FCG<br>• Health Institute Carlos III, National School of Public Health, Spain<br>• MAP - Metropolitan Area of Porto, Portugal<br>• National Institute for Rehabilitation - Ministry of Solidarity and Social Security |

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| | | • UNIFAI/ICBAS-UP<br>• University of Fordham (EUA)<br>• University of Heidelberg, Germany |
| University Federico II, Naples, Campania Region | Italy | |
| University Miguel Hernández | Spain | • Bioengineering Institute<br>• Ciber-bbn |
| University of Coimbra | Portugal | • Center for Neuroscience and Cell Biology<br>• Coimbra Municipality<br>• Critical Health<br>• Exploratório D. Henrique<br>• FMUC - Faculty of Medicine of Coimbra<br>• Faculty of Sport Science<br>• Heartcycle<br>• ISA - Intelligent Sensing Anywhere<br>• IPN business incubator<br>• Luso Municipality (Wiluso)<br>• Museu de Ciência UC<br>• Neuroeye<br>• Nurses School<br>• Social Studies<br>• Take the Wind<br>• Tice.healthy<br>• CHUC - University of Coimbra Hospital |
| University of Minho | Portugal | • Hospital de Braga, Braga<br>• Hospital de Guimarães, Guimarães<br>• Regional health care centres<br>• University of Minho, Life and Health Sciences Research Institute (ICVS) |
| University of Valencia | Spain | • CIBERDEM<br>• CIBERER<br>• CIBER OBN<br>• FIHCUV-INCLIVA<br>• FIVI<br>• UMH - Universidad Miguel Hernandez<br>• University Jaume I, Castellon<br>• University of Valencia<br>• Asociacion Salus Vitae,<br>• AECES - Asociacion espanola para el estudio cientifico del envejecimiento saludable<br>• Valentian health Service |
| University of Valencia (FRESHAGE) | Spain | • SERMAS<br>• University of Valencia |
| Vascular Cognitive Impairment (VCI) Program - University Medical Center Utrecht | Netherlands | • Boehringer Ingelheim |