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**advantAGE**  
MANAGING FRAILTY

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## ACRONYMS

EU: European Union.

JA: Joint Action.

MS: Member states.

SoAR: State of the Art on frailty report.

WP: Work package.

## EXECUTIVE SUMMARY

The ADVANTAGE “Managing Frailty” Joint Action aims to build a shared understanding among policy makers and stakeholders in order to develop a common European approach to the prevention and management of frailty. Work package 8.2 (WP8) aims to gather evidence of research gaps in the prevention and management of frailty across the European member states. This deliverable describes these gaps and proposes an agenda to address them.

To achieve the objective three steps were undertaken: a) Systematic review of the literature identifying the gaps in knowledge and actions; b) survey among member states participating in the Joint Action; c) a framework with proposals to implement advances in research on frailty.

Systematic reviews were conducted to identify scientific papers regarding gaps in the research evidence and knowledge of frailty. Furthermore, a review of evidence arising from EU funded projects and inputs from the other work packages of the present Joint Action were included.

The survey for Member States included questions about the budget allocated to clinical research on frailty and the proportion of clinical, social and basic research projects devoted to frailty. . According to the level of implementation reported, member states’ research on frailty was classified as sustainable, advanced, well developed, fair or basic.

From analysis of the information in the survey and consideration of the existing research on frailty we elaborated a framework of immediate, medium term and continuous actions to address the research gaps.

We identified seven domains of gaps in research on frailty: a) identification and assessment; b) human models of disease; c) mechanisms and markers; d) health care models; e) clinical management; f) environmental issues; g) health care in ethnics and in minorities.

The survey identified a general lack of research on the topic.

Implementing the framework to advance research on the objectives of ADVANTAGE will involve a wide range of researchers, engineers, social and healthcare providers, scientific societies, stakeholders, health authorities and international agencies working together at different levels of the system in both basic and applied research. The joint venture to improve knowledge requires appropriate funding to generate knowledge which transforms innovation and evidence to implementation and translates this to the day-to-day prevention and management of frailty.

## INTRODUCTION

### Why this report

ADVANTAGE Joint Action (JA) aims to build a shared understanding among policy makers and stakeholders in order to develop a common European approach to the prevention and management of frailty.

Work package 8 is responsible for Training and Research. It has two components that have developed separate although complementary tasks and deliverables. WP8.2 focused on research aims to gather evidence of research gaps in the prevention and management of frailty across participating European member states (MS). This deliverable depicts these gaps and proposes an agenda to address them.

The analysis of these unmet evidence needs offers us a wide list of issues to be covered in the following years. Implementation of actions includes not only health care providers, social care workers and other professionals in contact with patients or people at risk. Although their work is crucial, other stakeholders such as health authorities and funding agencies (including the EU Commission), responsible for planning the health care infrastructure, providing the regulatory frameworks and releasing funds for research, also need to be involved. Moreover, adequate resources, structural and economic, are key to implement the minimal requirements needed to address the research gaps.

### Sources of information

The data and information about research on frailty in each MS are based on the responses to the survey completed by each JA partner and the subsequent situation report based on the information gathered.

Furthermore, this report has also been informed by the State of the Art on frailty report (SoAR), specifically the area related to research, work developed by WP8.2<sup>1</sup>. This reported a systematic review of the literature, as well as a scan of European Union (EU)-funded research projects and inputs from the different WPs related to research on frailty.

### Methodology

The current report is divided into two parts which are described below:

a) Analysis of information from the WP8 Topic specific frailty situation report

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<sup>1</sup> <http://advantageja.eu/images/WP8-2-Extending-and-expanding-the-knowledge-on-frailty-to-foster-innovative-policy-on-frailty-a-Sistemativ-Review.pdf>

WP4 to WP8 partners analysed the information from the 21 MSs Background frailty situation reports contents corresponding to their work package topics. By comparing the reported situation against recommendations summarized in the State of the Art on frailty report (SoAR), each participant MSs was allocated to a given category for each of the topics considered.

The following categories were agreed:

- Basic: Nothing is going on in the MS in relation to that item.
- Fair: Something is being done in some places of the MS.
- Well developed: Relevant interventions/programmes are being carried out in many parts of the MS.
- Advanced: There is a national strategy on that item.
- Sustainable: There is an evaluated national strategy or there is an agreed plan to sustain it.

The process resulted in a number of tables, basically one per topic area addressed in the MS survey. These tables consist of three columns:

- Levels of implementation categories.
- Description of these levels.
- MSs which comply with each level.

b) Framework to design programs to address the unmet research needs on frailty.

In the second part of this report, WP8.2 creates a framework to design proposals to improve research knowledge on prevention and treatment of frailty.

The identification of research needs should drive future research activities. For each of them, the present report proposes potential actions, the agents involved and places them in a temporal framework.

This strengths and limitations of the systematic review should be considered. It was based on a wide search of recently published peer-reviewed and grey literature, as well as good practices from EU funded projects, but it was not comprehensive and so there might be other relevant issues which were not taken into account.

## RESULTS

### Evidence based research actions on frailty

A number of actions to address the gaps in knowledge of frailty are presented in Table 1. They are based on:

- Gaps identified in SoAR. The identified gaps were grouped in seven domains (table 1): a) identification and assessment, b) human models of disease, c) mechanisms and markers, d) health care models, e) clinical management, f) environmental issues g) health care in ethnic minority groups
- Current situation across the EU in terms of investment in research about frailty obtained from the specific questions in the survey of the MS.
- The urgency of needs and how long they will take to be met.

Table 1. Domains and needs in research on frailty determined through a systematic review of the literature, EU-funded research projects and inputs from the different WPs of the ADVANTAGE JA.

ACTION		DELIVERABLES
<b>Identification and assessment</b>	Code (descriptor) for frailty in the next update of the ICD.	Develop and use <i>eFrailty</i> as screening tool.
<b>Human models of disease.</b>	Identify physiological dysregulation as early markers of the frail phenotype	Identify subtle systemic dysfunctions prone to develop frailty.
	The intersection between aging biology and chronic diseases and conditions must be analysed in more detail.	Identify accelerators of frailty in chronic diseases.
<b>Mechanisms and markers.</b>	Development of reliable biomarkers of frailty risk.	Testing in longitudinal studies as predictor of becoming frail.  Define patterns of risk combining -omics.
<b>Health care models.</b>	Evaluation of new care tools and models.	Care cost, hospitalisation rate, transition to long-term care facilities, onset of disabilities and quality of life.
	Searching for elements of success common to the frailty-care programmes.	
<b>Clinical management.</b>	Impact of frailty in the evolution of chronic diseases.	Disease specific outcomes.
	Impact of diagnostic and therapeutic procedures of chronic diseases on frailty.	Identify treatments of chronic diseases with impact in frailty  Disease-specific algorithms for frail subjects to choose and evaluate elective treatments for the chronic comorbidities.
	Optimize the design of clinical trials in frailty subjects.	Unify criteria on subject selection, assessment methods, study duration, outcomes.

<b>Environmental issues.</b>	Research for on the quality of indoor air.	Regulatory standards in indoor climate-control equipment for nursing homes.
	Environment and risk of frailty.	Increase green spaces Improve transportation facilities.
<b>Health care in ethnic minority groups</b>	Differences in parameters to assess frailty among regions and ethnic groups (i.e. hand-grip).	Reference values tailored to ethnic and/or regional differences.

ICD: International Classification of Diseases.

### Areas analysed

According to the level of implementation, MS research was classified as sustainable, advanced, well developed, fair and basic as defined in Table 1.

MSs were then allocated to a given category according to the degree of implementation of research initiatives and the existence of defined budgets for research on frailty.

Table 2. Classification of MSs according to the degree of their research activities on frailty

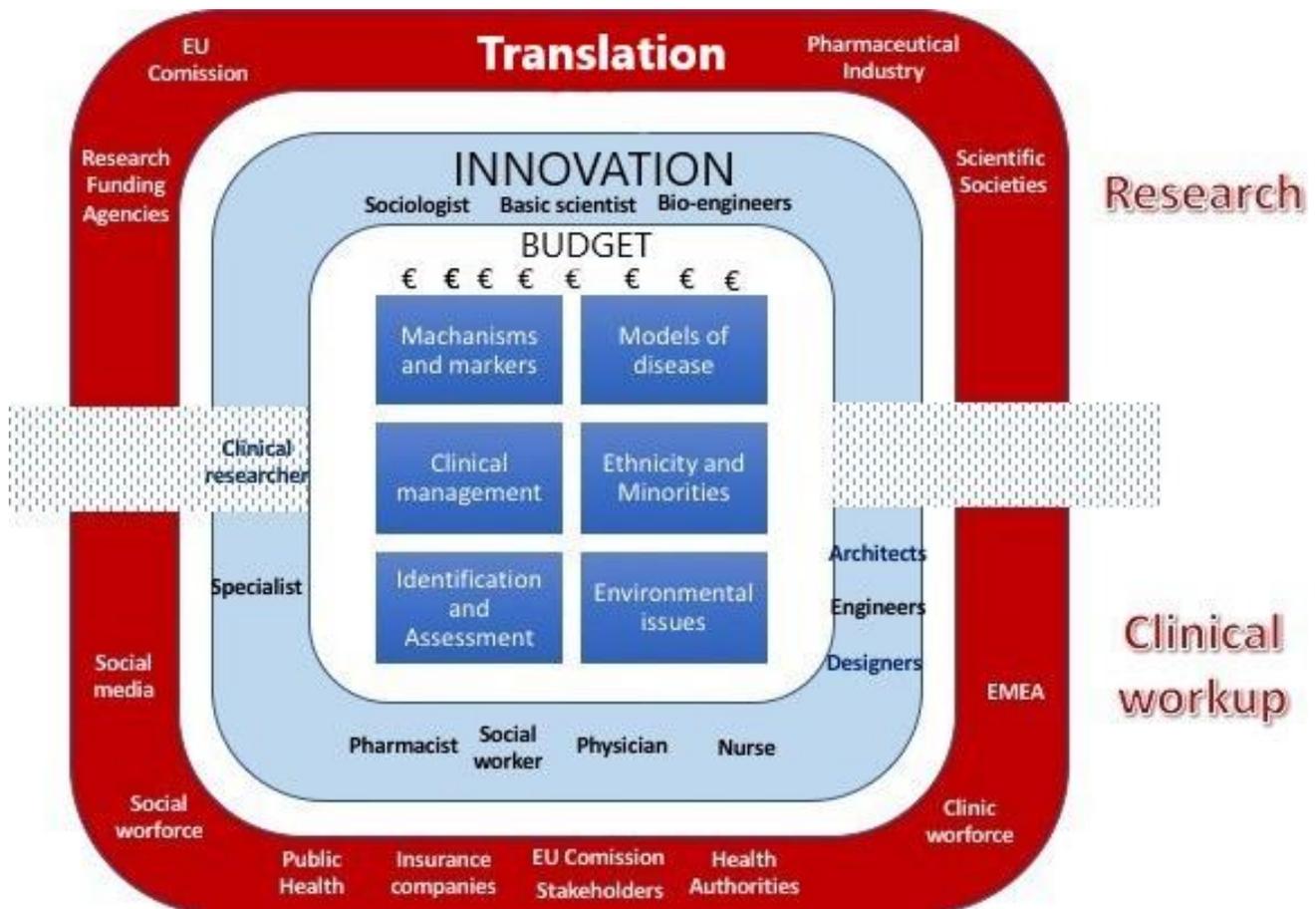
<b>LEVELS OF IMPLEMENTATION</b>	<b>DESCRIPTION OF THE LEVEL</b>	<b>MEMBER STATES WHICH COMPLY WITH THIS LEVEL</b>
<b>Sustainable</b>	There is a NATIONAL program on frailty research published and defined funding is released by the government.	
<b>Advanced</b>	There is a KNOWN PERCENTAGE of the research budget of clinical calls, social calls and basic research aligned with a national strategy on tackling frailty.	United Kingdom, Lithuania.
<b>Well developed</b>	There is a WIDE ARRAY of research initiatives on frailty (whose budget cannot be quantified).	Spain.
<b>Fair</b>	There are SCATTERED research initiatives on frailty (whose budget cannot be quantified).	Belgium, Greece, France, Italy, Portugal, Germany, Romania.
<b>Basic</b>	The MS has no research ongoing on frailty or did not answer the question.	Austria, Bulgaria, Cyprus, Finland, Croatia, Hungary, Ireland, Malta, The Netherlands, Poland, Slovenia.

## FRAMEWORK TO DESIGN PROGRAMS ON THE UNMET RESEARCH NEEDS ON FRAILITY

Integration of elements relevant to research on frailty are necessary in order to design programs to address the unmet research needs. It is represented in the Figure 1. The image presents:

- a) two big areas, research and clinical workup that require close interaction.
- b) a core with the domains condensed in six (dark blue) which need sufficient budget (white area).
- c) a light blue rim that includes the different professionals that should be involved in order to provide Innovation that may result in new elements to transfer to different stakeholders.

Figure 1. Integration of elements related to research on frailty



What needs to be done and how?

A proposed Framework on Research is described on the following tables, including:

- a) the agents who are responsible to present and lead the action.
- b) the action itself.
- c) the main objective of the action.
- d) the potential deliverables.

e) the timescale, immediate, medium term and continuous (see table 3), based on the urgency of needs and on how much time they require to be met.

Table 3. Actions to be taken according to the ADVANTAGE JA research framework on aging

AGENTS	ACTION	OBJECTIVE	DELIVERABLES	REQUIRED TIMESCALE
Funding agencies, regional, national and European.	Include frailty in the list of calls with a level of priority.	Gain insights in the mechanisms present in the frail process.	Identify potential target and reliable markers of risk and for monitoring interventions.	Continuous
Health and social care providers and authorities.	Clinical research. Test more effective types of enablement programs.	Evaluation of new models of attention.	Care costs, hospitalisation rate, transition to long-term care facilities, onset of disabilities and quality of life.	Continuous.
	Analyze special necessities in minorities and diverse ethnicities.	Identify particularities and needs.	Improved care provided.	Immediate
Epidemiologists, regulatory agencies.	Development of a specific ICD-code of frailty and/or work in to define an appropriate electronic code for frailty.	Easy identification of prevalence and incidence.	Increase the awareness in primary and specialized care.	Immediate
Specialist and scientific societies.	Assessment of risk of frailty in chronic diseases and outcomes during acute events.	Identify additional risk in chronic diseases.	Guidelines on risk evaluation and better management.	Continuous.
Basic researchers.	Identify physiological dysregulation as early markers of the frail phenotype and intersection between aging biology and chronic	Improving the understanding of frail biology.	Identification of potential targets.	Medium term

	diseases and conditions.			
Stakeholders and health authorities.	Test more effective types of enablement programs.	Evaluation of new models of care.	Care cost, hospitalisation rate, transition to long-term care facilities, onset of disabilities and quality of life.	Medium term
	Analyze special necessities in minorities and diverse ethnics.	Identify particularities and needs.	Improve care provided	Continuous
Engineers, architects, designers.	Design friendly environments.	Appropriate designs and technical conditions of equipments.	Improve environmental and living conditions.	Medium term

ICD: International Classification of Diseases.

## CONCLUSION

Overall there is a lack of information about the existence of specific funded programs for the implementation of research and/or development of innovative initiatives on frailty in the majority of countries (11 of the total 21 which responded to the survey). This means that there are no specific programs devoted to advancing knowledge and management of frailty.

Some specific examples are worth commenting on. Lithuania is the only MS among those answering the questionnaire that offered evidence about actions taken and provides the budget and the percentage of studies funded. UK was not able to produce percentages, because of the changing figures from one year to the next, but from the answers provided it is clear that there is a priority in gaining knowledge in complex health-care of older people at community and hospital levels, which is reflected by the continuous support of initiatives, not only at a national level, but also to regional programs. The case of Belgium, Italy and Spain is different: Many existing initiatives are usually developed and funded by regional governments. Scattered EU-funded projects in the topic are spread out over a few countries.

The results obtained from the systematic review and the survey point out that:

- Currently, frailty is not a priority for the research agenda in Europe.
- There are limited frailty specific calls from the funding agencies.
- Initiatives at regional, national and supranational levels should be encouraged to fuel the field.

- There is a need to increase the funds devoted to research in the different domains identified in the present report, from better identification to understanding the origin and factors related to progression, as well as search and test the best models and tailored clinical approaches.

Despite continued research effort over the past twenty years, frailty is still not well understood, leaving multiple unmet research needs regarding the condition. In this context, this report collects and briefly summarises the main issues that we believe should be addressed in the near future, both to advance our understanding of frailty and to help ameliorate this growing socio-medical problem.

Considering that frailty is not a current priority for research with a shortage of specific calls from the funding agencies, it is urgent that we take action to raise awareness of the relevance of frailty in our aging population and the importance of research to generate knowledge about ways to reduce its impact.

A call to action to stimulate research among the MSs where it is already more developed and to engage the large number of MS that are falling behind is crucial for advancing action on frailty.

## REFERENCES

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