



# EPIDEMIOLOGY, SURVEILLANCE AND POPULATION SCREENING OF FRAILTY. RESULTS FROM THE SYSTEMATIC REVIEWS OF THE EUROPEAN JOINT ACTION ADVANTAGE

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## Preface

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The ageing of societies around the world, particularly in the European Union (EU), while to be celebrated, is associated with many challenges, most important of which is the provision of appropriate and timely public health measures to address the growing number of older adults. As resources are limited, the relatively new construct of frailty has proved helpful in rationalising health expenditure and understanding which subgroup of older adults to target. Frailty is a multi-factorial state, correlating with vulnerability, disability and comorbidity resulting in an increased risk of adverse outcomes and lower self-reported health status, for which no definition is broadly accepted so far. Older people are at greatest risk of becoming frail and developing disability. This poses crucial challenges to the well-being of individuals and families, and to the sustainability of health and social care systems. Since frailty is a dynamic condition along a continuum from normal ageing to disability, during which transitions between frailty states are common, and recovery, although not frequent, is possible, there is ample potential for prevention and management. Based on these concepts the European Joint Action (JA) ADVANTAGE (<http://advantageja.eu/>), co-funded through the Third European Health Programme (grant number 724099), aims to develop a holistic and comprehensive strategic framework for the prevention and management of frailty at European level, bringing together 33 partners from 22 Member States. Understanding the current epidemiology of frailty and the main measures to address it at population-level is one of the main steps undertaken by ADVANTAGE towards the development of a common Frailty Prevention Approach across Europe.

Describing the real burden of frailty at population level, its frequency, progression and characteristics, and knowing which approaches and interventions for the monitoring, surveillance and screening of frailty are

available at population level are fundamental to develop and calibrate an adequate public health response, balancing available resources against individual and collective needs. A clear epidemiological picture of frailty in the population is necessary to inform resource planning, to prioritise interventions for groups of people deemed at higher risk, and to evaluate the effectiveness of prevention programmes.

What is the frequency of frailty in Europe? How many cases can we expect in the future? What are the characteristics associated with the progression (or regression) of frailty? Who is more likely to develop higher or lower levels of frailty over time? Is the epidemiological picture of frailty well delineated and reliable? Is there evidence to support the adoption of public health measures to detect, prevent and manage frailty at population level? Do we have information on the efficacy and feasibility of public health interventions aimed at screening, monitoring or surveillance of frailty at population level, especially in primary care settings? These are the main research questions forming the basis of the systematic reviews of the scientific and grey literature conducted by Work Package 5 of the ADVANTAGE JA *Knowing Frailty at Population Level*, which are described in this monograph on the epidemiology of frailty. The four papers report the current state of the art relating to frailty prevalence [1], incidence [2], trajectories and transitions over time [3], and screening, monitoring and surveillance approaches for frailty [4]. The larger amount of papers selected through the review of prevalence scientific literature allowed for the conduction of a meta-analysis to provide an overall quantitative estimate of the parameter. Whereas the limited number and uneven characteristics of findings retrieved through the other literature reviews prevented from pooling and meta-analysing results, which were synthesised and compared using a narrative and tabular approach.

For the purpose of these systematic reviews the frailty parameters and interventions investigated were defined as follows.

*Prevalence*: the proportion of cases in a population in a specific moment (point prevalence) or over a specific period of time (period prevalence).

*Incidence*: the number of new cases of frailty per population in a given time period.

*Trajectories*: the clusters of individuals following a similar progression of frailty over time and *Transitions*: the changes between different stages of frailty over time (i.e. transition from robust, pre-frail, frail, and back).

*Screening*: systems, programmes, processes and interventions specifically designed to identify frailty in a target population, in order to intervene to mitigate or reduce it at population level.

*Surveillance*: a systematic process for the collection, analysis and interpretation of health-related data on frailty, needed for the planning, implementation, and evaluation of public health interventions.

*Monitoring*: the process of observing for longitudinal changes in the health status (frailty) of a population; although related to surveillance, monitoring is not necessarily the trigger for a specific public health action and it can serve to measure the effect of an intervention on the health status of a population over time.

The first article of the series reviews the literature and provides a meta-analysis of the data on the prevalence of frailty in the 22 European countries involved in the JA ADVANTAGE [1]. The 62 papers reviewed and included in the meta-analysis, representing 68 unique datasets, showed a considerable and significant heterogeneity of results, with prevalence rates that varied greatly (median 10.8%) according to the classification of frailty, the setting and the characteristics of participants, highlighting the need for a common and standardised approach to provide accurate and comparable frailty prevalence estimates at population level. The few studies retrieved through the systematic review of literature on frailty incidence (a total of 6 studies found, only 3 of them conducted in Europe) [2] also showed considerable heterogeneity of findings (incidence proportion range 5%-13%) with very different follow-up times and age of participants, and a substantial lack of analysis of those factors, such as basic socio-demographic characteristics, potentially influencing the development of new cases of frailty. The adoption of incidence proportions (or cumulative incidence), rather than incidence rates, highly influenced by the duration of follow-up, was a further obstacle to comparing results. The systematic review of the literature on frailty trajectories and transitions states over time [3] was focused on studies conducted in Member States participating in the European JA ADVANTAGE. Again, results were very limited (only 3 studies included) and heterogeneous (1 study reporting trajectories and 2 providing data on transitions between different frailty states). Both papers reporting transitions provided the proportion of participants with

at least one frailty transition during the period of follow-up (34.3% over 2 years vs 32.6% over a double period of follow-up). The fourth and last paper of this monograph reports the results of three systematic reviews of the scientific literature on programmes or interventions for the screening, monitoring and surveillance of frailty at population level, accompanied by an opportunistic review of the grey literature among ADVANTAGE JA Member States [4]. No systematic description of frailty surveillance programmes was retrieved. Only one study described monitoring systems and a few local examples of population screening initiatives (some of which not yet evaluated) were found. This highlights that there is insufficient evidence for the effectiveness of population-level approaches to screening, monitoring and surveillance of frailty, suggesting the need for the development and evaluation of community-based, two-step programmes including those that incorporate electronic health records, particularly in primary care.

The main feature of the epidemiological picture that emerges from the systematic reviews conducted by Work Package 5 of the ADVANTAGE JA is the overall heterogeneity of data on the frequency of frailty in the population. Nevertheless, frailty appears very common among older people, with an overall pooled estimated prevalence of 18% that varies according to the adopted classification of frailty and by study setting (about four times higher in hospital/nursing home settings than in the community). Although frailty is a dynamic condition that can be potentially reversed through appropriate and timely intervention, there is a remarkable paucity of information about its progression over time, both in terms of the number of new cases per population in a given time period (incidence) and of the longitudinal changes among different levels of severity (transitions/trajectories). The evidence for the feasibility, acceptability, costs and potential benefits of screening strategies to address frailty are also very limited and are almost or totally lacking for monitoring or surveillance programmes. Few papers reported data from primary care.

Further methodologically sound research is needed to provide standardised and comparable estimates of the occurrence and progression of frailty, and to scale-up and assess public health interventions to address frailty. A careful longitudinal investigation of the major health and socioeconomic factors potentially involved in the development of new cases, and in the progression of existing ones, is of utmost importance to understand the underlying causes of frailty in the population and, if possible, to reverse it. There is a need to pilot and evaluate new programmes for the screening, monitoring and surveillance of frailty and to scale-up these across different countries. All these elements are essential to provide health care planners and policy makers with the evidence base to assist in the organisation and prioritisation of public health services and programmes to target the most vulnerable groups of older people, ideally before the onset of functional decline.

## REFERENCES

1. O'Caomh R, Galluzzo L, Rodríguez-Laso Á, Van der Heyden J, Ranhoff AH, Lamprini-Koula M, Ciutan M, López-Samaniego L, Carcaillon-Bentata L, Kennelly S, Liew A on behalf of Work Package 5 of the Joint Action ADVANTAGE. Prevalence of frailty at population level in European ADVANTAGE Joint Action Member States: a systematic review and meta-analysis. *Ann Ist Super Sanità*. 2018;54(3):226-238.
2. Galluzzo L, O'Caomh R, Rodríguez-Laso Á, Beltzer N, Ranhoff AH, Van der Heyden J, Lamprini-Koula M, Ciutan M, Lopez-Samaniego L, Liew A on behalf of Work Package 5 of the Joint Action ADVANTAGE. Incidence of frailty: a systematic review of scientific literature from a public health perspective. *Ann Ist Super Sanità*. 2018;54(3):239-245.
3. O'Caomh R, Galluzzo L, Rodríguez-Laso Á, Van der Heyden J, Ranhoff AH, Carcaillon-Bentata L, Beltzer N, Kennelly S, Liew A on behalf of Work Package 5 of the Joint Action ADVANTAGE. Transitions and trajectories in frailty states over time: a systematic review of the European Joint Action ADVANTAGE. *Ann Ist Super Sanità*. 2018;54(3):246-252.
4. Rodríguez-Laso Á, O'Caomh R, Galluzzo L, Carcaillon-Bentata L, Beltzer N, Macijauskiene J, Albaina Ba-caicoa O, Ciutan M, Hendry A, López Samaniego L, Liew A on behalf of Work Package 5 of the Joint Action ADVANTAGE. Population screening, monitoring and surveillance for frailty: three systematic reviews and a grey literature review. *Ann Ist Super Sanità*. 2018;54(3):253-262.

