Longitudinal trajectory of frailty indexes and disability in the elderly population

The purpose of this research grant is to carry out research activity into the research project PRIN 2020 titled "SOcial and health Frailty as determinants of Inequality in Aging (SOFIA)".

The average age of the population has increased: according to the latest Eurostat data for the EU 27 countries, the amount of people aged 65 and over is around 90 million, representing one fifth of the population. Ageing will impact almost all spheres of European societies, including economy, healthcare and social protection, labour market, macroeconomic sustainability, family structures and social ties. The association between health in later life and socio-economic position (SEP) is well known and widely investigated.

Furthermore, inequalities in life expectancy in good health are even steeper than inequalities in total life expectancy. To understand the mechanisms and the risk factors which affect the process of maintaining health and functional abilities at older ages, the attention to the differences across social groups is important, but it is not sufficient. Most of the research on healthy ageing focuses on single health outcomes, or single risk factors. However, health outcomes and risk factors are not independent, calling for a shift of the focus to multidimensional and longitudinal analyses.

Understanding the life-course determinants of the inequalities in healthy ageing is essential not only for improving the wellbeing of older adults, but also to better foresee and possibly alleviate the long-run cost associated with ageing, and to better design the policies addressing the needs of older people. In order to explore inequalities in ageing, and to design and manage health and social policies addressed to older people in bad health conditions, the identification of the negative aspects of ageing becomes relevant: frailty, defined as an individual condition of increased vulnerability to external stressors, becomes a central dimension for the stratification of older people.

Using longitudinal data coming from large population administrative registers the SOFIA project addresses the following broad research questions:

  i)   identification in the literature of frailty indicators for older people which could be used to stratify population;
  ii)   implementation of the stratification procedures both in terms of health and socio-economic conditions with different administrative health databases, and possibly identifying a standard procedure;
  iii) evaluation of the different stratification procedures in terms of adverse health outcomes;
  iv)   socioeconomic characterisation of different strata within different longitudinal studies, and identification of the critical points in health and socio-economic trajectories associated with frail health conditions in old age;
  v)   disentanglement of the possible mechanisms that lead social and health frailty to unhealthy ageing and finally
  vi)   implementation of a macro demo-economic model to estimate and project regional populations by demographic, socioeconomic variables and health status.

Within this general framework, this grant project aims to develop statistical methods for big-data using large administrative health datasets.

Frailty is a strong predictor of adverse health aging outcomes and is relevant to understand timing, size, territorial differences and determinants of the indicators proposed to measure this multidimensional trait.

We will consider, for these purposes, digital versions of these indicators completely based on the analysis of digital health data.

Until now, little is known about trajectories or transitions between different stages or strata/level of fragility indexes, and even the longitudinal drivers of frailty are not well understood.

<u>Objectives of the project</u>:

Making use of data coming from the LSEm planned by the Agenzia Sociale Sanitaria Regione Emilia Romagna and the Bologna Health Authority, the project will:

a. try to develop time to event models to consider the trajectories from different strata of frailty: non-frail, pre-frail and frail statuses, in order to calculate the status transition rates.
b. Design pathways of disability in later life.
c. Evaluate the life expectancies, YLL, and DALYs in the different strata of the population obtained from the indexes.

The results will form the basis for the implementation of targeted interventions to elderly populations according to the health and social risk factors of frailty previously identified.

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