Train@Ed Postdoctoral Research Fellowship Summary

Understanding the changing patterns of mortality in rapidly ageing populations

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All lives end in death, but the routes that we take to our common destination vary considerably. Looking back from death, it is often easy to identify different types of trajectories of accrual of conditions, functional limitations, reduced quality of life, use of health and social care, and more. The trajectories range from people who are fit to the end and rapidly carried off by a major event, to people who experience a 'prolonged dwindling' over many years. It is, however, much harder to identify or predict likely trajectories prospectively. Such prediction is essential for many purposes including risk stratification in health and social care to target interventions, insurance underwriting, and helping people and their families plan for future care needs, and we need this urgently because populations internationally are rapidly ageing, with changing trajectories of health and function before death. Over the next 20 years, the number of people aged over 75 in the UK will nearly double, posing enormous challenges to societies across both public and private sectors, because of impact on pensions, health and social care, consumption and economic activity, and housing needs. Better understanding and prediction tools based on the growing range of relevant datasets available can significantly help address these challenges, and include a number of linked health and social care datasets ranging in size from 250K to >5M individuals.

The aims of this fellowship are to: (1) Collaboratively develop, formulate and resolve ageing related research questions of importance to both private and public sector stakeholders, and; (2) Develop and implement advance statistical modelling and machine learning tools for examining and predicting trajectories of health, mortality and care, in order to inform future policy and practice.

We will work in collaboration with the Legal and General Longevity Science Panel to ensure that the research addresses key priorities (this also provides the private sector underwriting required by the Train@Ed scheme). However, we expect the fellow to take a leading role in identifying a focus aligned to their interests and longer-term plans, and to apply appropriate methods from classical epidemiology (such as survival analysis, latent class trajectory modelling, multi-state modelling) and/or develop advanced machine learning approaches (Gaussian processes, deep learning, causal inference). We will support the fellow in developing a future research programme to secure sustainable long-term funding.