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## Complex Statistical Models for New Challenges in Life Insurance Industry

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The modelling and projecting of disease incidence and mortality rates is a problem of fundamental importance in epidemiology and population studies generally, and for the insurance and pensions industry in particular. Human mortality has improved substantially over the last century, but this manifest benefit has brought with it additional stress in support systems for the elderly, such as healthcare and pension provision. For the insurance and pensions industry, the pricing and reserving of annuities depends on three things: stock market returns, interest rates and future mortality rates. Likewise, the return from savings for the policyholder depends on the same three factors. In the most obvious way, increasing longevity can only be regarded as a good thing for the policyholder; a less welcome consequence is that annual income from annuities will be reduced. In this talk, we consider one of these three factors: the prediction of mortality. The requirements of the insurance industry for forecasts of future mortality are daunting, because forecasts up to 50 years ahead are required for pricing and reserving. Human mortality so far ahead depends on the impact of such unknowables such as future medical advances. We will show how non-parametric regression models can be used to forecast future mortality by extrapolating past trends as well as create different scenarios to emulate the impact of future medical advances in mortality.

### Keywords

mortality forecasting, longevity risk, non-parametric regression, life insurance industry

### Classification

Both methodology and application

**Primary author:** DURBAN, Maria (Universidad Carlos III de Madrid)

**Presenter:** DURBAN, Maria (Universidad Carlos III de Madrid)

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