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Abstract title:
Unravelling mortality

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The ‘bath tub’ curve appears universal in its application to mortality in humans, animals as well as assemblies of inanimate objects. The curve exhibits different characteristics during the early and later stages of life. The later stage of life for humans follows the law proposed on empirical grounds by Benjamin Gompertz in 1825. We show how a simple toy model based on basic biology ideas can predict the law of Gompertz.

Is life finite or could we live for ever? We explore what existing data has to say about this question.

We re-examine using modern data the Farr and Bertillon conjecture that says that for all age-groups, the death-rate of married people is less than the death-rate of non-married be they single, widowed & divorced. Never established with great accuracy, the conjecture has been considered by many to be a statistical artefact. This leads to a more general conjecture (Richmond and Roehner Physica A 450(2016) 768-784) that any abrupt change in living or social conditions generates a mortality spike which acts as a type of selection process. The conjecture will be illustrated using a few examples from prison inmates to fish. Even birth we show may be described as a shock to the foetus and data for early life is used to illustrate how the character of the mortality curve in early life differs both qualitatively and quantitatively from the later Gompertz phase.

From considerations of causes of death in early life we show how diseases may be differentiated into two types characteristic of early and later life. This allows us to highlight the dominant impact of medical advances during the 20th century years and point to the challenges ahead.