

## Survival Extrapolation

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Survival extrapolation occurs in several areas of biostatistical applications. Clinical effectiveness of new health interventions is usually established in randomised controlled trials (RCTs) which almost invariably have short duration of patient follow up. Extrapolation of survival to the lifetime of the patient group represents an integral part of cost-effectiveness analysis. It is unlikely that simple extrapolation of short-term mortality rates observed during RCTs will be accurate. In the absence of long-term survival estimates from RCTs or meta-analysis we show how population data can be used to estimate survival patterns. We synthesize evidence from different sources such as patient registries, population statistics and meta-analyses. We apply this methodology to the estimation of life-years gained in two different medical problems, the use of implantable cardioverter defibrillators for the prevention of sudden cardiac death as well as the reduction of cold ischaemic times (CIT) in heart transplants. Additionally, the use of the Poly-Weibull distribution as a model for flexible hazards is explored. The ability of the model for a number of different hazard shapes is demonstrated and an illustration is given using a bath-tub shaped hazard in the CIT example.