

Mortality forecasting by causes of death in the framework of multistate population projection

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The purpose of population projections is the estimation of expected future population counts and other quantities related with the future of a population. If the population is sufficiently homogeneous with respect to mortality and fertility and furthermore, the immigrants adapt to the same mortality fertility regime the traditional cohort component method yields unbiased estimates. However in a more realistic model the heterogeneity of the population should be taken into account generalising the cohort component method using multistate life tables. A series of multistate life tables should be forecasted instead of simple life tables. The present paper addresses special problems of this topic, related with mortality forecasting. There is a grate tradition of mortality forecasts using various model life tables (Brass, Coale-Demény and Heligman model life tables, etc.). Heligman's model life table method based on principal component analysis generalised in a straightforward manner to deal with causes of death. The logit of the cause specific probabilities of dying is modelled finding the coefficients for principal components with the least squares method. The forecast is based on the trend of the time series of these coefficients. Trends should be considered with some caution because some trends may not continue as expected, e.g. after the complete eradication of a disease. All cause probabilities of dying are expressed as the sum of cause specific probabilities of dying for an appropriate partition of all causes of death. Finally the probabilities of dying of the whole population are weighted averages of the probabilities of dying of the strata of the population. The methods are illustrated on an example of population projection for the

population of Hungary stratified by level of education. Population, mortality, fertility and migration data of the Hungarian Central Statistical Office are used in the study.