

## METHODOLOGY FOR CONSTRUCTION OF LIFE TABLES

### Methodology and main concepts

Life tables (biometric tables) are used for studying the age-specific mortality. Data show the dying of a given generation and reflect the decrease of its number due to the mortality.

There is a system of age-specific coefficients in the life tables (presented as a function of the age) which measure the level of mortality within given periods, survival up to a given age, life expectancy, etc.

### Basic indicators

The main indicator measuring the mortality level depending on the age is the probability for dying within the year since reaching a given age -  $q_x$ . The probability for dying ( $q_x$ ) is a ratio of the number of dead persons at each age and the size of population from which these persons originate i.e. the life table number of the persons from a given cohort who have die within the age interval  $x$  and  $x+1$  years divided to the life table number of the persons from the same cohort who have survived up to the exact age  $x$  years:

$$q_x = \frac{M'_{x_0} + M'_{x_1}}{S_{x_0} + S_{x_1} + M'_{x_0} + M'_{x_1}} + \frac{M''_{x_0} + M''_{x_1}}{S_{x_0} + S_{x_1} + M'_{x_0} + M'_{x_1}}$$

Addition of  $q_x$  to 1,  $p_x = 1 - q_x$ , is the probability for surviving up to the next age (1 year more). The probability for surviving ( $p_x$ ) is the ratio between the number of those who survive to age  $x+1$  years and the number of those who survive to age  $x$  years. Probabilities for dying ( $q_x$ ) and probabilities for surviving ( $p_x$ ) are connected based on the following dependence:

$$p_x + q_x = 1.$$

The indicator  $p_x$  shows the probability existing for a person who has reached a given age, to survive one more year and to reach the next age. It is calculated according to the formula:

$$p_x = \frac{l_{x+1}}{l_x}.$$

Life expectancy ( $e_x$ ) is the ratio between the sum of men-years which the persons who have reached a given age  $x$  will survive for the whole period of their future life (from age  $x$  to the upper limit age) to the number of persons who have survived the age  $x$ . It is calculated according to the formula:

$$e_x = \frac{T_x}{l_x}$$

Life expectancy at birth of a newborn is accepted as a life expectancy of population.

In construction of life tables by causes of death, the average duration of forthcoming life is calculated under the hypothesis for exclusion of some basic causes for death and their maximum contribution to the life expectancy, based on all causes for death, is taken into account.

Age-specific probability for dying by basic causes of deaths shows the contribution of the separate causes to the age-specific probability for dying, in which the influence of all causes for death is aggregated.