

MORTALITY TABLE OR LIFE TABLE

The life table is a conventional method of expressing the most fundamental and essential facts about the age distribution of mortality in a tabular form and is a powerful tool for measuring the probability of life and death of various age sectors. It gives the life history of a hypothetical group or cohort. It usually begins with a population of one lakhs people or any other convenient figure like 10000, 1000 etc. These figures are known as the radix or cohort of the life table. The table consists of eight columns as expressed below-

✚ **First column**- In this column the age is entered in serial order from 0 to maximum probable age (99) in whole numbers.

✚ **Second column (l_x)**- This column shows the number of persons who attain the age x out of an assumed number of births l_0 , called the radix or cohort of the life table.

✚ **Third column (d_x)**- This column reveals the number of death persons between age x and the succeeding year ($x+1$). Obviously we have,

$$d_x = l_x - l_{x+1}$$

✚ **Fourth column (q_x)**- This column presents the probable mortality rate between every age x and ($x+1$). This rate is obtained by dividing the number of dying person (d_x) at each age by the number of people surviving at that age, i.e.,

$$q_x = \frac{d_x}{l_x}$$

✚ **Fifth column (p_x)**- This column indicates the probability of survival between the age x and ($x+1$). It can be obtained by subtracting q_x from 1, i.e.,

$$p_x = 1 - q_x$$

By definition,

$$\begin{aligned} l_{x+1} &= l_x - d_x \\ &= l_x - q_x l_x \\ &= l_x(1 - q_x) \\ &= l_x p_x \end{aligned}$$

✚ **Sixth column (L_x)**- This column reveals the average number of survivals between age x and ($x+1$), i.e.,

$$L_x = \frac{l_x + l_{x+1}}{2}$$

In the table we shall get,

$$L_0 = \frac{l_0 + l_1}{2}$$

Similarly,

$$L_1 = \frac{l_1 + l_2}{2} \quad \text{and so on.}$$

✚ **Seventh column (T_x)**- T_x is the total number of years lived by the cohort after attaining the age x , i.e.,

$$T_x = L_x + L_{x+1} + L_{x+2} + \dots$$

$$T_{x+1} = L_{x+1} + L_{x+2} + L_{x+3} + \dots \quad \text{and so on.}$$

✚ **Eighth column (e_x^0)** - The last column gives the average number of years lived by a person after attaining age x . This is known as expectation of the life at age 0 and it is given by,

$$e_x^0 = \frac{T_x}{l_x}$$

❖ Assumptions involved in the construction of a life table

- The cohort under study is closed to migration i.e., there is no change in the population except losses due to deaths.
- The cohort originates from standard number of births, say 10000 or 100000 which is called the radix of the table.
- Members of the cohort die at each age according to a schedule of mortality fixed in advance and remain unchanged.
- Deaths are uniformly distributed at each age except for the first few years of life.

❖ Uses of life table

- Life tables are of maximum utilities to life insurance corporation to work out the rate of premium for persons of different age groups.
- Population projection may be done by age and sex with the help of life table.
- It helps to assess the accuracy of census figures, death and birth registration etc.
- Estimation of migration can also be made from life tables.