

Life Table Construction

Sample Life Table Data

Age Category	# deaths	# surviving	Prop (lx)	n_x	l_x Log_{10}	d_x	q_x	T_x	e_x	Years
0-5	8	160	1.0	1000	0	50	0.05	6317	6.32	32
6-10	7	152	0.95	950	-0.02	40	0.04	5317	5.59	28
11-15	13	145	0.91	910	-0.04	85	0.09	4367	4.80	24
16-20	9	132	0.83	825	-0.08	56	0.07	3457	4.19	21
21-25	13	123	0.77	769	-0.11	81	0.11	2632	3.42	17
26-30	21	110	0.69	688	-0.16	132	0.19	1863	2.71	13.5
31-35	23	89	0.56	556	-0.25	143	0.26	1175	2.11	10.5
36-40	39	66	0.41	413	-0.39	244	0.59	619	1.50	7.5
41-45	22	27	0.17	169	-0.77	138	0.82	206	1.21	6
46-50	4	5	0.03	31	-1.51	25	0.81	37	1.19	6
51-55	1	1	0.006	6	-2.22	6	1.0	6	1	5
56-60	0	0	0	0	-	0	0	0	0	0
TOTAL	160			6317						

x = Age interval (e.g. 1 year, 0-5 years, etc)

n_x = Number alive at the beginning of the age interval x

l_x = Proportion alive at the beginning of age interval x

d_x = Number dying during age interval x

q_x = Mortality rate during age interval x (i.e., $q_x = d_x / n_x$)

e_x = Expectation for further life of an individual of age x

b_x = The number of female offspring produced per female of age x

Procedures

1. Calculate the age at death for each individual
2. Place individuals into 5-year age categories (separate tables for males and females).
The first category should be 0-5 and so on.
3. Determine the number of deaths in each age category.
4. Determine the number of individuals surviving from birth. Start by placing a 0 in the lowest box of the column. To determine the next box up, add to the 0 the number of deaths that appears to the left and 1 column up. The top box in this column should be the number of tombstones counted.
5. Determine l_x – the proportion alive at the start of age interval x . The first box should be 1.0. The second box = # surviving / Total.
6. Standardize the life table per 1000 to allow for comparisons of life tables.
 $n_x = l_x(1000)$ for each age category.
7. Calculate the Log_{10} of l_x for each time interval. This data will be used to graph survivorship curves.
8. Calculate d_x for each age category. $d_x = n_x - n_{x+1}$
9. Calculate q_x for each age category $q_x = d_x / n_x$
10. You are now ready to calculate the expectation for further life. In order to do this you must first construct a column called T_x , the sum of all the n_x 's up to that age category. So, $T_x(0-4)$ would be the total of the entire n_x column. $T_x(5-9) = T_x(0-4) - n_{x(0-4)}$ and so on.
11. You can now calculate expectation for future life for each age category as follows,
 $e_x = t_x / n_x$
12. Note that e_x is expressed in the number of age categories of additional life expected. Since each age category spans 5 years, you simply multiple each e_x by 5 To convert this value to years.

