

**PREMIUM GENERATION  
FOR DIFFERENT LIFE  
INSURANCE POLICIES**

by

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## **ABSTRACT**

### **PREMIUM GENERATION FOR DIFFERENT LIFE INSURANCE POLICIES**

This technical report explains the premium generation techniques of basic life insurance policies including

- Term Insurance
- Whole Life Insurance
- Pure Endowment Insurance
- Endowment Insurance
- Deferred Insurance

I have prepared this report with the assistance from Sir Mushtaq. This report explains the working of above mentioned basic life insurance policies and the general techniques involved in calculation of their premiums. Traditionally, actuarial work has been done with life tables, not theoretical distributions. Thus I feel it reasonable to calculate premium by using life tables and discrete method rather than continuous one. I used the table '1975-79 India LIC' obtained from Table Manager (Software available on SOA website).

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## Chapter 1

### Term Life Insurance

An n-year term life insurance provides for a payment only if the insured dies within n-year term of an insurance commencing at issue. If a unit is payable at the amount of death of (x) then

$$b_t = \begin{cases} 1; & t \leq n \\ 0; & t > n \end{cases}$$
$$v_t = v^t; \quad t \geq 0$$
$$Z = \begin{cases} v^T; & T \leq n \\ 0; & T > n \end{cases}$$

The expectation of the present value random variable Z, is called the actuarial present value of the insurance and it is denoted by  $A^1_{x:n}$ . The actuarial present value is a good estimate of what the true overall cost of insurance will be on average. The APV for discrete case of term life insurance is given by

$$A^1_{x:n} = E(Z) = \sum_{k=0}^{n-1} v^{k+1} {}_k p_x q_{x+k}$$

Insurance premium payments are made at the start of the period and the present value of these premium payments is given by

$$\ddot{a}_{x:n} = \sum_{k=0}^{n-1} v^k {}_k p_x$$

Most important and widely used method of calculating premium is equivalence principle. According to equivalence principle

**Total expected present value of future premiums = Total expected present value of future death benefits**

Based on equivalence principle, the premium for n-year term life insurance is given by

$$P^1_{x:n} = \frac{A^1_{x:n}}{\ddot{a}_{x:n}}$$

Here,

- $q_x = \frac{l_x - l_{x+1}}{l_x}$  (Mortality rate of a person aged x)
- ${}_k p_x = \frac{l_{x+k}}{l_x}$  (Probability that a person aged x will survive to age x+k)
- $v = \frac{1}{1+i}$  (Discount Factor)

The salient features of the term life insurance policy are:

- Term: 15 years.
- Valid for persons aged 25 years.
- Interest rate is assumed to be 10%.
- Sum Assured: Rs. 500,000.
- Premium is calculated on annual basis.
- Life Table: 1975-79 India LIC

In the below table, AVP stands for actuarial present value i.e.  $A^1_{x:\overline{n}|}$  and PVP stands for present value of premium i.e.  $\ddot{a}_{x:\overline{n}|}$ .

### 15-year Term Insurance

<b>k</b>	<b>x</b>	<b><math>l_x</math></b>	<b><math>q_x</math></b>	<b><math>p_x</math></b>	<b><math>{}_kp_x</math></b>	<b><math>(v^k)^*({}_kp_x)</math></b>	<b><math>(q_k)^*({}_kp_x)</math></b>	<b><math>(v^{k+1})^*({}_kp_x)^*(q_k)</math></b>
0	25	1000	0.001032	0.998968	1.000000	1.000000	0.001032	0.000938
1	26	999	0.001026	0.998974	0.998974	0.908158	0.001025	0.000847
2	27	998	0.00103	0.99897	0.997945	0.824748	0.001028	0.000772
3	28	997	0.001044	0.998956	0.996903	0.748988	0.001041	0.000711
4	29	996	0.001069	0.998931	0.995838	0.680170	0.001065	0.000661
5	30	995	0.001106	0.998894	0.994736	0.617653	0.001100	0.000621
6	31	994	0.001157	0.998843	0.993585	0.560853	0.001150	0.000590
7	32	992	0.001221	0.998779	0.992372	0.509244	0.001212	0.000565
8	33	991	0.001301	0.998699	0.991081	0.462347	0.001289	0.000547
9	34	990	0.001397	0.998603	0.989696	0.419728	0.001383	0.000533
10	35	988	0.001511	0.998489	0.988201	0.380994	0.001493	0.000523
11	36	987	0.001644	0.998356	0.986576	0.345789	0.001622	0.000517
12	37	985	0.001784	0.998216	0.984816	0.313793	0.001757	0.000509
13	38	983	0.001921	0.998079	0.982925	0.284718	0.001888	0.000497
14	39	981	0.002063	0.997937	0.980897	0.258301	0.002024	0.000484

<b>APV</b>	0.009316
<b>PVP</b>	8.315484
<b>Premium @ Re. 1</b>	<b>Re. 0.0011</b>
<b>Premium @ Rs. 500,000</b>	<b>Rs. 560.16</b>

## Chapter 2

### Whole Life Insurance

Whole life insurance provides for a payment following the death of the insured at any time in the future. If the payment is to be a unit amount at the moment of death of (x), then

$$\begin{aligned}b_t &= 1; \quad t \geq 0 \\v_t &= v^t; \quad t \geq 0 \\Z &= v^T; \quad T \geq 0\end{aligned}$$

The actuarial present value of whole life insurance is denoted by  $A_x$ . It shows the average cost of whole life insurance and is given by

$$A_x = \sum_{k=0}^{\infty} v^{k+1} {}_k p_x q_{x+k}$$

Insurance premium payments are made at the start of the period and the present value of these premium payments is given by

$$\ddot{a}_x = \sum_{k=0}^{\infty} v^k {}_k p_x$$

Based on equivalence principle, the premium for n-year term life insurance is given by

$$P_x = \frac{A_x}{\ddot{a}_x}$$

The above premium formula is for n-payment whole life insurance in which you have the advantage of not paying premium for your whole life. I have calculated the premium for whole life insurance on the assumption that the insurer will pay throughout the course of his life, which is obviously cheaper than the n-payment whole life insurance.

The salient features of whole life insurance policy are

- Valid for person aged 25 years.
- Interest rate is assumed to be 10%.
- Sum Assured: Rs. 500,000.
- Premium is calculated on annual basis.
- Life Table: 1975-79 India LIC

## Whole Life Insurance

<b>k</b>	<b>x</b>	<b><math>l_x</math></b>	<b><math>q_x</math></b>	<b><math>p_x</math></b>	<b><math>{}_kp_x</math></b>	<b><math>(v^k)*({}_kp_x)</math></b>	<b><math>(q_k)*({}_kp_x)</math></b>	<b><math>(v^{k+1})*({}_kp_x)*(q_k)</math></b>
0	25	1000	0.001032	0.998968	1.000000	1.000000	0.001032	0.000938
1	26	999	0.001026	0.998974	0.998974	0.908158	0.001025	0.000847
2	27	998	0.00103	0.99897	0.997945	0.824748	0.001028	0.000772
3	28	997	0.001044	0.998956	0.996903	0.748988	0.001041	0.000711
4	29	996	0.001069	0.998931	0.995838	0.680170	0.001065	0.000661
5	30	995	0.001106	0.998894	0.994736	0.617653	0.001100	0.000621
6	31	994	0.001157	0.998843	0.993585	0.560853	0.001150	0.000590
7	32	992	0.001221	0.998779	0.992372	0.509244	0.001212	0.000565
8	33	991	0.001301	0.998699	0.991081	0.462347	0.001289	0.000547
9	34	990	0.001397	0.998603	0.989696	0.419728	0.001383	0.000533
10	35	988	0.001511	0.998489	0.988201	0.380994	0.001493	0.000523
11	36	987	0.001644	0.998356	0.986576	0.345789	0.001622	0.000517
12	37	985	0.001784	0.998216	0.984816	0.313793	0.001757	0.000509
13	38	983	0.001921	0.998079	0.982925	0.284718	0.001888	0.000497
14	39	981	0.002063	0.997937	0.980897	0.258301	0.002024	0.000484
15	40	979	0.002224	0.997776	0.978715	0.234297	0.002177	0.000474
16	41	976	0.002446	0.997554	0.976321	0.212476	0.002388	0.000472
17	42	974	0.002735	0.997265	0.973651	0.192632	0.002663	0.000479
18	43	971	0.003088	0.996912	0.970644	0.174579	0.002997	0.000490
19	44	967	0.003492	0.996508	0.967255	0.158154	0.003378	0.000502
20	45	963	0.003944	0.996056	0.963440	0.143209	0.003800	0.000513
21	46	959	0.004448	0.995552	0.959155	0.129611	0.004266	0.000524
22	47	954	0.005006	0.994994	0.954353	0.117238	0.004777	0.000534
23	48	949	0.005625	0.994375	0.948985	0.105981	0.005338	0.000542
24	49	943	0.006309	0.993691	0.942998	0.095738	0.005949	0.000549
25	50	936	0.007064	0.992936	0.936336	0.086420	0.006614	0.000555
26	51	929	0.007894	0.992106	0.928945	0.077944	0.007333	0.000559
27	52	921	0.008807	0.991193	0.920764	0.070234	0.008109	0.000562
28	53	912	0.009809	0.990191	0.911732	0.063223	0.008943	0.000564
29	54	902	0.010906	0.989094	0.901789	0.056848	0.009835	0.000564
30	55	891	0.012107	0.987893	0.890871	0.051055	0.010786	0.000562
31	56	879	0.01342	0.98658	0.878915	0.045790	0.011795	0.000559
32	57	866	0.014853	0.985147	0.865861	0.041009	0.012861	0.000554
33	58	852	0.016416	0.983584	0.851647	0.036669	0.013981	0.000547
34	59	836	0.01812	0.98188	0.836215	0.032732	0.015152	0.000539
35	60	820	0.019974	0.980026	0.819512	0.029162	0.016369	0.000530
36	61	801	0.02199	0.97801	0.801491	0.025928	0.017625	0.000518
37	62	782	0.02418	0.97582	0.782111	0.023001	0.018911	0.000506
38	63	761	0.026558	0.973442	0.761340	0.020354	0.020220	0.000491
39	64	739	0.029138	0.970862	0.739156	0.017965	0.021538	0.000476
40	65	716	0.031933	0.968067	0.715552	0.015810	0.022850	0.000459
41	66	691	0.034959	0.965041	0.690537	0.013870	0.024141	0.000441
42	67	664	0.038234	0.961766	0.664135	0.012127	0.025393	0.000422
43	68	636	0.041773	0.958227	0.636393	0.010564	0.026584	0.000401



44	69	607	0.045595	0.954405	0.607376	0.009166	0.027693	0.000380
45	70	577	0.049718	0.950282	0.577179	0.007918	0.028696	0.000358
46	71	546	0.054163	0.945837	0.545917	0.006809	0.029569	0.000335
47	72	514	0.05895	0.94105	0.513735	0.005825	0.030285	0.000312
48	73	481	0.0641	0.9359	0.480805	0.004956	0.030820	0.000289
49	74	447	0.069635	0.930365	0.447324	0.004192	0.031149	0.000265
50	75	414	0.075576	0.924424	0.413517	0.003523	0.031252	0.000242
51	76	380	0.081947	0.918053	0.379630	0.002940	0.031110	0.000219
52	77	346	0.088771	0.911229	0.345930	0.002435	0.030709	0.000197
53	78	313	0.09607	0.90393	0.312697	0.002001	0.030041	0.000175
54	79	280	0.103867	0.896133	0.280218	0.001630	0.029105	0.000154
55	80	249	0.112184	0.887816	0.248782	0.001316	0.027909	0.000134
56	81	219	0.121044	0.878956	0.218668	0.001051	0.026468	0.000116
57	82	190	0.130467	0.869533	0.190139	0.000831	0.024807	0.000099
58	83	163	0.140472	0.859528	0.163430	0.000649	0.022957	0.000083
59	84	139	0.151077	0.848923	0.138740	0.000501	0.020960	0.000069
60	85	116	0.162298	0.837702	0.116222	0.000382	0.018863	0.000056
61	86	96	0.174149	0.825851	0.095982	0.000287	0.016715	0.000045
62	87	78	0.186638	0.813362	0.078068	0.000212	0.014571	0.000036
63	88	62	0.199775	0.800225	0.062472	0.000154	0.012480	0.000028
64	89	49	0.21356	0.78644	0.049131	0.000110	0.010492	0.000021
65	90	38	0.227995	0.772005	0.037929	0.000077	0.008648	0.000016
66	91	29	0.243072	0.756928	0.028710	0.000053	0.006979	0.000012
67	92	21	0.258782	0.741218	0.021280	0.000036	0.005507	0.000008
68	93	15	0.275109	0.724891	0.015426	0.000024	0.004244	0.000006
69	94	11	0.292031	0.707969	0.010921	0.000015	0.003189	0.000004
70	95	8	0.309522	0.690478	0.007541	0.000010	0.002334	0.000003
71	96	5	0.327549	0.672451	0.005071	0.000006	0.001661	0.000002
72	97	3	0.346073	0.653927	0.003316	0.000003	0.001148	0.000001
73	98	2	0.365052	0.634948	0.002105	0.000002	0.000769	0.000001
74	99	1	0.384436	0.615564	0.001296	0.000001	0.000498	0.000000

<b>APV</b>	0.027869
<b>PVP</b>	10.667219
<b>Premium @ Re. 1</b>	<b>Re. 0.0026</b>
<b>Premium @ Rs. 500,000</b>	<b>Rs. 1306.3</b>

## Chapter 3

### Pure Endowment Insurance

An n-year pure endowment insurance provides for a payment at the end of n years if and only if the insured survives at least n years from the time of policy issue. If the amount payable is a unit, then

$$b_t = \begin{cases} 0; & t \leq n \\ 1; & t > n \end{cases}$$
$$v_t = v^n; \quad t \geq 0$$
$$Z = \begin{cases} 0; & T \leq n \\ v^n; & T > n \end{cases}$$

The actuarial present value of pure endowment insurance is denoted by  $A_{x:\overline{n}|}^1$ . The expected cost of payments is given by

$$A_{x:\overline{n}|}^1 = E(Z) = v^n {}_n p_x$$

The actuarial present value of n-year pure endowment insurance when discussed in an annuity context is denoted by  ${}_n E_x$ .

Insurance premium payments are made at the start of the period and the present value of these premium payments is given by

$$\ddot{a}_{x:n} = \sum_{k=0}^{n-1} v^k {}_k p_x$$

Based on equivalence principle, the premium for n-year pure endowment insurance is given by

$$P_{x:\overline{n}|} = A_{x:\overline{n}|}^1 / \ddot{a}_{x:\overline{n}|}$$

The salient features of pure endowment policy are

- Term: 15 years.
- Valid for persons aged 25 years.
- Interest rate is assumed to be 10%.
- Sum Assured: Rs. 500,000.
- Premium is calculated on annual basis.
- Life Table: 1975-79 India LIC

### 15-year Pure Endowment

<b>k</b>	<b>x</b>	<b><math>l_x</math></b>	<b><math>q_x</math></b>	<b><math>p_x</math></b>	<b><math>{}_kp_x</math></b>	<b><math>(v^k)({}_kp_x)</math></b>
0	25	1000	0.001032	0.998968	1.000000	1.000000
1	26	999	0.001026	0.998974	0.998974	0.908158
2	27	998	0.00103	0.99897	0.997945	0.824748
3	28	997	0.001044	0.998956	0.996903	0.748988
4	29	996	0.001069	0.998931	0.995838	0.680170
5	30	995	0.001106	0.998894	0.994736	0.617653
6	31	994	0.001157	0.998843	0.993585	0.560853
7	32	992	0.001221	0.998779	0.992372	0.509244
8	33	991	0.001301	0.998699	0.991081	0.462347
9	34	990	0.001397	0.998603	0.989696	0.419728
10	35	988	0.001511	0.998489	0.988201	0.380994
11	36	987	0.001644	0.998356	0.986576	0.345789
12	37	985	0.001784	0.998216	0.984816	0.313793
13	38	983	0.001921	0.998079	0.982925	0.284718
14	39	981	0.002063	0.997937	0.980897	0.258301

<b>APV</b>	0.234818879
<b>PVP</b>	8.315484
<b>Premium @ Re. 1</b>	<b>0.028238751</b>
<b>Premium @ Rs. 500,000</b>	<b>14119.37554</b>

## Chapter 4

### Endowment Insurance

An n-year endowment insurance provides for an amount to be payable either following the death of insured or upon the survival of the insured to the end of the n-year term, whichever occurs first. If the insurance is for a unit amount and the death benefit is payable at the moment of death, then

$$\begin{aligned} b_t &= 1; \quad t \geq 0 \\ v_t &= \begin{cases} v^t; & t \leq n \\ v^n; & t > n \end{cases} \\ Z &= \begin{cases} v^T; & T \leq n \\ v^n; & T > n \end{cases} \end{aligned}$$

The actuarial present value of endowment insurance is given by  $A_{x:\overline{n}|}$ . According to definition this insurance can be viewed as combination of the n-year term insurance and n-year pure endowment. This implies

$$A_{x:\overline{n}|} = A_{x:\overline{n}|}^1 + A_{x:\overline{n}|}^{\overline{1}}$$

Insurance premium payments are made at the start of the period and the present value of these premium payments is given by

$$\ddot{a}_{x:n} = \sum_{k=0}^{n-1} v^k {}_k p_x$$

Based on equivalence principle, the premium for n-year endowment insurance is given by

$$P_{x:\overline{n}|} = A_{x:\overline{n}|} / \ddot{a}_{x:\overline{n}|}$$

I calculated the premium of endowment insurance policy by simply adding the 15-year term insurance and 15-year pure endowment policy. Features of my endowment insurance policy remain the same as term and endowment one.

## Chapter 5

### Deferred Insurance

An n-year deferred insurance provides for a benefit following the death of the insured only if the insured dies at least n years following policy issue. An n-year deferred whole life insurance with a unit amount payable at the moment of death has

$$b_t = \begin{cases} 1; & t > n \\ 0; & t \leq n \end{cases}$$
$$v_t = v'; \quad t > 0$$
$$Z = \begin{cases} v^T; & T > n \\ 0; & T \leq n \end{cases}$$

The actuarial present value of n-year deferred insurance is denoted by  ${}_n|A_x$  and is given by

$${}_n|A_x = \sum_{k=0}^{n-1} v^{k+1} {}_k p_x q_{x+k}$$

As with endowment insurance, the definition of n-year deferred insurance gives an intuitively appealing identity i.e. whole life insurance is a sum of n-year deferred insurance and n-year term insurance.

$$A_x = {}_n|A_x + A_{x:\overline{n}|}^1$$

$$\text{Or} \quad {}_n|A_x = A_x - A_{x:\overline{n}|}^1$$

I calculated the premium of 15-year deferred insurance by simply subtracting the 15-year term insurance from whole life insurance. Features of my 15-year deferred insurance policy are

- Deferred Term: 15 years
- Valid for persons aged 25 years.
- Interest rate is assumed to be 10%.
- Sum Assured: Rs. 500,000.
- Premium is calculated on annual basis.
- Life Table: 1975-79 India LIC

### Endowment

<b>Premium (Pure Endowment)</b>	Rs. 14119.37554
<b>Premium (Term Insurance)</b>	Rs. 560.169715

<b>Premium</b>	<b>Rs. 14679.54525</b>
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### 15-year Deferred Insurance

<b>Premium (Whole Life)</b>	Rs. 1306.306916
<b>Premium (Term Insurance)</b>	Rs. 560.169715

<b>Premium</b>	<b>Rs. 746.1372004</b>
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## Chapter 5

### Benefit Reserves

Insurance companies usually charge level premiums. After collecting premiums, insurance companies put the overpaid premiums (overpaid premium is the collected premium minus the cost of insurance) into a fund. Typically insurance companies invest the overpaid premiums and use this fund to subsidize the cost of insurance in later years. It is subsidized because in later years usually the premiums collected are less than the cost of insurance. This fund is called reserve. Simply put, reserve is a money set aside today for rainy days tomorrow.

At time 't', reserve can be calculated by retrospective method or by prospective method. By prospective method, Benefit reserve at time 't' is the conditional expectation of the difference between present value of future benefits and the present value of future benefit premiums, the conditional event being survivorship of the insured to time 't'. Benefit reserve is calculated nearly always on 'per policy basis'.

I have calculated benefit reserve in each year for my 15-year term insurance policy and for whole life insurance policy. Benefit reserves by retrospective method are given by

$$\text{Reserve } (t) = \frac{\text{Accumulated value of the reserve savings account } (t)}{\text{Number of surviving policies } (t)}$$

The formula for calculating benefit reserve by prospective method for whole life insurance at any point 't' is given by

$${}_kV_x = A_{x+k} - P_x \ddot{a}_{x+k}$$

I have calculated reserves for my term insurance policy and whole insurance policy by retrospective method. Interest rate is assumed to be 10%. Reserves are calculated on yearly basis till the policy matures. Other features of my policies remain same.



### Benefit Reserves - Term Life Insurance

Year	$l_x$	Exp. Benefit Premiums at Beginning of Year	Exp. Fund at Beginning of Year	Expected Interest	$d_x$	Expected Death Claims	Exp. Fund at End of Year	Exp. No. of Survivors at End of Year	$500,000 {}_kV_x$
1	1000	560206.9963	560206.9963	56020.69963	1	516000	100227.6959	999	100.3312378
2	999	559628.8627	659856.5586	65985.65586	1	512470.584	213371.6305	998	213.811428
3	998	559054.6835	772426.3139	77242.63139	1	513940.6753	335728.27	997	336.7671369
4	997	558478.8571	894207.1272	89420.71272	1	520389.7226	463238.1173	996	465.1571706
5	996	557895.8052	1021133.922	102113.3922	1	532294.8658	590952.449	995	594.0356076
6	995	557299.4146	1148251.864	114825.1864	1	550129.824	712947.2259	994	717.4603755
7	994	556683.0414	1269630.267	126963.0267	1	574860.9739	821732.3202	993	827.89198
8	993	556038.9592	1377771.279	137777.1279	1	605957.7742	909590.6331	991	917.5291771
9	991	555360.0356	1464950.669	146495.0669	1	644871.8162	966573.9194	990	976.2799309
10	990	554637.5122	1521211.432	152121.1432	1	691555.63	981776.9447	989	993.0228729
11	989	553862.6836	1535639.628	153563.9628	1	746944.005	942259.5861	987	954.4950982
12	987	553025.7971	1495285.383	149528.5383	2	811462.9203	833351.0012	986	845.5624085
13	986	552116.6227	1385467.624	138546.7624	2	879117.9522	644896.434	984	655.5157855
14	984	551131.6466	1196028.081	119602.8081	2	944939.9063	370690.9825	982	377.5202764
15	982	550072.9227	920763.9052	92076.39052	2	1012840.296	-1.45636E-07	980	-0.0000000001

### Benefit Reserves - Whole Life Insurance

Year	$l_x$	Exp. Benefit Premiums at Beginning of Year	Exp. Fund at Beginning of Year	Expected Interest	$d_x$	Expected Death Claims	Exp. Fund at End of Year	Exp. No. of Survivors at End of Year	500,000 ${}_kV_x$
1	1000	1329238.213	1329238.21	132923.8	1	516000	946162.0342	999	947.1394821
2	999	1327866.439	2274028.47	227402.8	1	512470.6	1988960.737	998	1993.060344
3	998	1326504.048	3315464.78	331546.5	1	513940.7	3133070.588	997	3142.765461
4	997	1325137.749	4458208.34	445820.8	1	520389.7	4383639.448	996	4401.799521
5	996	1323754.305	5707393.75	570739.4	1	532294.9	5745838.262	995	5775.815854
6	995	1322339.212	7068177.47	706817.7	1	550129.8	7224865.398	994	7270.600758
7	994	1320876.705	8545742.1	854574.2	1	574861	8825455.339	993	8891.610461
8	993	1319348.45	10144803.8	1014480	1	605957.8	10553326.39	991	10645.43161
9	991	1317737.526	11871063.9	1187106	1	644871.8	12413298.49	990	12537.94868
10	990	1316023.149	13729321.6	1372932	1	691555.6	14410698.18	989	14575.76793
11	989	1314184.665	15724882.8	1572488	1	746944	16550427.12	987	16765.33918
12	987	1312198.932	17862626.1	1786263	2	811462.9	18837425.74	986	19113.45766
13	986	1310041.677	20147467.4	2014747	2	879118	21283096.21	984	21633.55973
14	984	1307704.562	22590800.8	2259080	2	944939.9	23904940.94	982	24345.34515
15	982	1305192.462	25210133.4	2521013	2	1012840	26718306.45	980	27266.79309
16	980	1302499.85	28020806.3	2802081	2	1089632	29733255.42	978	30411.2691
17	978	1299603.09	31032858.5	3103286	2	1195733	32940410.92	975	33774.16966
18	975	1296424.261	34236835.2	3423684	3	1333742	36326777.2	973	37348.39653
19	973	1292878.541	37619655.7	3761966	3	1501766	39879855.53	970	41128.40272
20	970	1288886.132	41168741.7	4116874	3	1692996	43592619.67	966	45114.94642
21	966	1284385.341	44877005	4487701	4	1905458	47459247.28	962	49311.08602
22	962	1279319.726	48738567	4873857	4	2140479	51471944.26	958	53719.3001
23	958	1273629.312	52745573.6	5274557	5	2398287	55621844.35	953	58342.45447
24	953	1267253.523	56889097.9	5688910	5	2681348	59896659.43	948	63181.75935
25	948	1260125.222	61156784.7	6115678	6	2990484	64281979.56	942	68238.11156
26	942	1252175.092	65534154.7	6553415	7	3327231	68760339.24	935	73511.36907
27	935	1243329.727	70003669	7000367	7	3691906	73312129.94	928	79001.3043
28	928	1233514.882	74545644.8	7454564	8	4086388	77913821.53	920	84706.10342
29	920	1222651.317	79136472.8	7913647	9	4511226	82538894.59	911	90623.29974
30	911	1210658.33	83749552.9	8374955	10	4966544	87157964.36	901	96749.94667
31	901	1197454.89	88355419.2	8835542	11	5453344	91737617.21	890	103081.6125
32	890	1182957.304	92920574.5	9292057	12	5971573	96241058.6	878	109612.9414
33	878	1167082.017	97408140.6	9740814	13	6520528	100628427	865	116337.8639
34	865	1149747.348	101778174	10177817	14	7099650	104856341.6	851	123249.069
35	851	1130873.095	105987215	10598721	15	7707956	108877979.8	835	130337.86
36	835	1110381.675	109988361	10998836	17	8342659	112644538.1	819	137595.1332
37	819	1088202.911	113732741	11373274	18	9001239	116104776	801	145010.5915
38	801	1064273.329	117169049	11716905	19	9680029	119205925.2	781	152573.0285
39	781	1038539.2	120244464	12024446	21	10374936	121893974.3	761	160269.9425
40	761	1010957.676	122904932	12290493	22	11080514	124114911.4	738	168087.8423

41	738	981500.3913	125096412	12509641	24	11789554	125816498.7	715	176012.9088
42	715	950158.1393	126766657	12676666	25	12494592	126948730.5	690	184030.3797
43	690	916941.5609	127865672	12786567	26	13187382	127464857.5	663	192124.2587
44	663	881883.2173	128346741	12834674	28	13857150	127324264.4	636	200278.5838
45	636	845044.3096	128169309	12816931	29	14493187	126493052.8	607	208476.5946
46	607	806514.5143	127299567	12729957	30	15083184	124946340.2	577	216701.375
47	577	766416.2257	125712756	12571276	31	15614734	122669298.2	545	224935.3478
48	545	724904.8237	123394203	12339420	32	16074297	119659326.4	513	233160.8784
49	513	682171.6843	120341498	12034150	33	16448220	115927427.9	480	241360.3251
50	480	638444.4794	116565872	11656587	33	16723143	111499316.7	447	249516.0713
51	447	593986.398	112093303	11209330	34	16886031	106416602.1	413	257611.0535
52	413	549095.282	106965697	10696570	34	16925751	100736515.8	379	265628.2598
53	379	504098.5709	101240614	10124061	34	16832699	94531976.48	346	273551.1577
54	346	459349.2367	94991325.7	9499133	33	16599614	87890844.79	312	281364.0829
55	312	415219.5555	88306064.3	8830606	32	16222679	80913991.82	280	289052.131
56	280	372091.946	81286083.8	8128608	31	15701762	73712930.62	249	296601.4423
57	249	330349.1831	74043279.8	7404328	30	15041242	66406366.06	218	303999.004
58	218	290362.3966	66696728.5	6669673	28	14249782	59116618.83	190	311233.2326
59	190	252479.6858	59369098.5	5936910	27	13340847	51965161.68	163	318294.131
60	163	217013.3594	52182175	5218218	25	12332525	45067867.42	139	325173.4329
61	139	184227.6321	45252095.1	4525210	22	11246959	38530345.23	116	331864.957
62	116	154327.8558	38684673.1	3868467	20	10109566	32443574.82	96	338365.0498
63	96	127451.8141	32571026.6	3257103	18	8947738	26880390.87	78	344673.9789
64	78	103664.4624	26984055.3	2698406	16	7790014	21892447.09	62	350796.387
65	62	82954.89442	21975402	2197540	13	6663910	17509032.33	49	356744.5549
66	49	65239.04717	17574271.4	1757427	11	5595000	13736698.16	38	362541.2691
67	38	50364.87061	13787063	1378706	9	4605002	10560767.11	29	368227.3056
68	29	38122.58078	10598889.7	1059889	7	3710937	7947841.977	21	373872.7314
69	21	28257.14308	7976099.12	797609.9	6	2924154	5849555.069	15	379598.6798
70	15	20483.34871	5870038.42	587003.8	5	2250076	4206966.71	11	385617.4632
71	11	14501.5759	4221468.29	422146.8	3	1688394	2955220.689	8	392308.4755
72	8	10013.01912	2965233.71	296523.4	2	1233697	2028060.076	5	400366.696
73	5	6733.264723	2034793.34	203479.3	2	876517.5	1361755.17	3	411099.4464
74	3	4403.0636	1366158.23	136615.8	1	604612.2	898161.8972	2	427035.8408
75	2	2795.716427	900957.614	90095.76	2	1000000	-8946.624999	0	0

## Life Table

Table name: 1975-79 India LIC, Male+Female  
 Table type: Aggregate  
 Usage: Insured mortality  
 Contributor: John S. Brake  
 Country: India  
 Observation period: 1975 to 1979  
 LIC stands for Life Insurance Corporation of India  
 Minimum age: 15  
 Maximum age: 99  
 Number of decimal places: 6

Table values:

Age	q <sub>x</sub>	Age	q <sub>x</sub>	Age	q <sub>x</sub>	Age	q <sub>x</sub>
15	0.001487	37	0.001784	59	0.01812	81	0.121044
16	0.001416	38	0.001921	60	0.019974	82	0.130467
17	0.00135	39	0.002063	61	0.02199	83	0.140472
18	0.001289	40	0.002224	62	0.02418	84	0.151077
19	0.001233	41	0.002446	63	0.026558	85	0.162298
20	0.001182	42	0.002735	64	0.029138	86	0.174149
21	0.001138	43	0.003088	65	0.031933	87	0.186638
22	0.0011	44	0.003492	66	0.034959	88	0.199775
23	0.001069	45	0.003944	67	0.038234	89	0.21356
24	0.001046	46	0.004448	68	0.041773	90	0.227995
25	0.001032	47	0.005006	69	0.045595	91	0.243072
26	0.001026	48	0.005625	70	0.049718	92	0.258782
27	0.00103	49	0.006309	71	0.054163	93	0.275109
28	0.001044	50	0.007064	72	0.05895	94	0.292031
29	0.001069	51	0.007894	73	0.0641	95	0.309522
30	0.001106	52	0.008807	74	0.069635	96	0.327549
31	0.001157	53	0.009809	75	0.075576	97	0.346073
32	0.001221	54	0.010906	76	0.081947	98	0.365052
33	0.001301	55	0.012107	77	0.088771	99	0.384436
34	0.001397	56	0.01342	78	0.09607		
35	0.001511	57	0.014853	79	0.103867		
36	0.001644	58	0.016416	80	0.112184		

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