# life_insurance_solutions

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Row 40 of the given life table has 93,131 people, so it can be used to model what we think will happen with this population of 40 year olds that want life insurance.

| x | Lives | Epected Deaths | Premium Collected | Payout for Deaths | PV Premiums at age 40 | PV Payouts at age 40 |
|---|---|---|---|---|---|---|
| 40 | 93131.64 | 259.02 | 223515936 | 38853000 | 223515936 | 38853000 |
| 41 | 92872.62 | 276.92 | 222894288 | 41538000 | 214321430.8 | 39940384.62 |
| 42 | 92595.7 | 296.47 | 222229680 | 44470500 | 205463831.4 | 41115477.07 |
| 43 | 92299.23 | 317.76 | 221518152 | 47664000 | 196928830.5 | 42373122.44 |
| 44 | 91981.47 | 340.97 | 220755528 | 51145500 | 188702750.5 | 43719387.75 |
| 45 | 91640.5 | 366.25 | 219937200 | 54937500 | 180772346.5 | 45154620.43 |
| 46 | 91274.25 | 393.77 | 219058200 | 59065500 | 173124877.4 | 46680322.62 |
| 47 | 90880.48 | 423.7 | 218113152 | 63555000 | 165748069.5 | 48296576.62 |
| 48 | 90456.78 | 456.23 | 217096272 | 68434500 | 158630119.5 | 50004418.83 |
| 49 | 90000.55 | 491.55 | 216001320 | 73732500 | 151759662.3 | 51803476.48 |
| 50 | 89509 | 529.89 | 214821600 | 79483500 | 145125775.6 | 53696204.61 |
| 51 | 88979.11 | 571.43 | 213549864 | 85714500 | 138717919.6 | 55678504.76 |
| 52 | 88407.68 | 616.42 | 212178432 | 92463000 | 132526022.6 | 57752117 |
| 53 | 87791.26 | 665.06 | 210699024 | 99759000 | 126540373.8 | 59912670.26 |
| 54 | 87126.2 | 717.6 | 209102880 | 107640000 | 120751702.9 | 62159417.91 |
| 55 | 86408.6 | 774.27 | 207380640 | 116140500 | 115151107.9 | 64488696.98 |
| 56 | 85634.33 | 835.26 | 205522392 | 125289000 | 109730085.4 | 66892821.42 |
| 57 | 84799.07 | 900.82 | 203517768 | 135123000 | 104480577.1 | 69368533.1 |
| 58 | 83898.25 | 971.14 | 201355800 | 145671000 | 99394885.21 | 71907302.02 |
| 59 | 82927.11 | 1046.38 | 199025064 | 156957000 | 94465738.82 | 74498450.95 |
| 60 | 81880.73 | 1126.72 | 196513752 | 169008000 | 89686311.16 | 77133045 |
| 61 | 80754.01 | 1212.23 | 193809624 | 181834500 | 85050175.42 | 79795088.62 |
| 62 | 79541.78 | 1303 | 190900272 | 195450000 | 80551398.08 | 82471180.32 |
| 63 | 78238.78 | 1399 | 187773072 | 209850000 | 76184480 | 85141671.05 |
| 64 | 76839.78 | 1500.15 | 184415472 | 225022500 | 71944435.83 | 87786109.46 |
| 65 | 75339.63 | 1606.26 | 180815112 | 240939000 | 67826786.61 | 90380267.22 |
| 66 | 73733.37 | 1717.04 | 176960088 | 257556000 | 63827598.4 | 92897676.08 |
| 67 | 72016.33 | 1832.02 | 172839192 | 274803000 | 59943495.75 | 95306233.92 |
| 68 | 70184.31 | 1950.65 | 168442344 | 292597500 | 56171726.93 | 97574674.4 |
| 69 | 68233.66 | 2072.12 | 163760784 | 310818000 | 52510127.06 | 99664231.41 |
| 70 | 66161.54 | 2195.46 | 158787696 | 329319000 | 48957210.92 | 101535195.4 |
| 71 | 63966.08 | 2319.46 | 153518592 | 347919000 | 45512161.34 | 103144156.4 |
| 72 | 61646.62 | 2442.69 | 147951888 | 366403500 | 42174860.42 | 104446226.9 |
| 73 | 59203.93 | 2563.43 | 142089432 | 384514500 | 38945885.38 | 105393183.9 |
| 74 | 56640.5 | 2679.7 | 135937200 | 401955000 | 35826533.11 | 105936080.2 |
| 75 | 53960.8 | 2789.29 | 129505920 | 418393500 | 32818803.68 | 106027385.8 |

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|---|---|---|---|---|---|---|
| 76 | 51171.51 | 2889.7 | 122811624 | 433455000 | 29925351.45 | 105619425.8 |
| 77 | 48281.81 | 2978.21 | 115876344 | 446731500 | 27149462.15 | 104667782.3 |
| 78 | 45303.6 | 3051.98 | 108728640 | 457797000 | 24494978.49 | 103134994.3 |
| 79 | 42251.62 | 3107.98 | 101403888 | 466197000 | 21966171.71 | 100987876.9 |
| 80 | 39143.64 | 3143.27 | 93944736 | 471490500 | 19567659.31 | 98206305.81 |
| 81 | 36000.37 | 3154.96 | 86400888 | 473244000 | 17304190.79 | 94780327.55 |
| 82 | 32845.41 | 3140.46 | 78828984 | 471069000 | 15180486.1 | 90716079.86 |
| 83 | 29704.95 | 3097.61 | 71291880 | 464641500 | 13200989.26 | 86036831.25 |
| 84 | 26607.34 | 3024.89 | 63857616 | 453733500 | 11369615.34 | 80785592.79 |
| 85 | 23582.45 | 2921.55 | 56597880 | 438232500 | 9689467.17 | 75024708.02 |
| 86 | 20660.9 | 2787.91 | 49586160 | 418186500 | 8162569.079 | 68839292.94 |
| 87 | 17872.99 | 2625.41 | 42895176 | 393811500 | 6789558.069 | 62333490.54 |
| 88 | 15247.58 | 2436.75 | 36594192 | 365512500 | 5569444.442 | 55629088.95 |
| 89 | 12810.83 | 2225.92 | 30745992 | 333888000 | 4499402.903 | 48861543.86 |
| 90 | 10584.91 | 1998.156 | 25403784 | 299723400 | 3574632.886 | 42174863.49 |
| 91 | 8586.754 | 1759.682 | 20608209.6 | 263952300 | 2788302.952 | 35712902.36 |
| 92 | 6827.072 | 1517.487 | 16384972.8 | 227623050 | 2131631.264 | 29613012.83 |
| 93 | 5309.585 | 1278.861 | 12743004 | 191829150 | 1594060.633 | 23996484.37 |
| 94 | 4030.724 | 1050.913 | 9673737.6 | 157636950 | 1163573.926 | 18960845.58 |
| 95 | 2979.811 | 840.045 | 7151546.4 | 126006750 | 827115.7662 | 14573375.29 |
| 96 | 2139.766 | 651.443 | 5135438.4 | 97716450 | 571097.8477 | 10866775.13 |
| 97 | 1488.323 | 488.6772 | 3571975.2 | 73301580 | 381951.3901 | 7838139.63 |
| 98 | 999.6458 | 353.4741 | 2399149.92 | 53021115 | 246674.1884 | 5451489.464 |
| 99 | 646.1717 | 245.6771 | 1550812.08 | 36851565 | 153317.651 | 3643249.529 |
| 100 | 400.4946 | 163.4494 | 961187.04 | 24517410 | 91370.82548 | 2330634.827 |
| 101 | 237.0452 | 103.656 | 568908.48 | 15548400 | 52000.64255 | 1421189.557 |
| 102 | 133.3892 | 62.37457 | 320134.08 | 9356185.5 | 28136.16312 | 822302.8344 |
| 103 | 71.01463 | 35.43584 | 170435.112 | 5315376 | 14403.19016 | 449193.6573 |
| 104 | 35.57879 | 18.90227 | 85389.096 | 2835340.5 | 6938.549656 | 230394.1811 |
| 105 | 16.67652 | 9.410455 | 40023.648 | 1411568.25 | 3127.156498 | 110289.6674 |
| 106 | 7.266065 | 4.343847 | 17438.556 | 651577.05 | 1310.117134 | 48951.43024 |
| 107 | 2.922218 | 1.845778 | 7013.3232 | 276866.7 | 506.629087 | 20000.32216 |
| 108 | 1.07644 | 0.7163166 | 2583.456 | 107447.49 | 179.4460888 | 7463.270841 |
| 109 | 0.3601234 | 0.2517149 | 864.29616 | 37757.235 | 57.72476477 | 2521.736888 |
| 110 | 0.1084085 | 0.07934139 | 260.1804 | 11901.2085 | 16.70862939 | 764.2884787 |
| 111 | 0.02906711 | 0.022202482 | 69.761064 | 3330.3723 | 4.307705509 | 205.6485707 |
| 112 | 0.006864628 | 0.005454072 | 16.4751072 | 818.1108 | 0.9782003629 | 48.57487552 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 113 | 0.001410556 | 0.001161733 | 3.3853344 | 174.25995 | 0.1932714948 | 9.948642301 |
| 114 | 0.000248823 | 2.12E-04 | 0.5971752 | 3.18E+01 | 0.03278194034 | 1.74E+00 |
| 115 | 3.71E-05 | 3.25E-05 | 8.90E-02 | 4.87E+00 | 4.70E-03 | 2.57E-01 |
| 116 | 4.61E-06 | 4.14E-06 | 1.11E-02 | 6.21E-01 | 5.62E-04 | 3.15E-02 |
| 117 | 4.68E-07 | 4.30E-07 | 1.12E-03 | 6.45E-02 | 5.48E-05 | 3.15E-03 |
| 118 | 3.82E-08 | 3.58E-08 | 9.17E-05 | 5.36E-03 | 4.30E-06 | 2.52E-04 |
| 119 | 2.44E-09 | 2.32E-09 | 5.86E-06 | 3.48E-04 | 2.64E-07 | 1.57E-05 |
| 120 | 1.20E-10 | 1.16E-10 | 2.88E-07 | 1.73E-05 | 1.25E-08 | 7.52E-07 |
| 121 | 4.39E-12 | 4.27E-12 | 1.05E-08 | 6.41E-07 | 4.40E-10 | 2.67E-08 |
| 122 | 1.17E-13 | 1.15E-13 | 2.81E-10 | 1.72E-08 | 1.13E-11 | 6.91E-10 |
| 123 | 2.20E-15 | 2.17E-15 | 5.28E-12 | 3.26E-10 | 2.04E-13 | 1.26E-11 |
| 124 | 2.82E-17 | 2.80E-17 | 6.77E-14 | 4.19E-12 | 2.51E-15 | 1.56E-13 |
| 125 | 2.38E-19 | 2.37E-19 | 5.71E-16 | 3.55E-14 | 2.04E-17 | 1.27E-15 |
| 126 | 1.26E-21 | 1.26E-21 | 3.02E-18 | 1.88E-16 | 1.04E-19 | 6.46E-18 |
| 127 | 4.04E-24 | 4.03E-24 | 9.70E-21 | 6.05E-19 | 3.20E-22 | 1.99E-20 |
| 128 | 7.45E-27 | 7.44E-27 | 1.79E-23 | 1.12E-21 | 5.67E-25 | 3.54E-23 |
| 129 | 7.47E-30 | 7.47E-30 | 1.79E-26 | 1.12E-24 | 5.46E-28 | 3.41E-26 |
| 130 | 3.85E-33 | 3.85E-33 | 9.24E-30 | 5.77E-28 | 2.71E-31 | 1.69E-29 |
| 131 | 9.54E-37 | 9.54E-37 | 2.29E-33 | 1.43E-31 | 6.45E-35 | 4.03E-33 |
| 132 | 1.06E-40 | 1.06E-40 | 2.54E-37 | 1.59E-35 | 6.89E-39 | 4.31E-37 |
| 133 | 4.92E-45 | 4.92E-45 | 1.18E-41 | 7.38E-40 | 3.08E-43 | 1.92E-41 |
| 134 | 8.70E-50 | 8.70E-50 | 2.09E-46 | 1.30E-44 | 5.23E-48 | 3.27E-46 |
| 135 | 5.35E-55 | 5.35E-55 | 1.28E-51 | 8.02E-50 | 3.09E-53 | 1.93E-51 |
| 136 | 1.03E-60 | 1.03E-60 | 2.47E-57 | 1.54E-55 | 5.73E-59 | 3.58E-57 |
| 137 | 5.61E-67 | 5.61E-67 | 1.35E-63 | 8.41E-62 | 3.00E-65 | 1.87E-63 |
| 138 | 7.58E-74 | 7.58E-74 | 1.82E-70 | 1.14E-68 | 3.90E-72 | 2.43E-70 |
| 139 | 2.23E-81 | 2.23E-81 | 5.35E-78 | 3.35E-76 | 1.10E-79 | 6.89E-78 |
| | | | | | | |
| | | | | **Total** | 4222283791 | 3972826363 |
| | | | | **Profit** | | 249457428.48 |