

## 构建寿命表（从 0 岁开始逐年计算）

寿命表（死亡表或精算表）用来显示每个年龄活着的人在他或她的下一个生日前死亡的概率，及他或她的剩余预期寿命。寿命表通常是分男性和女性分别统计，因为他们的死亡率有很大不同。也可以分不同的危险因素暴露情况，如吸烟状况、职业、社会经济阶层来分别统计。还可以扩展到死亡之外的其他结局，例如健康预期寿命表，是最有名的例子是无残疾预期寿命（DFLE）和健康生活年（HLY），表示一个人可以活在一个特定的健康状态，如无残疾的年数。

死亡者在所在年存活时间所占的比例分数：这个比例分数通常被指定为 0.5，这意味着某年龄死亡者平均存活时间为 0.5 岁。然而，对于 0 岁（婴儿）和 1 岁，这个数字不适当。Keyfitz & Flieger(1968)提出 0 岁组存活时间计算公式： $0.07+1.7*M$ （M: 0 岁组死亡率），如按 5 岁分组, 1-5 岁组存活时间一般定义为 1.5；如果按 1 岁分组，1 岁组存活时间可以定义为 0.3。最后 1 组是没有上限年龄的开放组，存活时间为  $1/M$ （M 为最后 1 组的死亡率）。此模块，用户可以自己定义存活时间分数，也可以用上述默认的计算方法。

例：

	年龄	死亡率	存活时间分数
1	0	0.00512	0.1
2	1	0.00040	0.3
3	2	0.00024	0.5
4	3	0.00023	0.5
5	4	0.00021	0.5
6	5	0.00018	0.5
7	6	0.00014	0.5
8	7	0.00010	0.5
9	8	0.00010	0.5
10	9	0.00010	0.5
11	10	0.00011	0.5
12	11	0.00011	0.5
13	12	0.00015	0.5
14	13	0.00019	0.5
15	14	0.00023	0.5
16	15	0.00027	0.5
17	16	0.00031	0.5
18	17	0.00034	0.5
19	18	0.00035	0.5
20	19	0.00034	0.5
21	20	0.00033	0.5
22	21	0.00032	0.5
23	22	0.00032	0.5

开始计算

Clear table

Example data

99	98	0.27957	0.5
100	99	0.30110	0.5
101	100	0.32339	0.5
102	101	0.34639	0.5
103	102	0.37002	0.5
104	103	0.39420	0.5
105	104	0.41885	0.5
106	105	0.44388	0.5
107	106	0.4692	0.5
108	107	0.49471	0.5
109	108	0.52032	0.5
110	109	0.54592	1.8

点击开始计算，得结果如下：

Life table

AGE	Factor	Mortality rate	Prob.of death	Cum. survival	N. death	Person-years	Total person-years	Life expectation
0	0.1	0.00512000	0.00509652	1.00000000	0.00509652	0.99949035	81.41035588	81.41035588
1	0.3	0.00040000	0.00039989	0.99490348	0.00039785	0.99478413	80.41086554	80.82278007
2	0.5	0.00024000	0.00023997	0.99450563	0.00023865	0.99438631	79.41608141	79.85483303
3	0.5	0.00023000	0.00022997	0.99426698	0.00022866	0.99415265	78.42169510	78.87388047
4	0.5	0.00021000	0.00020998	0.99403833	0.00020873	0.99393396	77.42754244	77.89190854
5	0.5	0.00018000	0.00017998	0.99382960	0.00017887	0.99374016	76.43360848	76.90816255
6	0.5	0.00014000	0.00013999	0.99365073	0.00013910	0.99358118	75.43986832	75.92191725
7	0.5	0.00010000	0.00010000	0.99351163	0.00009935	0.99346195	74.44628714	74.93247706

8	0.5	0.00010000	0.00010000	0.99341228	0.00009934	0.99336261	73.45282519	73.93992068
9	0.5	0.00010000	0.00010000	0.99331294	0.00009933	0.99326328	72.45946257	72.94726504
10	0.5	0.00011000	0.00010999	0.99321362	0.00010925	0.99315899	71.46619929	71.95451013
11	0.5	0.00011000	0.00010999	0.99310437	0.00010924	0.99304975	70.47304030	70.96237056
12	0.5	0.00015000	0.00014999	0.99299513	0.00014894	0.99292067	69.47999055	69.97012184
13	0.5	0.00019000	0.00018998	0.99284620	0.00018862	0.99275188	68.48706988	68.98054314
14	0.5	0.00023000	0.00022997	0.99265757	0.00022828	0.99254343	67.49431800	67.99355568
15	0.5	0.00027000	0.00026996	0.99242929	0.00026792	0.99229533	66.50177457	67.00908099
16	0.5	0.00031000	0.00030995	0.99216137	0.00030752	0.99200761	65.50947924	66.02704086
17	0.5	0.00034000	0.00033994	0.99185385	0.00033717	0.99168526	64.51747163	65.04735739
18	0.5	0.00035000	0.00034994	0.99151667	0.00034697	0.99134319	63.52578637	64.06930723
19	0.5	0.00034000	0.00033994	0.99116970	0.00033694	0.99100123	62.53444318	63.09156038
20	0.5	0.00033000	0.00032995	0.99083276	0.00032692	0.99066930	61.54344195	62.11284513
21	0.5	0.00032000	0.00031995	0.99050584	0.00031691	0.99034739	60.55277265	61.13318072
22	0.5	0.00032000	0.00031995	0.99018893	0.00031681	0.99003053	59.56242526	60.15258644
23	0.5	0.00033000	0.00032995	0.98987212	0.00032660	0.98970882	58.57239473	59.17167833
24	0.5	0.00034000	0.00033994	0.98954552	0.00033639	0.98937732	57.58268591	58.19104318
25	0.5	0.00035000	0.00034994	0.98920913	0.00034616	0.98903605	56.59330859	57.21066147
26	0.5	0.00036000	0.00035994	0.98886297	0.00035593	0.98868500	55.60427254	56.23051367
27	0.5	0.00038000	0.00037993	0.98850704	0.00037556	0.98831926	54.61558754	55.25058027
28	0.5	0.00040000	0.00039992	0.98813148	0.00039517	0.98793389	53.62726828	54.27138944
29	0.5	0.00042000	0.00041991	0.98773630	0.00041476	0.98752892	52.63933439	53.29290230
30	0.5	0.00044000	0.00043990	0.98732154	0.00043433	0.98710438	51.65180547	52.31507998
31	0.5	0.00047000	0.00046989	0.98688722	0.00046373	0.98665535	50.66470109	51.33788363
32	0.5	0.00051000	0.00050987	0.98642349	0.00050295	0.98617201	49.67804573	50.36178305
33	0.5	0.00054000	0.00053985	0.98592054	0.00053225	0.98565441	48.69187372	49.38721905
34	0.5	0.00058000	0.00057983	0.98538829	0.00057136	0.98510261	47.70621931	48.41362527
35	0.5	0.00063000	0.00062980	0.98481693	0.00062024	0.98450681	46.72111670	47.44142324
36	0.5	0.00068000	0.00067977	0.98419669	0.00066903	0.98386218	45.73660989	46.47100565
37	0.5	0.00075000	0.00074972	0.98352766	0.00073737	0.98315898	44.75274771	45.50227657
38	0.5	0.00082000	0.00081966	0.98279029	0.00080556	0.98238751	43.76958874	44.53604094
39	0.5	0.00091000	0.00090959	0.98198474	0.00089320	0.98153814	42.78720122	43.57216530
40	0.5	0.00100000	0.00099950	0.98109154	0.00098060	0.98060124	41.80566309	42.61137882
41	0.5	0.00110000	0.00109940	0.98011093	0.00107753	0.97957217	40.82506185	41.65351126
42	0.5	0.00122000	0.00121926	0.97903341	0.00119369	0.97843656	39.84548968	40.69880504
43	0.5	0.00133000	0.00132912	0.97783971	0.00129966	0.97718988	38.86705312	39.74787751
44	0.5	0.00145000	0.00144895	0.97654005	0.00141496	0.97583257	37.88986324	38.80011192
45	0.5	0.00158000	0.00157875	0.97512509	0.00153948	0.97435535	36.91403067	37.85568738
46	0.5	0.00173000	0.00172850	0.97358561	0.00168285	0.97274419	35.93967532	36.91475603
47	0.5	0.00190000	0.00189820	0.97190276	0.00184486	0.97098033	34.96693113	35.97780810
48	0.5	0.00208000	0.00207784	0.97005790	0.00201562	0.96905009	33.99595080	35.04528003
49	0.5	0.00228000	0.00227740	0.96804228	0.00220462	0.96693997	33.02690071	34.11720902
50	0.5	0.00250000	0.00249688	0.96583765	0.00241158	0.96463186	32.05996074	33.19394373
51	0.5	0.00274000	0.00273625	0.96342607	0.00263618	0.96210799	31.09532888	32.27578089
52	0.5	0.00303000	0.00302542	0.96078990	0.00290679	0.95933650	30.13322089	31.36296597
53	0.5	0.00335000	0.00334440	0.95788311	0.00320354	0.95628134	29.17388439	30.45662265
54	0.5	0.00371000	0.00370313	0.95467957	0.00353530	0.95291191	28.21760305	29.55714571
55	0.5	0.00410000	0.00409161	0.95114426	0.00389171	0.94919841	27.26469114	28.66514807

56	0.5	0.00453000	0.00451976	0.94725255	0.00428136	0.94511187	26.31549273	27.78086239
57	0.5	0.00498000	0.00496763	0.94297119	0.00468433	0.94062903	25.37038086	26.90472524
58	0.5	0.00543000	0.00541530	0.93828686	0.00508110	0.93574631	24.42975183	26.03654902
59	0.5	0.00590000	0.00588265	0.93320576	0.00548972	0.93046090	23.49400552	25.17558997
60	0.5	0.00641000	0.00638952	0.92771604	0.00592766	0.92475221	22.56354462	24.32160670
61	0.5	0.00699000	0.00696566	0.92178838	0.00642086	0.91857795	21.63879242	23.47479417
62	0.5	0.00767000	0.00764070	0.91536752	0.00699405	0.91187049	20.72021447	22.63595122
63	0.5	0.00843000	0.00839462	0.90837347	0.00762545	0.90456075	19.80834398	21.80638759
64	0.5	0.00926000	0.00921732	0.90074802	0.00830249	0.89659678	18.90378323	20.98676071
65	0.5	0.01018000	0.01012845	0.89244554	0.00903909	0.88792599	18.00718645	20.17735055
66	0.5	0.01121000	0.01114752	0.88340645	0.00984779	0.87848256	17.11926045	19.37869080
67	0.5	0.01235000	0.01227421	0.87355866	0.01072224	0.86819754	16.24077790	18.59151380
68	0.5	0.01356000	0.01346868	0.86283642	0.01162127	0.85702579	15.37258036	17.81633225
69	0.5	0.01483000	0.01472084	0.85121515	0.01253061	0.84494985	14.51555457	17.05274459
70	0.5	0.01623000	0.01609935	0.83868455	0.01350228	0.83193341	13.67060472	16.30005560
71	0.5	0.01785000	0.01769210	0.82518227	0.01459921	0.81788266	12.83867132	15.55858850
72	0.5	0.01979000	0.01959610	0.81058306	0.01588426	0.80264093	12.02078865	14.82980491
73	0.5	0.02196000	0.02172150	0.79469880	0.01726205	0.78606777	11.21814772	14.11622588
74	0.5	0.02429000	0.02399854	0.77743675	0.01865735	0.76810808	10.43207995	13.41855781
75	0.5	0.02693000	0.02657221	0.75877940	0.02016244	0.74869818	9.66397188	12.73620743
76	0.5	0.02997000	0.02952753	0.73861696	0.02180953	0.72771219	8.91527369	12.07022606
77	0.5	0.03354000	0.03298681	0.71680743	0.02364519	0.70498483	8.18756150	11.42226098
78	0.5	0.03754000	0.03684836	0.69316224	0.02554189	0.68039129	7.48257667	10.79484179
79	0.5	0.04188000	0.04102102	0.66762035	0.02738647	0.65392711	6.80218538	10.18870292
80	0.5	0.04672000	0.04565353	0.64023388	0.02922894	0.62561941	6.14825826	9.60314420
81	0.5	0.05223000	0.05090073	0.61100494	0.03110060	0.59545464	5.52263885	9.03861571
82	0.5	0.05857000	0.05690358	0.57990434	0.03299863	0.56340503	4.92718421	8.49654647
83	0.5	0.06560000	0.06351665	0.54690571	0.03473762	0.52953690	4.36377918	7.97903384
84	0.5	0.07324000	0.07065270	0.51216809	0.03618606	0.49407506	3.83424228	7.48629669
85	0.5	0.08165000	0.07844739	0.47598203	0.03733955	0.45731226	3.34016722	7.01742290
86	0.5	0.09102000	0.08705799	0.43864249	0.03818733	0.41954882	2.88285496	6.57222007
87	0.5	0.10153000	0.09662484	0.40045515	0.03869392	0.38110820	2.46330614	6.15126592
88	0.5	0.11306000	0.10701069	0.36176124	0.03871232	0.34240508	2.08219794	5.75572428
89	0.5	0.12548000	0.11807215	0.32304892	0.03814308	0.30397738	1.73979286	5.38553994
90	0.5	0.13898000	0.12994979	0.28490584	0.03702345	0.26639411	1.43581548	5.03961411
91	0.5	0.15374000	0.14276561	0.24788239	0.03538908	0.23018785	1.16942137	4.71764612
92	0.5	0.16993000	0.15662256	0.21249331	0.03328125	0.19585268	0.93923353	4.42006172
93	0.5	0.18511000	0.16942854	0.17921206	0.03036364	0.16403024	0.74338084	4.14805146
94	0.5	0.20214000	0.18358506	0.14884842	0.02732635	0.13518525	0.57935060	3.89221866
95	0.5	0.22012000	0.19829559	0.12152208	0.02409729	0.10947343	0.44416536	3.65501785
96	0.5	0.23904000	0.21352008	0.09742478	0.02080215	0.08702371	0.33469193	3.43538791
97	0.5	0.25887000	0.22920310	0.07662264	0.01756215	0.06784156	0.24766822	3.23231132
98	0.5	0.27957000	0.24528310	0.05906049	0.01448654	0.05181722	0.17982665	3.04478763
99	0.5	0.30110000	0.26170093	0.04457395	0.01166504	0.03874143	0.12800943	2.87184398
100	0.5	0.32339000	0.27837772	0.03290891	0.00916111	0.02832835	0.08926800	2.71257883
101	0.5	0.34639000	0.29525356	0.02374780	0.00701162	0.02024199	0.06093965	2.56611766
102	0.5	0.37002000	0.31225053	0.01673618	0.00522588	0.01412324	0.04069766	2.43171776
103	0.5	0.39420000	0.32929580	0.01151030	0.00379029	0.00961515	0.02657442	2.30875209

104	0.5	0.41885000	0.34632160	0.00772000	0.00267360	0.00638320	0.01695927	2.19679553
105	0.5	0.44388000	0.36325843	0.00504640	0.00183315	0.00412983	0.01057607	2.09576502
106	0.5	0.46920000	0.38004212	0.00321325	0.00122117	0.00260267	0.00644624	2.00614234
107	0.5	0.49471000	0.39660722	0.00199208	0.00079007	0.00159704	0.00384358	1.92942688
108	0.5	0.52032000	0.41289995	0.00120201	0.00049631	0.00095385	0.00224653	1.86898242
109	1.8318	0.54592000	1.00000000	0.00070570	0.00070570	0.00129268	0.00129268	1.83177022

Simple lifetable using Keyfitz and Flieger separation factors and exponential tail of death distribution

Average proportion of the year lived by those who die at age 0 (Keyfitz & Flieger 1968):  $0.07 + 1.7 * \text{Mortality of age 0}$

Average proportion of the year lived by those who die at open age interval:

$1 / \text{Mortality of the interval}$ .