

Development Process
of
Standard Mortality Table 2018



The Institute of Actuaries of Japan

Think the Future, Manage the Risk

Standard Mortality Table 2018 (For Life Insurance) - Male

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	81	0.00081	80.77
1	99,919	56	0.00056	79.84
2	99,863	36	0.00036	78.88
3	99,827	22	0.00022	77.91
4	99,805	14	0.00014	76.92
5	99,791	10	0.00010	75.94
6	99,781	9	0.00009	74.94
7	99,772	9	0.00009	73.95
8	99,763	9	0.00009	72.96
9	99,754	9	0.00009	71.96
10	99,745	10	0.00010	70.97
11	99,735	10	0.00010	69.98
12	99,725	11	0.00011	68.98
13	99,714	13	0.00013	67.99
14	99,701	17	0.00017	67.00
15	99,684	23	0.00023	66.01
16	99,662	30	0.00030	65.03
17	99,632	38	0.00038	64.05
18	99,594	46	0.00046	63.07
19	99,548	53	0.00053	62.10
20	99,495	59	0.00059	61.13
21	99,436	63	0.00063	60.17
22	99,374	66	0.00066	59.20
23	99,308	68	0.00068	58.24
24	99,241	67	0.00068	57.28
25	99,173	66	0.00067	56.32
26	99,107	64	0.00065	55.36
27	99,042	63	0.00064	54.39
28	98,979	63	0.00064	53.43
29	98,916	65	0.00066	52.46
30	98,850	67	0.00068	51.50
31	98,783	68	0.00069	50.53
32	98,715	69	0.00070	49.57
33	98,646	71	0.00072	48.60
34	98,575	73	0.00074	47.64
35	98,502	76	0.00077	46.67
36	98,426	82	0.00083	45.71
37	98,344	89	0.00090	44.74
38	98,256	97	0.00099	43.78
39	98,159	107	0.00109	42.83
40	98,052	116	0.00118	41.87
41	97,936	126	0.00129	40.92
42	97,810	137	0.00140	39.97
43	97,673	147	0.00151	39.03
44	97,525	159	0.00163	38.09
45	97,366	172	0.00177	37.15
46	97,194	189	0.00194	36.21
47	97,005	208	0.00214	35.28
48	96,798	228	0.00236	34.36
49	96,569	250	0.00259	33.44
50	96,319	275	0.00285	32.52
51	96,045	299	0.00311	31.61
52	95,746	323	0.00337	30.71
53	95,423	347	0.00364	29.81
54	95,076	372	0.00391	28.92
55	94,704	400	0.00422	28.03
56	94,305	432	0.00458	27.15
57	93,873	469	0.00500	26.27
58	93,403	510	0.00546	25.40
59	92,893	555	0.00597	24.54

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
60	92,339	603	0.00653	23.68
61	91,736	657	0.00716	22.83
62	91,079	715	0.00785	22.00
63	90,364	775	0.00858	21.17
64	89,589	838	0.00935	20.34
65	88,751	901	0.01015	19.53
66	87,850	966	0.01100	18.73
67	86,884	1,034	0.01190	17.93
68	85,850	1,109	0.01292	17.14
69	84,741	1,193	0.01408	16.36
70	83,548	1,290	0.01544	15.58
71	82,258	1,400	0.01702	14.82
72	80,858	1,525	0.01886	14.07
73	79,333	1,665	0.02099	13.33
74	77,667	1,822	0.02346	12.60
75	75,845	2,000	0.02637	11.90
76	73,845	2,199	0.02978	11.20
77	71,646	2,422	0.03381	10.53
78	69,224	2,667	0.03853	9.88
79	66,557	2,926	0.04396	9.26
80	63,631	3,185	0.05006	8.66
81	60,445	3,429	0.05673	8.09
82	57,016	3,650	0.06402	7.55
83	53,366	3,861	0.07235	7.03
84	49,505	4,048	0.08177	6.54
85	45,457	4,171	0.09175	6.08
86	41,286	4,240	0.10269	5.64
87	37,047	4,248	0.11466	5.23
88	32,799	4,190	0.12775	4.84
89	28,609	4,064	0.14204	4.48
90	24,545	3,868	0.15760	4.14
91	20,677	3,609	0.17453	3.82
92	17,068	3,292	0.19290	3.52
93	13,776	2,931	0.21279	3.24
94	10,844	2,540.4	0.23426	2.98
95	8,304.0	2,137.4	0.25739	2.74
96	6,166.6	1,740.3	0.28222	2.52
97	4,426.3	1,366.7	0.30878	2.31
98	3,059.5	1,031.3	0.33708	2.12
99	2,028.2	744.6	0.36710	1.95
100	1,283.7	511.94	0.39881	1.78
101	771.73	333.46	0.43210	1.64
102	438.26	204.61	0.46686	1.50
103	233.66	117.51	0.50292	1.38
104	116.15	62.726	0.54006	1.26
105	53.420	30.877	0.57800	1.16
106	22.543	13.8961	0.61642	1.06
107	8.6471	5.6633	0.65494	0.95
108	2.9838	2.0682	0.69314	0.81
109	0.9156	0.9156	1.00000	0.50

Standard Mortality Table 2018 (For Life Insurance) - Female

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	78	0.00078	86.56
1	99,922	53	0.00053	85.63
2	99,869	33	0.00033	84.67
3	99,836	19	0.00019	83.70
4	99,817	11	0.00011	82.72
5	99,806	8	0.00008	81.73
6	99,798	8	0.00008	80.73
7	99,790	8	0.00008	79.74
8	99,782	7	0.00007	78.75
9	99,775	7	0.00007	77.75
10	99,768	7	0.00007	76.76
11	99,761	7	0.00007	75.76
12	99,754	8	0.00008	74.77
13	99,746	10	0.00010	73.77
14	99,736	12	0.00012	72.78
15	99,724	14	0.00014	71.79
16	99,710	16	0.00016	70.80
17	99,694	19	0.00019	69.81
18	99,675	21	0.00021	68.82
19	99,655	23	0.00023	67.84
20	99,632	25	0.00025	66.85
21	99,607	26	0.00026	65.87
22	99,581	27	0.00027	64.89
23	99,554	28	0.00028	63.90
24	99,526	29	0.00029	62.92
25	99,497	29	0.00029	61.94
26	99,468	30	0.00030	60.96
27	99,438	31	0.00031	59.98
28	99,408	32	0.00032	58.99
29	99,376	34	0.00034	58.01
30	99,342	37	0.00037	57.03
31	99,305	40	0.00040	56.05
32	99,266	44	0.00044	55.08
33	99,222	49	0.00049	54.10
34	99,173	54	0.00054	53.13
35	99,120	58	0.00059	52.15
36	99,061	64	0.00065	51.19
37	98,997	70	0.00071	50.22
38	98,927	76	0.00077	49.25
39	98,850	82	0.00083	48.29
40	98,768	87	0.00088	47.33
41	98,681	92	0.00093	46.37
42	98,590	98	0.00099	45.41
43	98,492	102	0.00104	44.46
44	98,390	110	0.00112	43.50
45	98,279	120	0.00122	42.55
46	98,160	133	0.00135	41.60
47	98,027	147	0.00150	40.66
48	97,880	163	0.00167	39.72
49	97,717	178	0.00182	38.79
50	97,539	192	0.00197	37.86
51	97,347	205	0.00211	36.93
52	97,141	219	0.00225	36.01
53	96,923	234	0.00241	35.09
54	96,689	248	0.00256	34.17
55	96,441	260	0.00270	33.26
56	96,181	273	0.00284	32.35
57	95,908	288	0.00300	31.44
58	95,620	303	0.00317	30.53
59	95,317	322	0.00338	29.62

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
60	94,995	345	0.00363	28.72
61	94,650	368	0.00389	27.83
62	94,282	390	0.00414	26.93
63	93,892	409	0.00436	26.04
64	93,482	428	0.00458	25.15
65	93,054	450	0.00484	24.27
66	92,604	477	0.00515	23.38
67	92,127	510	0.00554	22.50
68	91,616	552	0.00603	21.62
69	91,064	602	0.00661	20.75
70	90,462	660	0.00730	19.89
71	89,802	731	0.00814	19.03
72	89,071	812	0.00912	18.18
73	88,258	906	0.01026	17.34
74	87,353	1,006	0.01152	16.52
75	86,346	1,113	0.01289	15.71
76	85,233	1,230	0.01443	14.90
77	84,004	1,363	0.01623	14.12
78	82,640	1,521	0.01840	13.34
79	81,120	1,704	0.02101	12.58
80	79,415	1,917	0.02414	11.84
81	77,498	2,153	0.02778	11.12
82	75,345	2,407	0.03195	10.42
83	72,938	2,669	0.03659	9.75
84	70,269	2,986	0.04249	9.10
85	67,283	3,287	0.04885	8.49
86	63,997	3,581	0.05596	7.90
87	60,415	3,861	0.06390	7.33
88	56,555	4,114	0.07275	6.80
89	52,440	4,332	0.08261	6.29
90	48,108	4,502	0.09357	5.82
91	43,607	4,612	0.10576	5.36
92	38,995	4,651	0.11928	4.94
93	34,344	4,610	0.13424	4.54
94	29,733	4,483	0.15078	4.17
95	25,250	4,268	0.16901	3.82
96	20,983	3,967	0.18906	3.49
97	17,016	3,591	0.21104	3.19
98	13,425	3,156	0.23506	2.91
99	10,269	2,682.5	0.26122	2.65
100	7,586.6	2,197.0	0.28959	2.42
101	5,389.6	1,725.8	0.32021	2.20
102	3,663.8	1,293.7	0.35310	2.00
103	2,370.1	920.1	0.38820	1.81
104	1,450.0	616.89	0.42543	1.65
105	833.14	387.10	0.46462	1.49
106	446.05	225.50	0.50554	1.36
107	220.55	120.830	0.54785	1.23
108	99.723	58.951	0.59115	1.12
109	40.772	25.888	0.63494	1.02
110	14.884	10.1008	0.67863	0.93
111	4.7833	3.4515	0.72158	0.84
112	1.3318	1.0162	0.76308	0.74
113	0.3155	0.3155	1.00000	0.50

Standard Mortality Table 2018 (For Medical Insurance) - Male

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	53	0.00053	83.47
1	99,947	22	0.00022	82.52
2	99,925	15	0.00015	81.53
3	99,910	11	0.00011	80.55
4	99,899	8	0.00008	79.55
5	99,891	6	0.00006	78.56
6	99,885	6	0.00006	77.57
7	99,879	6	0.00006	76.57
8	99,873	5	0.00005	75.57
9	99,868	5	0.00005	74.58
10	99,863	5	0.00005	73.58
11	99,858	6	0.00006	72.59
12	99,852	6	0.00006	71.59
13	99,846	8	0.00008	70.59
14	99,838	9	0.00009	69.60
15	99,829	11	0.00011	68.61
16	99,818	15	0.00015	67.61
17	99,803	18	0.00018	66.62
18	99,785	22	0.00022	65.64
19	99,763	27	0.00027	64.65
20	99,736	31	0.00031	63.67
21	99,705	34	0.00034	62.69
22	99,672	36	0.00036	61.71
23	99,636	39	0.00039	60.73
24	99,597	39	0.00039	59.75
25	99,558	39	0.00039	58.78
26	99,519	39	0.00039	57.80
27	99,480	39	0.00039	56.82
28	99,441	40	0.00040	55.84
29	99,402	41	0.00041	54.87
30	99,361	41	0.00041	53.89
31	99,320	43	0.00043	52.91
32	99,278	44	0.00044	51.93
33	99,234	46	0.00046	50.96
34	99,188	48	0.00048	49.98
35	99,141	51	0.00051	49.00
36	99,090	54	0.00054	48.03
37	99,036	58	0.00059	47.05
38	98,978	63	0.00064	46.08
39	98,915	70	0.00071	45.11
40	98,844	75	0.00076	44.14
41	98,769	83	0.00084	43.17
42	98,686	90	0.00091	42.21
43	98,597	98	0.00099	41.25
44	98,499	107	0.00109	40.29
45	98,392	116	0.00118	39.33
46	98,276	128	0.00130	38.38
47	98,148	139	0.00142	37.43
48	98,008	155	0.00158	36.48
49	97,854	169	0.00173	35.54
50	97,684	187	0.00191	34.60
51	97,498	207	0.00212	33.66
52	97,291	230	0.00236	32.73
53	97,061	255	0.00263	31.81
54	96,806	285	0.00294	30.89
55	96,521	316	0.00327	29.98
56	96,206	350	0.00364	29.08
57	95,856	386	0.00403	28.18
58	95,469	425	0.00445	27.29
59	95,045	467	0.00491	26.41

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
60	94,578	518	0.00548	25.54
61	94,060	570	0.00606	24.68
62	93,490	617	0.00660	23.83
63	92,873	664	0.00715	22.98
64	92,209	716	0.00776	22.14
65	91,493	773	0.00845	21.31
66	90,720	836	0.00922	20.49
67	89,883	905	0.01007	19.68
68	88,978	973	0.01094	18.87
69	88,005	1,049	0.01192	18.08
70	86,956	1,137	0.01308	17.29
71	85,818	1,238	0.01443	16.51
72	84,580	1,348	0.01594	15.74
73	83,232	1,476	0.01773	14.99
74	81,756	1,627	0.01990	14.25
75	80,129	1,796	0.02242	13.53
76	78,333	1,979	0.02527	12.83
77	76,353	2,175	0.02848	12.15
78	74,179	2,383	0.03212	11.49
79	71,796	2,595	0.03614	10.86
80	69,201	2,800	0.04046	10.25
81	66,402	2,995	0.04511	9.66
82	63,406	3,196	0.05041	9.09
83	60,210	3,410	0.05663	8.55
84	56,800	3,612	0.06360	8.03
85	53,188	3,782	0.07110	7.54
86	49,406	3,887	0.07868	7.08
87	45,519	3,945	0.08667	6.64
88	41,574	3,968	0.09545	6.22
89	37,605	3,963	0.10539	5.83
90	33,642	3,922	0.11657	5.45
91	29,721	3,794	0.12767	5.11
92	25,926	3,616	0.13949	4.78
93	22,310	3,392	0.15204	4.48
94	18,918	3,128	0.16536	4.19
95	15,789	2,833	0.17945	3.92
96	12,956	2,518	0.19434	3.67
97	10,438	2,192.5	0.21005	3.43
98	8,245.6	1,868.1	0.22656	3.21
99	6,377.5	1,555.3	0.24387	3.01
100	4,822.2	1,263.3	0.26198	2.81
101	3,558.9	999.6	0.28086	2.63
102	2,559.3	769.0	0.30047	2.47
103	1,790.3	574.3	0.32077	2.31
104	1,216.1	415.54	0.34171	2.17
105	800.52	290.75	0.36320	2.04
106	509.77	196.34	0.38516	1.91
107	313.43	127.72	0.40749	1.80
108	185.71	79.87	0.43007	1.70
109	105.84	47.919	0.45275	1.60
110	57.921	27.536	0.47541	1.51
111	30.385	15.128	0.49788	1.42
112	15.257	7.9333	0.51998	1.34
113	7.3236	3.9662	0.54156	1.24
114	3.3574	1.8883	0.56243	1.12
115	1.4691	0.8556	0.58241	0.92
116	0.6135	0.6135	1.00000	0.50

Standard Mortality Table 2018 (For Medical Insurance) - Female

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	52	0.00052	89.59
1	99,948	20	0.00020	88.63
2	99,928	14	0.00014	87.65
3	99,914	9	0.00009	86.66
4	99,905	7	0.00007	85.67
5	99,898	6	0.00006	84.68
6	99,892	5	0.00005	83.68
7	99,887	5	0.00005	82.69
8	99,882	4	0.00004	81.69
9	99,878	4	0.00004	80.69
10	99,874	4	0.00004	79.70
11	99,870	4	0.00004	78.70
12	99,866	4	0.00004	77.70
13	99,862	5	0.00005	76.71
14	99,857	6	0.00006	75.71
15	99,851	8	0.00008	74.71
16	99,843	8	0.00008	73.72
17	99,835	10	0.00010	72.73
18	99,825	12	0.00012	71.73
19	99,813	13	0.00013	70.74
20	99,800	15	0.00015	69.75
21	99,785	15	0.00015	68.76
22	99,770	16	0.00016	67.77
23	99,754	16	0.00016	66.78
24	99,738	16	0.00016	65.79
25	99,722	16	0.00016	64.80
26	99,706	17	0.00017	63.81
27	99,689	18	0.00018	62.82
28	99,672	19	0.00019	61.84
29	99,653	21	0.00021	60.85
30	99,632	22	0.00022	59.86
31	99,610	23	0.00023	58.87
32	99,587	25	0.00025	57.89
33	99,562	26	0.00026	56.90
34	99,536	27	0.00027	55.92
35	99,509	29	0.00029	54.93
36	99,480	32	0.00032	53.95
37	99,448	34	0.00034	52.96
38	99,415	38	0.00038	51.98
39	99,377	41	0.00041	51.00
40	99,336	43	0.00043	50.02
41	99,293	47	0.00047	49.04
42	99,247	50	0.00050	48.07
43	99,197	56	0.00056	47.09
44	99,142	61	0.00062	46.12
45	99,080	66	0.00067	45.14
46	99,014	70	0.00071	44.17
47	98,943	75	0.00076	43.21
48	98,868	84	0.00085	42.24
49	98,784	93	0.00094	41.27
50	98,691	101	0.00102	40.31
51	98,591	108	0.00110	39.35
52	98,482	116	0.00118	38.40
53	98,366	123	0.00125	37.44
54	98,243	132	0.00134	36.49
55	98,111	142	0.00145	35.53
56	97,969	153	0.00156	34.59
57	97,816	163	0.00167	33.64
58	97,653	175	0.00179	32.69
59	97,478	188	0.00193	31.75

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
60	97,290	203	0.00209	30.81
61	97,087	221	0.00228	29.88
62	96,865	241	0.00249	28.94
63	96,624	264	0.00273	28.01
64	96,360	283	0.00294	27.09
65	96,077	305	0.00317	26.17
66	95,772	330	0.00345	25.25
67	95,442	361	0.00378	24.33
68	95,081	394	0.00414	23.43
69	94,688	432	0.00456	22.52
70	94,256	481	0.00510	21.62
71	93,775	540	0.00576	20.73
72	93,235	609	0.00653	19.85
73	92,626	689	0.00744	18.97
74	91,937	781	0.00850	18.11
75	91,156	881	0.00967	17.26
76	90,274	994	0.01101	16.43
77	89,280	1,122	0.01257	15.60
78	88,158	1,271	0.01442	14.80
79	86,887	1,439	0.01656	14.01
80	85,448	1,623	0.01899	13.23
81	83,825	1,824	0.02176	12.48
82	82,001	2,048	0.02498	11.75
83	79,953	2,305	0.02883	11.03
84	77,648	2,581	0.03324	10.35
85	75,067	2,885	0.03843	9.69
86	72,182	3,195	0.04426	9.05
87	68,987	3,516	0.05097	8.45
88	65,471	3,828	0.05847	7.88
89	61,643	4,113	0.06672	7.33
90	57,530	4,357	0.07574	6.82
91	53,173	4,555	0.08566	6.34
92	48,618	4,699	0.09665	5.89
93	43,919	4,790	0.10906	5.46
94	39,129	4,801	0.12270	5.07
95	34,328	4,701	0.13693	4.71
96	29,627	4,490	0.15156	4.38
97	25,137	4,197	0.16698	4.07
98	20,940	3,836	0.18319	3.79
99	17,104	3,424	0.20020	3.53
100	13,680	2,982	0.21800	3.28
101	10,697	2,530.8	0.23658	3.06
102	8,166.7	2,090.0	0.25592	2.85
103	6,076.6	1,677.2	0.27600	2.66
104	4,399.5	1,305.6	0.29676	2.48
105	3,093.9	984.4	0.31817	2.32
106	2,109.5	717.6	0.34015	2.17
107	1,392.0	504.78	0.36264	2.03
108	887.18	342.04	0.38554	1.91
109	545.14	222.82	0.40874	1.79
110	322.32	139.29	0.43214	1.68
111	183.03	83.389	0.45560	1.59
112	99.642	47.726	0.47897	1.49
113	51.917	26.068	0.50212	1.41
114	25.848	13.567	0.52487	1.32
115	12.281	6.7187	0.54707	1.23
116	5.5626	3.1626	0.56856	1.11
117	2.3999	1.4140	0.58917	0.91
118	0.9860	0.9860	1.00000	0.50

Table of Contents

Introduction

Chapter 1 Standard Mortality Table 2018 (For Life Insurance)

- Section 1.1 Crude Mortality
- Section 1.2 Modification at Younger Ages
- Section 1.3 Mortality Improvement
- Section 1.4 First Adjustment - Safety Margin Based on Mathematical Risk Theory
- Section 1.5 Second Adjustment - Smoothing Based on Greville's Method
- Section 1.6 Third Adjustment - Extrapolation Based on Gompertz-Makeham's Model
- Section 1.7 Summary of Development Process of Standard Mortality Table 2018 (For Life Insurance)
- Section 1.8 Comparison of Development Methodologies Between Standard Mortality Table 2018 and 2007 (For Life Insurance)
- Section 1.9 Comparison Against Standard Mortality Table 2007 (For Life Insurance)

Chapter 2 Standard Mortality Table 2018 (For Medical Insurance)

- Section 2.1 Determination of Underlying Data
- Section 2.2 Mortality Improvement
- Section 2.3 Safety Margin Based on Mathematical Risk Theory
- Section 2.4 Summary of Development Process of Standard Mortality Table 2018 (For Medical Insurance)
- Section 2.5 Comparison of Development Methodologies Between Standard Mortality Table 2018 and 2007 (For Medical Insurance)
- Section 2.6 Comparison Against Standard Mortality Table 2007 (For Medical Insurance)

Chapter 3 Standard Mortality Table Applied to Policies After Annuitization

Reference: Standard Mortality Table 2007 (After Annuitization)

Appendix Standard Mortality Table 2007 Standard Mortality Table 1996

Introduction

The standard mortality table is one of the bases used in the calculation of statutory reserves in Japan, as provisioned in Article 116, Paragraph 2 of the Insurance Business Act (the “Act”). The Institute of Actuaries of Japan (IAJ), a designated association as prescribed in Article 122-2, Paragraph 1 of the Act, is entrusted with development of the standard mortality table by the Financial Services Agency (FSA) in accordance with Article 122-2, Paragraph 2, Item 3, of the Act.

After deliberation in the Standard Mortality Advisory Committee held on March 16, 2017, it was concluded that the standard mortality tables (in particular, the "Standard Mortality Table 2007 (For Life Insurance)" and the "Standard Mortality Table 2007 (For Medical Insurance)") would be revised from fiscal year 2018 onwards, based on evidence such as improvement in mortality rates. On March 31, 2017, the IAJ announced the revision proposal of the standard mortality table and conducted a public comment procedure. On May 10, 2017, the "Standard Mortality Table 2018" was approved by the Board of Directors. Following the revision of the relevant Public Notice by the FSA, "Standard Mortality Table 2018" is to be applied accordingly from April 2018 onwards.

The IAJ has hereby produced the "Development Process of Standard Mortality Table 2018", where the development processes and features of the Standard Mortality Table 2018 have been described, for reference and effective use.

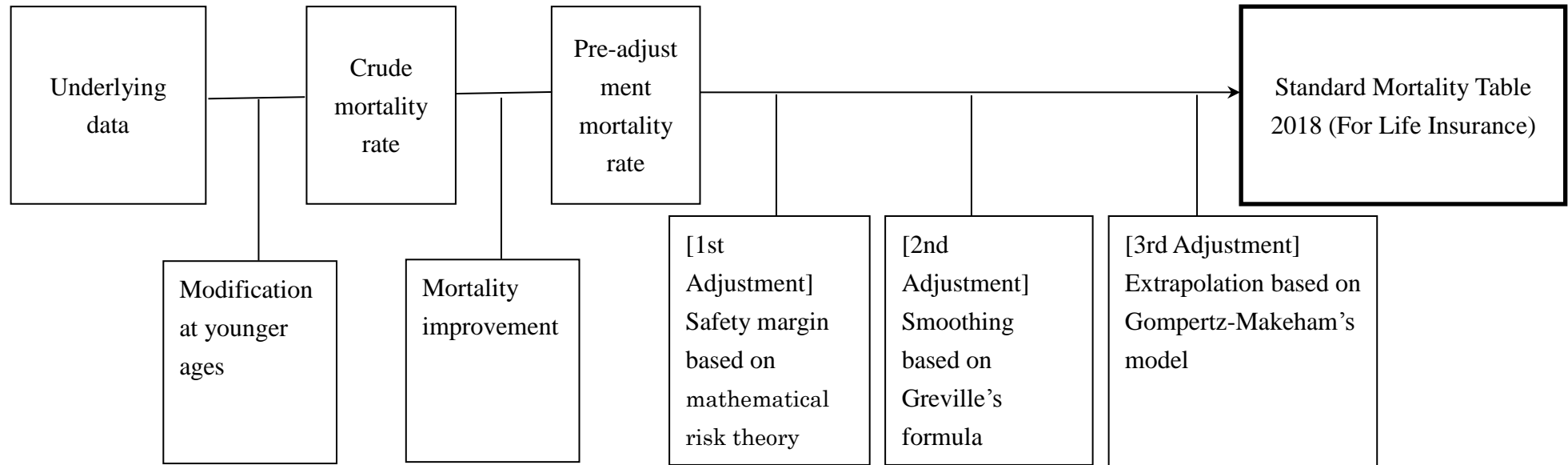
Please note that the standard mortality table is a basis used for calculating statutory reserves, in accordance with the Act, to ensure financial soundness, and is characteristically different from pricing basis mortality rates used for calculating policyholders' premiums, which may vary depending on strategies adopted by different companies.

Finally, the IAJ would like to express our gratitude to the Life Insurance Association of Japan that provided the underlying data.

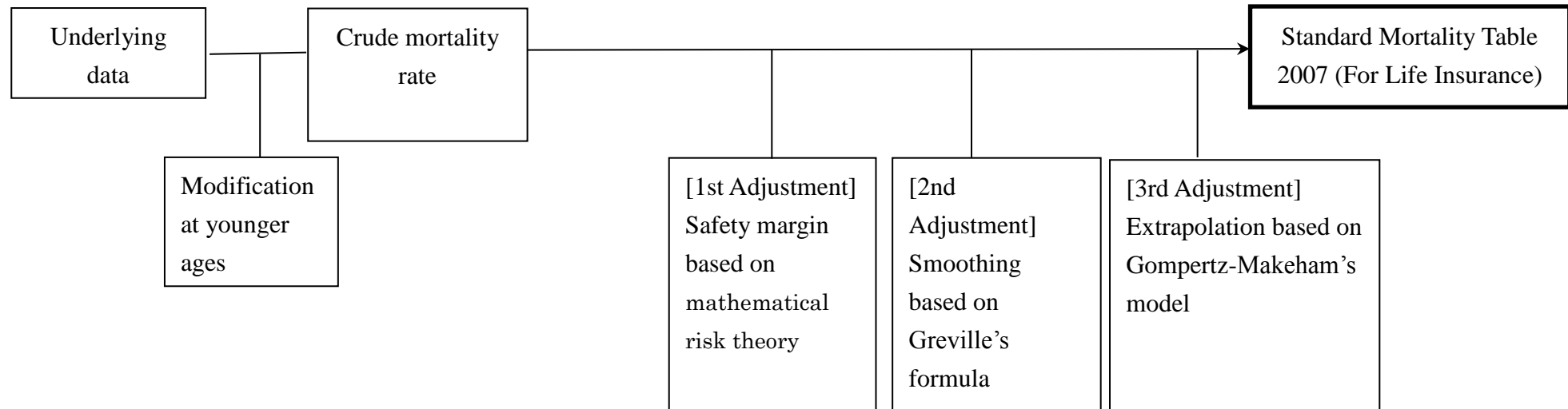
The Institute of Actuaries of Japan

Chapter 1 Standard Mortality Table 2018 (For Life Insurance)

Below is an outline of the development process of the Standard Mortality Table 2018 (For Life Insurance):



(cf) Development process of the Standard Mortality Table 2007 (For Life Insurance):



Section 1.1 Crude Mortality

The underlying data for developing the crude mortality rates is derived based on the experience data of 29 life insurance companies in Japan, compiled by the Life Insurance Association of Japan (LIAJ). This data has the following features:

- With medical examination, split by male/female
- Duration is 30 years or less

Analyzing this data, the observation years and truncated period of the underlying data are decided as shown below, taking into account the stability and prudence of the mortality rates, as well as the effect of selection in the experience mortality rates.

➤ Observation Years

An observation period of 3 years is adopted to ensure stable mortality rates. Observation years 2008, 2009 and 2011 are selected to remove large increases in mortality rates at specific ages due to the Great East Japan Earthquake which occurred in observation year 2010.

➤ Truncated period (cf. Table 2)

The underlying data is truncated to remove the selection effect and to ensure the prudence of the mortality rates.

A truncated period between 1 and 10 years is adopted depending on gender and attained age group to ensure stability of the mortality rates so that the exposure after truncation is not less than 50% of original exposure. (Although a period of 5 years was adopted as the maximum truncated period in developing the SMT2007, a period of 10 years is adopted based on the fact that selection effects have been observed for durations up to 10 years.)

However, there is insufficient exposure from policies with medical examination at younger ages. Thus, considering the stability and credibility of data, an observation period of 6 years (2005-2009 and 2011) including policies with and without medical examination is adopted as the underlying data for males aged 17 or younger and females aged 27 or younger. The ages where the “upper limit of the 95% confidence interval of the crude mortality rates with medical examination” exceed “130% of the crude mortality rates with medical examination” are adopted as the connection ages where the data with an observation period of 3 years is connected to the data with an observation period of 6 years (cf. Table 3).

Regarding males and females aged 81 or older, given longevity trends and the requirement for sufficient data to develop mortality rates, an observation period of 6 years (2005-2009 and 2011) with medical examination is adopted as the underlying data, considering the stability and availability of experience data. Age 81 is adopted as the connection age where the exposure in the data with an observation period of 3 years falls below 100,000 policies.

[Table 1] Underlying data to develop the crude mortality rate (in comparison to the SMT2007 (For Life Insurance))

	SMT2018 (For Life Insurance)		SMT2007 (For Life Insurance)																																																				
	Male	Female	Male	Female																																																			
Observation Period	2008, 2009, 2011 (3 observation years) [For males aged 17 or younger or 81 or older and for females aged 27 or younger or 81 or older; 2005-2009, 2011 (6 observation years)]		1999-2001 (3 observation years) [For males aged 15 or younger and females aged 19 or younger; 1996-2001 (6 observation years), For age 0; 1991-2001 (11 observation years)]																																																				
Truncated period	<table border="1"> <thead> <tr> <th>Truncated Period</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr><td>1</td><td>1-19</td><td>1-4</td></tr> <tr><td>2</td><td>20-24</td><td>5-24</td></tr> <tr><td>3</td><td>25-29</td><td>25-29</td></tr> <tr><td>4</td><td>30-34</td><td>30-34</td></tr> <tr><td>5</td><td>35-39</td><td>-</td></tr> <tr><td>6</td><td>-</td><td>35-39</td></tr> <tr><td>7</td><td>40-44</td><td>40-44</td></tr> <tr><td>8</td><td>45-49</td><td>45-49</td></tr> <tr><td>9</td><td>-</td><td>-</td></tr> <tr><td>10</td><td>50-</td><td>50-</td></tr> </tbody> </table> <p>First year for age 0</p>		Truncated Period	Male	Female	1	1-19	1-4	2	20-24	5-24	3	25-29	25-29	4	30-34	30-34	5	35-39	-	6	-	35-39	7	40-44	40-44	8	45-49	45-49	9	-	-	10	50-	50-	<table border="1"> <thead> <tr> <th>Truncated Period</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr><td>1</td><td>1-9</td><td>1-9</td></tr> <tr><td>2</td><td>10-29</td><td>10-24</td></tr> <tr><td>3</td><td>30-34</td><td>25-29</td></tr> <tr><td>4</td><td>35-39</td><td>30-34</td></tr> <tr><td>5</td><td>40-</td><td>35-</td></tr> </tbody> </table> <p>First year for age 0</p>		Truncated Period	Male	Female	1	1-9	1-9	2	10-29	10-24	3	30-34	25-29	4	35-39	30-34	5	40-	35-
Truncated Period	Male	Female																																																					
1	1-19	1-4																																																					
2	20-24	5-24																																																					
3	25-29	25-29																																																					
4	30-34	30-34																																																					
5	35-39	-																																																					
6	-	35-39																																																					
7	40-44	40-44																																																					
8	45-49	45-49																																																					
9	-	-																																																					
10	50-	50-																																																					
Truncated Period	Male	Female																																																					
1	1-9	1-9																																																					
2	10-29	10-24																																																					
3	30-34	25-29																																																					
4	35-39	30-34																																																					
5	40-	35-																																																					
Policy duration	30 years or less		30 years or less																																																				
Medical examination	Aggregate with/without examination: age 17 or younger, With examination: age 18 or older	Aggregate with/without examination: age 27 or younger, With examination: age 28 or older	Aggregate with/without examination: age 15 or younger, With examination: age 16 or older	Aggregate with/without examination: age 19 or younger, With examination: age 20 or older																																																			
Exposure Counts (unit: million)	40.68	30.02	62.49	37.48																																																			
Claims of Death (unit: thousand)	263	95	335	93																																																			

[Table 2] Truncated period (for removing selection effects)

Crude mortality by duration vs the MHLW's Abridged Population Life Table (2011)*1

Observation Years: 2008,2009,2011, with medical examination (duration 30 years or less)

Male

Attained Age	Duration											Total
	1	2	3	4	5	6	7	8	9	10	11+	
20-24	59.7	59.7	77.4	98.4	101.6	95.2	122.6	96.8	93.5	122.6	117.7	80.6
25-29	46.3	46.3	64.2	59.7	91.0	76.1	79.1	92.5	103.0	101.5	107.5	68.7
30-34	33.8	42.9	45.5	64.9	63.6	64.9	76.6	79.2	74.0	106.5	102.6	63.6
35-39	42.2	51.0	54.9	66.7	68.6	66.7	70.6	75.5	72.5	82.4	92.2	69.6
40-44	35.7	47.1	56.7	60.5	61.1	66.2	69.4	67.5	82.2	82.8	84.1	68.8
45-49	32.9	42.9	45.8	58.8	56.7	65.8	64.2	71.3	79.2	87.1	80.4	68.8
50-54	32.5	41.2	53.4	56.2	59.0	63.4	66.2	68.0	74.5	89.2	82.0	70.9
55-59	26.4	40.3	52.6	55.1	59.2	64.5	65.0	69.8	70.8	83.7	80.8	72.3
60-64	27.5	39.4	50.7	57.3	62.6	64.8	66.7	69.9	74.1	85.8	78.5	73.4
65-69	28.6	41.6	50.0	62.1	60.1	67.6	68.5	70.6	69.6	80.5	79.7	76.3
70-74	26.5	42.7	50.5	55.3	62.6	70.1	65.8	70.7	70.0	71.3	81.1	78.7
75-79	32.0	41.6	52.7	57.2	67.7	69.9	64.7	65.0	68.7	72.1	82.8	81.3

Female

Attained Age	Duration											Total
	1	2	3	4	5	6	7	8	9	10	11+	
20-24	31.3	40.6	37.5	78.1	50.0	84.4	68.8	165.6	62.5	131.3	112.5	59.5
25-29	18.9	40.5	51.4	48.6	59.5	67.6	89.2	86.5	81.1	94.6	97.3	58.5
30-34	24.4	42.2	62.2	60.0	64.4	64.4	93.3	95.6	68.9	120.0	102.2	69.9
35-39	28.1	35.9	50.0	62.5	81.3	60.9	89.1	96.9	95.3	93.8	103.1	76.4
40-44	25.0	40.2	57.6	79.3	64.1	77.2	84.8	89.1	105.4	117.4	92.4	77.3
45-49	26.4	36.4	50.7	58.6	80.7	60.7	86.4	75.0	101.4	130.7	91.4	77.5
50-54	23.6	39.9	43.8	68.5	69.0	83.7	72.4	90.1	103.4	101.0	96.6	80.9
55-59	20.0	40.3	42.1	56.9	58.3	65.2	76.6	91.4	83.8	98.6	91.4	78.1
60-64	21.8	34.8	41.5	53.5	55.9	65.9	77.2	72.7	84.2	88.5	88.2	77.6
65-69	23.0	42.8	44.9	53.3	59.2	66.4	69.0	71.3	83.3	82.8	82.3	75.8
70-74	21.1	35.3	46.8	46.0	57.2	54.3	51.8	55.2	66.4	73.9	83.1	76.6
75-79	18.2	35.4	38.8	44.7	50.6	57.4	55.0	61.4	67.2	62.8	82.0	77.7

Note:

*1. The Abridged Life Tables issued by the Ministry of Health, Labour and Welfare (The MHLW's Abridged Life Tables) are the population mortality tables based on the Provisional Annual Vital Statistics and the Population Estimates. For details, please refer to the following link:

<http://www.mhlw.go.jp/english/database/db-hw/vs02.html>

Truncated years and policies after removing selection effect

Observation Years: 2008,2009,2011, with medical examination (duration 30 years or less)

Male

Attained Age	No Truncation	Truncated Year									
		1	2	3	4	5	6	7	8	9	10
20-24	100	77	58	42	31	23	17	12	9	7	6
25-29	100	81	64	50	40	31	25	19	14	10	8
30-34	100	86	73	61	51	42	34	28	22	17	13
35-39	100	90	80	71	63	56	48	41	34	28	23
40-44	100	92	84	77	70	63	57	51	45	39	34
45-49	100	94	88	82	77	71	65	60	54	48	44
50-54	100	95	90	84	80	75	70	65	60	55	51
55-59	100	96	92	88	85	80	77	73	69	65	61
60-64	100	97	95	92	89	86	84	81	78	75	73
65-69	100	98	97	95	93	91	89	88	86	84	82
70-74	100	99	98	97	96	95	93	92	91	90	89
75-79	100	100	99	99	98	97	96	95	94	93	92

Female

Attained Age	No Truncation	Truncated Year									
		1	2	3	4	5	6	7	8	9	10
20-24	100	80	62	47	36	27	21	15	12	9	8
25-29	100	84	70	58	48	40	32	24	18	13	10
30-34	100	87	76	66	57	49	42	35	28	23	19
35-39	100	90	81	73	66	59	53	46	40	34	30
40-44	100	91	83	76	70	64	59	53	48	44	40
45-49	100	93	87	81	75	70	64	59	54	50	47
50-54	100	93	87	82	77	72	67	62	58	53	50
55-59	100	95	90	86	81	77	72	67	63	60	57
60-64	100	96	92	88	85	81	78	74	71	68	65
65-69	100	97	94	92	89	86	83	80	77	74	72
70-74	100	98	96	94	92	90	88	85	83	81	79
75-79	100	99	98	97	96	94	92	90	89	87	85

[Table 3] Verification of exposure counts, claims of death, mortality rates and credibility

Observation years: 2008, 2009, 2011, with medical examination, after removing selection effect

Male							Female						
	Exposure Counts	Claims of Death	Mortality Rate	Upper Limit of 95% Confidence Interval	Upper Limit / Mortality Rate		Exposure Counts	Claims of Death	Mortality Rate	Upper Limit of 95% Confidence Interval	Upper Limit / Mortality Rate		
Age	lives	deaths	‰	‰	%		Age	lives	deaths	‰	‰	%	
0	608	0	0.00	0.00	—		0	173	0	0.00	0.00	—	
1	653	1	1.53	4.53	296%		1	195	0	0.00	0.00	—	
2	787	2	2.54	6.06	238%		2	271	0	0.00	0.00	—	
3	855	3	3.51	7.47	213%		3	288	0	0.00	0.00	—	
4	3,388	3	0.89	1.89	213%		4	2,783	0	0.00	0.00	—	
5	5,856	2	0.34	0.81	239%		5	3,249	1	0.31	0.92	295%	
6	8,546	6	0.70	1.26	180%		6	6,121	0	0.00	0.00	—	
7	12,556	3	0.24	0.51	213%		7	8,504	1	0.12	0.35	294%	
8	16,811	0	0.00	0.00	—		8	12,706	2	0.16	0.38	237%	
9	20,951	5	0.24	0.45	187%		9	16,730	0	0.00	0.00	—	
10	24,706	5	0.20	0.38	188%		10	20,261	0	0.00	0.00	—	
11	28,487	6	0.21	0.38	180%		11	23,522	5	0.21	0.40	188%	
12	32,128	4	0.12	0.24	200%		12	26,800	0	0.00	0.00	—	
13	35,918	9	0.25	0.41	165%		13	29,667	3	0.10	0.21	214%	
14	39,268	9	0.23	0.38	165%		14	32,980	3	0.09	0.19	214%	
15	39,660	9	0.23	0.38	165%		15	33,023	5	0.15	0.28	188%	
16	61,822	18	0.29	0.42	146%		16	32,980	3	0.09	0.19	214%	
17	84,085	29	0.34	0.46	137%		17	51,594	8	0.16	0.27	168%	
18	94,502	51	0.54	0.69	127%		18	60,703	6	0.10	0.18	180%	
19	129,797	55	0.42	0.53	127%		19	69,150	13	0.19	0.29	154%	
20	115,462	68	0.59	0.73	124%		20	92,548	19	0.21	0.30	144%	
21	145,700	66	0.45	0.56	124%		21	111,321	24	0.22	0.31	140%	
22	172,325	111	0.64	0.76	119%		22	130,659	38	0.29	0.38	132%	
23	195,983	134	0.68	0.80	117%		23	149,411	32	0.21	0.28	135%	
24	224,994	134	0.60	0.70	117%		24	170,819	42	0.25	0.32	130%	
25	201,081	125	0.62	0.73	118%		25	155,096	47	0.30	0.39	129%	
26	235,194	127	0.54	0.63	117%		26	172,896	52	0.30	0.38	127%	
27	269,561	164	0.61	0.70	115%		27	188,219	39	0.21	0.28	131%	
28	312,518	169	0.54	0.62	115%		28	203,486	55	0.27	0.34	126%	
29	362,156	200	0.55	0.63	114%		29	223,721	70	0.31	0.38	124%	

$$\text{Upper Limit of 95\% Confidence Interval} = q_x + u(0.025) \sqrt{\frac{q_x(1-q_x)}{n_x}} \quad q_x: \text{Mortality Rates, } n_x: \text{Exposure Counts, } u(0.025) = 1.96$$

Section 1.2 Modification at Younger Ages

The population mortality table in Japan is adopted for younger ages where the “upper limit of the 95% confidence interval for crude mortality rates” exceeds “130% of the crude mortality rates” based on verification of credibility of mortality rates in 2005-2009 and 2011 observation years. The crude mortality is replaced with the MHLW’s 21st Life Tables (2010)^{*2} for males aged 12 or younger and females aged 15 or younger.

[Table 4] Verification of exposure counts, claims of death, mortality rates and credibility

Observation Years in 2005-2009, 2011, with Medical Examination, after removing Selection Effect

Male							Female						
Age	Exposure Counts	Claims of Death	Mortality Rate	Upper Limit of 95% Confidence Interval	Upper Limit / Mortality Rate		Age	Exposure Counts	Claims of Death	Mortality Rate	Upper Limit of 95% Confidence Interval	Upper Limit / Mortality Rate	
	lives	deaths	‰	‰	‰			lives	deaths	‰	‰	‰	‰
0	231,242	77	0.33	0.40	122%		0	218,308	67	0.31	0.38	124%	
1	171,432	28	0.16	0.22	137%		1	161,621	17	0.11	0.16	146%	
2	209,417	15	0.07	0.11	151%		2	198,488	16	0.08	0.12	149%	
3	175,864	18	0.10	0.15	147%		3	166,972	21	0.13	0.18	142%	
4	203,574	20	0.10	0.14	143%		4	194,519	21	0.11	0.16	142%	
5	180,894	16	0.09	0.13	149%		5	114,101	9	0.08	0.13	165%	
6	194,559	28	0.14	0.19	138%		6	132,906	13	0.10	0.15	154%	
7	234,100	25	0.11	0.15	139%		7	152,313	12	0.08	0.12	156%	
8	268,142	27	0.10	0.14	138%		8	188,220	6	0.03	0.05	182%	
9	294,916	18	0.06	0.09	147%		9	218,710	11	0.05	0.08	159%	
10	321,140	28	0.09	0.12	136%		10	243,829	16	0.07	0.10	147%	
11	350,883	34	0.10	0.13	133%		11	269,569	16	0.06	0.09	149%	
12	374,952	42	0.11	0.14	131%		12	294,561	13	0.04	0.06	157%	
13	404,106	52	0.13	0.17	127%		13	320,863	20	0.06	0.09	145%	
14	423,105	49	0.12	0.15	128%		14	346,337	24	0.07	0.10	140%	
15	429,586	89	0.21	0.25	121%		15	356,664	40	0.11	0.14	131%	
16	509,578	116	0.23	0.27	118%		16	366,580	48	0.13	0.17	128%	
17	577,813	180	0.31	0.36	115%		17	436,837	87	0.20	0.24	121%	
18	621,928	291	0.47	0.52	111%		18	469,675	73	0.16	0.20	123%	
19	814,174	373	0.46	0.51	110%		19	507,525	103	0.20	0.24	119%	

$$\text{Upper Limit of 95\% Confidence Interval} = q_x + u(0.025) \sqrt{\frac{q_x(1-q_x)}{n_x}} \quad q_x: \text{Mortality Rates}, n_x: \text{Exposure Counts}, u(0.025) = 1.96$$

Note:

*2. The 21st Life Tables (2010) issued by the Ministry of Health, Labour and Welfare (The MHLW’s 21st Life Tables) are the latest, at the time of development, of the population mortality tables constructed every five years based on the Annual Vital Statistics and the Population Census. For details, please refer to the following link:

<http://www.mhlw.go.jp/english/database/db-hw/vs02.html>

[Table 5] Mortality adjustment at younger ages

Age	Crude Mortality					
	Pre-adjusted Mortality at younger ages		The MHLW's 21st Life Table (2010)		Post-adjusted Mortality at younger ages	
	Male	Female	Male	Female	Male	Female
	‰	‰	‰	‰	‰	‰
0	0.33	0.31	0.89	0.84	0.89	0.84
1	0.16	0.11	0.37	0.33	0.37	0.33
2	0.07	0.08	0.26	0.23	0.26	0.23
3	0.10	0.13	0.18	0.15	0.18	0.15
4	0.10	0.11	0.13	0.11	0.13	0.11
5	0.09	0.08	0.11	0.09	0.11	0.09
6	0.14	0.10	0.10	0.08	0.10	0.08
7	0.11	0.08	0.09	0.08	0.09	0.08
8	0.10	0.03	0.08	0.07	0.08	0.07
9	0.06	0.05	0.08	0.06	0.08	0.06
10	0.09	0.07	0.08	0.06	0.08	0.06
11	0.10	0.06	0.10	0.06	0.10	0.06
12	0.11	0.04	0.11	0.07	0.11	0.07
13	0.13	0.06	0.13	0.08	0.13	0.08
14	0.12	0.07	0.15	0.10	0.12	0.10
15	0.21	0.11	0.19	0.12	0.21	0.12
16	0.23	0.13	0.24	0.14	0.23	0.13
17	0.31	0.20	0.30	0.16	0.31	0.20
18	0.54	0.16	0.38	0.19	0.54	0.16
19	0.42	0.20	0.45	0.21	0.42	0.20

* The mortality rate at age 0 has been set as the mortality rate over a year from an attained age of 3 months, under the assumption that the age nearest birthday of 0 is equivalent to an age last birthday of 0 to 6 months.

	Male	Female
3 months survivors (l_{3M})	99,834	99,866
1 year survivors (l_1)	99,754	99,790
Numbers of Deaths at age 1 (d_1)	37	33
Mortality of 0 year-3 months old ($l_{3M} - (l_1 - d_1 * 3/12)) / l_{3M}$	0.89‰	0.84‰

Section 1.3 Mortality Improvement

Mortality improvement from the observation periods to the implementation date of the SMT2018 is applied based on mortality improvement trends observed over the observation periods, using similar methodologies to those adopted in developing the Commissioners Standard Ordinary (CSO) mortality table in the United States. Mortality rates reflecting mortality improvement are defined as the “Pre-adjustment mortality rate”. The details are as follows.

(1) For the 5 years up to and including 2015, for which population mortality experience data is available:

- i) Estimate the average annual improvement rates (2.5% for males and 2.0% for females), using the MHLW's Abridged Life Tables from 2010 to 2015.
- ii) Apply mortality improvement over 5 years to the crude mortality rates by gender and age developed in Section 1.1 and 1.2, using the average annual improvement rates derived in (1) i).

(2) For the following 3 years up to 2018 (the implementation date of the SMT), for which population mortality experience data is not available:

- i) Estimate the annual improvement rates beyond 2015 (1.0% for both males and females), based on analyses of the IPSS's Population Projections (January 2012)^{*3}
- ii) Apply mortality improvement over 3 years to the mortality rates by gender and age in (1) ii), using the average annual improvement rate derived in (2) i).

Note:

**3. The Population Projections for Japan (January 2012) issued by the National Institute of Population and Social Security Research (The IPSS's Population Projections) have been made based on the Vital Statistics and the Population Census. For details, please refer to the following link:*

http://www.ipss.go.jp/site-ad/index_english/population-e.html

Section 1.4 First Adjustment - Safety Margin Based on Mathematical Risk Theory

The crude mortality rates and pre-adjustment mortality rates described in Section 1.1-1.3 are based on the experience data provided by 29 life insurance companies in Japan. Although the volume of the underlying data is extensive, adjustments are applied to the pre-adjustment mortality rates based on mathematical risk theory, considering the following points:

- To address yearly fluctuations in future mortality
- To address differences in scale (i.e. insurance portfolio size)
- To address uncertainties in the level of future mortality

In general, the death of an insured individual can be regarded as a binomial trial, and thus the number of deaths of a group of insured follows a binomial distribution. Given a sample of size n extracted from a group of insured individuals following binomial distributions with mortality rate q , the sample mortality rate \hat{q} ,

approximately follows the normal distribution $N\left(q, \frac{q(1-q)}{n}\right)$ provided that the sample size n is large enough. For the sample average \hat{q} , we estimate \bar{q} , the upper limit of the interval, as follows:

$$\bar{q} = q + u(\varepsilon) \sqrt{\frac{q(1-q)}{n}}, \text{ given that } \text{Pr} \left\{ \frac{\hat{q} - q}{\sqrt{\frac{q(1-q)}{n}}} \geq u(\varepsilon) \right\} = \varepsilon$$

Here, $u(\varepsilon)$ is an upper ε point of $N(0,1)$ (approximated as $u(\varepsilon) = 2(\varepsilon \doteq 0.0228)$).

The sample size n_x at each age used for adjustment is obtained from the following formulas, based on the analysis and consideration of the latest experience of each company's inforce policy counts and recent age distributions:

$$\text{Male: } n_x = 1,000,000 \times f(x; \mu_1, \sigma_1^2)$$

$$\text{Female: } n_x = 1,000,000 \times f(x; \mu_2, \sigma_2^2)$$

Here, $f(x; \mu_1, \sigma_1^2)$, $f(x; \mu_2, \sigma_2^2)$ are density functions of normal distributions, where the means (μ_i) and the standard deviations (σ_i) are derived from the industry data in observation year 2011 for males and

[Table 6] Exposure counts in observation year 2011

Aggregate with/without-medical examination, duration 30 years or less

Age	lives		Age	lives	
	Male	Female		Male	Female
0	57,311	54,276	50	689,024	506,206
1	96,047	90,318	51	672,049	497,235
2	112,198	106,672	52	659,535	494,165
3	133,168	127,324	53	644,201	493,762
4	119,616	114,257	54	594,818	459,840
5	67,592	65,257	55	589,844	465,324
6	59,027	56,884	56	584,886	466,729
7	59,636	57,692	57	568,969	458,770
8	62,349	60,807	58	561,073	458,327
9	66,026	64,519	59	563,058	472,806
10	71,398	69,575	60	571,914	500,316
11	75,002	72,540	61	601,668	532,499
12	77,731	75,313	62	628,962	568,361
13	79,517	77,392	63	618,056	568,368
14	79,602	77,571	64	591,257	552,371
15	96,068	93,553	65	430,276	423,232
16	111,381	108,427	66	321,643	315,209
17	131,476	126,844	67	380,390	376,930
18	188,991	178,577	68	396,988	395,705
19	217,300	196,976	69	366,257	369,301
20	233,737	210,539	70	353,099	369,024
21	242,763	219,472	71	306,788	326,299
22	252,178	230,409	72	254,023	274,397
23	277,965	249,051	73	225,019	247,628
24	301,116	263,913	74	227,492	257,037
25	336,247	287,145	75	202,374	240,598
26	369,163	305,794	76	180,951	217,152
27	408,484	329,980	77	147,631	178,242
28	450,987	352,198	78	123,386	149,059
29	478,551	366,552	79	103,381	124,556
30	506,633	374,374	80	67,182	81,582
31	547,846	394,454	81	52,150	65,036
32	595,062	422,810	82	40,160	50,232
33	642,263	447,596	83	31,221	40,441
34	689,288	475,154	84	23,714	30,758
35	740,491	504,622	85	16,545	22,383
36	795,559	533,909	86	11,893	16,664
37	861,564	574,560	87	8,171	12,123
38	903,588	606,746	88	4,462	7,516
39	913,100	611,444	89	3,176	5,352
40	904,664	607,814	90	2,263	3,962
41	880,147	594,063	91	1,619	2,969
42	865,973	588,197	92	1,095	1,997
43	857,903	588,421	93	629	1,439
44	846,620	589,227	94	499	995
45	705,474	495,656	95	338	613
46	768,734	541,711	96	214	355
47	777,554	552,700	97	186	289
48	739,560	530,655	98	140	274
49	717,857	519,362	99	101	187
Means μ_i		45.3	46.5		
Standard Deviations σ_i		16.3	17.7		

females in each age, respectively.

In order to avoid extreme differences at each age in the ratios of the post-adjustment mortality rates against the pre-adjustment mortality rates, 130% of the pre-adjustment mortality rates is set as the upper limit for the adjusted rates. Below is the mathematical formula describing this adjustment:

$$q_x^{(1)} = q_x^{(0)} + \min\left(2\sqrt{\frac{q_x^{(0)}(1-q_x^{(0)})}{n_x}}, 0.3q_x^{(0)}\right), \text{ where } q_x^{(0)} \text{ is the pre-adjustment mortality rate}$$

[Table 7] Adjustment of mortality rates based on mathematical risk theory

Age	Male			Female			Age	Male			Female		
	Pre-adjustment mortality rate (After applying mortality improvement)	Exposure count for adjustment	Post-adjustment mortality rate	Pre-adjustment mortality rate (After applying mortality improvement)	Exposure count for adjustment	Post-adjustment mortality rate		Pre-adjustment mortality rate (After applying mortality improvement)	Exposure count for adjustment	Post-adjustment mortality rate	Pre-adjustment mortality rate (After applying mortality improvement)	Exposure count for adjustment	Post-adjustment mortality rate
	%	lives	%	%	lives	%		%	lives	%	%	lives	%
0	0.76	515	0.99	0.74	715	0.96	50	2.34	23,478	2.97	1.58	22,103	2.05
1	0.32	609	0.42	0.29	828	0.38	51	2.41	23,023	3.06	1.61	21,822	2.09
2	0.22	718	0.29	0.20	956	0.26	52	2.62	22,492	3.30	1.64	21,477	2.13
3	0.15	844	0.20	0.13	1,100	0.17	53	2.98	21,891	3.72	1.89	21,069	2.46
4	0.11	988	0.14	0.10	1,262	0.13	54	3.19	21,226	3.96	1.89	20,604	2.46
5	0.09	1,152	0.12	0.08	1,443	0.10	55	3.44	20,503	4.26	2.24	20,084	2.91
6	0.09	1,338	0.12	0.07	1,645	0.09	56	3.55	19,731	4.40	2.20	19,516	2.86
7	0.08	1,548	0.10	0.07	1,869	0.09	57	4.13	18,917	5.06	2.23	18,903	2.90
8	0.07	1,785	0.09	0.06	2,116	0.08	58	4.40	18,068	5.38	2.42	18,250	3.15
9	0.07	2,050	0.09	0.05	2,389	0.07	59	5.06	17,192	6.14	2.49	17,565	3.24
10	0.07	2,346	0.09	0.05	2,689	0.07	60	5.35	16,297	6.49	2.90	16,851	3.73
11	0.09	2,674	0.12	0.05	3,016	0.07	61	5.92	15,391	7.16	3.09	16,114	3.96
12	0.09	3,037	0.12	0.06	3,372	0.08	62	6.41	14,481	7.74	3.26	15,361	4.18
13	0.11	3,436	0.14	0.07	3,759	0.09	63	7.05	13,573	8.49	3.37	14,596	4.33
14	0.10	3,873	0.13	0.09	4,177	0.12	64	7.96	12,674	9.54	3.59	13,825	4.61
15	0.18	4,349	0.23	0.11	4,626	0.14	65	8.57	11,791	10.27	3.85	13,053	4.93
16	0.20	4,865	0.26	0.11	5,107	0.14	66	9.23	10,927	11.06	3.85	12,285	4.97
17	0.27	5,422	0.35	0.18	5,620	0.23	67	9.86	10,089	11.83	4.34	11,525	5.56
18	0.46	6,020	0.60	0.14	6,165	0.18	68	10.52	9,281	12.64	4.71	10,778	6.03
19	0.36	6,659	0.47	0.18	6,742	0.23	69	12.05	8,505	14.42	5.28	10,047	6.73
20	0.50	7,338	0.65	0.19	7,348	0.25	70	12.84	7,764	15.40	5.74	9,336	7.30
21	0.38	8,056	0.49	0.22	7,984	0.29	71	14.17	7,062	16.98	6.28	8,648	7.98
22	0.55	8,811	0.72	0.20	8,648	0.26	72	15.74	6,399	18.85	7.24	7,984	9.14
23	0.58	9,600	0.75	0.21	9,336	0.27	73	17.65	5,776	21.12	8.22	7,348	10.33
24	0.51	10,421	0.66	0.22	10,047	0.29	74	19.43	5,194	23.26	9.04	6,742	11.35
25	0.53	11,270	0.69	0.23	10,778	0.30	75	22.34	4,654	26.67	10.72	6,165	13.34
26	0.46	12,142	0.60	0.24	11,525	0.31	76	24.90	4,154	29.74	11.62	5,620	14.48
27	0.52	13,032	0.68	0.23	12,285	0.30	77	28.15	3,693	33.59	13.00	5,107	16.17
28	0.46	13,935	0.60	0.24	13,053	0.31	78	32.24	3,272	38.42	14.82	4,626	18.37
29	0.47	14,845	0.61	0.27	13,825	0.35	79	36.78	2,888	43.78	16.50	4,177	20.44
30	0.57	15,754	0.74	0.25	14,596	0.33	80	42.28	2,539	50.27	19.81	3,759	24.36
31	0.54	16,657	0.70	0.31	15,361	0.40	81	47.70	2,224	56.74	22.95	3,372	28.11
32	0.60	17,545	0.78	0.39	16,114	0.51	82	54.88	1,941	65.22	26.26	3,016	32.08
33	0.49	18,411	0.64	0.33	16,851	0.43	83	59.96	1,687	71.52	29.75	2,689	36.30
34	0.53	19,247	0.69	0.42	17,565	0.55	84	68.57	1,461	81.79	34.87	2,389	42.38
35	0.60	20,045	0.78	0.47	18,250	0.61	85	75.48	1,261	90.36	39.48	2,116	47.95
36	0.66	20,799	0.86	0.48	18,903	0.62	86	86.01	1,084	103.04	45.11	1,869	54.71
37	0.73	21,499	0.95	0.54	19,516	0.70	87	98.82	928	118.41	52.00	1,645	62.95
38	0.71	22,140	0.92	0.62	20,084	0.81	88	110.26	792	132.52	59.13	1,443	71.55
39	0.80	22,713	1.04	0.64	20,604	0.83	89	111.64	673	135.92	70.86	1,262	85.31
40	0.96	23,215	1.25	0.65	21,069	0.85	90	119.16	570	146.30	79.92	1,100	96.27
41	1.03	23,638	1.34	0.75	21,477	0.98	91	144.99	481	177.10	85.49	956	103.58
42	1.03	23,979	1.34	0.74	21,822	0.96	92	152.18	404	187.92	98.33	828	119.03
43	1.17	24,233	1.52	0.82	22,103	1.07	93	177.47	338	219.03	102.93	715	125.66
44	1.27	24,397	1.65	0.85	22,315	1.11	94	154.68	282	197.75	116.70	615	142.59
45	1.34	24,471	1.74	0.92	22,458	1.20	95	183.20	234	233.78	138.95	528	169.06
46	1.48	24,452	1.92	0.99	22,530	1.29	96	162.53	194	211.29	123.54	451	154.53
47	1.66	24,342	2.16	1.18	22,530	1.53	97	103.08	160	134.00	149.21	385	185.53
48	1.75	24,142	2.28	1.28	22,458	1.66	98	113.05	131	146.97	91.22	327	118.59
49	2.03	23,852	2.61	1.43	22,315	1.86	99	8.02	108	10.43	78.99	277	102.69

Section 1.5 Second Adjustment - Smoothing Based on Greville's Method

In general, a mortality curve is considered to be smooth, but the first adjusted mortality rate is derived from the crude mortality rate and includes several random fluctuations. In order to remove such fluctuations, the second adjustment is applied.

In this smoothing adjustment, it is desirable to eliminate random fluctuations and to smooth the mortality curve as much as possible (smoothness), as well as to maintain the characteristics of the crude mortality rate (fitness).

Among several smoothing methodologies, we adopt Greville's method(1979) which is commonly used for population mortality tables, etc. We adopt the second adjusted mortality table ($= q_x^{(2)}$) by Greville's cubic polynomials of 13 terms as was done in the SMT2007 (For Life Insurance).

The mortality rate with Greville cubic polynomials with $(2n+1)$ terms ($= q'_x$) is calculated via the following formula:

$$q'_x = c_0 q_x^{(1)} + \sum_{i=1}^n c_i (q_{x+i}^{(1)} + q_{x-i}^{(1)})$$

Here, $q_x^{(1)}$ denotes the first adjusted mortality rate with

c_i ($i = 0, \dots, n$) as the coefficient with value shown in Table 8.

$q_{x-i}^{(1)} (x-i < 0)$ and $q_{x+i}^{(1)} (99 < x+i)$ are extrapolated via the following formula:

$$q_{x-i}^{(1)} = \sum_{j=1}^n a_j q_{x-i+j}^{(1)} (x-i < 0), \quad q_{x+i}^{(1)} = \sum_{j=1}^n a_j q_{x+i-j}^{(1)} (99 < x+i)$$

where, a_j are the coefficients with value shown in Table 9.

[Table 8] Coefficients for adjustment (c_i)

For cubic polynomials of 13 terms ($2n+1=13$)

i	c_i
0	0.240058
1	0.214337
2	0.147356
3	0.065492
4	0.000000
5	-0.027864
6	-0.019350

[Table 9] Coefficients for extrapolation (a_j)

For cubic polynomials of 13 terms ($2n+1=13$)

j	a_j
1	1.016301
2	0.360880
3	-0.021625
4	-0.160909
5	-0.138330
6	-0.056317

Section 1.6 Third Adjustment - Extrapolation Based on Gompertz-Makeham's Model

Due to the small number in exposures, for the mortality rates of older ages, we adopt a reasonable methodology as the third adjustment to connect the adjusted mortality rates to the second adjusted mortality rates. To estimate the mortality rates for older ages, we introduce Gompertz-Makeham's model.

The force of mortality μ_x is assumed as follows in Gompertz-Makeham's model:

$$\mu_x = \alpha + \beta e^{\gamma x}$$

Here, x is the attained age and α , β , γ are constants.

To determine the above constants, we adopt the same method used for the MHLW's 21st Life Tables (2010) as shown below, based on available experience data of older ages.

First, the force of mortality μ'_x is calculated using the second adjusted mortality rate.

Denote l_x as the survivorship curve of the second adjusted mortality. Then, the corresponding force of mortality μ'_x is given by the formula:

$$\mu'_x = -\frac{1}{l_t} \cdot \frac{dl_t}{dt} \Big|_{t=x}$$

The differential coefficients of the survivorship curve l_t at $t = x$ are derived by fitting l_t to a quartic polynomial.

The quartic polynomial is assumed to pass through five points including the point (x, l_x) . The force of mortality μ'_x is determined from the following relation:

$$\mu'_x = \frac{8(l_{x-1} - l_{x+1}) - (l_{x-2} - l_{x+2})}{12l_x}$$

This formula is obtained by substituting the differential coefficients of the following quartic polynomial at $t = x$:

$$g_x(t) = \sum_{i=-2}^2 l_{x+i} \left(\prod_{\substack{-2 \leq j \leq 2 \\ j \neq i}} \frac{t - (x + j)}{i - j} \right) \quad (\text{Lagrange's interpolation formula})$$

$g_x(t)$ is determined to pass through the five points $(x - 2, l_{x-2})$, $(x - 1, l_{x-1})$, (x, l_x) , $(x + 1, l_{x+1})$, $(x + 2, l_{x+2})$.

Given μ'_x above, constants A , B and C are determined to minimize the following:

$$\sum_{x=x_0}^{x_1} (A + Be^{C(x-x_0)} - \mu'_x)^2 \quad (x_0 : \text{male } 81, \text{female } 81, x_1 : \text{male } 92, \text{female } 94)$$

Here, x_0 , x_1 , which are the age limits used to determine the constants above, are defined as the ages where the force of mortality μ'_x is downward convex, within the ages where the underlying data has an observation period of 6 years with medical examination.

With these constants A , B and C , mortality rate q_x is derived as follows:

$$q_x = 1 - \exp\left[-\left\{A + \frac{B}{C}(e^C - 1)e^{C(x-x_0)}\right\}\right]$$

The values of the determined constants are given in Table 10.

[Table 10]

	Male	Female
A	-0.0151980380	-0.0097866159
B	0.0700064560	0.0351813295
C	0.1032065545	0.1180349265

Taking the stability of mortality rates into consideration, we adopt the mortality rates derived using Gompertz-Makeham's model for ages 84 or older for both males and females, as age 84 is the age at which the exposure in the data with an observation period of 6 years with medical examination falls below 100,000 policies.

Section 1.7 Summary of Development Process of Standard Mortality Table 2018 (For Life Insurance)

[Table 11] Development process of SMT2018 (For Life Insurance), Male

Age	Underlying data Observation years: 2008,2009,2011		Crude mortality rate (After modification at younger ages)	Pre-adjustment mortality rate (After applying mortality improvement)	Mortality rate (After first adjustment)	Mortality rate (After second adjustment)	Mortality rate (After third adjustment)	SMT2018 (For Life Insurance)
	Exposure counts	Claims of death						
	lives	deaths	%	%	%	%	%	%
0	231,242	77	0.89	0.76	0.99	0.81		0.81
1	171,432	28	0.37	0.32	0.42	0.56		0.56
2	209,417	15	0.26	0.22	0.29	0.36		0.36
3	175,864	18	0.18	0.15	0.20	0.22		0.22
4	203,574	20	0.13	0.11	0.14	0.14		0.14
5	180,894	16	0.11	0.09	0.12	0.10		0.10
6	194,559	28	0.10	0.09	0.12	0.09		0.09
7	234,100	25	0.09	0.08	0.10	0.09		0.09
8	268,142	27	0.08	0.07	0.09	0.09		0.09
9	294,916	18	0.08	0.07	0.09	0.09		0.09
10	321,140	28	0.08	0.07	0.09	0.10		0.10
11	350,883	34	0.10	0.09	0.12	0.10		0.10
12	374,952	42	0.11	0.09	0.12	0.11		0.11
13	404,106	52	0.13	0.11	0.14	0.13		0.13
14	423,105	49	0.12	0.10	0.13	0.17		0.17
15	429,586	89	0.21	0.18	0.23	0.23		0.23
16	509,578	116	0.23	0.20	0.26	0.30		0.30
17	577,813	180	0.31	0.27	0.35	0.38		0.38
18	94,502	51	0.54	0.46	0.60	0.46		0.46
19	129,797	55	0.42	0.36	0.47	0.53		0.53
20	115,462	68	0.59	0.50	0.65	0.59		0.59
21	145,700	66	0.45	0.38	0.49	0.63		0.63
22	172,325	111	0.64	0.55	0.72	0.66		0.66
23	195,983	134	0.68	0.58	0.75	0.68		0.68
24	224,994	134	0.60	0.51	0.66	0.68		0.68
25	201,081	125	0.62	0.53	0.69	0.67		0.67
26	235,194	127	0.54	0.46	0.60	0.65		0.65
27	269,561	164	0.61	0.52	0.68	0.64		0.64
28	312,518	169	0.54	0.46	0.60	0.64		0.64
29	362,156	200	0.55	0.47	0.61	0.66		0.66
30	342,859	229	0.67	0.57	0.74	0.68		0.68
31	405,184	254	0.63	0.54	0.70	0.69		0.69
32	478,186	333	0.70	0.60	0.78	0.70		0.70
33	566,315	321	0.57	0.49	0.64	0.72		0.72
34	667,582	413	0.62	0.53	0.69	0.74		0.74
35	653,297	457	0.70	0.60	0.78	0.77		0.77
36	732,751	564	0.77	0.66	0.86	0.83		0.83
37	798,133	676	0.85	0.73	0.95	0.90		0.90
38	842,923	700	0.83	0.71	0.92	0.99		0.99
39	875,578	824	0.94	0.80	1.04	1.09		1.09
40	707,574	796	1.12	0.96	1.25	1.18		1.18
41	739,126	884	1.20	1.03	1.34	1.29		1.29
42	724,417	875	1.21	1.03	1.34	1.40		1.40
43	739,083	1,013	1.37	1.17	1.52	1.51		1.51
44	791,707	1,176	1.49	1.27	1.65	1.63		1.63
45	689,228	1,082	1.57	1.34	1.74	1.77		1.77
46	724,330	1,250	1.73	1.48	1.92	1.94		1.94
47	737,746	1,434	1.94	1.66	2.16	2.14		2.14
48	741,919	1,521	2.05	1.75	2.28	2.36		2.36
49	744,766	1,768	2.37	2.03	2.61	2.59		2.59
50	619,845	1,697	2.74	2.34	2.97	2.85		2.85
51	617,778	1,743	2.82	2.41	3.06	3.11		3.11
52	621,890	1,911	3.07	2.62	3.30	3.37		3.37
53	641,417	2,233	3.48	2.98	3.72	3.64		3.64
54	644,384	2,403	3.73	3.19	3.96	3.91		3.91
55	660,022	2,654	4.02	3.44	4.26	4.22		4.22
56	689,099	2,859	4.15	3.55	4.40	4.58		4.58
57	723,994	3,495	4.83	4.13	5.06	5.00		5.00
58	773,320	3,983	5.15	4.40	5.38	5.46		5.46
59	841,767	4,981	5.92	5.06	6.14	5.97		5.97

Age	Underlying data Observation years: 2008,2009,2011		Crude mortality rate (After modification at younger ages)	Pre-adjustment mortality rate (After applying mortality improvement)	Mortality rate (After first adjustment)	Mortality rate (After second adjustment)	Mortality rate (After third adjustment)	SMT2018 (For Life Insurance)
	Exposure counts	Claims of death						
	lives	deaths	%	%	%	%	%	%
60	873,517	5,464	6.26	5.35	6.49	6.53		6.53
61	907,161	6,279	6.92	5.92	7.16	7.16		7.16
62	861,266	6,463	7.50	6.41	7.74	7.85		7.85
63	743,037	6,130	8.25	7.05	8.49	8.58		8.58
64	737,624	6,868	9.31	7.96	9.54	9.35		9.35
65	703,179	7,043	10.02	8.57	10.27	10.15		10.15
66	663,451	7,165	10.80	9.23	11.06	11.00		11.00
67	692,243	7,982	11.53	9.86	11.83	11.90		11.90
68	682,085	8,390	12.30	10.52	12.64	12.92		12.92
69	614,007	8,658	14.10	12.05	14.42	14.08		14.08
70	558,188	8,382	15.02	12.84	15.44	15.44		15.44
71	527,065	8,740	16.58	14.17	16.98	17.02		17.02
72	488,618	8,997	18.41	15.74	18.85	18.86		18.86
73	451,144	9,311	20.64	17.65	21.12	20.99		20.99
74	422,319	9,598	22.73	19.43	23.26	23.46		23.46
75	370,051	9,669	26.13	22.34	26.67	26.37		26.37
76	335,737	9,778	29.12	24.90	29.74	29.78		29.78
77	285,789	9,410	32.93	28.15	33.59	33.81		33.81
78	241,400	9,103	37.71	32.24	38.42	38.53		38.53
79	203,618	8,759	43.02	36.78	43.78	43.96		43.96
80	120,186	5,944	49.46	42.28	50.27	50.06		50.06
81	185,207	10,335	55.80	47.70	56.74	56.73		56.73
82	143,190	9,192	64.19	54.88	65.22	64.02		64.02
83	107,078	7,510	70.14	59.96	71.52	72.35		72.35
84	77,118	6,186	80.21	68.57	81.79	82.01	81.77	81.77
85	45,703	4,035	88.29	75.48	90.36	92.49	91.75	91.75
86	31,997	3,219	100.60	86.01	103.52	102.69	102.69	102.69
87	22,104	2,555	115.59	98.82	118.41	114.66	114.66	114.66
88	11,437	1,475	128.97	110.26	132.52	127.40	127.75	127.75
89	8,370	1,093	130.59	111.64	135.92	141.29	142.04	142.04
90	5,467	762	139.38	119.16	146.30	156.83	157.60	157.60
91	3,420	580	169.59	144.99	177.10	174.98	174.53	174.53
92	2,191	390	178.00	152.18	187.92	193.06	192.90	192.90
93	1,267	263	207.58	177.47	219.03	208.93	212.79	212.79
94	713	129	180.93	154.68	197.75	217.41	234.26	234.26
95	462	99	214.29	183.20	233.78	213.06	257.39	257.39
96	263	50	190.11	162.53	211.29	192.60	282.22	282.22
97	141	17	120.57	103.08	134.00	156.01	308.78	308.78
98	121	16	132.23	113.05	146.97	105.94	337.08	337.08
99	533	5	9.38	8.02	10.43	46.65	367.10	367.10
100							398.81	398.81
101							432.10	432.10
102							466.86	466.86
103							502.92	502.92
104							540.06	540.06
105							578.00	578.00
106							616.42	616.42
107							654.94	654.94
108							693.14	693.14
109							730.57	1000.00

*The underlying data is in observation years 2005-2009, 2011 for age 17 or younger, and age 81 or older.

*Terminal ages are defined as the age at which the number of remaining lives would fall below 1, starting from 100,000 lives at age 0.

[Table 12] Development process of SMT2018 (For Life Insurance), Female

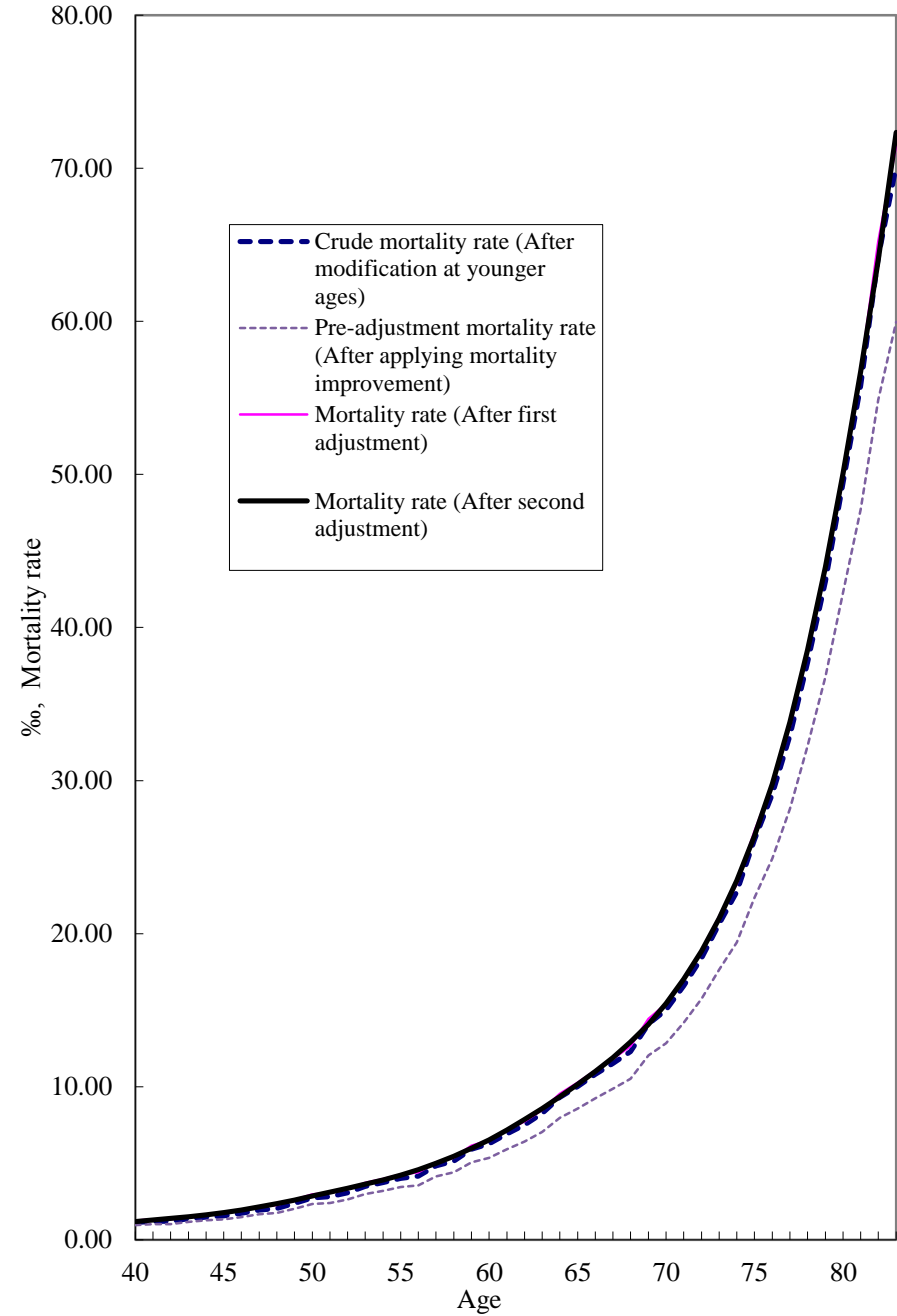
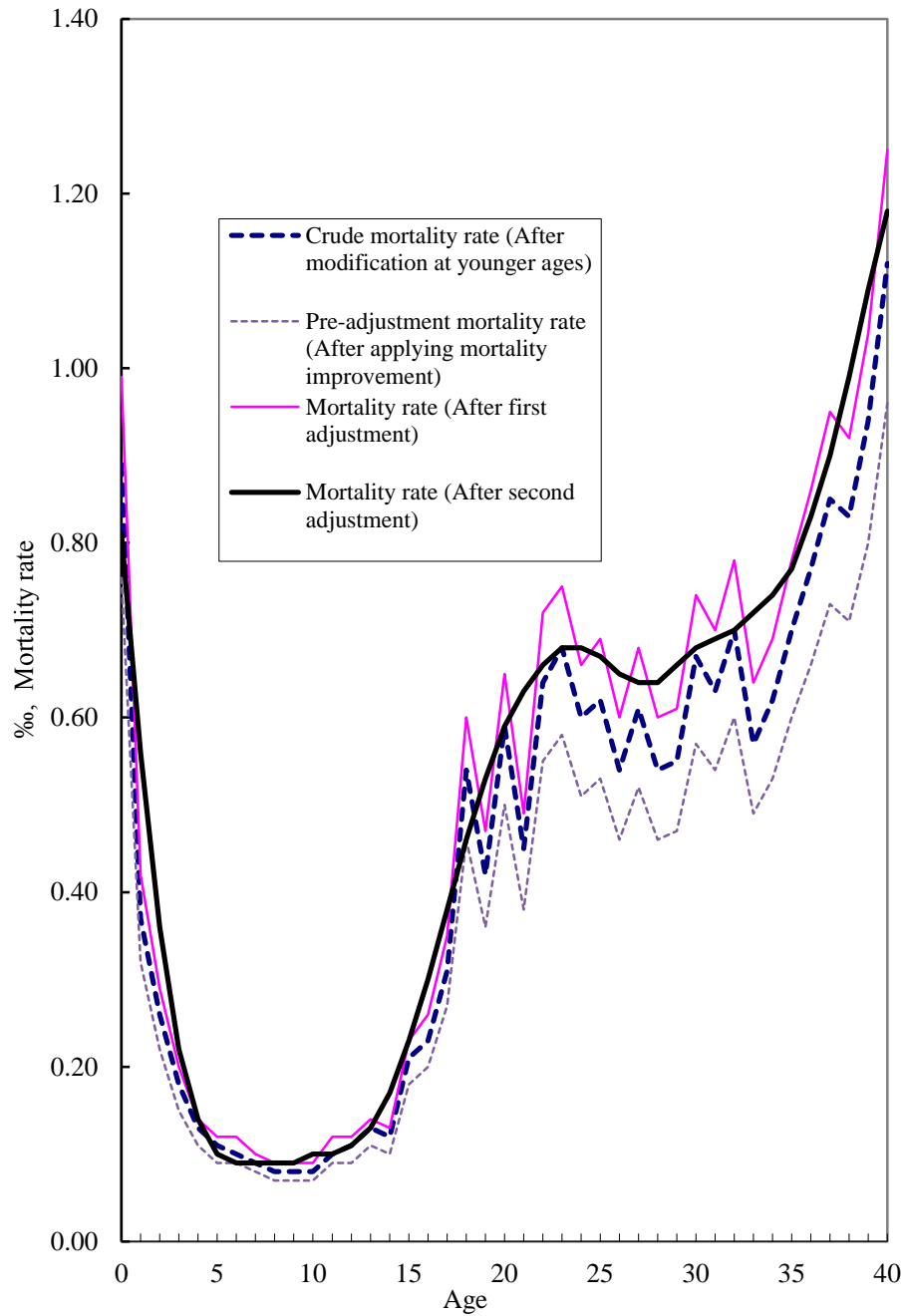
Age	Underlying data Observation years: 2008,2009,2011		Crude mortality rate (After modification at younger ages)	Pre-adjustment mortality rate (After applying mortality improvement)	Mortality rate (After first adjustment)	Mortality rate (After second adjustment)	Mortality rate (After third adjustment)	SMT2018 (For Life Insurance)
	Exposure counts	Claims of death						
	lives	deaths	%	%	%	%	%	%
0	218,308	67	0.84	0.74	0.96	0.78	0.78	0.78
1	161,621	17	0.33	0.29	0.38	0.53	0.53	0.53
2	198,488	16	0.23	0.20	0.26	0.33	0.33	0.33
3	166,972	21	0.15	0.13	0.17	0.19	0.19	0.19
4	194,519	21	0.11	0.10	0.13	0.11	0.11	0.11
5	114,101	9	0.09	0.08	0.10	0.08	0.08	0.08
6	132,906	13	0.08	0.07	0.09	0.08	0.08	0.08
7	152,313	12	0.08	0.07	0.09	0.08	0.08	0.08
8	188,220	6	0.07	0.06	0.08	0.07	0.07	0.07
9	218,710	11	0.06	0.05	0.07	0.07	0.07	0.07
10	243,829	16	0.06	0.05	0.07	0.07	0.07	0.07
11	269,569	16	0.06	0.05	0.07	0.07	0.07	0.07
12	294,561	13	0.07	0.06	0.08	0.08	0.08	0.08
13	320,863	20	0.08	0.07	0.09	0.10	0.10	0.10
14	346,337	24	0.10	0.09	0.12	0.12	0.12	0.12
15	356,664	40	0.12	0.11	0.14	0.14	0.14	0.14
16	366,580	48	0.13	0.11	0.14	0.16	0.16	0.16
17	436,837	87	0.20	0.18	0.23	0.19	0.19	0.19
18	469,675	73	0.16	0.14	0.18	0.21	0.21	0.21
19	507,525	103	0.20	0.18	0.23	0.23	0.23	0.23
20	631,405	142	0.22	0.19	0.25	0.25	0.25	0.25
21	698,092	172	0.25	0.22	0.29	0.26	0.26	0.26
22	768,070	179	0.23	0.20	0.26	0.27	0.27	0.27
23	845,583	203	0.24	0.21	0.27	0.28	0.28	0.28
24	929,844	236	0.25	0.22	0.29	0.29	0.29	0.29
25	803,936	206	0.26	0.23	0.30	0.29	0.29	0.29
26	886,496	235	0.27	0.24	0.31	0.30	0.30	0.30
27	966,813	247	0.26	0.23	0.30	0.31	0.31	0.31
28	203,486	55	0.27	0.24	0.31	0.32	0.32	0.32
29	223,721	70	0.31	0.27	0.35	0.34	0.34	0.34
30	210,762	61	0.29	0.25	0.33	0.37	0.37	0.37
31	235,142	82	0.35	0.31	0.40	0.40	0.40	0.40
32	264,368	118	0.45	0.39	0.51	0.44	0.44	0.44
33	297,889	113	0.38	0.33	0.43	0.49	0.49	0.49
34	337,214	162	0.48	0.42	0.55	0.54	0.54	0.54
35	289,832	156	0.54	0.47	0.61	0.59	0.59	0.59
36	322,803	177	0.55	0.48	0.62	0.65	0.65	0.65
37	348,440	213	0.61	0.54	0.70	0.71	0.71	0.71
38	371,344	265	0.71	0.62	0.81	0.77	0.77	0.77
39	386,131	281	0.73	0.64	0.83	0.83	0.83	0.83
40	360,257	266	0.74	0.65	0.85	0.88	0.88	0.88
41	377,399	322	0.85	0.75	0.98	0.93	0.93	0.93
42	371,438	312	0.84	0.74	0.96	0.99	0.99	0.99
43	377,481	355	0.94	0.82	1.07	1.04	1.04	1.04
44	403,612	392	0.97	0.85	1.11	1.12	1.12	1.12
45	356,830	376	1.05	0.92	1.20	1.22	1.22	1.22
46	367,756	414	1.13	0.99	1.29	1.35	1.35	1.35
47	370,629	498	1.34	1.18	1.53	1.50	1.50	1.50
48	366,999	537	1.46	1.28	1.66	1.67	1.67	1.67
49	364,749	596	1.63	1.43	1.86	1.82	1.82	1.82
50	315,032	566	1.80	1.58	2.05	1.97	1.97	1.97
51	311,552	570	1.83	1.61	2.09	2.11	2.11	2.11
52	307,217	576	1.87	1.64	2.13	2.25	2.25	2.25
53	315,213	680	2.16	1.89	2.46	2.41	2.41	2.41
54	313,435	674	2.15	1.89	2.46	2.56	2.56	2.56
55	318,493	811	2.55	2.24	2.91	2.70	2.70	2.70
56	332,334	833	2.51	2.20	2.86	2.84	2.84	2.84
57	348,715	887	2.54	2.23	2.90	3.00	3.00	3.00
58	375,411	1,036	2.76	2.42	3.15	3.17	3.17	3.17
59	411,499	1,168	2.84	2.49	3.24	3.38	3.38	3.38

Age	Underlying data Observation years: 2008,2009,2011		Crude mortality rate (After modification at younger ages)	Pre-adjustment mortality rate (After applying mortality improvement)	Mortality rate (After first adjustment)	Mortality rate (After second adjustment)	Mortality rate (After third adjustment)	SMT2018 (For Life Insurance)
	Exposure counts	Claims of death						
	lives	deaths	%	%	%	%	%	%
60	432,342	1,430	3.31	2.90	3.73	3.63	3.63	3.63
61	454,591	1,601	3.52	3.09	3.96	3.89	3.89	3.89
62	436,975	1,626	3.72	3.26	4.18	4.14	4.14	4.14
63	383,336	1,471	3.84	3.37	4.33	4.36	4.36	4.36
64	382,675	1,564	4.09	3.59	4.61	4.58	4.58	4.58
65	370,985	1,628	4.39	3.85	4.93	4.84	4.84	4.84
66	351,480	1,542	4.39	3.85	4.97	5.15	5.15	5.15
67	376,215	1,862	4.95	4.34	5.56	5.54	5.54	5.54
68	382,049	2,052	5.37	4.71	6.03	6.03	6.03	6.03
69	354,379	2,134	6.02	5.28	6.73	6.61	6.61	6.61
70	333,321	2,183	6.55	5.74	7.30	7.30	7.30	7.30
71	328,609	2,353	7.16	6.28	7.98	8.14	8.14	8.14
72	318,613	2,632	8.26	7.24	9.14	9.12	9.12	9.12
73	309,212	2,898	9.37	8.22	10.33	10.26	10.26	10.26
74	305,811	3,154	10.31	9.04	11.35	11.52	11.52	11.52
75	283,672	3,466	12.22	10.72	13.34	12.89	12.89	12.89
76	272,164	3,606	13.25	11.62	14.48	14.43	14.43	14.43
77	245,871	3,645	14.82	13.00	16.17	16.23	16.23	16.23
78	219,704	3,714	16.90	14.82	18.37	18.40	18.40	18.40
79	197,113	3,708	18.81	16.50	20.44	21.01	21.01	21.01
80	108,446	2,450	22.59	19.81	24.36	24.14	24.14	24.14
81	179,236	4,690	26.17	22.95	28.11	27.78	27.78	27.78
82	147,664	4,421	29.94	26.26	32.08	31.95	31.95	31.95
83	119,113	4,040	33.92	29.75	36.30	36.59	36.59	36.59
84	92,268	3,669	39.76	34.87	42.38	41.82	42.49	42.49
85	56,810	2,557	45.01	39.48	47.97	47.97	48.85	48.85
86	43,531	2,239	51.43	45.11	54.71	55.21	55.96	55.96
87	33,141	1,965	59.29	52.00	62.95	63.70	63.90	63.90
88	17,206	1,160	67.42	59.13	71.55	73.23	72.75	72.75
89	12,625	1,020	80.79	70.86	85.31	83.24	82.61	82.61
90	8,813	803	91.12	79.92	96.27	94.18	93.57	93.57
91	5,899	575	97.47	85.49	103.58	105.78	105.76	105.76
92	3,889	436	112.11	98.33	119.03	119.29	119.28	119.28
93	2,471	290	117.36	102.93	125.66	134.34	134.24	134.24
94	1,488	198	133.06	116.70	142.59	148.34	150.78	150.78
95	808	128	158.42	138.95	169.06	157.73	169.01	169.01
96	426	60	140.85	123.54	154.53	159.31	189.06	189.06
97	241	41	170.12	149.21	185.53	151.43	211.04	211.04
98	125	13	104.00	91.22	118.59	134.79	235.06	235.06
99	322	29	90.06	78.99	102.69	112.12	261.22	261.22
100							289.59	289.59
101							320.21	320.21
102							353.10	353.10
103							388.20	388.20
104							425.43	425.43
105							464.62	464.62
106							505.54	505.54
107							547.85	547.85
108							591.15	591.15
109							634.94	634.94
110							678.63	678.63
111							721.58	721.58
112							763.08	763.08
113							802.43	1000.00

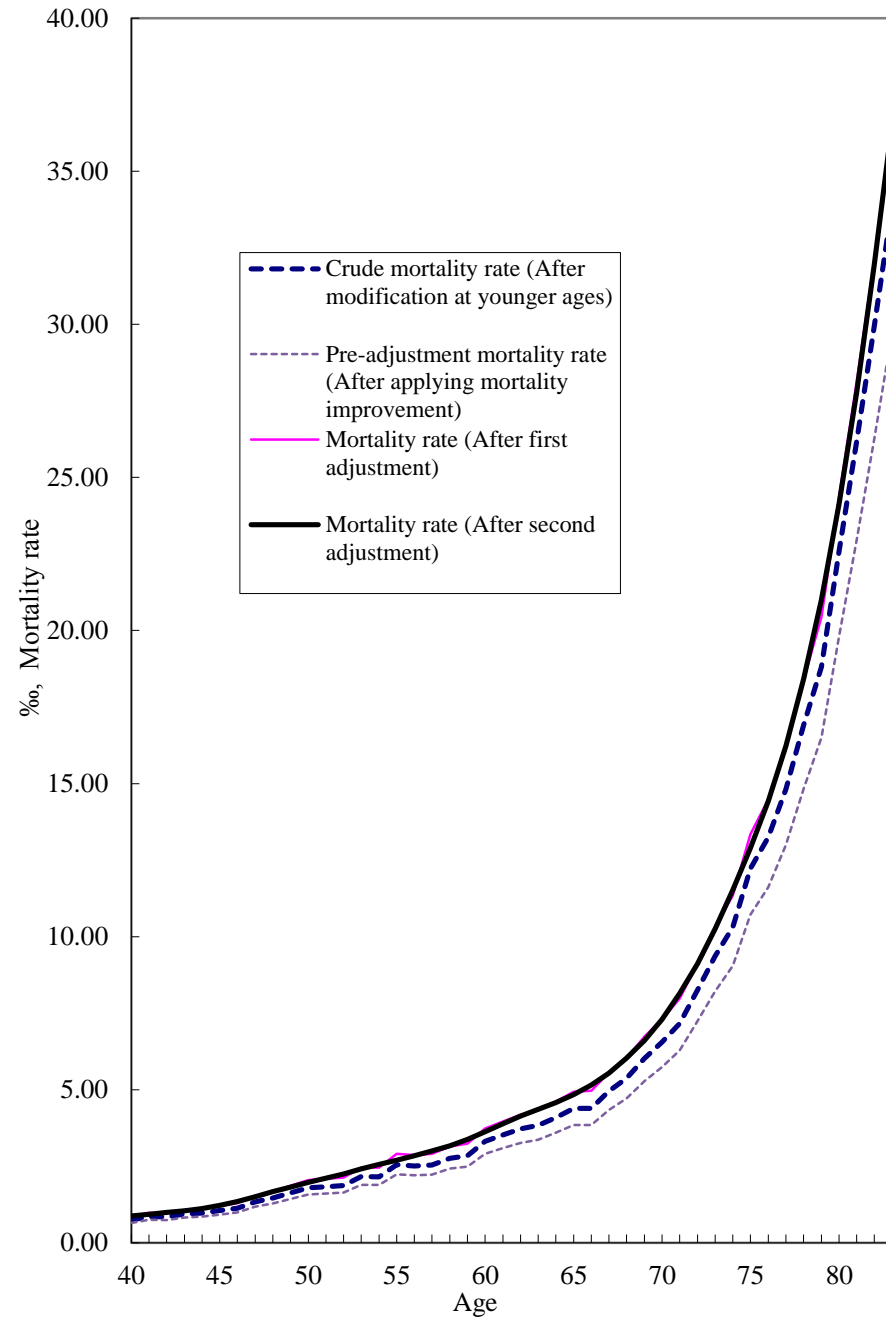
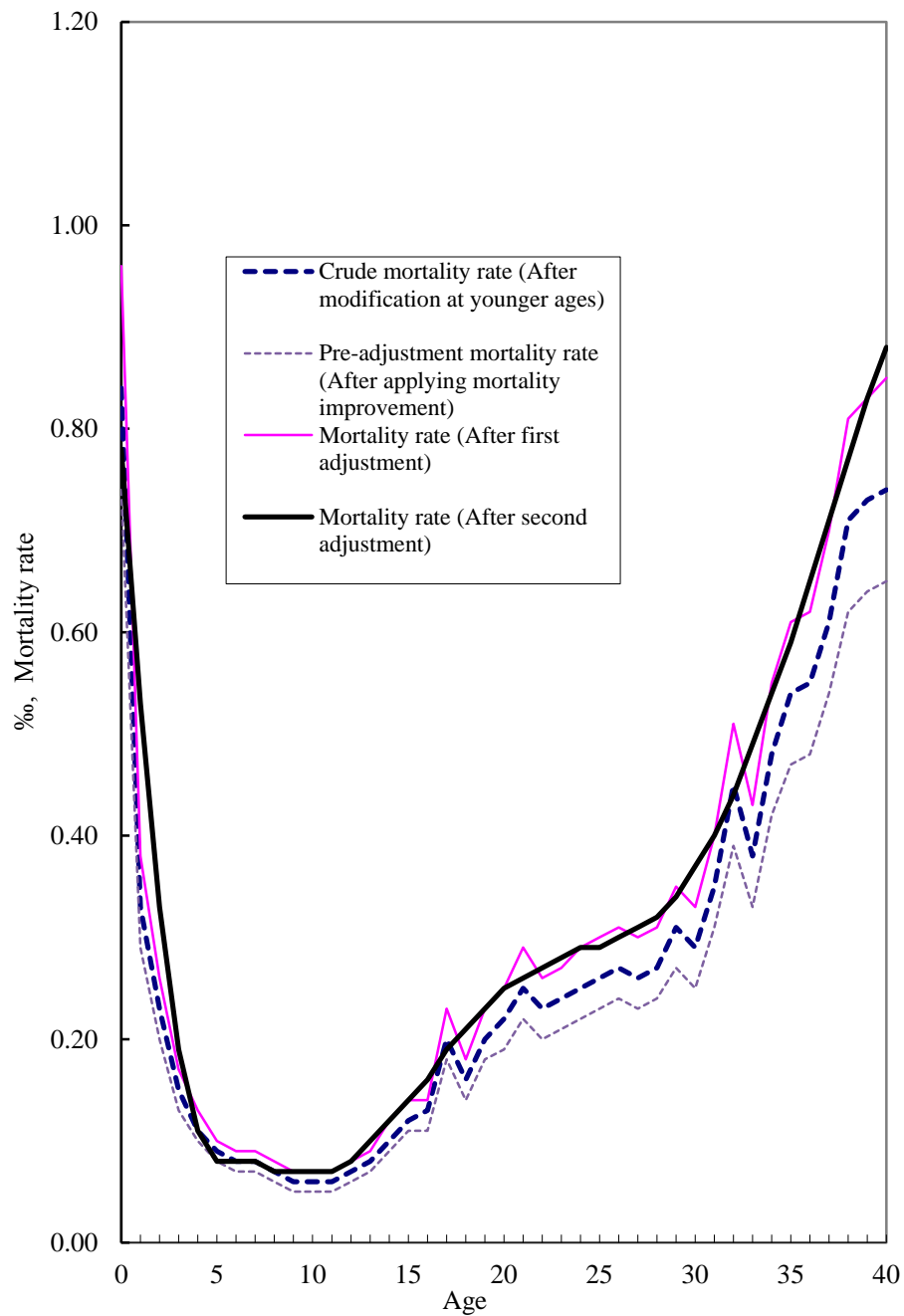
*The underlying data is in observation years 2005-2009, 2011 for age 27 or younger, and age 81 or older.

*Terminal ages are defined as the age at which the number of remaining lives would fall below 1, starting from 100,000 lives at age 0.

[Graph 1] Development process of SMT2018 (For Life Insurance), Male (Pre-adjustment, first adjustment and second adjustment)



[Graph 2] Development process of SMT2018 (For Life Insurance), Female (Pre-adjustment, first adjustment and second adjustment)



Section 1.8 Comparison of Development Methodologies Between Standard Mortality Table 2018 and 2007 (For Life Insurance)

[Table 13-1] Methodology adopted for developing SMT2018 (For Life Insurance) (in comparison to the methodology adopted for SMT2007 (For Life Insurance))

	SMT2018 (For Life Insurance)			SMT2007 (For Life Insurance)			Comments																																																	
	Male	Female		Male	Female																																																			
Observation period	2008,2009,2011 (3 observation years) [For males aged 17 or younger or 81 or older and for females aged 27 or younger or 81 or older; 2005-2009,2011 (6 observation years)]			1999-2001 (3 observation years) [For males aged 15 or younger and females aged 19 or younger; 1996-2001 (6 observation years), For age 0; 1991-2001 (11 observation years)]			<ul style="list-style-type: none"> The latest 3 observation years were used, except for the 2010 observation year in which the impact of the Great East Japan Earthquake is material. (6 observation years used for young / older ages). The younger age groups are connected at the ages where the "upper limit of the 95% confidence interval of the crude mortality rates with medical examination" exceeds "130% of the mortality rates with medical examination". The older age groups are connected at the ages where the number of exposure counts is less than 100,000. 																																																	
Truncated period	<table border="1"> <thead> <tr> <th>Truncated Period</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr><td>1</td><td>1-19</td><td>1-4</td></tr> <tr><td>2</td><td>20-24</td><td>5-24</td></tr> <tr><td>3</td><td>25-29</td><td>25-29</td></tr> <tr><td>4</td><td>30-34</td><td>30-34</td></tr> <tr><td>5</td><td>35-39</td><td>-</td></tr> <tr><td>6</td><td>-</td><td>35-39</td></tr> <tr><td>7</td><td>40-44</td><td>40-44</td></tr> <tr><td>8</td><td>45-49</td><td>45-49</td></tr> <tr><td>9</td><td>-</td><td>-</td></tr> <tr><td>10</td><td>50-</td><td>50-</td></tr> </tbody> </table>	Truncated Period	Male	Female	1	1-19	1-4	2	20-24	5-24	3	25-29	25-29	4	30-34	30-34	5	35-39	-	6	-	35-39	7	40-44	40-44	8	45-49	45-49	9	-	-	10	50-	50-			<table border="1"> <thead> <tr> <th>Truncated Period</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr><td>1</td><td>1-9</td><td>1-9</td></tr> <tr><td>2</td><td>10-29</td><td>10-24</td></tr> <tr><td>3</td><td>30-34</td><td>25-29</td></tr> <tr><td>4</td><td>35-39</td><td>30-34</td></tr> <tr><td>5</td><td>40-</td><td>35-</td></tr> </tbody> </table>	Truncated Period	Male	Female	1	1-9	1-9	2	10-29	10-24	3	30-34	25-29	4	35-39	30-34	5	40-	35-	<ul style="list-style-type: none"> The upper limit of the years of underlying data truncation is changed to 10 years, based on the observed selection effect, etc. The truncated periods are determined so that the remaining exposure counts after truncation are approximately 50% of original data.
Truncated Period	Male	Female																																																						
1	1-19	1-4																																																						
2	20-24	5-24																																																						
3	25-29	25-29																																																						
4	30-34	30-34																																																						
5	35-39	-																																																						
6	-	35-39																																																						
7	40-44	40-44																																																						
8	45-49	45-49																																																						
9	-	-																																																						
10	50-	50-																																																						
Truncated Period	Male	Female																																																						
1	1-9	1-9																																																						
2	10-29	10-24																																																						
3	30-34	25-29																																																						
4	35-39	30-34																																																						
5	40-	35-																																																						
Policy duration	30 years or less			30 years or less			<ul style="list-style-type: none"> Only 30 years or less is used considering the sufficiency of exposure counts. 																																																	
Medical examination	Aggregate with/without examination: age 17 or younger With examination: age 18 or older	Aggregate with/without examination: age 27 or younger With examination: age 28 or older		Aggregate with/without examination: age 15 or younger With examination: age 16 or older	Aggregate with/without examination: age 19 or younger With examination: age 20 or older																																																			
Exposure counts (unit: million)	40.68	30.02		62.49	37.48																																																			
Claims of death (unit: thousand)	263	95		335	93																																																			

[Table 13-2] Methodology adopted for developing SMT2018 (For Life Insurance) (in comparison to the methodology adopted for SMT2007 (For Life Insurance))

	SMT2018 (For Life Insurance)		SMT2007 (For Life Insurance)		Comments
	Male	Female	Male	Female	
Adjustment at younger ages	The MHLW's 21st Life Tables (2010) are used for males aged 12 or younger and females aged 15 or younger.		Average of the MHLW's Abridged Population Life Tables in 2002-2004 is used for males aged 7 or younger and females aged 12 or younger.		<ul style="list-style-type: none"> Population mortality table in Japan is adopted at younger ages where the "upper limit of the 95% confidence interval for the crude mortality rates" exceed "130% of the crude mortality rates" based on the verification of credibility of mortality rates in 2005-2009 and 2011 observation years.
Mortality improvement	Improvement rates: 2.5% p.a. for 5 years 1.0% p.a. for 3 years	Improvement rates: 2.0% p.a. for 5 years 1.0% p.a. for 3 years	—		<ul style="list-style-type: none"> Mortality improvement from the observation periods to the implementation date of the SMT2018 is applied, based on mortality improvement trends observed over the observation periods, using similar methodologies adopted in developing the Commissioners Standard Ordinary (CSO) mortality table in the United States. Mortality improvement rates have been developed based on analyses of population mortality experience and projections. Different improvement rates are applied for 5 years up to 2015, for which population mortality experience data is available, and for the following 3 years, for which such data is not available.
Safety margin based on mathematical risk theory	2 σ level is applied to reflect the expected fluctuations of future mortality, assuming that the probability exceeding the expected fluctuations is 2.28%. 130% of pre-adjustment mortality rate is applied as the maximum margin to avoid extreme fluctuations between ages. Expected fluctuations in 1 million policies for each male / female		Expected fluctuations in 4 million policies for each male / female		<ul style="list-style-type: none"> Adjustments are applied based on the following considerations: <ul style="list-style-type: none"> To address yearly fluctuations in future mortality To address differences in scale (i.e. insurance portfolio size) To address uncertainties in the level of future mortality Adjustment based on mathematical risk theory is called the first adjustment The hypothetical policy counts used are based on the size of a standard insurance portfolio.
Smoothing	Greville's cubic of 13 terms				<ul style="list-style-type: none"> Smoothing is called the second adjustment.
Mortality at older ages	Connect to mortality rate based on Gompertz-Makeham's model				<ul style="list-style-type: none"> Gompertz-Makeham's model is applied for the mortality rates for older age group. Mortality rate development for older ages, and its connection are called the third adjustment. The underlying data used to determine the constants is from 2005 to 2009 and 2011 (6 observation years), and the age band is defined as the ages where the force of mortality is downward convex. Connect at the age where the exposure counts are less than 100,000.
Ages in the underlying data to determine the constants	The constants are determined with the same approach as for the population mortality table.		The constants are determined using King-Hardy method.		
Connected age	81-92	81-94	69-79 King-Hardy 3 age band	61-79 King-Hardy 5 age band	
Terminal age	84	84	78	70	
Average life expectancy	109	113	107	110	<ul style="list-style-type: none"> This is set as the age at which the number of remaining lives would fall below 1, starting from 100,000 lives at age 0.
Average life expectancy	80.77	86.56	78.24	84.94	<ul style="list-style-type: none"> Weighted average mortality rates are as follows: SMT2007: Male: 5.70‰; Female: 3.20‰ SMT2018: Male: 4.31‰ (24.4% reduction); Female: 2.72‰ (15.0% reduction)

Notes:

* Developed based on age nearest birthday.

* The mortality rates in the SMT2018 (For Life Insurance) include total and permanent disabilities (TPD), same as the mortality rates in the SMT2007 (For Life Insurance).

Section 1.9 Comparison Against Standard Mortality Table 2007 (For Life Insurance)

[Table 14] Comparison between SMT2018 and 2007 (For Life Insurance)

< Male >

Age	SMT2018 (For Life Insurance)		SMT2007 (For Life Insurance)
	versus 2007	%	
0	0.81	75	1.08
1	0.56	75	0.75
2	0.36	73	0.49
3	0.22	71	0.31
4	0.14	67	0.21
5	0.10	59	0.17
6	0.09	56	0.16
7	0.09	56	0.16
8	0.09	56	0.16
9	0.09	60	0.15
10	0.10	71	0.14
11	0.10	77	0.13
12	0.11	79	0.14
13	0.13	72	0.18
14	0.17	68	0.25
15	0.23	64	0.36
16	0.30	61	0.49
17	0.38	61	0.62
18	0.46	63	0.73
19	0.53	66	0.80
20	0.59	70	0.84
21	0.63	73	0.86
22	0.66	78	0.85
23	0.68	81	0.84
24	0.68	82	0.83
25	0.67	82	0.82
26	0.65	80	0.81
27	0.64	80	0.80
28	0.64	79	0.81
29	0.66	80	0.83
30	0.68	79	0.86
31	0.69	78	0.89
32	0.70	76	0.92
33	0.72	75	0.96
34	0.74	74	1.00
35	0.77	73	1.05
36	0.83	74	1.12
37	0.90	76	1.19
38	0.99	77	1.28
39	1.09	80	1.37
40	1.18	80	1.48
41	1.29	80	1.61
42	1.40	80	1.76
43	1.51	79	1.92
44	1.63	77	2.11
45	1.77	77	2.31
46	1.94	76	2.54
47	2.14	77	2.77
48	2.36	78	3.04
49	2.59	78	3.33
50	2.85	78	3.65
51	3.11	78	4.01
52	3.37	77	4.40
53	3.64	76	4.80
54	3.91	75	5.22
55	4.22	74	5.67
56	4.58	74	6.15
57	5.00	75	6.66
58	5.46	76	7.18
59	5.97	77	7.74

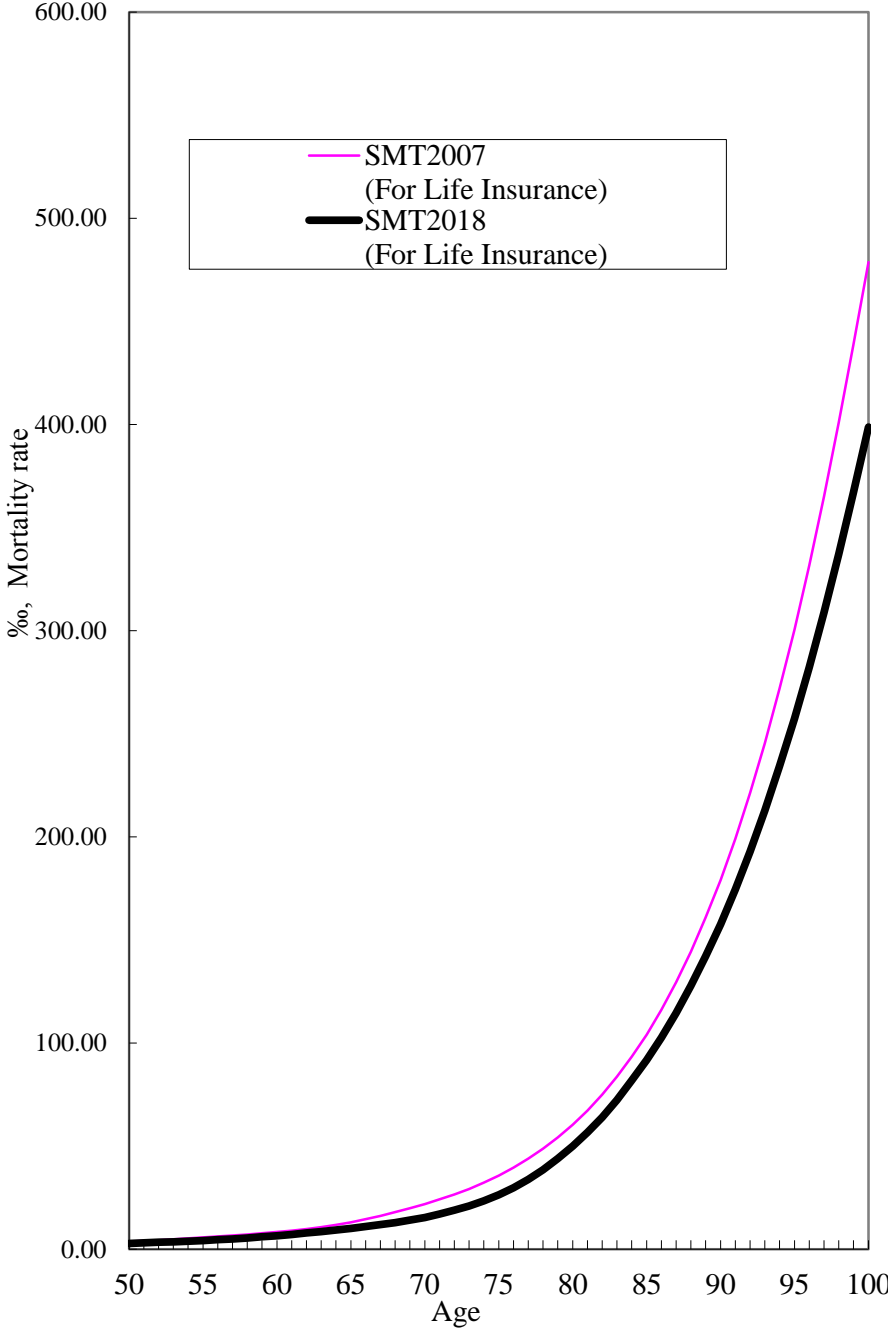
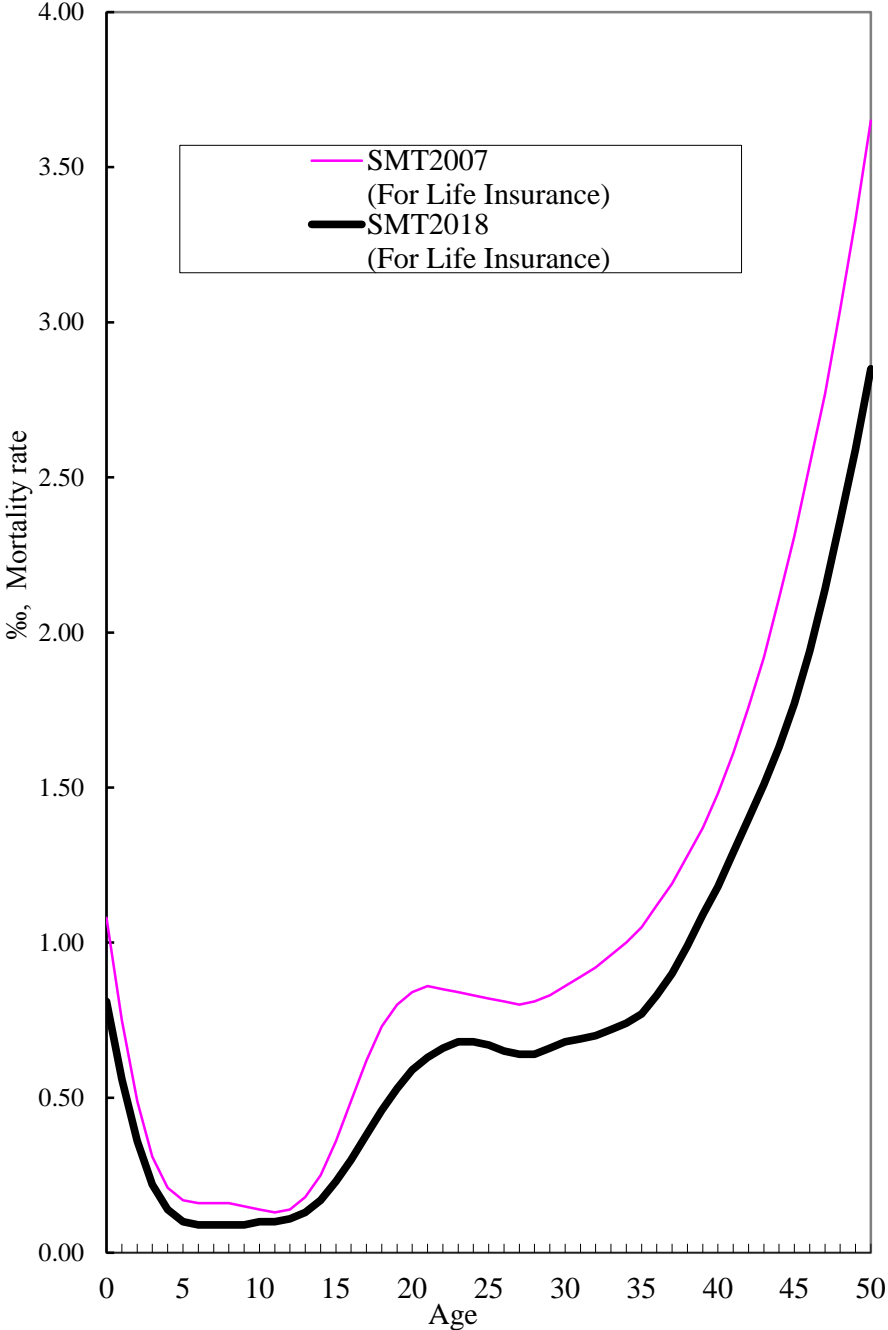
< Female >

Age	SMT2018 (For Life Insurance)		SMT2007 (For Life Insurance)
	versus 2007	%	
60	6.53	78	8.34
61	7.16	79	9.02
62	7.85	80	9.81
63	8.58	80	10.72
64	9.35	79	11.80
65	10.15	78	13.06
66	11.00	76	14.52
67	11.90	74	16.16
68	12.92	72	17.94
69	14.08	71	19.86
70	15.44	70	21.93
71	17.02	70	24.15
72	18.86	71	26.57
73	20.99	72	29.23
74	23.46	73	32.23
75	26.37	74	35.68
76	29.78	75	39.61
77	33.81	77	44.00
78	38.53	79	48.77
79	43.96	81	54.25
80	50.06	83	60.39
81	56.73	84	67.28
82	64.02	85	75.00
83	72.35	87	83.64
84	81.77	88	93.29
85	91.75	88	104.07
86	102.69	88	116.09
87	114.66	89	129.46
88	127.75	89	144.32
89	142.04	88	160.79
90	157.60	88	179.00
91	174.53	88	199.10
92	192.90	87	221.19
93	212.79	87	245.40
94	234.26	86	271.84
95	257.39	86	300.58
96	282.22	85	331.66
97	308.78	85	365.10
98	337.08	84	400.85
99	367.10	84	438.80
100	398.81	83	478.77
101	432.10	83	520.48
102	466.86	83	563.59
103	502.92	83	607.61
104	540.06	83	652.00
105	578.00	83	696.12
106	616.42	83	739.25
107	654.94	65	1000.00
108	693.14		
109	1000.00		

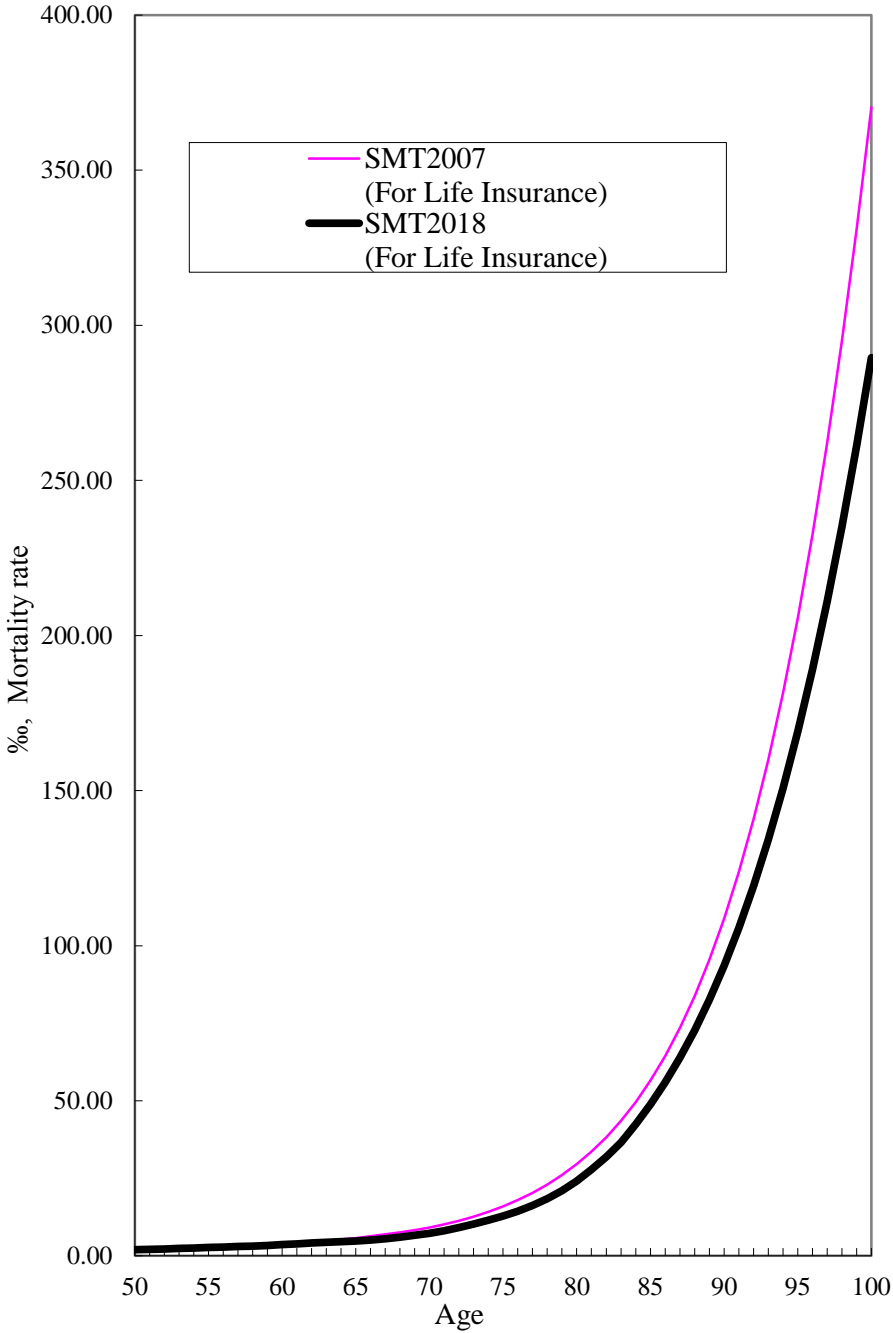
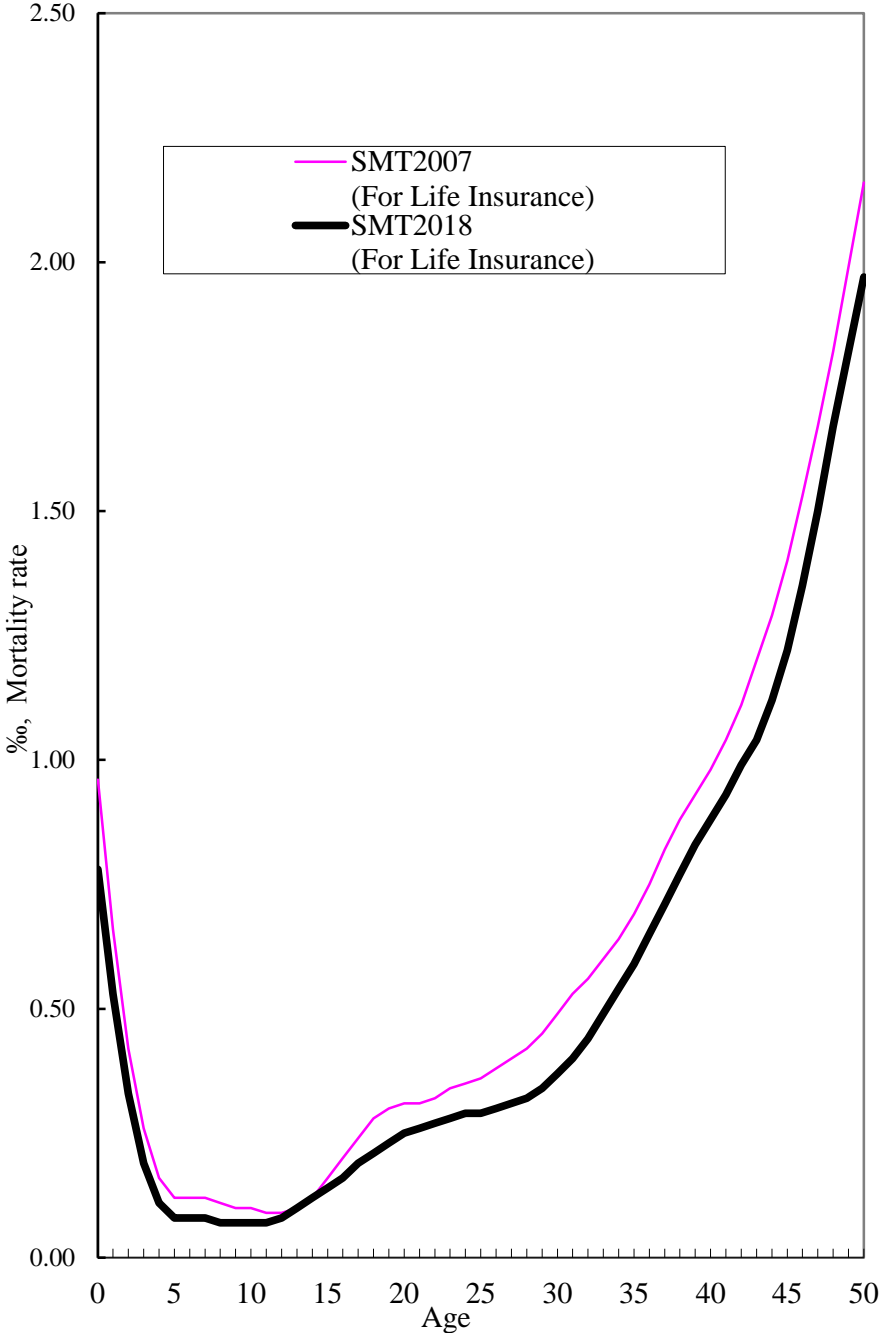
Age	SMT2018 (For Life Insurance)		SMT2007 (For Life Insurance)
	versus 2007	%	
0	0.78	81	0.96
1	0.53	80	0.66
2	0.33	79	0.42
3	0.19	73	0.26
4	0.11	69	0.16
5	0.08	67	0.12
6	0.08	67	0.12
7	0.08	67	0.12
8	0.07	64	0.11
9	0.07	70	0.10
10	0.07	70	0.10
11	0.07	78	0.09
12	0.08	89	0.09
13	0.10	100	0.10
14	0.12	100	0.12
15	0.14	88	0.16
16	0.16	80	0.20
17	0.19	79	0.24
18	0.21	75	0.28
19	0.23	77	0.30
20	0.25	81	0.31
21	0.26	84	0.31
22	0.27	84	0.32
23	0.28	82	0.34
24	0.29	83	0.35
25	0.29	81	0.36
26	0.30	79	0.38
27	0.31	78	0.40
28	0.32	76	0.42
29	0.34	76	0.45
30	0.37	76	0.49
31	0.40	75	0.53
32	0.44	79	0.56
33	0.49	82	0.60
34	0.54	84	0.64
35	0.59	86	0.69
36	0.65	87	0.75
37	0.71	87	0.82
38	0.77	88	0.88
39	0.83	89	0.93
40	0.88	90	0.98
41	0.93	89	1.04
42	0.99	89	1.11
43	1.04	87	1.20
44	1.12	87	1.29
45	1.22	87	1.40
46	1.35	88	1.53
47	1.50	90	1.67
48	1.67	92	1.82
49	1.82	91	1.99
50	1.97	91	2.16
51	2.11	90	2.34
52	2.25	90	2.51
53	2.41	90	2.68
54	2.56	90	2.84
55	2.70	91	2.98
56	2.84	91	3.11
57	3.00	93	3.24
58	3.17	94	3.38
59	3.38	95	3.56

Age	SMT2018 (For Life Insurance)		SMT2007 (For Life Insurance)
	versus 2007	%	
60	3.63	96	3.79
61	3.89	95	4.08
62	4.14	94	4.42
63	4.36	90	4.82
64	4.58	87	5.27
65	4.84	84	5.77
66	5.15	81	6.33
67	5.54	80	6.95
68	6.03	79	7.62
69	6.61	79	8.35
70	7.30	80	9.14
71	8.14	80	10.16
72	9.12	81	11.32
73	10.26	81	12.66
74	11.52	81	14.20
75	12.89	81	15.97
76	14.43	80	18.00
77	16.23	80	20.33
78	18.40	80	23.01
79	21.01	81	26.08
80	24.14	82	29.60
81	27.78	83	33.64
82	31.95	83	38.27
83	36.59	84	43.57
84	42.49	86	49.64
85	48.85	86	56.57
86	55.96	87	64.49
87	63.90	87	73.52
88	72.75	87	83.80
89	82.61	87	95.50
90	93.57	86	108.78
91	105.76	85	123.82
92	119.28	85	140.82
93	134.24	84	159.97
94	150.78	83	181.49
95	169.01	82	205.58
96	189.06	81	232.43
97	211.04	80	262.21
98	235.06	80	295.05
99	261.22	79	331.05
100	289.59	78	370.22
101	320.21	78	412.46
102	353.10	77	457.59
103	388.20	77	505.26
104	425.43	77	554.96
105	464.62	77	606.01
106	505.54	77	657.57
107	547.85	77	708.61
108	591.15	78	758.02
109	634.94	79	804.60
110	678.63	68	1000.00
111	721.58		
112	763.08		
113	1000.00		

[Graph 3] Comparison between SMT2018 and 2007 (For Life Insurance), Male

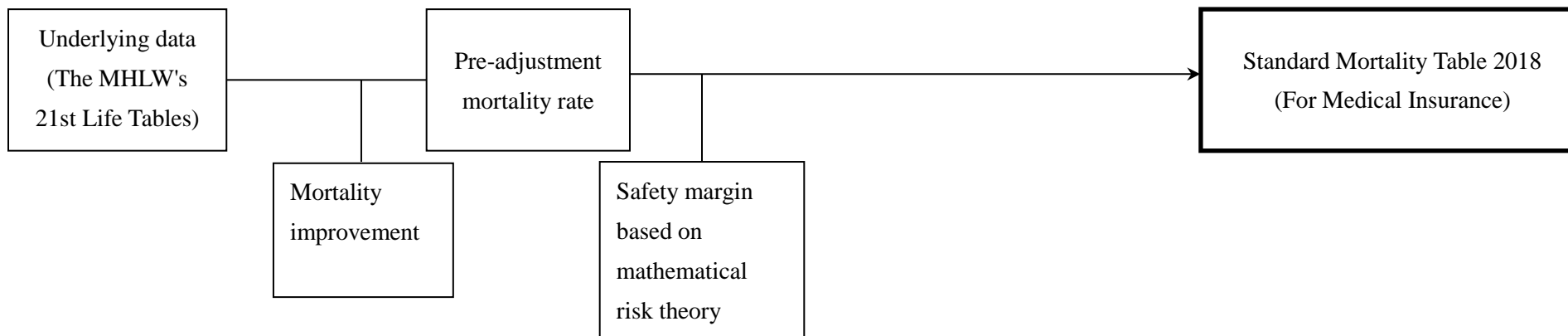


[Graph 4] Comparison between SMT2018 and 2007 (For Life Insurance), Female

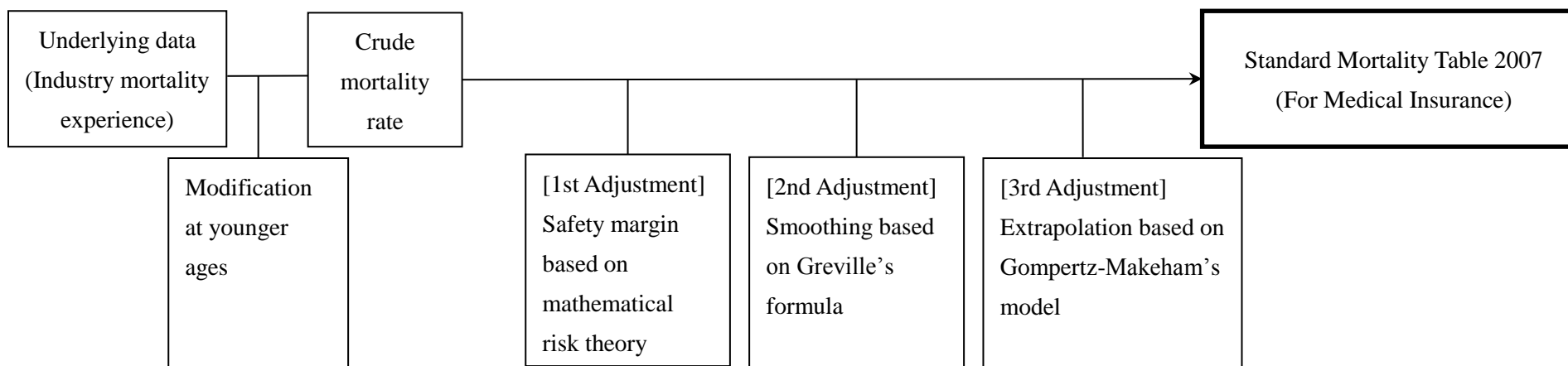


Chapter 2 Standard Mortality Table 2018 (For Medical Insurance)

Below is an outline of the development process of the Standard Mortality Table 2018 (For Medical Insurance):



(cf) Development process of Standard Mortality Table 2007 (For Medical Insurance):



Section 2.1 Determination of Underlying Data

When developing the SMT2007 (For Medical Insurance), the same industry mortality experience as used in the SMT2007 (For Life Insurance) was adopted as the underlying data, as the majority of medical insurance products prevalent in the market at the time were riders attached to life insurance products. However, due to the following reasons, the MHLW's 21st Life Tables (2010) have been adopted as the underlying data for the SMT2018 (For Medical Insurance):

- Increasing volume of medical insurance products offered as base policies or standalone products;
- Differences in underwriting standards compared to life insurance products; and
- To obtain consistency with the SMT2007 (After Annuitization) which is applied to lives with the same mortality (survival) risk characteristics.

The mortality rates in the MHLW's 21st Life Tables have already been smoothed. The mortality rates at ages exceeding the published upper limit age (male: 110, female: 114) in the MHLW's 21st Life Tables have been developed with coefficients derived using Gompertz-Makeham's model adopted for developing the MHLW's 21st Life Tables. The mortality rates applied for standard mortality tables are developed based on age nearest birthday. The mortality rate at age 0 has been set as the mortality rate over a year from an attained age of 3 months, under the assumption that the age nearest birthday of 0 is equivalent to an age last birthday of 0 to 6 months.

Section 2.2 Mortality Improvement

Just as in "Chapter 1 Standard Mortality Table 2018 (For Life Insurance)", mortality improvement from the observation periods to the implementation date of the SMT2018 is applied based on mortality improvement trends observed over the observation periods, using similar methodologies to those adopted in developing the Commissioners Standard Ordinary (CSO) mortality table in the United States. Mortality rates reflecting mortality improvement are defined as the "Pre-adjustment mortality rate". The details are as follows.

(1) For the 5 years up to and including 2015, for which population mortality experience data is available:

- i) Estimate the average annual improvement rates (2.5% for males and 2.0% for females), using the MHLW's Abridged Life Tables from 2010 to 2015.
- ii) Apply mortality improvement over 5 years to the crude mortality rates by gender and age developed in Section 2.1, using the average annual improvement rates derived in (1) i).

(2) For the following 3 years up to 2018 (the implementation date of SMT), for which population mortality experience data is not available:

- i) Estimate the annual improvement rates beyond 2015 (1.0% for both males and females), based on analyses of the IPSS's Population Projections (January 2012).
- ii) Apply mortality improvement over 3 years to the mortality rates by gender and age in (1) ii), using the average annual improvement rate derived in (2) i).

Section 2.3 Safety Margin Based on Mathematical Risk Theory

Although the choice of underlying data is different from the SMT2018 (For Life Insurance), adjustments based on mathematical risk theory, under the same methodology as described in “Chapter 1 Standard Mortality Table 2018 (For Life Insurance)”, are applied based on the following considerations:

- To address yearly fluctuations in future mortality
- To address differences in scale (i.e. insurance portfolio size)
- To address the use of population mortality data
- To address uncertainties in the level of future mortality

Just as in "Chapter 1 Standard Mortality Table 2018 (For Life Insurance)", mortality rates at each age are reduced by 2 standard deviations ($u(\varepsilon) = 2(\varepsilon \doteq 0.0228)$) to reflect the expected fluctuations of future mortality.

70% of the pre-adjustment mortality rates is set as the lower limit for the reduced rates. In addition, an upper limit (85% of the pre-adjustment mortality rates) is set to primarily address uncertainties in the level of future mortality for older ages.

The mathematical formula describing the adjustment is as follows:

$$q_x^{(1)} = q_x^{(0)} - \max \left(\min \left(2 \sqrt{\frac{q_x^{(0)}(1 - q_x^{(0)})}{n_x}}, 0.3q_x^{(0)} \right), 0.15q_x^{(0)} \right),$$

where $q_x^{(0)}$ is the pre-adjustment mortality rate.

For details, please refer to "Chapter 1 Standard Mortality Table 2018 (For Life Insurance)". In order to obtain consistency with underlying data, $f(x; \mu_1, \sigma_1^2)$ and $f(x; \mu_2, \sigma_2^2)$ are used as the density functions of the normal distributions for males and females, respectively, where the means (μ_i) and the standard deviations (σ_i) are derived from the Japanese population data from the 2010 census underlying the MHLW's 21st Life Tables.

[Table 1] Japanese population from the 2010 census

Population distribution used in the MHLW's 21st Life Tables

Age	Male		Female	
	lives	lives	lives	lives
0	529,061	504,519	788,867	795,794
1	528,416	504,440	789,256	799,709
2	543,121	518,237	836,802	854,989
3	541,118	516,176	882,686	905,034
4	537,581	512,635	936,519	962,583
5	536,230	511,351	1,006,964	1,038,074
6	556,302	531,968	1,100,087	1,139,451
7	567,211	539,456	1,089,261	1,133,179
8	582,215	554,936	1,034,232	1,078,392
9	590,348	561,895	639,832	676,514
10	597,582	566,519	678,884	731,826
11	596,606	568,960	822,551	894,094
12	606,261	578,294	792,387	865,615
13	602,967	576,246	808,507	890,130
14	600,387	571,569	780,648	864,950
15	616,731	585,981	700,515	787,001
16	621,876	588,608	601,883	684,696
17	609,601	576,878	631,202	733,074
18	613,695	582,063	637,334	750,502
19	597,843	572,126	624,866	750,237
20	600,454	576,029	581,139	716,598
21	610,706	587,781	533,186	674,962
22	628,961	604,630	515,480	672,951
23	642,776	621,353	485,672	649,760
24	657,469	634,719	447,364	619,923
25	684,069	664,897	403,490	580,276
26	707,083	687,341	370,336	556,354
27	716,678	696,689	336,961	527,061
28	716,786	698,676	302,089	494,972
29	730,078	709,586	268,970	470,358
30	764,572	742,654	222,842	423,748
31	786,140	761,664	176,851	368,611
32	821,361	798,146	137,654	333,291
33	844,032	820,625	112,280	298,067
34	888,326	862,040	91,281	258,952
35	929,944	903,091	79,270	236,620
36	982,154	953,025	53,431	165,591
37	998,119	972,428	44,695	147,613
38	981,358	952,248	35,720	123,862
39	953,919	929,671	27,768	104,068
40	926,954	902,226	19,777	77,599
41	911,124	891,860	14,931	62,227
42	890,835	873,566	10,057	45,645
43	890,997	874,212	6,770	32,955
44	692,205	683,064	4,011	22,008
45	858,837	847,834	2,529	14,958
46	804,428	793,126	1,500	9,561
47	784,285	775,856	836	5,871
48	758,724	753,481	478	3,533
49	747,799	742,815	240	1,706
50	753,059	750,867	127	1,061
51	766,639	767,283	66	584
52	745,821	749,747	37	320
53	725,002	730,110	16	170
54	761,750	769,191	2	94

Means	μ_i	43.0	46.1
Standard deviations	σ_i	22.8	24.1

[Table2] Adjustment of mortality rates based on mathematical risk theory

Age	Male				Female			
	Pre-adjustment mortality rate (After applying mortality improvement)	Exposure count for adjustment	Post-adjustment mortality rate (SMT2018 (For Medical Insurance))	Terminal ages	Pre-adjustment mortality rate (After applying mortality improvement)	Exposure count for adjustment	Post-adjustment mortality rate (SMT2018 (For Medical Insurance))	Terminal ages
0	0.76	2,955	0.53	0.74	0.74	2,657	0.52	0.52
1	0.32	3,207	0.22	0.29	0.29	2,874	0.20	0.20
2	0.22	3,474	0.15	0.20	0.20	3,103	0.14	0.14
3	0.15	3,755	0.11	0.13	0.13	3,345	0.09	0.09
4	0.11	4,052	0.08	0.10	0.10	3,600	0.07	0.07
5	0.09	4,363	0.06	0.08	0.08	3,867	0.06	0.06
6	0.09	4,689	0.06	0.07	0.07	4,147	0.05	0.05
7	0.08	5,030	0.06	0.07	0.07	4,439	0.05	0.05
8	0.07	5,386	0.05	0.06	0.06	4,744	0.04	0.04
9	0.07	5,756	0.05	0.05	0.05	5,062	0.04	0.04
10	0.07	6,139	0.05	0.05	0.05	5,391	0.04	0.04
11	0.09	6,535	0.06	0.05	0.05	5,732	0.04	0.04
12	0.09	6,943	0.06	0.06	0.06	6,084	0.04	0.04
13	0.11	7,363	0.08	0.07	0.07	6,446	0.05	0.05
14	0.13	7,792	0.09	0.09	0.09	6,818	0.06	0.06
15	0.16	8,232	0.11	0.11	0.11	7,199	0.08	0.08
16	0.21	8,679	0.15	0.12	0.12	7,589	0.08	0.08
17	0.26	9,133	0.18	0.14	0.14	7,985	0.10	0.10
18	0.32	9,592	0.22	0.17	0.17	8,388	0.12	0.12
19	0.38	10,055	0.27	0.18	0.18	8,797	0.13	0.13
20	0.44	10,520	0.31	0.21	0.21	9,209	0.15	0.15
21	0.49	10,985	0.34	0.22	0.22	9,624	0.15	0.15
22	0.52	11,449	0.36	0.23	0.23	10,040	0.16	0.16
23	0.55	11,909	0.39	0.23	0.23	10,457	0.16	0.16
24	0.55	12,365	0.39	0.23	0.23	10,872	0.16	0.16
25	0.55	12,813	0.39	0.23	0.23	11,283	0.16	0.16
26	0.56	13,251	0.39	0.24	0.24	11,691	0.17	0.17
27	0.56	13,679	0.39	0.25	0.25	12,092	0.18	0.18
28	0.57	14,093	0.40	0.27	0.27	12,486	0.19	0.19
29	0.58	14,491	0.41	0.30	0.30	12,870	0.21	0.21
30	0.59	14,872	0.41	0.32	0.32	13,243	0.22	0.22
31	0.61	15,234	0.43	0.33	0.33	13,603	0.23	0.23
32	0.63	15,575	0.44	0.35	0.35	13,950	0.25	0.25
33	0.66	15,893	0.46	0.37	0.37	14,280	0.26	0.26
34	0.69	16,186	0.48	0.39	0.39	14,593	0.27	0.27
35	0.73	16,453	0.51	0.42	0.42	14,888	0.29	0.29
36	0.77	16,692	0.54	0.46	0.46	15,162	0.32	0.32
37	0.84	16,902	0.59	0.49	0.49	15,415	0.34	0.34
38	0.92	17,082	0.64	0.54	0.54	15,645	0.38	0.38
39	1.01	17,230	0.71	0.58	0.58	15,851	0.41	0.41
40	1.09	17,347	0.76	0.62	0.62	16,032	0.43	0.43
41	1.20	17,430	0.84	0.67	0.67	16,187	0.47	0.47
42	1.30	17,481	0.91	0.72	0.72	16,316	0.50	0.50
43	1.42	17,497	0.99	0.80	0.80	16,417	0.56	0.56
44	1.55	17,481	1.09	0.88	0.88	16,491	0.62	0.62
45	1.69	17,430	1.18	0.95	0.95	16,536	0.67	0.67
46	1.85	17,347	1.30	1.01	1.01	16,553	0.71	0.71
47	2.03	17,230	1.42	1.09	1.09	16,542	0.76	0.76
48	2.25	17,082	1.58	1.21	1.21	16,502	0.85	0.85
49	2.47	16,902	1.73	1.34	1.34	16,434	0.94	0.94
50	2.71	16,692	1.91	1.46	1.46	16,338	1.02	1.02
51	2.97	16,453	2.12	1.57	1.57	16,215	1.10	1.10
52	3.26	16,186	2.36	1.68	1.68	16,065	1.18	1.18
53	3.58	15,893	2.63	1.79	1.79	15,889	1.25	1.25
54	3.94	15,575	2.94	1.92	1.92	15,688	1.34	1.34
55	4.33	15,234	3.27	2.07	2.07	15,462	1.45	1.45
56	4.77	14,872	3.64	2.23	2.23	15,214	1.56	1.56
57	5.23	14,491	4.03	2.39	2.39	14,944	1.67	1.67
58	5.72	14,093	4.45	2.56	2.56	14,654	1.79	1.79
59	6.26	13,679	4.91	2.75	2.75	14,344	1.93	1.93

※ Terminal ages of Post-adjustment mortality rate based on mathematical risk theory are defined as the age at which the number of remaining lives would fall below 1, starting from 100,000 lives at age 0.

Section 2.4 Summary of Development Process of Standard Mortality Table 2018 (For Medical Insurance)

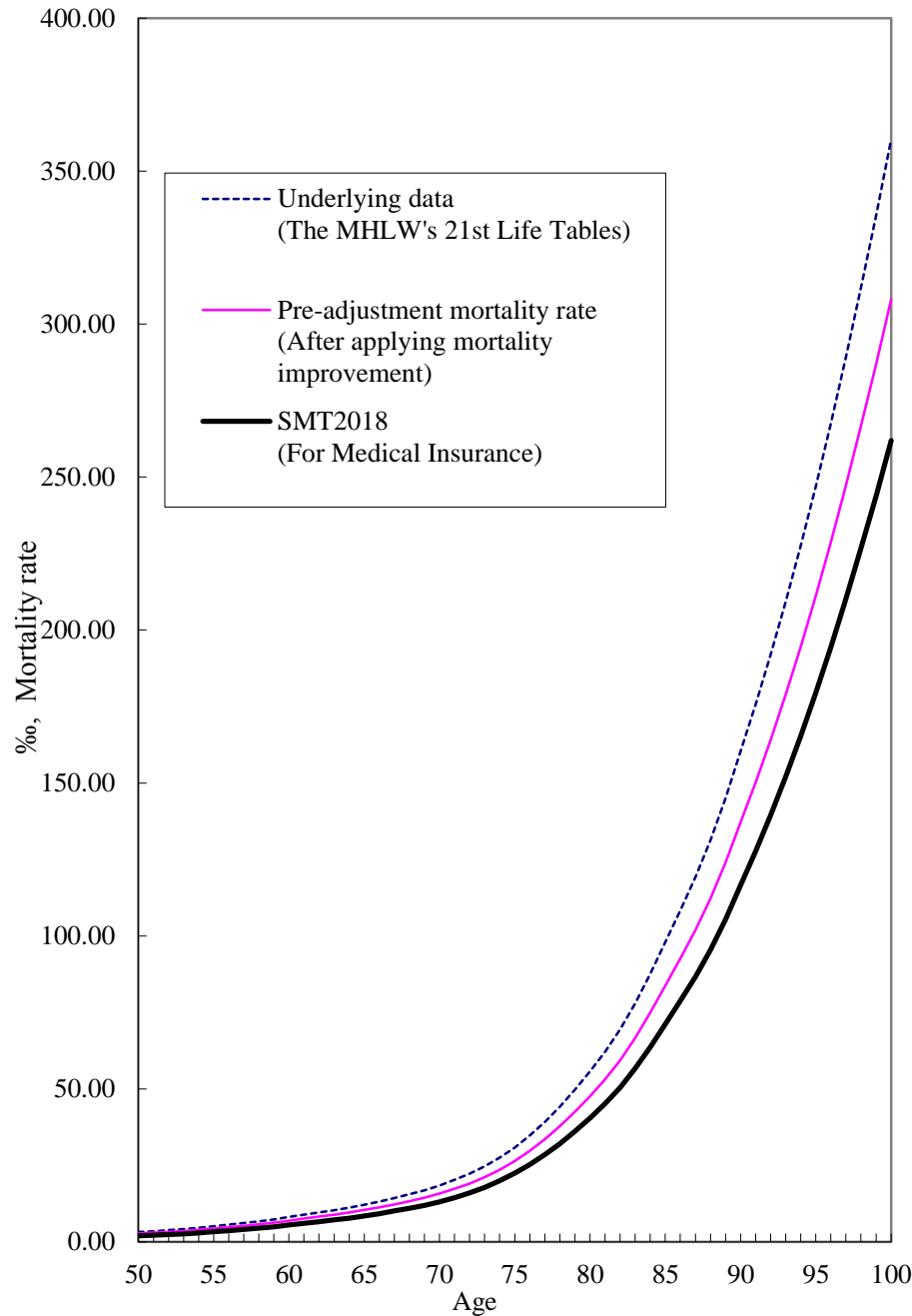
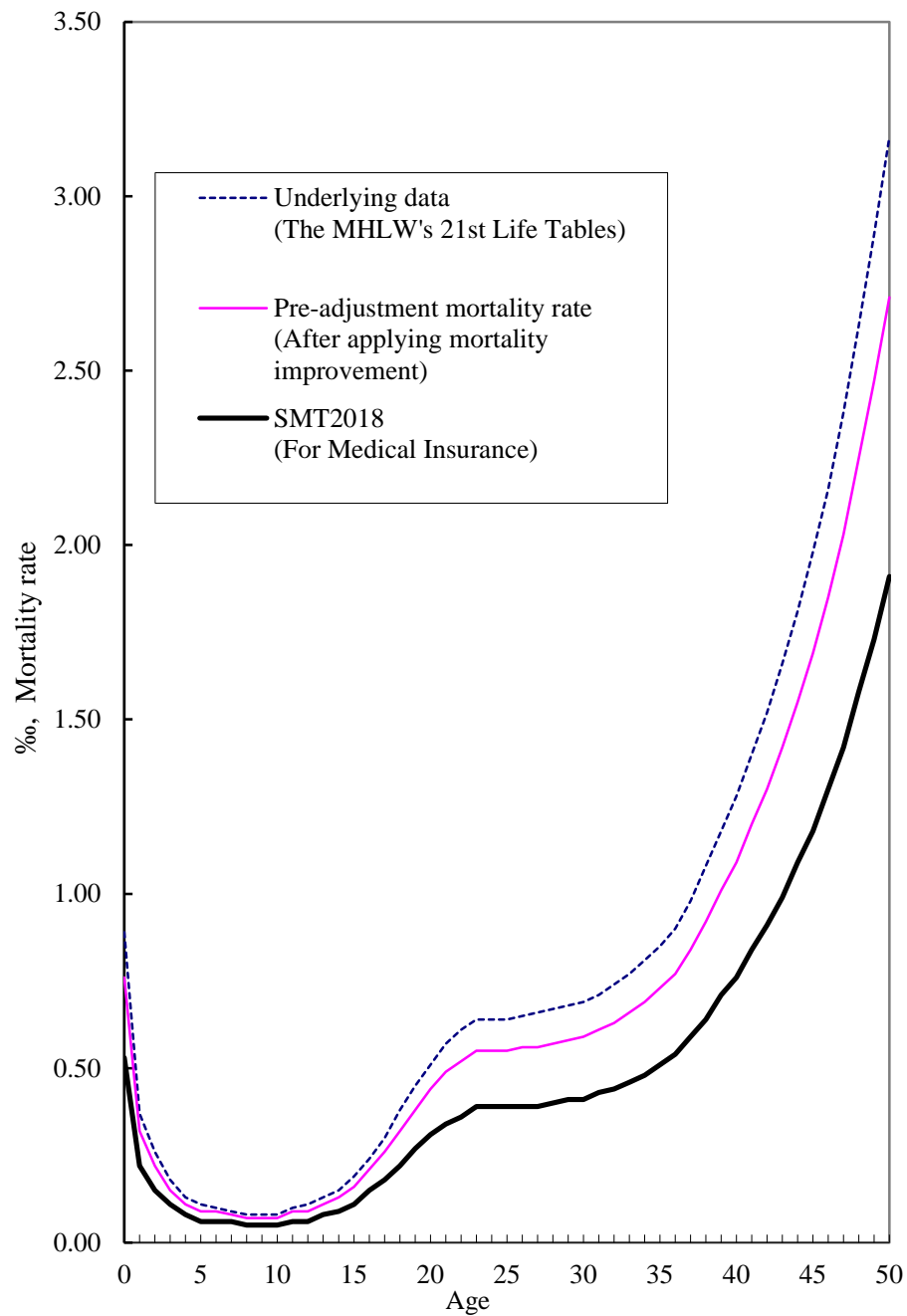
[Table 3] Development process of SMT2018 (For Medical Insurance), Male

Age	Underlying data (The MHLW's 21st Life Tables)	Pre-adjustment mortality rate (After applying mortality improvement)	SMT2018 (For Medical Insurance)
0	0.89	0.76	0.53
1	0.37	0.32	0.22
2	0.26	0.22	0.15
3	0.18	0.15	0.11
4	0.13	0.11	0.08
5	0.11	0.09	0.06
6	0.10	0.09	0.06
7	0.09	0.08	0.06
8	0.08	0.07	0.05
9	0.08	0.07	0.05
10	0.08	0.07	0.05
11	0.10	0.09	0.06
12	0.11	0.09	0.06
13	0.13	0.11	0.08
14	0.15	0.13	0.09
15	0.19	0.16	0.11
16	0.24	0.21	0.15
17	0.30	0.26	0.18
18	0.38	0.32	0.22
19	0.45	0.38	0.27
20	0.51	0.44	0.31
21	0.57	0.49	0.34
22	0.61	0.52	0.36
23	0.64	0.55	0.39
24	0.64	0.55	0.39
25	0.64	0.55	0.39
26	0.65	0.56	0.39
27	0.66	0.56	0.39
28	0.67	0.57	0.40
29	0.68	0.58	0.41
30	0.69	0.59	0.41
31	0.71	0.61	0.43
32	0.74	0.63	0.44
33	0.77	0.66	0.46
34	0.81	0.69	0.48
35	0.85	0.73	0.51
36	0.90	0.77	0.54
37	0.98	0.84	0.59
38	1.08	0.92	0.64
39	1.18	1.01	0.71
40	1.28	1.09	0.76
41	1.40	1.20	0.84
42	1.52	1.30	0.91
43	1.66	1.42	0.99
44	1.81	1.55	1.09
45	1.98	1.69	1.18
46	2.16	1.85	1.30
47	2.38	2.03	1.42
48	2.63	2.25	1.58
49	2.89	2.47	1.73
50	3.17	2.71	1.91
51	3.47	2.97	2.12
52	3.81	3.26	2.36
53	4.19	3.58	2.63
54	4.61	3.94	2.94
55	5.07	4.33	3.27
56	5.58	4.77	3.64
57	6.12	5.23	4.03
58	6.69	5.72	4.45
59	7.32	6.26	4.91

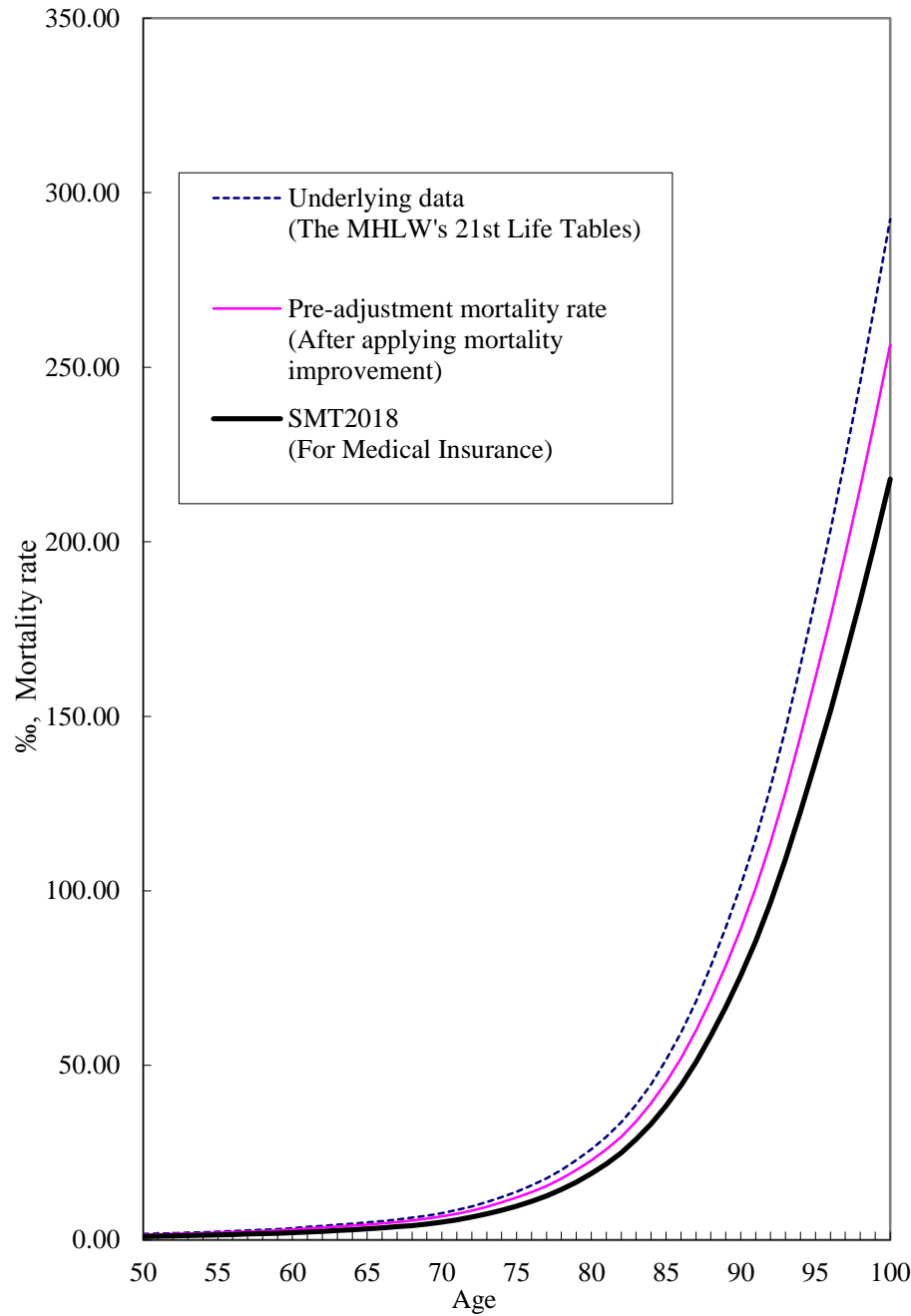
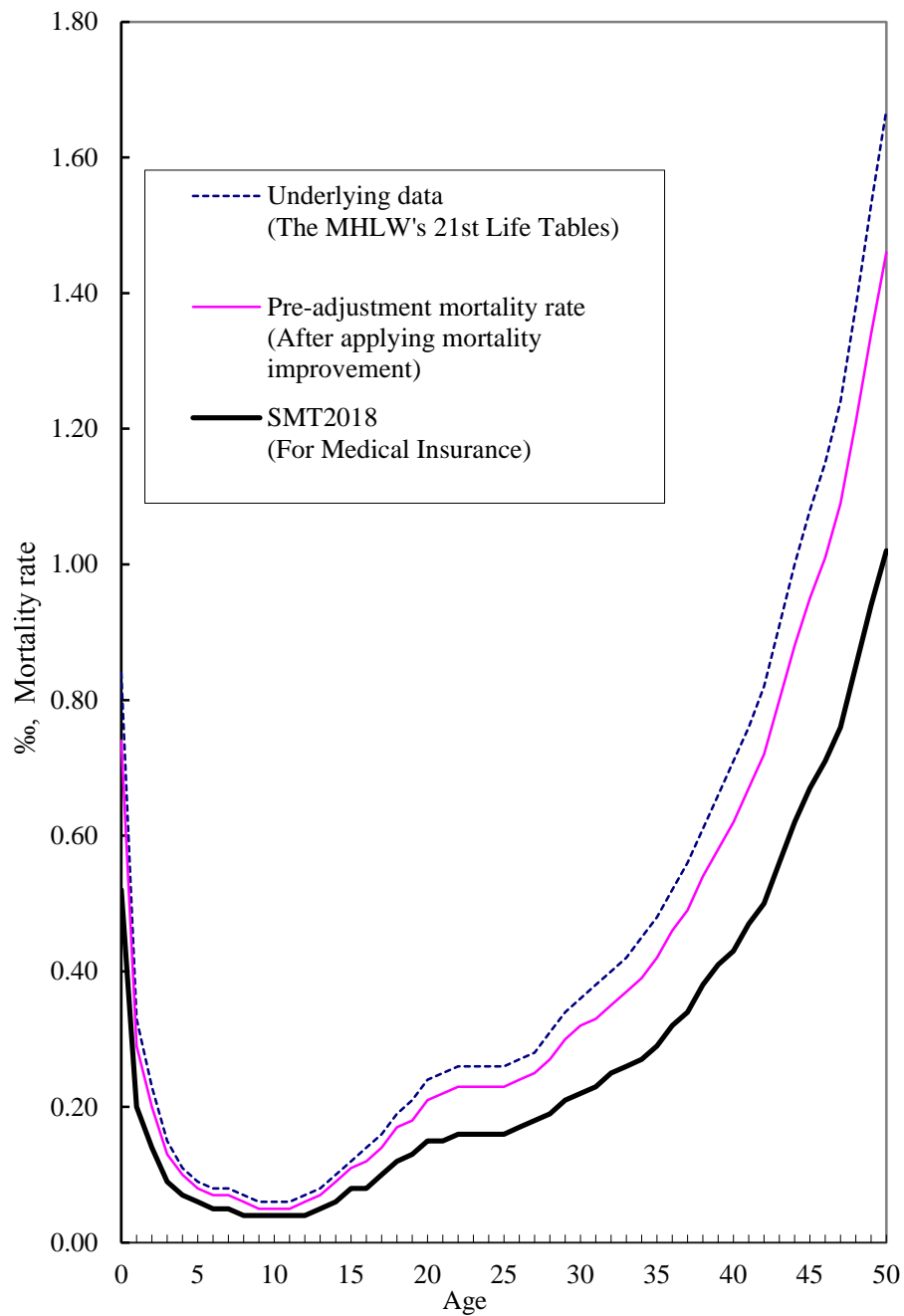
[Table 4] Development process of SMT2018 (For Medical Insurance), Female

Age	Underlying data (The MHLW's 21st Life Tables)	Pre-adjustment mortality rate (After applying mortality improvement)	SMT2018 (For Medical Insurance)
0	0.84	0.74	0.52
1	0.33	0.29	0.20
2	0.23	0.20	0.14
3	0.15	0.13	0.09
4	0.11	0.10	0.07
5	0.09	0.08	0.06
6	0.08	0.07	0.05
7	0.08	0.07	0.05
8	0.07	0.06	0.04
9	0.06	0.05	0.04
10	0.06	0.05	0.04
11	0.06	0.05	0.04
12	0.07	0.06	0.04
13	0.08	0.07	0.05
14	0.10	0.09	0.06
15	0.12	0.11	0.08
16	0.14	0.12	0.08
17	0.16	0.14	0.10
18	0.19	0.17	0.12
19	0.21	0.18	0.13
20	0.24	0.21	0.15
21	0.25	0.22	0.15
22	0.26	0.23	0.16
23	0.26	0.23	0.16
24	0.26	0.23	0.16
25	0.26	0.23	0.16
26	0.27	0.24	0.17
27	0.28	0.25	0.18
28	0.31	0.27	0.19
29	0.34	0.30	0.21
30	0.36	0.32	0.22
31	0.38	0.33	0.23
32	0.40	0.35	0.25
33	0.42	0.37	0.26
34	0.45	0.39	0.27
35	0.48	0.42	0.29
36	0.52	0.46	0.32
37	0.56	0.49	0.34
38	0.61	0.54	0.38
39	0.66	0.58	0.41
40	0.71	0.62	0.43
41	0.76	0.67	0.47
42	0.82	0.72	0.50
43	0.91	0.80	0.56
44	1.00	0.88	0.62
45	1.08	0.95	0.67
46	1.15	1.01	0.71
47	1.24	1.09	0.76
48	1.38	1.21	0.85
49	1.53	1.34	0.94
50	1.67	1.46	1.02
51	1.79	1.57	1.10
52	1.91	1.68	1.18
53	2.04	1.79	1.25
54	2.19	1.92	1.34
55	2.36	2.07	1.45
56	2.54	2.23	1.56
57	2.73	2.39	1.67
58	2.92	2.56	1.79
59	3.13	2.75	1.93

[Graph 1] Development process of SMT2018 (For Medical Insurance), Male (Applying mortality improvement and adjustment based on mathematical risk theory)



[Graph 2] Development process of SMT2018 (For Medical Insurance), Female (Applying mortality improvement and adjustment based on mathematical risk theory)



Section 2.5 Comparison of Development Methodologies Between Standard Mortality Table 2018 and 2007 (For Medical Insurance)

[Table 5] Methodology adopted for developing SMT2018 (For Medical Insurance) (in comparison to the methodology adopted for SMT2007 (For Medical Insurance))

	SMT2018 (For Medical Insurance)		SMT2007 (For Medical Insurance)		Comments
	Male	Female	Male	Female	
Underlying data (Truncated period) (Ages combining lives with and without medical examination)	The MHLW's 21st Life Tables (2010) -		Industry mortality experience same as the SMT2007 (For Life Insurance) except below (No truncation) (Males aged 14 or younger; females aged 16 or younger)		<ul style="list-style-type: none"> When developing the SMT2007 (For Medical Insurance), the same industry mortality experience as used in the SMT2007 (For Life Insurance) was adopted as the underlying data, as the majority of medical insurance products prevalent in the market at the time were riders attached to life insurance products. However, due to the following reasons, the MHLW's 21st Life Tables (2010) is adopted as the underlying data for the SMT2018 (For Medical Insurance): <ul style="list-style-type: none"> An increasing volume of medical insurance products offered as base policies or standalone products Differences in underwriting standards compared to life insurance products To obtain consistency with the SMT2007 (After Annuitization) which is applied to lives with the same mortality (survival) risk characteristics.
Adjustment at younger ages	-		Average of the MHLW's Abridged Population Life Tables in 2002-2004 is used for males aged 5 or younger and females aged 12 or younger.		
Mortality improvement	Improvement rates: 2.5% p.a. for 5 years 1.0% p.a. for 3 years	Improvement rates: 2.0% p.a. for 5 years 1.0% p.a. for 3 years	-		<ul style="list-style-type: none"> Mortality improvement from the observation periods to the implementation date of the SMT2018 is applied, based on mortality improvement trends observed over the observation periods, using similar methodologies adopted in developing the Commissioners Standard Ordinary (CSO) mortality table in the United States. Mortality improvement rates have been developed based on analyses of population mortality experience and projections. Different improvement rates are applied for 5 years up to 2015, for which population mortality experience data is available, and for the following 3 years, for which such data is not available.
Safety margin based on mathematical risk theory	2 σ level is applied to reflect the expected fluctuations of future mortality, assuming that the probability exceeding the expected fluctuations is 2.28%. Certain limits are applied to avoid extreme fluctuations between ages. (Expected fluctuations in 1 million policies for each male / female) (70% and 85% of the pre-adjustment mortality rates are set as the lower and upper limits, respectively, for the adjusted rates)		(Expected fluctuations in 4 million policies for each male / female) (70% of the crude mortality rates is set as the lower limit for the adjusted rates)		<ul style="list-style-type: none"> Adjustments are applied based on the following considerations: <ul style="list-style-type: none"> To address yearly fluctuations in future mortality To address differences in scale (i.e. insurance portfolio size) To address the use of population mortality data To address uncertainties in the level of future mortality The hypothetical policy counts used are based on the size of a standard insurance portfolio. The upper limit is set primarily addressing uncertainties in the level of future mortality for older ages.
Smoothing	-		Greville's cubic of 13 terms		<ul style="list-style-type: none"> The mortality rates in the MHLW's 21st Life Tables have already been smoothed.
Mortality at older ages	-		Connect to mortality rate based on Gompertz-Makeham's model. The constants are determined using the King-Hardy method. Age band: 3 Connected age: 78		<ul style="list-style-type: none"> The mortality rates at older ages in the MHLW's 21st Life Tables are extrapolated using Gompertz-Makeham's model.
Terminal age	116	118	109	111	<ul style="list-style-type: none"> This is set as the age at which the number of remaining lives would fall below 1, starting from 100,000 lives at age 0.
Average life expectancy	83.47	89.59	81.15	87.83	<ul style="list-style-type: none"> Weighted average mortality rates are as follows: SMT2007: Male: 4.38‰; Female: 2.22‰ SMT2018: Male: 3.43‰ (21.7% reduction); Female: 1.75‰ (21.2% reduction)

Notes:

*1. Developed based on age nearest birthday.

*2. The mortality rates in the SMT2018 (For Medical Insurance) do not include total and permanent disabilities (TPD), while the mortality rates in the SMT2007 (For Medical Insurance) include TPD.

Section 2.6 Comparison Against Standard Mortality Table 2007 (For Medical Insurance)

[Table 6] Comparison between SMT2018 and 2007 (For Medical Insurance)

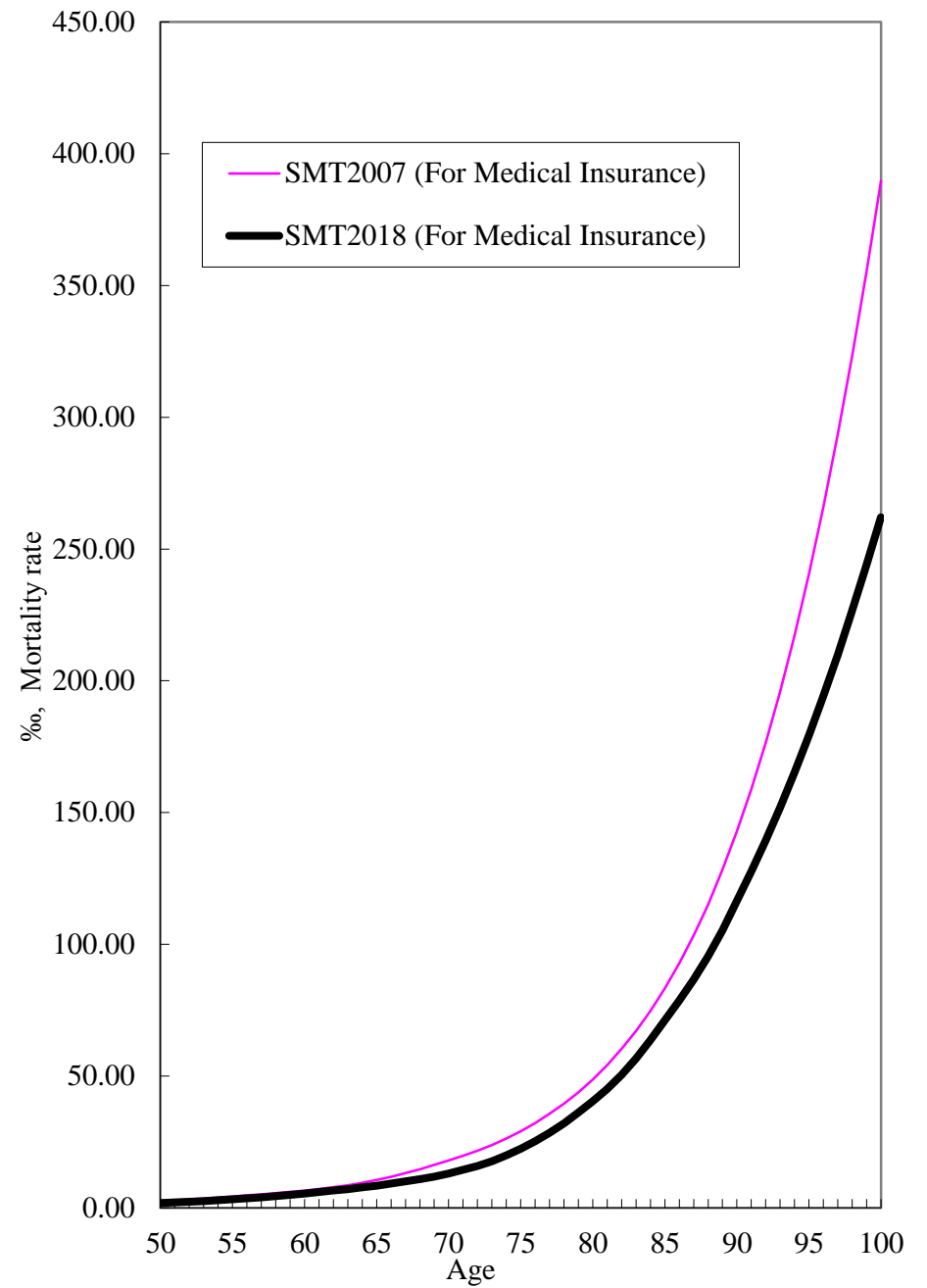
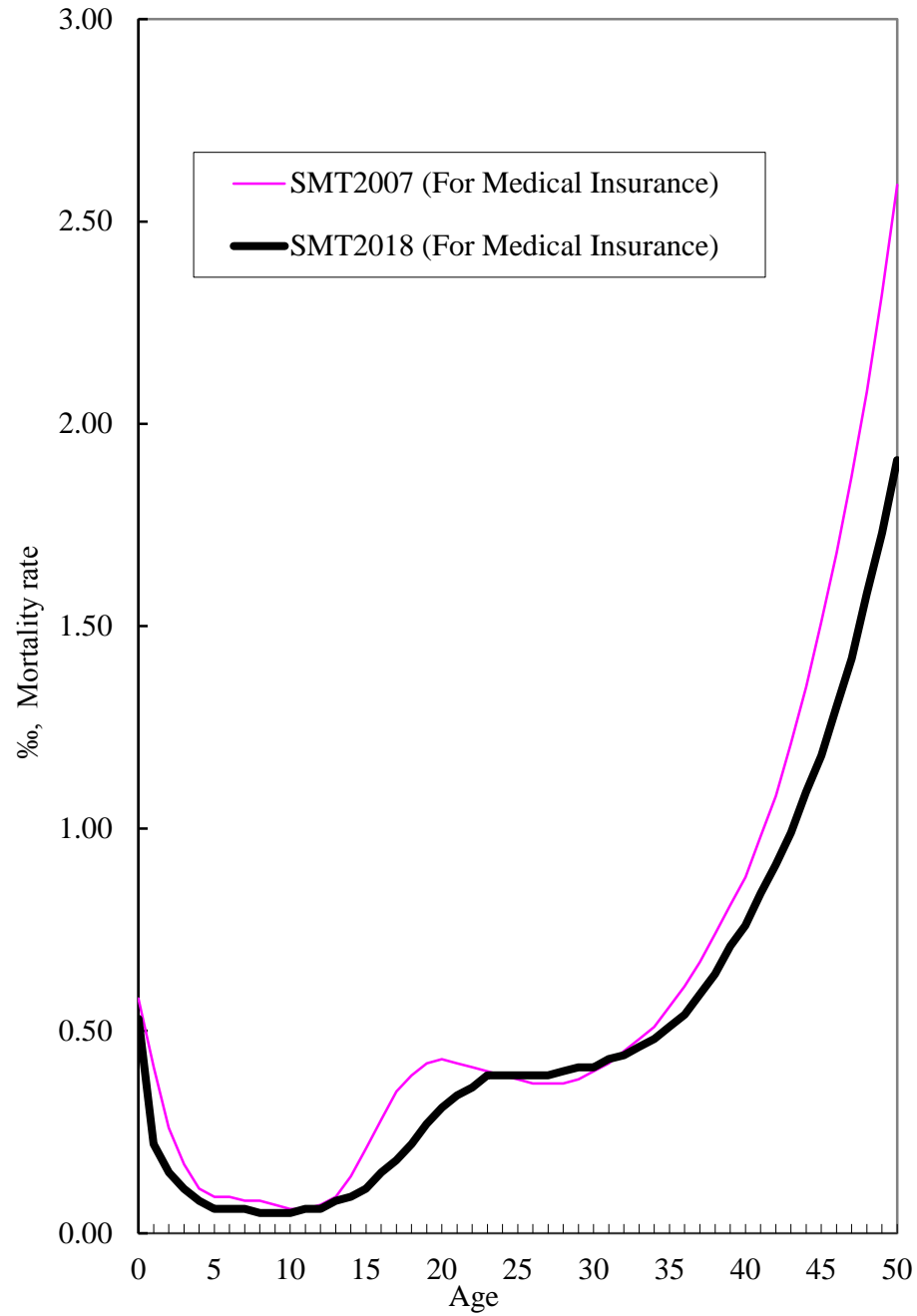
<Male>

Age	SMT2018 (For Medical Insurance) versus 2007		SMT2007 (For Medical Insurance)
	%	%	
0	0.53	91	0.58
1	0.22	54	0.41
2	0.15	58	0.26
3	0.11	65	0.17
4	0.08	73	0.11
5	0.06	67	0.09
6	0.06	67	0.09
7	0.06	75	0.08
8	0.05	63	0.08
9	0.05	71	0.07
10	0.05	83	0.06
11	0.06	100	0.06
12	0.06	86	0.07
13	0.08	89	0.09
14	0.09	64	0.14
15	0.11	52	0.21
16	0.15	54	0.28
17	0.18	51	0.35
18	0.22	56	0.39
19	0.27	64	0.42
20	0.31	72	0.43
21	0.34	81	0.42
22	0.36	88	0.41
23	0.39	98	0.40
24	0.39	100	0.39
25	0.39	103	0.38
26	0.39	105	0.37
27	0.39	105	0.37
28	0.40	108	0.37
29	0.41	108	0.38
30	0.41	103	0.40
31	0.43	102	0.42
32	0.44	98	0.45
33	0.46	96	0.48
34	0.48	94	0.51
35	0.51	91	0.56
36	0.54	89	0.61
37	0.59	88	0.67
38	0.64	86	0.74
39	0.71	88	0.81
40	0.76	86	0.88
41	0.84	86	0.98
42	0.91	84	1.08
43	0.99	82	1.21
44	1.09	81	1.35
45	1.18	78	1.51
46	1.30	77	1.68
47	1.42	76	1.87
48	1.58	76	2.08
49	1.73	75	2.32
50	1.91	74	2.59
51	2.12	73	2.89
52	2.36	73	3.22
53	2.63	74	3.56
54	2.94	75	3.92
55	3.27	76	4.30
56	3.64	77	4.72
57	4.03	78	5.15
58	4.45	80	5.59
59	4.91	81	6.07

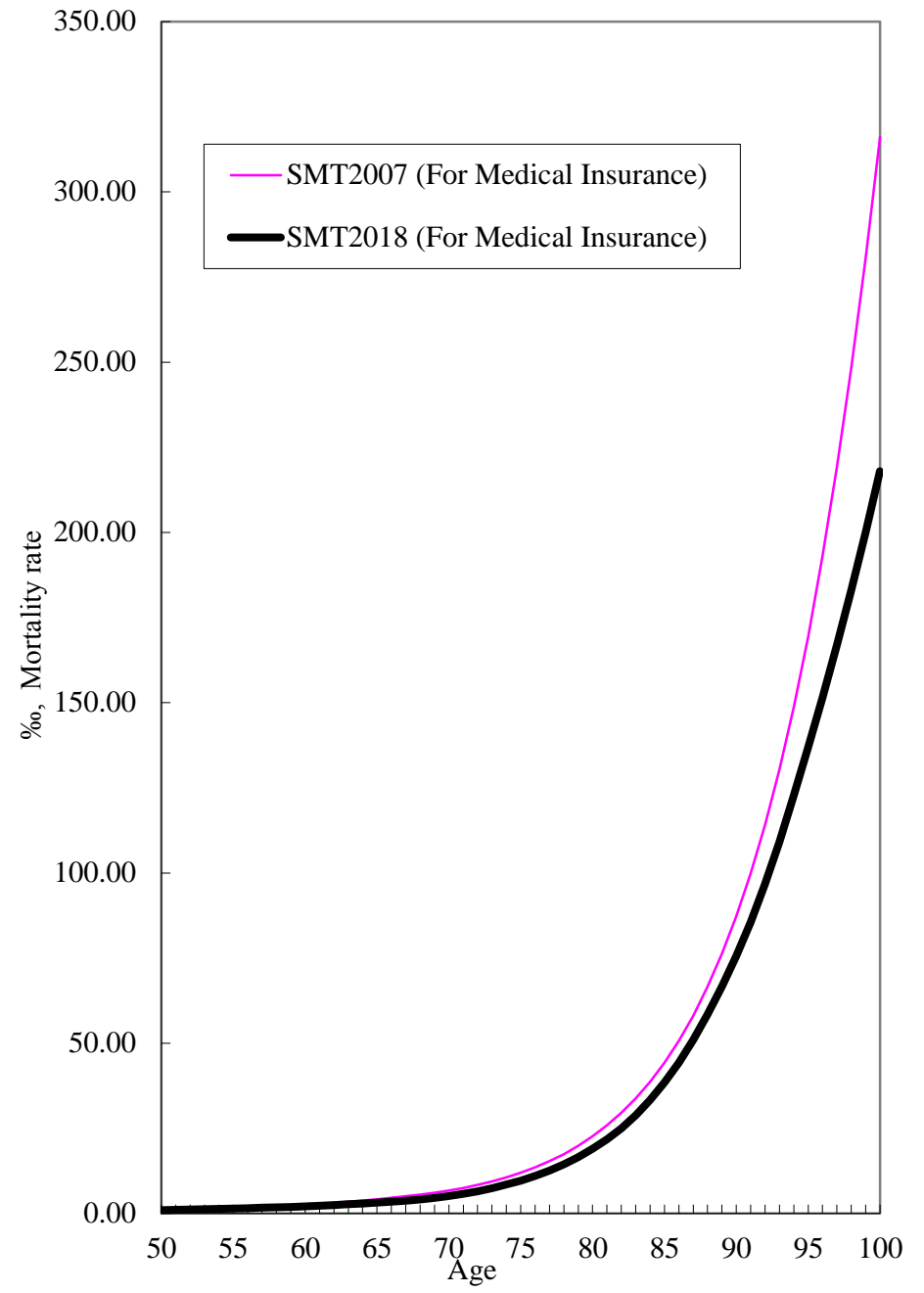
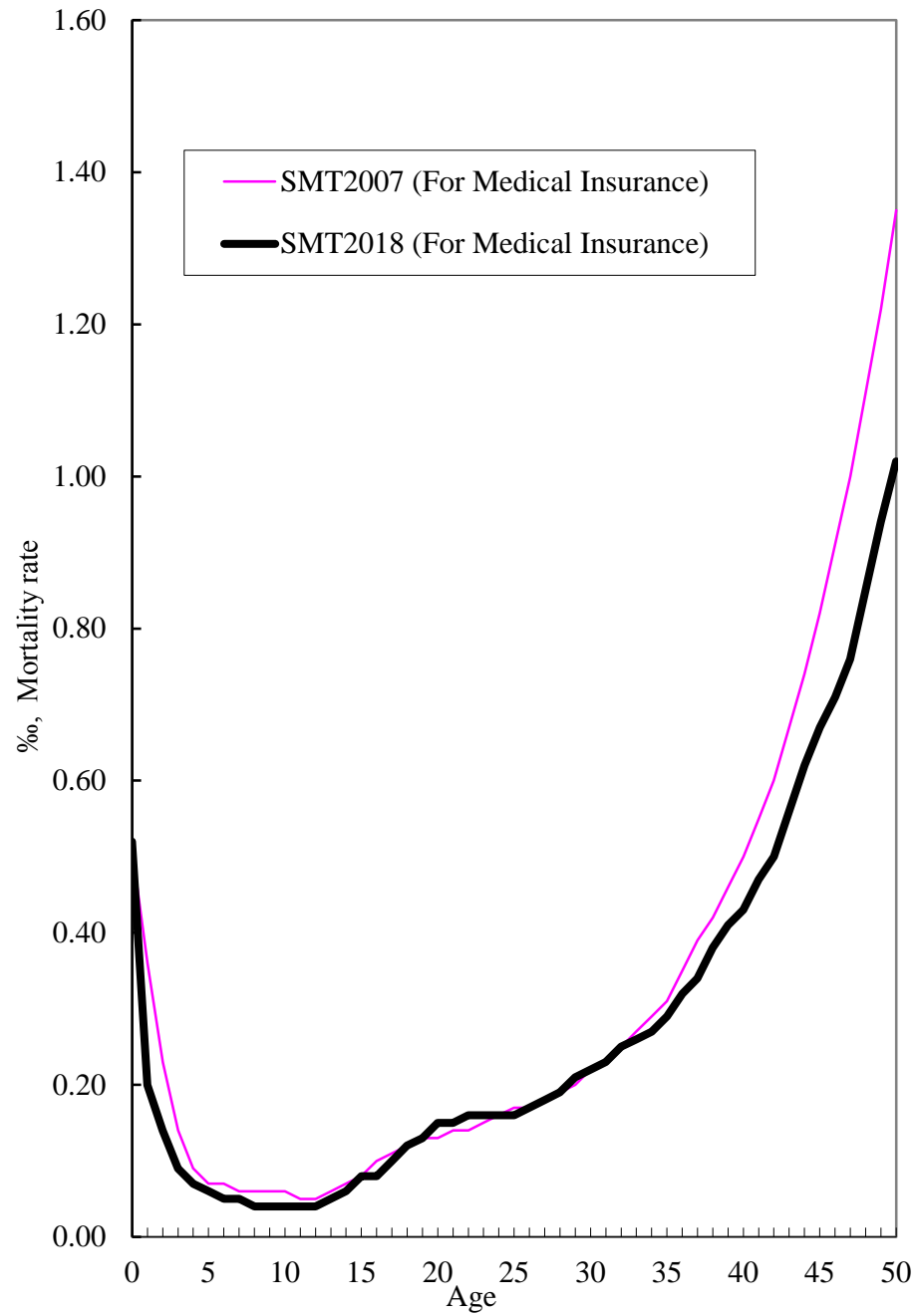
<Female>

Age	SMT2018 (For Medical Insurance) versus 2007		SMT2007 (For Medical Insurance)
	%	%	
0	0.52	102	0.51
1	0.20	56	0.36
2	0.14	61	0.23
3	0.09	64	0.14
4	0.07	78	0.09
5	0.06	86	0.07
6	0.05	71	0.07
7	0.05	83	0.06
8	0.04	67	0.06
9	0.04	67	0.06
10	0.04	67	0.06
11	0.04	80	0.05
12	0.04	80	0.05
13	0.05	83	0.06
14	0.06	86	0.07
15	0.08	100	0.08
16	0.08	80	0.10
17	0.10	91	0.11
18	0.12	100	0.12
19	0.13	100	0.13
20	0.15	115	0.13
21	0.15	107	0.14
22	0.16	114	0.14
23	0.16	107	0.15
24	0.16	100	0.16
25	0.16	94	0.17
26	0.17	100	0.17
27	0.18	100	0.18
28	0.19	100	0.19
29	0.21	105	0.20
30	0.22	100	0.22
31	0.23	100	0.23
32	0.25	100	0.25
33	0.26	96	0.27
34	0.27	93	0.29
35	0.29	94	0.31
36	0.32	91	0.35
37	0.34	87	0.39
38	0.38	90	0.42
39	0.41	89	0.46
40	0.43	86	0.50
41	0.47	85	0.55
42	0.50	83	0.60
43	0.56	84	0.67
44	0.62	84	0.74
45	0.67	82	0.82
46	0.71	78	0.91
47	0.76	76	1.00
48	0.85	77	1.11
49	0.94	77	1.22
50	1.02	76	1.35
51	1.10	74	1.48
52	1.18	73	1.61
53	1.25	72	1.74
54	1.34	72	1.86
55	1.45	73	1.98
56	1.56	75	2.09
57	1.67	76	2.19
58	1.79	77	2.31
59	1.93	78	2.46
60	2.09	79	2.64
61	2.28	80	2.86
62	2.49	80	3.12
63	2.73	80	3.42
64	2.94	78	3.77
65	3.17	76	4.15
66	3.45	75	4.58
67	3.78	75	5.05
68	4.14	74	5.56
69	4.56	75	6.10
70	5.10	76	6.70
71	5.76	77	7.47
72	6.53	78	8.37
73	7.44	79	9.40
74	8.50	80	10.58
75	9.67	81	11.95
76	11.01	81	13.53
77	12.57	82	15.35
78	14.42	83	17.45
79	16.56	83	19.87
80	18.99	84	22.66
81	21.76	84	25.87
82	24.98	85	29.56
83	28.83	85	33.81
84	33.24	86	38.69
85	38.43	87	44.29
86	44.26	87	50.73
87	50.97	88	58.11
88	58.47	88	66.56
89	66.72	88	76.22
90	75.74	87	87.26
91	85.66	86	99.84
92	96.65	85	114.15
93	109.06	84	130.40
94	122.70	82	148.80
95	136.93	81	169.56
96	151.56	79	192.91
97	166.98	76	219.06
98	183.19	74	248.21
99	200.20	71	280.52
100	218.00	69	316.11
101	236.58	67	355.04
102	255.92	64	397.24
103	276.00	62	442.55
104	296.76	60	490.67
105	318.17	59	541.09
106	340.15	57	593.14
107	362.64	56	645.96
108	385.54	55	698.48
109	408.74	55	749.52
110	432.14	54	797.81
111	455.60	46	1000.00
112	478.97		
113	502.12		
114	524.87		
115	547.07		
116	568.56		
117	589.17		
118	1000.00		

[Graph 3] Comparison between SMT2018 and 2007 (For Medical Insurance), Male



[Graph 4] Comparison between SMT2018 and 2007 (For Medical Insurance), Female



Chapter 3 Standard Mortality Table Applied to Policies After Annuitization

Although population mortality rate is improving, it is concluded that the SMT2007 (After Annuitization) is still valid for standard mortality tables applied to policies after annuitization in fiscal year 2018 onward, as the SMT2007 (After Annuitization) has robustness when comparing the life expectancy of the table to an estimated future life expectancy of population.

Reference

Section 1 Development process of Standard Mortality Table 2007 (After Annuityization)

The SMT2007 (After Annuityization) is developed based on the methodology adopted for developing SMT1996 (After Annuityization) and mortality improvement rates are set considering mortality improvement by cause of death, while causes of death have not been considered in developing the SMT1996 (After Annuityization).

- (1) The MHLW's 19th Life Tables (2000) are used for the underlying data.
- (2) Annual improvement rates by gender and 5-year age band are calculated considering improvement of population mortality from 1980 to 2000 by gender, 5-year age band and cause of death.
 - i) Average annual improvement rates are calculated from 1980 to 2000 by gender, 5-year age band and cause of death, based on Vital Statistics published by MHLW.
 - 8 causes of death which are major in Vital Statistics 1980 and 2000 are selected:
Malignant neoplasm, Heart disease, Cerebrovascular disease, Pneumonia, Senility, Accident, Suicide, others
 - Annual improvement rates are calculated to exclude effects of change in ICD definition as:
 $(1 - R_1)^5 \times (1 - R_2)^{13} = (1 - R)^{18}$, where
 R_1 : average annual improvement rate from 1995 to 2000, 5 years (with geometric mean method)
 R_2 : average annual improvement rate from 1980 to 1993, 13 years (with geometric mean method)
 R : average annual improvement rate used for developing the SMT2007 (After Annuityization)
 - ii) Future mortality of central ages of 5-year age bands by cause of death are projected using the annual improvement rates by cause of death derived in i) above.
 - 1960 is assumed to be the representative birth year.
 - If annual improvement rate for a cause of death is negative (i.e. deterioration), future annual improvement rate for the cause of death is assumed to be zero.
 - iii) Annual improvement rates of central ages of 5-year age bands for all causes of death are calculated by using the total of the future mortality by cause of death derived in ii) above and mortality for all causes of death in Vital Statistics 2000.
 - iv) Annual improvement rates by age are calculated by interpolating the annual improvement rates of central ages of 5-year age bands for all causes of death derived in iii) above.
 - Regarding ages 45 to 52, the annual improvement rates are calculated as linear interpolation values of those between age 44 and 53 to remove the cohort effect observed in ages 45 to 52.

[Example for calculating annual improvement rate for center age 62 of 5-year age band from 60 to 64 (male)]

Mortality by cause of death (per 100,000 population)

	1980	1993	1995	2000
Malignant neoplasm	558.8	605.6	601.3	508.9
Heart disease	236.8	203.7	160.5	145.7
Cerebrovascular disease	276.4	128.5	135.9	105.8
Pneumonia	38.4	53.3	42.9	37.6
Senility	0.4	0.1	0.2	0.1
Accident	60.7	60.5	68.9	54.2
Suicide	32.5	35.5	37.1	58.2
Others	307.3	268.6	264.8	218.2
Total	1,511.3	1,355.8	1,311.6	1,128.7

Future mortality 2022
457.9
107.7
30.6
37.6
0.0
40.3
58.2
146.1
878.3

Source: Vital Statistics – Trends in mortality by cause of death, gender and age

Improvement rate by cause of death

	R ₂ 1980 to 1993	R ₁ 1995 to 2000	R Mean	Post-adjustment of negative improvement rate
Malignant neoplasm	-0.6 %	3.3 %	0.5 %	0.5 %
Heart disease	1.2 %	1.9 %	1.4 %	1.4 %
Cerebrovascular disease	5.7 %	4.9 %	5.5 %	5.5 %
Pneumonia	-2.6 %	2.6 %	-1.1 %	0.0 %
Senility	10.1 %	12.9 %	10.9 %	10.9 %
Accident	0.0 %	4.7 %	1.3 %	1.3 %
Suicide	-0.7 %	-9.4 %	-3.0 %	0.0 %
Others	1.0 %	3.8 %	1.8 %	1.8 %

Average annual improvement rate for all causes of death
1.1 %

The average annual improvement rate for malignant neoplasm is calculated as below:

$$(1 - 3.3\%)^5 \times (1 - (-0.6\%))^3 = (1 - R)^{18}, \text{ implies } R = 0.5\%.$$

The future mortality rate for malignant neoplasm in 2022 when people born in 1960 reach age 62 is calculated as:

$$508.9 \times (1 - 0.5\%)^{(2022 - 2000)} = 457.9$$

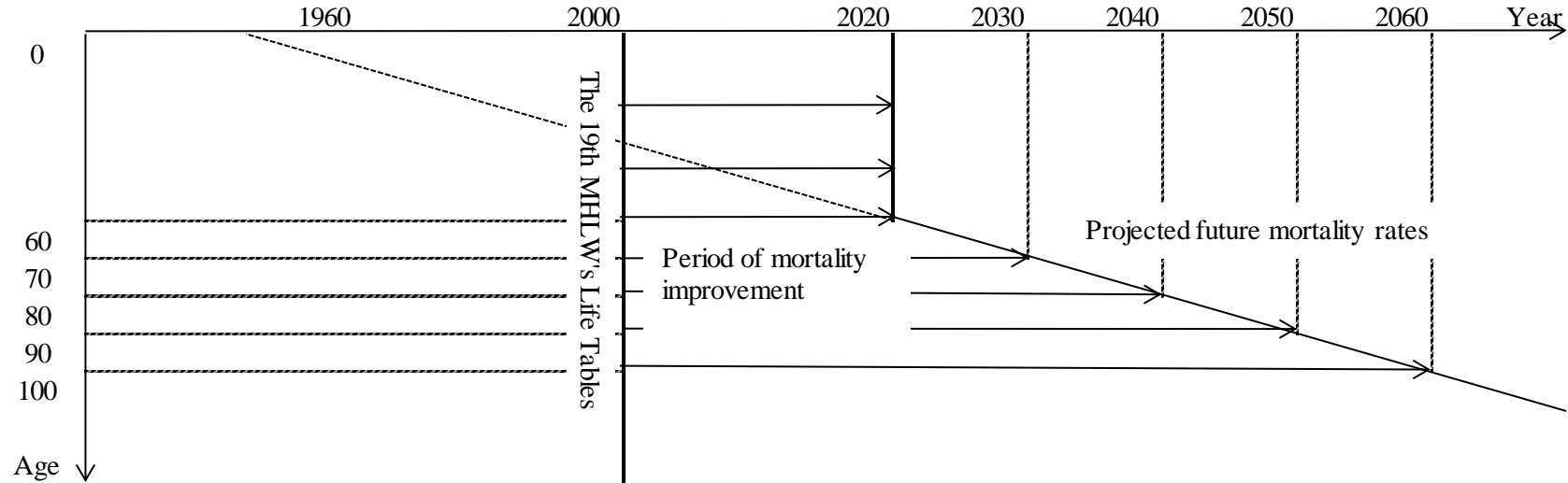
The future mortality rate for all causes of death in 2022 is calculated as 878.3 by aggregating all future mortality by cause of death which are derived in the same way as used for malignant neoplasm.

The average annual improvement rate for center age 62 is calculated as:

$$1 - (878.3 / 1128.7)^{1/(2022 - 2000)} = 1.1 \%$$

(3) Future mortality rates are projected on the assumption that mortality rates continue to improve every year at the improvement rates derived in (2) above.

- It is assumed that the projected “future” corresponds to each year when people born in 1960 reach each age and “future mortality rates” are derived by reflecting mortality improvement commensurate with the period from 2000 to the “future” in the 19th MHLW’s Life Tables.
- Mortality improvement is reflected for at least 20 years, and the projected “future” is 2020 with regard to ages up to 60.

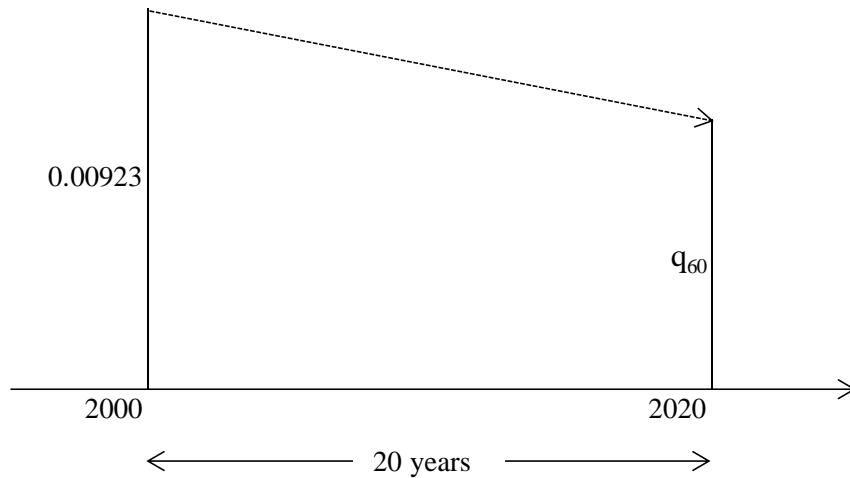


[Projected “future” and period of mortality improvement]

Age	Projected “future”	Period of mortality improvement
50	2020	20 years (i.e. 2020 - 2000)
60	2020 (i.e. 1960 + 60)	20 years (i.e. 2020 - 2000)
80	2040 (i.e. 1960 + 80)	40 years (i.e. 2040 - 2000)
100	2060 (i.e. 1960 + 100)	60 years (i.e. 2060 - 2000)

[Example for calculating mortality for male at age 60]

Mortality rate in 2020 (i.e. 1960 + 60) is projected.



Projected mortality rate q_{60} is calculated as:

$$0.00923 \times (1 - r_{60})^{20} = 0.00755, \text{ where}$$

r_{60} is 1.0%, annual improvement rate for male at age 60. 1.0% is derived from interpolating 0.9% and 1.1%, where 0.9% is improvement rate for center age 57 of 5-year age band and 1.1% is the improvement rate for center age 62 of 5-year age band.

(4) The future mortality derived in (3) above is extrapolated for younger and older ages.

i) Extrapolation for older ages

- Mortality rates at age 94 or older are extrapolated by fitting a cubic function with least-squares method.
- It is assumed that mortality y % for age x is approximated by a cubic function $y = ax^3 + bx^2 + cx + d$, where a , b , c and d are solved by least-squares method.
- Future mortality rates at ages from 65 to 95 for male and from 70 to 95 for female are used for determining the coefficients a , b , c and d .

[Table 1] Coefficients of the cubic function which approximates future mortality rates

	Male	Female
a	0.0020987496	0.0027111850
b	-0.3283838845	-0.4887420372
c	16.1953235050	28.4531680522
d	-228.9231026396	-521.5470400453

ii) Extrapolation in younger ages

- Mortality rates at age 0 to 16 are set as 60% of the 19th MHLW's Life Tables.
- However, mortality rate at age 0 is set as 60% of the mortality rate for a year from an attained age of 3 months (mean of the age nearest birthday of 0) in the MHLW's 19th Life Tables.

[Calculation of mortality rate at age 0]

	Male	Female
Number of survivors for 3 months ($l_{3 \text{ months}}$)	99,755	99,783
Number of survivors for one year (l_1)	99,655	99,702
Number of deaths at age 1 (d_1)	51	43
Mortality rate at age 3 months $(l_{3 \text{ months}} - (l_1 - d_1 \times 3/12)) / l_{3 \text{ months}}$	1.13 ‰	0.92 ‰
60% of mortality rate at age 3 months	0.68 ‰	0.55 ‰

(5) Adjustment for longevity risk is applied to the post-extrapolation mortality rates derived in (4) above to develop the SMT2007 (After Annuityization).

- 85% as adjustment for longevity risk is multiplied to the post-extrapolation mortality to address discrepancies between the assumptions and actual rates of mortality improvement and the representative birth year, etc.
- Terminal ages of the SMT2007 (After Annuityization) are 122 for male and 126 for female.

Section 2 Summary of Development Process of SMT2007 (After Annuityization)

[Table 2] Development process of mortality rates (Male)

	The MHLW's 19th Life Tables (2000)	Improvement rates	Duration of Projection	Pre-extrapolation mortality rates	Post-extrapolation mortality rates	Adjustment for longevity risk	Mortality		The MHLW's 19th Life Tables (2000)	Improvement rates	Duration of Projection	Pre-extrapolation mortality rates	Post-extrapolation mortality rates	Adjustment for longevity risk	Mortality
Age	%	%	years	%	%	%	%	Age	%	%	years	%	%	%	%
0	1.13			0.68	0.58	85	0.58	60	9.23	1.0	20	7.55	7.55	85	6.42
1	0.51			0.31	0.26	85	0.26	61	10.07	1.1	21	7.98	7.98	85	6.78
2	0.38			0.23	0.20	85	0.20	62	11.06	1.1	22	8.67	8.67	85	7.37
3	0.27			0.16	0.14	85	0.14	63	12.26	1.1	23	9.51	9.51	85	8.08
4	0.21			0.13	0.11	85	0.11	64	13.59	1.1	24	10.42	10.42	85	8.86
5	0.18			0.11	0.09	85	0.09	65	14.98	1.1	25	11.36	11.36	85	9.66
6	0.16			0.10	0.09	85	0.09	66	16.46	1.1	26	12.35	12.35	85	10.50
7	0.14			0.08	0.07	85	0.07	67	18.08	1.1	27	13.41	13.41	85	11.40
8	0.12			0.07	0.06	85	0.06	68	19.88	1.2	28	14.18	14.18	85	12.05
9	0.11			0.07	0.06	85	0.06	69	21.81	1.2	29	15.37	15.37	85	13.06
10	0.10			0.06	0.05	85	0.05	70	23.84	1.2	30	16.60	16.60	85	14.11
11	0.11			0.07	0.06	85	0.06	71	26.05	1.2	31	17.92	17.92	85	15.23
12	0.13			0.08	0.07	85	0.07	72	28.50	1.3	32	18.75	18.75	85	15.94
13	0.16			0.10	0.09	85	0.09	73	31.26	1.3	33	20.30	20.30	85	17.26
14	0.21			0.13	0.11	85	0.11	74	34.37	1.3	34	22.03	22.03	85	18.73
15	0.27			0.16	0.14	85	0.14	75	37.84	1.3	35	23.94	23.94	85	20.35
16	0.36			0.22	0.19	85	0.19	76	41.62	1.3	36	25.98	25.98	85	22.08
17	0.46	2.4	20	0.28	0.28	85	0.24	77	46.06	1.3	37	28.38	28.38	85	24.12
18	0.54	2.2	20	0.35	0.35	85	0.30	78	51.27	1.3	38	31.18	31.18	85	26.50
19	0.60	2.0	20	0.40	0.40	85	0.34	79	57.31	1.3	39	34.40	34.40	85	29.24
20	0.63	1.8	20	0.44	0.44	85	0.37	80	64.01	1.2	40	39.49	39.49	85	33.57
21	0.65	1.6	20	0.47	0.47	85	0.40	81	71.56	1.2	41	43.62	43.62	85	37.08
22	0.67	1.4	20	0.51	0.51	85	0.43	82	79.62	1.2	42	47.95	47.95	85	40.76
23	0.69	1.5	20	0.51	0.51	85	0.43	83	88.13	1.2	43	52.44	52.44	85	44.57
24	0.69	1.6	20	0.50	0.50	85	0.43	84	96.99	1.1	44	59.62	59.62	85	50.68
25	0.68	1.7	20	0.48	0.48	85	0.41	85	106.40	1.1	45	64.68	64.68	85	54.98
26	0.66	1.8	20	0.46	0.46	85	0.39	86	116.78	1.1	46	70.21	70.21	85	59.68
27	0.65	1.9	20	0.44	0.44	85	0.37	87	128.06	1.1	47	76.14	76.14	85	64.72
28	0.67	1.7	20	0.48	0.48	85	0.41	88	140.42	1.1	48	82.58	82.58	85	70.19
29	0.71	1.6	20	0.51	0.51	85	0.43	89	153.78	1.1	49	89.44	89.44	85	76.02
30	0.77	1.5	20	0.57	0.57	85	0.48	90	170.13	1.1	50	97.86	97.86	85	83.18
31	0.82	1.3	20	0.63	0.63	85	0.54	91	184.65	1.0	51	110.60	110.60	85	94.01
32	0.88	1.2	20	0.69	0.69	85	0.59	92	199.68	1.0	52	118.40	118.40	85	100.64
33	0.92	1.3	20	0.71	0.71	85	0.60	93	215.23	1.0	53	126.35	126.35	85	107.40
34	0.95	1.3	20	0.73	0.73	85	0.62	94	231.29	1.0	54	134.42	135.03	85	114.78
35	0.99	1.4	20	0.75	0.75	85	0.64	95	247.87	1.0	55	142.61	145.38	85	123.57
36	1.05	1.5	20	0.78	0.78	85	0.66	96	264.96	1.0	56	150.92	156.28	85	132.84
37	1.14	1.6	20	0.83	0.83	85	0.71	97	282.55	1.0	57	159.33	167.73	85	142.57
38	1.25	1.6	20	0.91	0.91	85	0.77	98	300.65	1.0	58	167.84	179.75	85	152.79
39	1.36	1.6	20	0.99	0.99	85	0.84	99	319.23	1.0	59	176.43	192.34	85	163.49
40	1.47	1.6	20	1.06	1.06	85	0.90	100	338.28				205.52	85	174.69
41	1.59	1.6	20	1.15	1.15	85	0.98	101	357.78				219.30	85	186.41
42	1.73	1.6	20	1.25	1.25	85	1.06	102	377.72				233.70	85	198.65
43	1.90	1.7	20	1.35	1.35	85	1.15	103	398.08				248.73	85	211.42
44	2.10	1.7	20	1.49	1.49	85	1.27	104	418.81				264.40	85	224.74
45	2.32	1.7	20	1.65	1.65	85	1.40	105	439.89				280.72	85	238.61
46	2.58	1.7	20	1.83	1.83	85	1.56	106	461.29				297.70	85	253.05
47	2.87	1.7	20	2.04	2.04	85	1.73	107	482.97				315.37	85	268.06
48	3.18	1.7	20	2.26	2.26	85	1.92	108	504.87				333.72	85	283.66
49	3.52	1.6	20	2.55	2.55	85	2.17	109	526.96				352.78	85	299.86
50	3.92	1.6	20	2.84	2.84	85	2.41	110	549.18				372.55	85	316.67
51	4.35	1.6	20	3.15	3.15	85	2.68	111	571.47				393.05	85	334.09
52	4.80	1.6	20	3.48	3.48	85	2.96	112	593.78				414.30	85	352.16
53	5.27	1.6	20	3.82	3.82	85	3.25	113					436.29	85	370.85
54	5.75	1.4	20	4.34	4.34	85	3.69	114					459.06	85	390.20
55	6.25	1.2	20	4.91	4.91	85	4.17	115					482.60	85	410.21
56	6.78	1.0	20	5.55	5.55	85	4.72	116					506.93	85	430.89
57	7.37	0.9	20	6.15	6.15	85	5.23	117					532.07	85	452.26
58	7.95	0.9	20	6.63	6.63	85	5.64	118					558.02	85	474.32
59	8.54	1.0	20	6.98	6.98	85	5.93	119					584.80	85	497.08
								120					612.43	85	520.57
								121					640.91	85	544.77
								122							1,000.00

[Table 3] Development process of mortality rates (Female)

	The MHLW's 19th Life Tables (2000)	Improvement rates	Duration of Projection	Pre-extrapolation mortality rates	Post- extrapolation mortality rates	Adjustment for longevity risk	Mortality
Age	%	%	years	%	%	%	%
0	0.92			0.55	85	85	0.47
1	0.44			0.26	85	85	0.22
2	0.30			0.18	85	85	0.15
3	0.20			0.12	85	85	0.10
4	0.14			0.08	85	85	0.07
5	0.12			0.07	85	85	0.06
6	0.11			0.07	85	85	0.06
7	0.10			0.06	85	85	0.05
8	0.09			0.05	85	85	0.04
9	0.08			0.05	85	85	0.04
10	0.08			0.05	85	85	0.04
11	0.08			0.05	85	85	0.04
12	0.08			0.05	85	85	0.04
13	0.08			0.05	85	85	0.04
14	0.10			0.06	85	85	0.05
15	0.12			0.07	85	85	0.06
16	0.16			0.10	85	85	0.09
17	0.19	2.3		0.12	85	85	0.10
18	0.22	2.1	20	0.14	85	85	0.12
19	0.23	2.0	20	0.15	85	85	0.13
20	0.25	1.9	20	0.17	85	85	0.14
21	0.27	1.8	20	0.19	85	85	0.16
22	0.28	1.7	20	0.20	85	85	0.17
23	0.30	1.8	20	0.21	85	85	0.18
24	0.30	1.8	20	0.21	85	85	0.18
25	0.31	1.9	20	0.21	85	85	0.18
26	0.31	2.0	20	0.21	85	85	0.18
27	0.32	2.1	20	0.21	85	85	0.18
28	0.34	2.0	20	0.23	85	85	0.20
29	0.36	2.0	20	0.24	85	85	0.20
30	0.38	1.9	20	0.26	85	85	0.22
31	0.41	1.9	20	0.28	85	85	0.24
32	0.44	1.8	20	0.31	85	85	0.26
33	0.47	1.8	20	0.33	85	85	0.28
34	0.50	1.9	20	0.34	85	85	0.29
35	0.54	1.9	20	0.37	85	85	0.31
36	0.58	1.9	20	0.40	85	85	0.34
37	0.62	1.9	20	0.42	85	85	0.36
38	0.67	1.9	20	0.46	85	85	0.39
39	0.72	1.8	20	0.50	85	85	0.43
40	0.78	1.7	20	0.55	85	85	0.47
41	0.85	1.6	20	0.62	85	85	0.53
42	0.94	1.5	20	0.69	85	85	0.59
43	1.04	1.5	20	0.77	85	85	0.65
44	1.13	1.5	20	0.84	85	85	0.71
45	1.22	1.5	20	0.90	85	85	0.77
46	1.31	1.6	20	0.95	85	85	0.81
47	1.43	1.6	20	1.04	85	85	0.88
48	1.58	1.6	20	1.14	85	85	0.97
49	1.75	1.7	20	1.24	85	85	1.05
50	1.96	1.7	20	1.39	85	85	1.18
51	2.15	1.8	20	1.50	85	85	1.28
52	2.33	1.9	20	1.59	85	85	1.35
53	2.51	1.8	20	1.75	85	85	1.49
54	2.66	1.8	20	1.85	85	85	1.57
55	2.79	1.8	20	1.94	85	85	1.65
56	2.94	1.7	20	2.09	85	85	1.78
57	3.13	1.7	20	2.22	85	85	1.89
58	3.34	1.8	20	2.32	85	85	1.97
59	3.56	1.9	20	2.43	85	85	2.07
60	3.83	2.0	20	2.56	85	85	2.18
61	4.16	2.1	21	2.66	85	85	2.26
62	4.58	2.2	22	2.81	85	85	2.39
63	5.07	2.2	23	3.04	85	85	2.58
64	5.62	2.2	24	3.30	85	85	2.81
65	6.18	2.2	25	3.54	85	85	3.01
66	6.80	2.2	26	3.81	85	85	3.24
67	7.48	2.3	27	3.99	85	85	3.39
68	8.25	2.3	28	4.30	85	85	3.66
69	9.07	2.4	29	4.48	85	85	3.81
70	9.99	2.4	30	4.82	85	85	4.10
71	11.06	2.5	31	5.05	85	85	4.29
72	12.28	2.6	32	5.29	85	85	4.50
73	13.71	2.5	33	5.95	85	85	5.06
74	15.39	2.5	34	6.51	85	85	5.53
75	17.40	2.4	35	7.44	85	85	6.32
76	19.74	2.3	36	8.54	85	85	7.26
77	22.49	2.3	37	9.51	85	85	8.08
78	25.73	2.2	38	11.05	85	85	9.39
79	29.44	2.1	39	12.87	85	85	10.94
80	33.65	2.0	40	15.00	85	85	12.75
81	38.37	1.9	41	17.48	85	85	14.86
82	43.56	1.8	42	20.31	85	85	17.26
83	49.34	1.8	43	22.59	85	85	19.20
84	55.81	1.7	44	26.25	85	85	22.31
85	63.16	1.6	45	30.56	85	85	25.98
86	71.55	1.6	46	34.07	85	85	28.96
87	80.85	1.5	47	39.74	85	85	33.78
88	91.17	1.5	48	44.14	85	85	37.52
89	102.52	1.4	49	51.38	85	85	43.67
90	115.50	1.4	50	57.07	85	85	48.51
91	129.79	1.4	51	63.24	85	85	53.75
92	144.72	1.3	52	73.29	85	85	62.30
93	159.66	1.3	53	79.80	85	85	67.83
94	174.98	1.3	54	86.32	85	85	73.43
95	190.62	1.3	55	92.81	85	85	80.84
96	206.55	1.3	56	99.26	85	85	88.73
97	222.78	1.3	57	105.67	85	85	97.12
98	239.29	1.3	58	112.03	85	85	106.02
99	256.09	1.3	59	118.33	85	85	115.45
100	273.16			147.53	85	85	125.40
101	290.48			159.90	85	85	135.92
102	308.05			172.94	85	85	147.00
103	325.85			186.65	85	85	158.65
104	343.87			201.06	85	85	170.90
105	362.10			216.19	85	85	183.76
106	380.50			232.05	85	85	197.24
107	399.07			248.65	85	85	211.35
108	417.78			266.02	85	85	226.12
109	436.61			284.17	85	85	241.54
110	455.54			303.11	85	85	257.64
111	474.54			322.86	85	85	274.43
112	493.59			343.45	85	85	291.93
113	512.66			364.87	85	85	310.14
114	531.72			387.16	85	85	329.09
115	550.75			410.33	85	85	348.78
116	569.70			434.39	85	85	369.23
117				459.35	85	85	390.45
118				485.25	85	85	412.46
119				512.08	85	85	435.27
120				539.88	85	85	458.90
121				568.64	85	85	483.34
122				598.40	85	85	508.64
123				629.17	85	85	534.79
124				660.96	85	85	561.82
125				693.79	85	85	589.72
126							1,000.00

Section 3 Comparison of Development Methodologies between Standard Mortality Table 2007 And 1996 (After Annuityization)

[Table 4] Methodology adopted for developing SMT2007 (After Annuityization) (in comparison to the methodology adopted for SMT1996 (After Annuityization))

	SMT2007 (After Annuityization)		SMT1996 (After Annuityization)		Comments
	Male	Female	Male	Female	
Summary of development methodology	1) Determine underlying data 2) Determine mortality improvement rates and a representative birth year 3) Project future mortality rates of people born in the representative birth year with mortality improvement rates(*) 4) Extrapolation in younger and older ages 5) Adjustment for longevity risk		1) Determine underlying data 2) Determine mortality improvement rates and a representative birth year 3) Project future mortality rates of people born in the representative birth year with mortality improvement rates 4) Smoothing 5) Extrapolation in older ages		<ul style="list-style-type: none"> The mortality improvement rates are derived by causes of death as below: Malignant neoplasm, Heart disease, Cerebrovascular disease, Pneumonia, Senility, Accident, Suicide, others Cohort effect is removed in determining the mortality improvement rates.
Underlying data	The MHLW's 19th Life Table (2000)		The MHLW's 15th Life Table (1980)		<ul style="list-style-type: none"> The latest MHLW's Life Tables are used.
Mortality improvement	Annual improvement rates are calculated with geometric mean method from 1980 to 2000 by gender, 5-year age band and cause of death based on Vital Statistics published by MHLW.		Annual improvement rates are calculated with geometric mean method between the MHLW's 10th Life Tables and the MHLW's 15th Life Tables by gender and age.		
Representative birth year	1960		1945		
Removing cohort effect	Cohort effect is observed in a cohort (males aged 45 to 52) in Vital Statistics (1980). The mortality improvement rates for the cohort are derived from linearly interpolated values of those between age 44 and 53 to remove the cohort effect.		-		<ul style="list-style-type: none"> Cohort effect: Characteristics peculiar to particular generation due to the times and environment in which they were born and raised. Mortality of males born in the first ten years of the Showa era (i.e. from 1926 to 1935) is said to be higher than other generations.
Smoothing	-		Greville's cubic of 13 terms		<ul style="list-style-type: none"> It is concluded that smoothing is unnecessary as the underlying data themselves have been already smoothed and the mortality improvement rates are calculated as linear interpolation values among center ages of age bands.
Mortality at older ages	Mortality rates at age 94 or older are extrapolated by fitting a cubic function with least-squares method.		Mortality rates at age 106 or older are connected based on the Gompertz-Makeham's model.		<ul style="list-style-type: none"> It is concluded that the Gompertz-Makeham's model is not used for extrapolating the mortality rates because the projected mortality rates do not correspond to those at one particular time.
Mortality at younger ages	Mortality rates at ages 0 to 16 are set as 60% of the underlying data.		-		<ul style="list-style-type: none"> Ratio of the projected mortality over the underlying data at around age 17 is about 60%.
Making adjustment for longevity risk	85% is multiplied to the post-extrapolation mortality to which the mortality improvement rates are reflected to address discrepancies between the assumptions and actual rates of mortality improvement and the representative birth year, etc.		-		<ul style="list-style-type: none"> Adjustments are applied based on 2σ level of the SMT2007 (For Life Insurance) as well as the following considerations: <ul style="list-style-type: none"> To address yearly fluctuations in future mortality To address discrepancy in mortality improvement rates To address differences in scale (i.e. insurance portfolio size) To address discrepancy in representative birth year To address the use of population mortality data
Terminal age	122	126	113	114	<ul style="list-style-type: none"> This is set as the age at which the number of remaining lives would fall below 1, starting from 100,000 lives at age 0.
Average life expectancy (years)	26.96 at age 60 19.08 at age 70	34.27 at age 60 25.13 at age 70	22.52 at age 60 14.35 at age 70	26.85 at age 60 17.76 at age 70	

Notes:

* Developed based on age nearest birthday.

Section 4 Comparison against Standard Mortality Table 1996 (After Annuityization) and the MHLW's 19th Life Tables (2000)

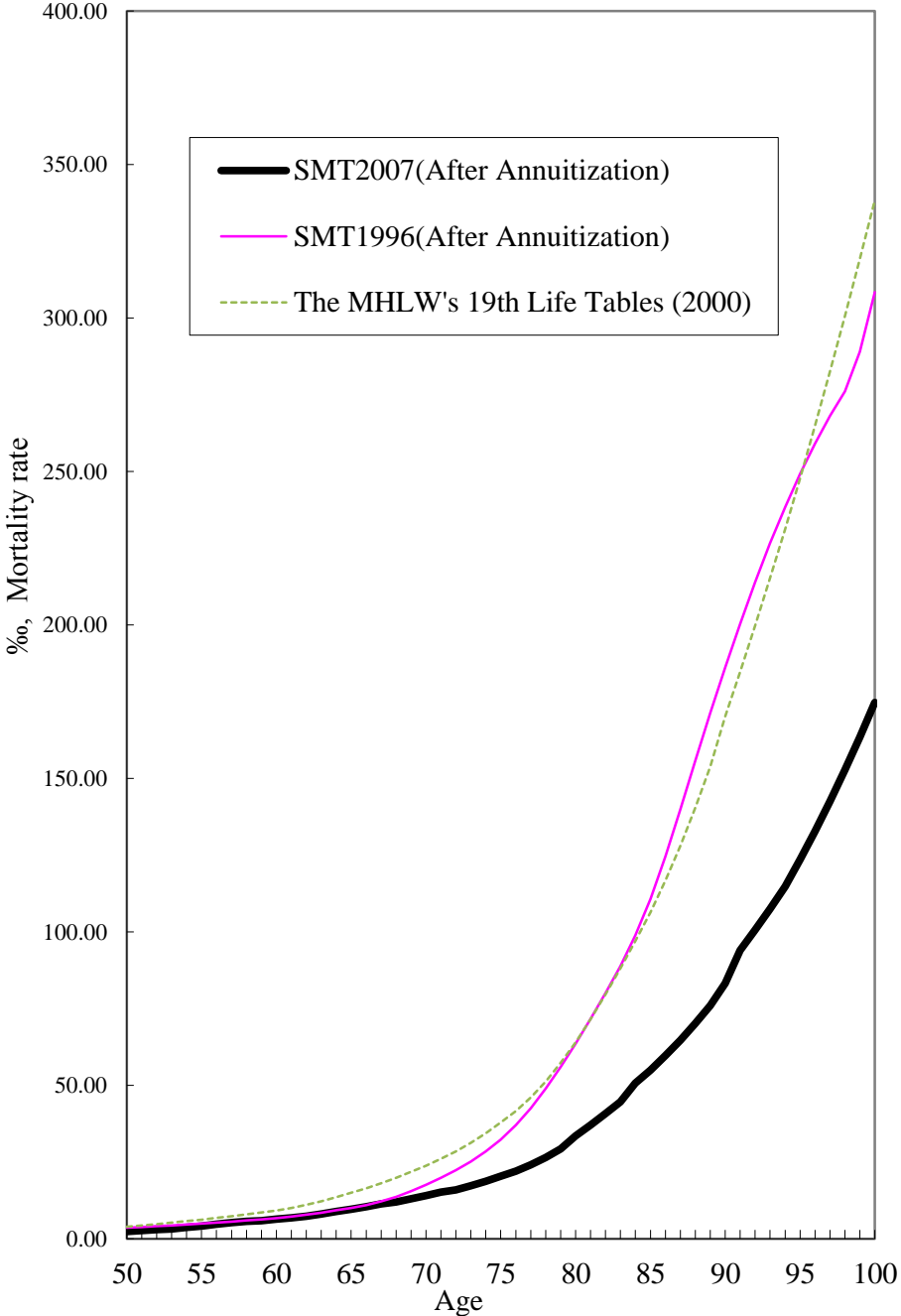
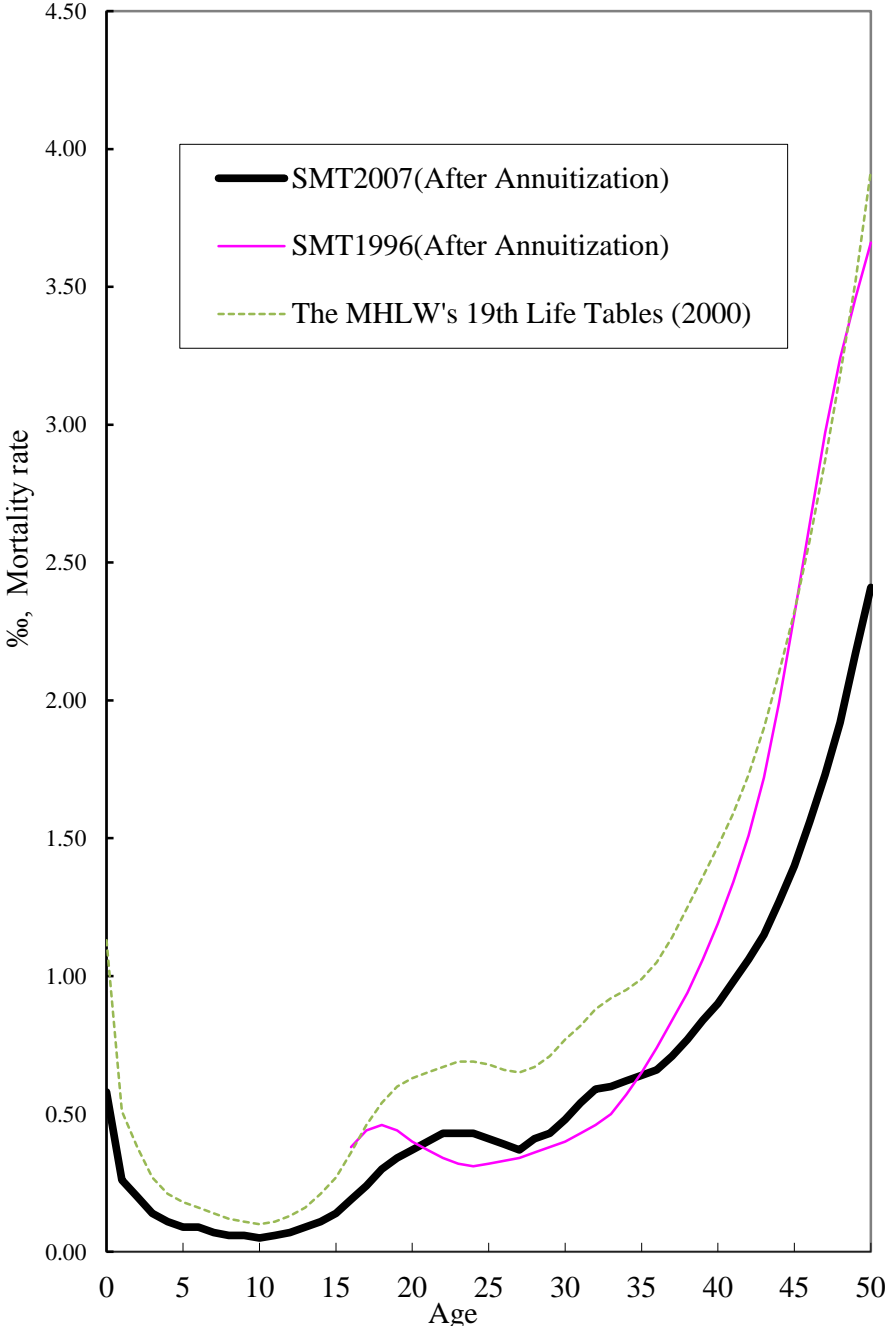
[Table 5] Comparison against SMT1996 (After Annuityization) and the MHLW's 19th Life Tables (2000) - Mortality rates

< Male >						< Female >											
Age	SMT2007 (After Annuityization)		SMT1996 (After Annuityization)	The MHLW's 19th Life Tables (2000)		Age	SMT2007 (After Annuityization)		SMT1996 (After Annuityization)	The MHLW's 19th Life Tables (2000)		Age	SMT2007 (After Annuityization)		SMT1996 (After Annuityization)	The MHLW's 19th Life Tables (2000)	
	%	versus SMT1996					%	versus the MHLW's					%	versus SMT1996			
0	0.58		51	1.13	60	6.42	95	70	6.75	9.23	0	0.47	77	57	2.84	3.83	
1	0.26		51	0.51	61	6.78	94	67	7.25	10.07	1	0.22	73	54	3.08	4.16	
2	0.20		53	0.38	62	7.37	94	67	7.85	11.06	2	0.15	72	52	3.32	4.58	
3	0.14		52	0.27	63	8.08	95	66	8.53	12.26	3	0.10	72	51	3.58	5.07	
4	0.11		52	0.21	64	8.86	96	65	9.27	13.59	4	0.07	73	50	3.85	5.62	
5	0.09		50	0.18	65	9.66	96	64	10.07	14.98	5	0.06	73	49	4.15	6.18	
6	0.09		56	0.16	66	10.50	96	64	10.99	16.46	6	0.06	72	48	4.48	6.80	
7	0.07		50	0.14	67	11.40	94	63	12.17	18.08	7	0.05	69	45	4.90	7.48	
8	0.06		50	0.12	68	12.05	88	61	13.68	19.88	8	0.04	67	44	5.48	8.25	
9	0.06		55	0.11	69	13.06	84	60	15.52	21.81	9	0.04	61	42	6.26	9.07	
10	0.05		50	0.10	70	14.11	80	59	17.63	23.84	10	0.04	57	41	7.24	9.99	
11	0.06		55	0.11	71	15.23	76	58	19.92	26.05	11	0.04	51	39	8.39	11.06	
12	0.07		54	0.13	72	15.94	71	56	22.40	28.50	12	0.04	46	37	9.68	12.28	
13	0.09		56	0.16	73	17.26	69	55	25.17	31.26	13	0.04	50	37	11.11	13.71	
14	0.11		52	0.21	74	18.73	66	54	28.42	34.37	14	0.05	50	36	12.76	15.39	
15	0.14		52	0.27	75	20.35	63	54	32.33	37.84	15	0.06	43	36	14.75	17.40	
16	0.19	50	53	0.36	76	22.08	60	53	37.02	41.62	16	0.09	100	56	17.25	19.74	
17	0.24	55	52	0.44	77	24.12	57	52	42.57	46.06	17	0.10	100	53	20.41	22.49	
18	0.30	65	56	0.46	78	26.50	54	52	48.95	51.27	18	0.12	120	55	24.32	25.73	
19	0.34	77	57	0.44	79	29.24	52	51	56.01	57.31	19	0.13	130	57	29.03	29.44	
20	0.37	93	59	0.40	80	33.57	53	52	63.60	64.01	20	0.14	140	56	34.58	33.65	
21	0.40	108	62	0.37	81	37.08	52	52	71.65	71.56	21	0.16	160	59	41.00	38.37	
22	0.43	126	64	0.34	82	40.76	51	51	79.99	79.62	22	0.17	170	61	48.35	43.56	
23	0.43	134	62	0.32	83	44.57	50	51	88.83	88.13	23	0.18	180	60	56.73	49.34	
24	0.43	139	62	0.31	84	50.68	51	52	98.87	96.99	24	0.18	180	60	66.24	55.81	
25	0.41	128	60	0.32	85	54.98	50	52	110.76	106.40	25	0.18	150	58	76.69	63.16	
26	0.39	118	59	0.33	86	59.68	48	51	124.62	116.78	26	0.18	138	58	87.66	71.55	
27	0.37	109	57	0.34	87	64.72	46	51	139.94	128.06	27	0.18	129	56	99.28	80.85	
28	0.41	114	61	0.36	88	70.19	45	50	155.79	140.42	28	0.20	143	59	111.93	91.17	
29	0.43	113	61	0.38	89	76.02	44	49	171.30	153.78	29	0.20	133	56	125.75	102.52	
30	0.48	120	62	0.40	90	83.18	45	49	186.12	170.13	30	0.22	138	58	140.47	115.50	
31	0.54	126	66	0.43	91	94.01	47	51	200.35	184.65	31	0.24	133	59	155.54	129.79	
32	0.59	128	67	0.46	92	100.64	47	50	213.86	199.68	32	0.26	130	59	170.53	144.72	
33	0.60	120	65	0.50	93	107.40	47	50	226.55	215.23	33	0.28	127	60	185.55	159.66	
34	0.62	109	65	0.57	94	114.78	48	50	238.36	231.29	34	0.29	121	58	201.12	174.98	
35	0.64	98	65	0.65	95	123.57	50	50	249.24	247.87	35	0.31	115	57	217.48	190.62	
36	0.66	89	63	0.74	96	132.84	51	50	259.15	264.96	36	0.34	113	59	234.45	206.55	
37	0.71	85	62	0.84	97	142.57	53	50	268.11	282.55	37	0.36	109	58	252.04	222.78	
38	0.77	82	62	0.94	98	152.79	55	51	276.12	300.65	38	0.39	105	58	270.23	239.29	
39	0.84	79	62	1.06	99	163.49	57	51	289.01	319.23	39	0.43	105	60	289.01	256.09	
40	0.90	76	61	1.19	100	174.69	57	52	308.39	338.28	40	0.47	102	60	308.39	273.16	
41	0.98	73	62	1.34	101	186.41	57	52	328.37	357.78	41	0.53	102	62	328.37	290.48	
42	1.06	70	61	1.51	102	198.65	57	53	349.00	377.72	42	0.59	102	63	349.00	308.05	
43	1.15	67	61	1.72	103	211.42	57	53	370.30	398.08	43	0.65	100	63	370.30	325.85	
44	1.27	64	60	1.99	104	224.74	57	54	392.15	418.81	44	0.71	97	63	392.15	343.87	
45	1.40	61	60	2.31	105	238.61	58	54	414.35	439.89	45	0.77	94	63	414.35	362.10	
46	1.56	59	60	2.64	106	253.05	58	55	437.31	461.29	46	0.81	89	62	437.31	380.50	
47	1.73	58	60	2.97	107	268.06	58	56	460.98	482.97	47	0.88	88	62	460.98	399.07	
48	1.92	59	60	3.24	108	283.66	58	56	485.31	504.87	48	0.97	87	61	485.31	417.78	
49	2.17	63	62	3.46	109	299.86	59	57	510.23	526.96	49	1.05	85	60	510.23	436.61	
50	2.41	66	61	3.66	110	316.67	59	58	535.67	549.18	50	1.18	86	60	535.67	455.54	
51	2.68	69	62	3.87	111	334.09	59	58	561.55	571.47	51	1.28	85	60	561.55	474.54	
52	2.96	72	62	4.11	112	352.16	60	59	587.75	593.78	52	1.35	83	58	587.75	493.59	
53	3.25	74	62	4.38	113	370.85	37		1000.00		53	1.49	85	59	614.17	512.66	
54	3.69	79	64	4.68	114	390.20					54	1.57	82	59	1000.00	531.72	
55	4.17	84	67	4.99	115	410.21					55	1.65	79	59	550.75	550.75	
56	4.72	89	70	5.30	116	430.89					56	1.78	80	61	569.70	569.70	
57	5.23	93	71	5.62	117	452.26					57	1.89	81	60			
58	5.64	95	71	5.95	118	474.32					58	1.97	80	59			
59	5.93	94	69	6.32	119	497.08					59	2.07	79	58			
120					120	520.57											
121					121	544.77											
122					122	1000.00											
123					123												
124					124												
125					125												
126					126												

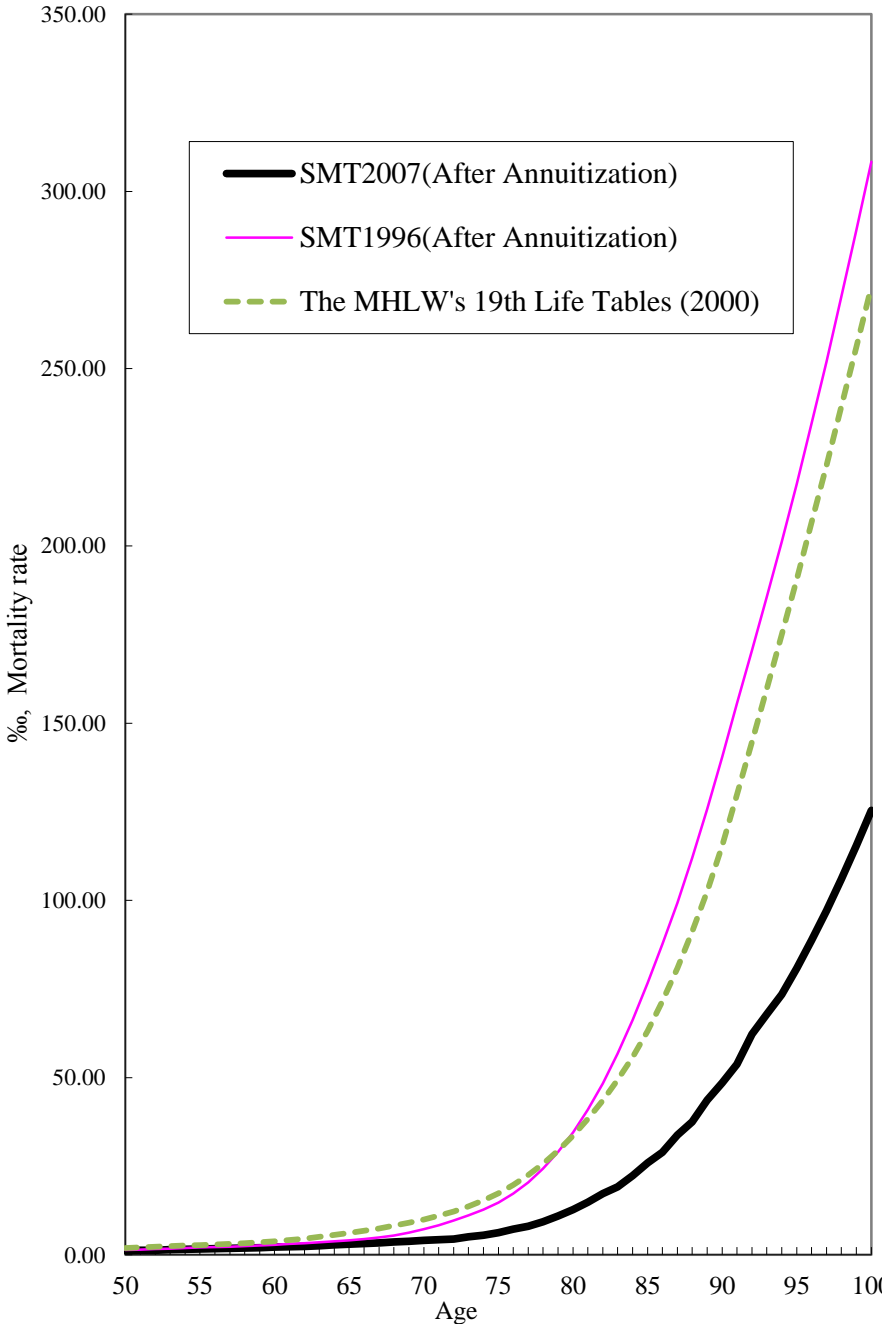
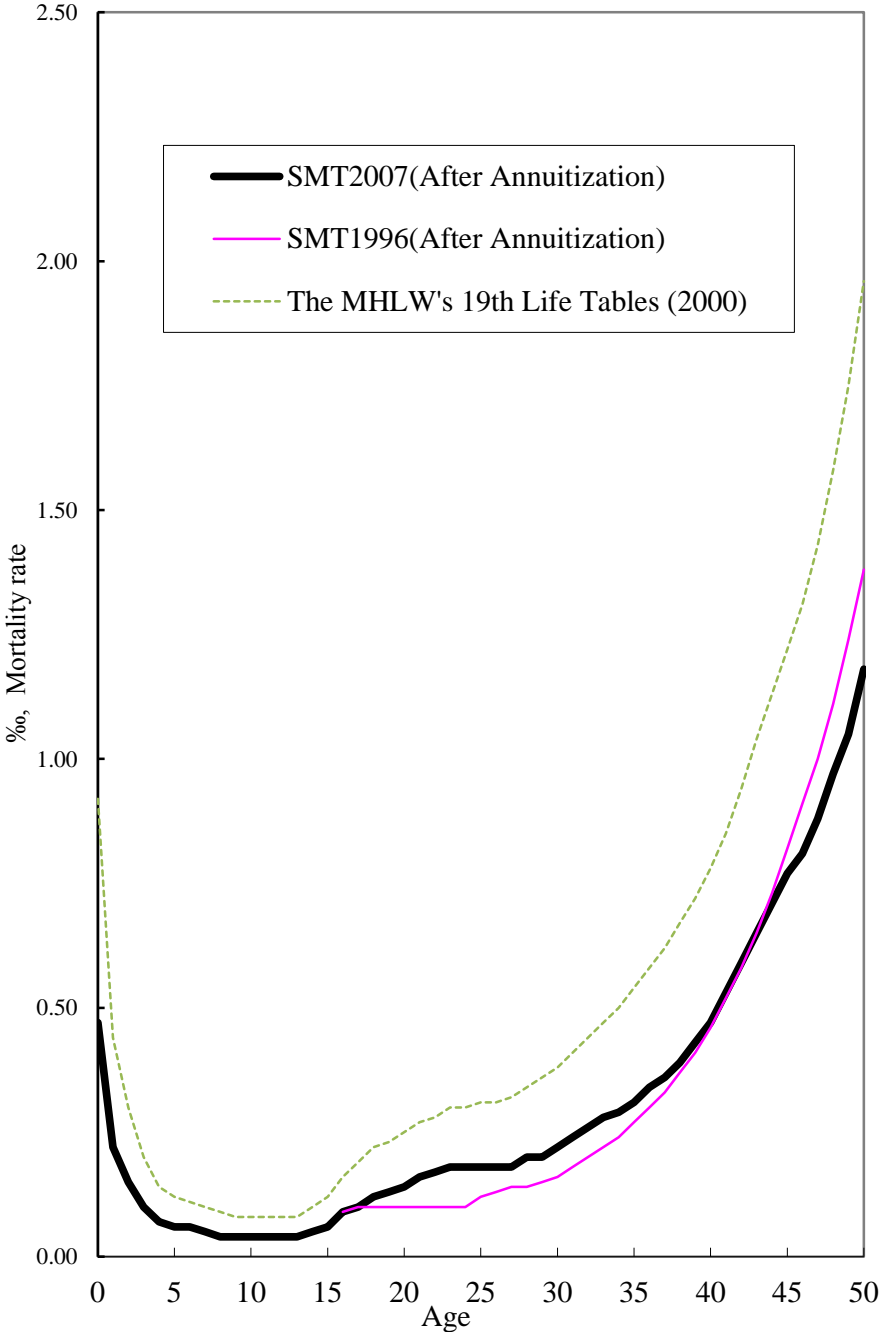
[Table 6] Comparison against SMT1996 (After Annuitization) and the MHLW's 19th Life Tables (2000) - Survival rates

<Male>					<Female>										
Age	SMT2007 (After Annuitization)		SMT1996 (After Annuitization)	The MHLW's 19th Life Tables (2000)	Age	SMT2007 (After Annuitization)		SMT1996 (After Annuitization)	The MHLW's 19th Life Tables (2000)	Age	SMT2007 (After Annuitization)		SMT1996 (After Annuitization)	The MHLW's 19th Life Tables (2000)	
	versus SMT1996	versus the MHLW's				versus SMT1996	versus the MHLW's				versus SMT1996	versus the MHLW's			versus SMT1996
	%	%	%	%		%	%	%	%		%	%	%	%	
0	999.42		100	998.87	60	993.58	100	100	993.25	990.77	0	999.53		100	999.08
1	999.74		100	999.49	61	993.22	100	100	992.75	989.93	1	999.78		100	999.56
2	999.80		100	999.62	62	992.63	100	100	992.15	988.94	2	999.85		100	999.70
3	999.86		100	999.73	63	991.92	100	100	991.47	987.74	3	999.90		100	999.80
4	999.89		100	999.79	64	991.14	100	100	990.73	986.41	4	999.93		100	999.86
5	999.91		100	999.82	65	990.34	100	101	989.93	985.02	5	999.94		100	999.88
6	999.91		100	999.84	66	989.50	100	101	989.01	983.54	6	999.94		100	999.89
7	999.93		100	999.86	67	988.60	100	101	988.83	981.92	7	999.95		100	999.90
8	999.94		100	999.88	68	987.95	100	101	988.32	980.12	8	999.96		100	999.91
9	999.94		100	999.89	69	986.94	100	101	984.48	978.19	9	999.96		100	999.92
10	999.95		100	999.90	70	985.89	100	101	982.37	976.16	10	999.96		100	999.92
11	999.94		100	999.89	71	984.77	100	101	980.08	973.95	11	999.96		100	999.92
12	999.93		100	999.87	72	984.06	101	101	977.60	971.50	12	999.96		100	999.92
13	999.91		100	999.84	73	982.74	101	101	974.83	968.74	13	999.96		100	999.92
14	999.89		100	999.79	74	981.27	101	102	971.58	965.63	14	999.95		100	999.90
15	999.86		100	999.73	75	979.65	101	102	967.67	962.16	15	999.94		100	999.88
16	999.81	100	100	999.62	76	977.92	102	102	962.98	958.38	16	999.91	100	100	999.91
17	999.76	100	100	999.56	77	975.88	102	102	957.43	953.94	17	999.90	100	100	999.90
18	999.70	100	100	999.54	78	973.50	102	103	951.05	948.73	18	999.88	100	100	999.90
19	999.66	100	100	999.56	79	970.76	103	103	943.99	942.69	19	999.87	100	100	999.90
20	999.63	100	100	999.37	80	966.43	103	103	936.40	935.99	20	999.86	100	100	999.90
21	999.60	100	100	999.63	81	962.92	104	104	928.35	928.44	21	999.84	100	100	999.90
22	999.57	100	100	999.33	82	959.24	104	104	920.01	920.38	22	999.83	100	100	999.90
23	999.57	100	100	999.68	83	955.43	105	105	911.17	911.87	23	999.82	100	100	999.90
24	999.57	100	100	999.31	84	949.32	105	105	901.13	903.01	24	999.82	100	100	999.90
25	999.59	100	100	999.68	85	945.02	106	106	889.24	893.60	25	999.82	100	100	999.88
26	999.61	100	100	999.34	86	940.32	107	106	875.38	883.22	26	999.82	100	100	999.87
27	999.63	100	100	999.66	87	935.28	109	107	860.06	871.94	27	999.82	100	100	999.86
28	999.59	100	100	999.64	88	929.81	110	108	844.21	859.58	28	999.80	100	100	999.86
29	999.57	100	100	999.62	89	923.98	111	109	828.70	846.22	29	999.80	100	100	999.85
30	999.52	100	100	999.60	90	916.82	113	110	813.88	829.87	30	999.78	100	100	999.84
31	999.46	100	100	999.57	91	905.99	113	111	799.65	815.35	31	999.76	100	100	999.82
32	999.41	100	100	999.54	92	899.36	114	112	786.14	800.32	32	999.74	100	100	999.80
33	999.40	100	100	999.50	93	892.60	115	114	773.45	784.77	33	999.72	100	100	999.78
34	999.38	100	100	999.43	94	885.22	116	115	761.64	768.71	34	999.71	100	100	999.76
35	999.36	100	100	999.35	95	876.43	117	117	750.76	752.13	35	999.69	100	100	999.73
36	999.34	100	100	999.26	96	867.16	117	118	740.85	735.04	36	999.66	100	100	999.70
37	999.29	100	100	999.16	97	857.43	117	120	731.89	717.45	37	999.64	100	100	999.67
38	999.23	100	100	999.06	98	847.21	117	121	723.88	699.35	38	999.61	100	100	999.63
39	999.16	100	100	998.94	99	836.51	118	123	710.99	680.77	39	999.57	100	100	999.59
40	999.10	100	100	998.81	100	825.31	119	125	691.61	661.72	40	999.53	100	100	999.54
41	999.02	100	100	998.66	101	813.59	121	127	671.63	642.22	41	999.47	100	100	999.48
42	998.94	100	100	998.49	102	801.35	123	129	651.00	622.28	42	999.41	100	100	999.42
43	998.85	100	100	998.28	103	788.58	125	131	629.70	601.92	43	999.35	100	100	999.35
44	998.73	100	100	998.01	104	775.26	128	133	607.85	581.19	44	999.29	100	100	999.27
45	998.60	100	100	997.69	105	761.39	130	136	585.65	560.11	45	999.23	100	100	999.18
46	998.44	100	100	997.36	106	746.95	133	139	562.69	538.71	46	999.19	100	100	999.09
47	998.27	100	100	997.03	107	731.94	136	142	539.02	517.03	47	999.12	100	100	999.00
48	998.08	100	100	996.76	108	716.34	139	145	514.69	495.13	48	999.03	100	100	998.89
49	997.83	100	100	996.54	109	700.14	143	148	489.77	473.04	49	998.95	100	100	998.76
50	997.59	100	100	996.34	110	683.33	147	152	464.33	450.82	50	998.82	100	100	998.62
51	997.32	100	100	996.13	111	665.91	152	155	438.45	428.53	51	998.72	100	100	998.49
52	997.04	100	100	995.89	112	647.84	157	159	412.25	406.22	52	998.65	100	100	998.37
53	996.75	100	100	995.62	113	629.15					53	998.51	100	100	998.24
54	996.31	100	100	995.32	114	609.80					54	998.43	100	100	998.09
55	995.83	100	100	995.01	115	589.79					55	998.35	100	100	997.92
56	995.28	100	100	994.70	116	569.11					56	998.22	100	100	997.78
57	994.77	100	100	994.38	117	547.74					57	998.11	100	100	997.66
58	994.36	100	100	994.05	118	525.68					58	998.03	100	100	997.53
59	994.07	100	100	993.68	119	502.92					59	997.93	100	100	997.37
120					120	479.43					120				541.10
					121	455.23					121				516.66
											122				491.36
											123				465.21
											124				438.18
											125				410.28

[Graph 1] Comparison against SMT1996 (After Annuity) and the MHLW's 19th Life Tables (2000), Male



[Graph 2] Comparison against SMT1996 (After Annuity) and the MHLW's 19th Life Tables (2000), Female



Section 5 Trend in average life expectancy

[Table 7] Trend in average life expectancy

Gender	Age	Life Tables based on Population Census								Abridged Life Tables							SMT1996	SMT2007
		12th	13th	14th	15th	16th	17th	18th*	19th	1999	2000	2001	2002	2003	2004	2005	(After Annuitization)	(After Annuitization)
		(1965)	(1970)	(1975)	(1980)	(1985)	(1990)	(1995)	(2000)									
Male	20	50.18	51.26	53.27	54.56	55.74	56.77	57.22	58.33	57.74	58.24	58.64	58.87	58.89	59.15	59.05	59.97	64.59
	30	40.90	41.90	43.78	45.00	46.16	47.16	47.59	48.69	48.11	48.59	48.99	49.21	49.23	49.49	49.39	50.16	54.84
	40	31.73	32.68	34.41	35.52	36.63	37.58	38.00	39.13	38.56	39.03	39.43	39.64	39.67	39.93	39.82	40.45	45.16
	50	23.00	23.88	25.56	26.57	27.56	28.40	28.78	29.91	29.37	29.82	30.21	30.42	30.47	30.70	30.59	31.23	35.72
	60	15.20	15.93	17.38	18.31	19.34	20.01	20.30	21.44	20.91	21.34	21.72	21.93	21.98	22.17	22.06	22.52	26.96
	70	8.99	9.56	10.53	11.18	12.00	12.66	12.98	13.97	13.48	13.87	14.17	14.32	14.35	14.51	14.38	14.35	19.08
	80	4.81	5.26	5.70	6.08	6.51	6.88	7.14	7.96	7.53	7.86	8.13	8.25	8.26	8.39	8.23	7.77	12.19
Female	20	54.85	56.11	58.04	59.66	61.20	62.54	63.55	65.08	64.50	65.09	65.39	65.69	65.79	66.01	65.90	65.70	72.99
	30	45.31	46.50	48.35	49.90	51.41	52.73	53.72	55.26	54.69	55.27	55.56	55.86	55.97	56.18	56.09	55.77	63.11
	40	35.91	37.01	38.76	40.23	41.72	43.00	43.98	45.52	44.94	45.53	45.82	46.12	46.22	46.44	46.35	45.91	53.29
	50	26.85	27.84	29.46	30.84	32.28	33.51	34.49	36.01	35.43	36.02	36.29	36.58	36.68	36.90	36.81	36.23	43.65
	60	18.42	19.27	20.68	21.89	23.24	24.39	25.35	26.85	26.29	26.86	27.13	27.40	27.49	27.74	27.62	26.85	34.27
	70	11.09	11.75	12.78	13.73	14.89	15.87	16.79	18.19	17.67	18.20	18.43	18.69	18.75	18.98	18.85	17.76	25.13
	80	5.80	6.27	6.76	7.33	8.07	8.72	9.48	10.60	10.18	10.63	10.80	11.02	11.04	11.23	11.11	9.73	16.44

Notes: * The life expectancy is calculated excluding the effect of the Great Hanshin-Awaji Earthquake.

Appendix

Standard Mortality Table 2007 (For Life Insurance) - Male

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	108	0.00108	78.24
1	99,892	75	0.00075	77.32
2	99,817	49	0.00049	76.38
3	99,768	31	0.00031	75.42
4	99,737	21	0.00021	74.44
5	99,716	17	0.00017	73.46
6	99,699	16	0.00016	72.47
7	99,683	16	0.00016	71.48
8	99,667	16	0.00016	70.49
9	99,651	15	0.00015	69.50
10	99,636	14	0.00014	68.51
11	99,622	13	0.00013	67.52
12	99,609	14	0.00014	66.53
13	99,595	18	0.00018	65.54
14	99,577	25	0.00025	64.55
15	99,552	36	0.00036	63.57
16	99,516	49	0.00049	62.59
17	99,467	62	0.00062	61.62
18	99,405	73	0.00073	60.66
19	99,332	79	0.00080	59.70
20	99,253	83	0.00084	58.75
21	99,170	85	0.00086	57.80
22	99,085	84	0.00085	56.85
23	99,001	83	0.00084	55.90
24	98,918	82	0.00083	54.94
25	98,836	81	0.00082	53.99
26	98,755	80	0.00081	53.03
27	98,675	79	0.00080	52.07
28	98,596	80	0.00081	51.12
29	98,516	82	0.00083	50.16
30	98,434	85	0.00086	49.20
31	98,349	88	0.00089	48.24
32	98,261	90	0.00092	47.28
33	98,171	94	0.00096	46.33
34	98,077	98	0.00100	45.37
35	97,979	103	0.00105	44.41
36	97,876	110	0.00112	43.46
37	97,766	116	0.00119	42.51
38	97,650	125	0.00128	41.56
39	97,525	134	0.00137	40.61
40	97,391	144	0.00148	39.67
41	97,247	157	0.00161	38.72
42	97,090	171	0.00176	37.79
43	96,919	186	0.00192	36.85
44	96,733	204	0.00211	35.92
45	96,529	223	0.00231	35.00
46	96,306	245	0.00254	34.08
47	96,061	266	0.00277	33.16
48	95,795	291	0.00304	32.25
49	95,504	318	0.00333	31.35
50	95,186	347	0.00365	30.45
51	94,839	380	0.00401	29.56
52	94,459	416	0.00440	28.68
53	94,043	451	0.00480	27.80
54	93,592	489	0.00522	26.94

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
55	93,103	528	0.00567	26.07
56	92,575	569	0.00615	25.22
57	92,006	613	0.00666	24.37
58	91,393	656	0.00718	23.53
59	90,737	702	0.00774	22.70
60	90,035	751	0.00834	21.87
61	89,284	805	0.00902	21.05
62	88,479	868	0.00981	20.24
63	87,611	939	0.01072	19.44
64	86,672	1,023	0.01180	18.64
65	85,649	1,119	0.01306	17.86
66	84,530	1,227	0.01452	17.09
67	83,303	1,346	0.01616	16.33
68	81,957	1,470	0.01794	15.59
69	80,487	1,598	0.01986	14.87
70	78,889	1,730	0.02193	14.16
71	77,159	1,863	0.02415	13.46
72	75,296	2,001	0.02657	12.79
73	73,295	2,142	0.02923	12.12
74	71,153	2,293	0.03223	11.47
75	68,860	2,457	0.03568	10.84
76	66,403	2,630	0.03961	10.22
77	63,773	2,806	0.04400	9.62
78	60,967	2,973	0.04877	9.04
79	57,994	3,146	0.05425	8.48
80	54,848	3,312	0.06039	7.93
81	51,536	3,467	0.06728	7.41
82	48,069	3,605	0.07500	6.91
83	44,464	3,719	0.08364	6.43
84	40,745	3,801	0.09329	5.97
85	36,944	3,845	0.10407	5.53
86	33,099	3,842	0.11609	5.12
87	29,257	3,788	0.12946	4.73
88	25,469	3,676	0.14432	4.35
89	21,793	3,504	0.16079	4.00
90	18,289	3,274	0.17900	3.67
91	15,015	2,989	0.19910	3.37
92	12,026	2,660.0	0.22119	3.08
93	9,366.0	2,298.4	0.24540	2.81
94	7,067.6	1,921.3	0.27184	2.56
95	5,146.3	1,546.9	0.30058	2.34
96	3,599.4	1,193.8	0.33166	2.12
97	2,405.6	878.3	0.36510	1.93
98	1,527.3	612.22	0.40085	1.75
99	915.08	401.54	0.43880	1.59
100	513.54	245.87	0.47877	1.44
101	267.67	139.32	0.52048	1.31
102	128.35	72.337	0.56359	1.19
103	56.013	34.034	0.60761	1.08
104	21.979	14.3303	0.65200	0.98
105	7.6487	5.3244	0.69612	0.88
106	2.3243	1.7182	0.73925	0.76
107	0.6061	0.6061	1.00000	0.50
108				
109				

Standard Mortality Table 2007 (For Life Insurance) - Female

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	96	0.00096	84.94
1	99,904	66	0.00066	84.02
2	99,838	42	0.00042	83.07
3	99,796	26	0.00026	82.11
4	99,770	16	0.00016	81.13
5	99,754	12	0.00012	80.14
6	99,742	12	0.00012	79.15
7	99,730	12	0.00012	78.16
8	99,718	11	0.00011	77.17
9	99,707	10	0.00010	76.18
10	99,697	10	0.00010	75.19
11	99,687	9	0.00009	74.19
12	99,678	9	0.00009	73.20
13	99,669	10	0.00010	72.21
14	99,659	12	0.00012	71.21
15	99,647	16	0.00016	70.22
16	99,631	20	0.00020	69.23
17	99,611	24	0.00024	68.25
18	99,587	28	0.00028	67.26
19	99,559	30	0.00030	66.28
20	99,529	31	0.00031	65.30
21	99,498	31	0.00031	64.32
22	99,467	32	0.00032	63.34
23	99,435	34	0.00034	62.36
24	99,401	35	0.00035	61.38
25	99,366	36	0.00036	60.41
26	99,330	38	0.00038	59.43
27	99,292	40	0.00040	58.45
28	99,252	42	0.00042	57.47
29	99,210	45	0.00045	56.50
30	99,165	49	0.00049	55.52
31	99,116	53	0.00053	54.55
32	99,063	55	0.00056	53.58
33	99,008	59	0.00060	52.61
34	98,949	63	0.00064	51.64
35	98,886	68	0.00069	50.67
36	98,818	74	0.00075	49.71
37	98,744	81	0.00082	48.74
38	98,663	87	0.00088	47.78
39	98,576	92	0.00093	46.83
40	98,484	97	0.00098	45.87
41	98,387	102	0.00104	44.91
42	98,285	109	0.00111	43.96
43	98,176	118	0.00120	43.01
44	98,058	126	0.00129	42.06
45	97,932	137	0.00140	41.11
46	97,795	150	0.00153	40.17
47	97,645	163	0.00167	39.23
48	97,482	177	0.00182	38.29
49	97,305	194	0.00199	37.36
50	97,111	210	0.00216	36.44
51	96,901	227	0.00234	35.51
52	96,674	243	0.00251	34.60
53	96,431	258	0.00268	33.68
54	96,173	273	0.00284	32.77

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
55	95,900	286	0.00298	31.86
56	95,614	297	0.00311	30.96
57	95,317	309	0.00324	30.05
58	95,008	321	0.00338	29.15
59	94,687	337	0.00356	28.25
60	94,350	358	0.00379	27.34
61	93,992	383	0.00408	26.45
62	93,609	414	0.00442	25.55
63	93,195	449	0.00482	24.66
64	92,746	489	0.00527	23.78
65	92,257	532	0.00577	22.91
66	91,725	581	0.00633	22.04
67	91,144	633	0.00695	21.17
68	90,511	690	0.00762	20.32
69	89,821	750	0.00835	19.47
70	89,071	814	0.00914	18.63
71	88,257	897	0.01016	17.80
72	87,360	989	0.01132	16.97
73	86,371	1,093	0.01266	16.16
74	85,278	1,211	0.01420	15.36
75	84,067	1,343	0.01597	14.58
76	82,724	1,489	0.01800	13.81
77	81,235	1,652	0.02033	13.05
78	79,583	1,831	0.02301	12.31
79	77,752	2,028	0.02608	11.59
80	75,724	2,241	0.02960	10.89
81	73,483	2,472	0.03364	10.20
82	71,011	2,718	0.03827	9.54
83	68,293	2,976	0.04357	8.90
84	65,317	3,242	0.04964	8.28
85	62,075	3,512	0.05657	7.69
86	58,563	3,777	0.06449	7.12
87	54,786	4,028	0.07352	6.58
88	50,758	4,254	0.08380	6.06
89	46,504	4,441	0.09550	5.57
90	42,063	4,576	0.10878	5.10
91	37,487	4,642	0.12382	4.66
92	32,845	4,625	0.14082	4.25
93	28,220	4,514	0.15997	3.87
94	23,706	4,302	0.18149	3.51
95	19,404	3,989	0.20558	3.17
96	15,415	3,583	0.23243	2.87
97	11,832	3,102.5	0.26221	2.58
98	8,729.5	2,575.6	0.29505	2.32
99	6,153.9	2,037.2	0.33105	2.09
100	4,116.7	1,524.1	0.37022	1.87
101	2,592.6	1,069.3	0.41246	1.67
102	1,523.3	697.05	0.45759	1.50
103	826.25	417.47	0.50526	1.34
104	408.78	226.86	0.55496	1.20
105	181.92	110.245	0.60601	1.08
106	71.675	47.131	0.65757	0.97
107	24.544	17.3921	0.70861	0.88
108	7.1519	5.4213	0.75802	0.79
109	1.7306	1.3924	0.80460	0.70
110	0.3382	0.3382	1.00000	0.50

Standard Mortality Table 2007 (After Annuityization) - Male

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	58	0.00058	84.35
1	99,942	26	0.00026	83.40
2	99,916	20	0.00020	82.42
3	99,896	14	0.00014	81.44
4	99,882	11	0.00011	80.45
5	99,871	9	0.00009	79.46
6	99,862	9	0.00009	78.46
7	99,853	7	0.00007	77.47
8	99,846	6	0.00006	76.48
9	99,840	6	0.00006	75.48
10	99,834	5	0.00005	74.49
11	99,829	6	0.00006	73.49
12	99,823	7	0.00007	72.49
13	99,816	9	0.00009	71.50
14	99,807	11	0.00011	70.50
15	99,796	14	0.00014	69.51
16	99,782	19	0.00019	68.52
17	99,763	24	0.00024	67.53
18	99,739	30	0.00030	66.55
19	99,709	34	0.00034	65.57
20	99,675	37	0.00037	64.59
21	99,638	40	0.00040	63.62
22	99,598	43	0.00043	62.64
23	99,555	43	0.00043	61.67
24	99,512	43	0.00043	60.70
25	99,469	41	0.00041	59.72
26	99,428	39	0.00039	58.75
27	99,389	37	0.00037	57.77
28	99,352	41	0.00041	56.79
29	99,311	43	0.00043	55.81
30	99,268	48	0.00048	54.84
31	99,220	54	0.00054	53.86
32	99,166	59	0.00059	52.89
33	99,107	59	0.00060	51.92
34	99,048	61	0.00062	50.95
35	98,987	63	0.00064	49.99
36	98,924	65	0.00066	49.02
37	98,859	70	0.00071	48.05
38	98,789	76	0.00077	47.08
39	98,713	83	0.00084	46.12
40	98,630	89	0.00090	45.16
41	98,541	97	0.00098	44.20
42	98,444	104	0.00106	43.24
43	98,340	113	0.00115	42.29
44	98,227	125	0.00127	41.33
45	98,102	137	0.00140	40.39
46	97,965	153	0.00156	39.44
47	97,812	169	0.00173	38.50
48	97,643	187	0.00192	37.57
49	97,456	211	0.00217	36.64
50	97,245	234	0.00241	35.72
51	97,011	260	0.00268	34.80
52	96,751	286	0.00296	33.89
53	96,465	314	0.00325	32.99
54	96,151	355	0.00369	32.10
55	95,796	399	0.00417	31.22
56	95,397	450	0.00472	30.35
57	94,947	497	0.00523	29.49
58	94,450	533	0.00564	28.64
59	93,917	557	0.00593	27.80

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
60	93,360	599	0.00642	26.96
61	92,761	629	0.00678	26.13
62	92,132	679	0.00737	25.31
63	91,453	739	0.00808	24.49
64	90,714	804	0.00886	23.69
65	89,910	869	0.00966	22.89
66	89,041	935	0.01050	22.11
67	88,106	1,004	0.01140	21.34
68	87,102	1,050	0.01205	20.58
69	86,052	1,124	0.01306	19.83
70	84,928	1,198	0.01411	19.08
71	83,730	1,275	0.01523	18.35
72	82,455	1,314	0.01594	17.63
73	81,141	1,400	0.01726	16.90
74	79,741	1,494	0.01873	16.19
75	78,247	1,592	0.02035	15.49
76	76,655	1,693	0.02208	14.80
77	74,962	1,808	0.02412	14.13
78	73,154	1,939	0.02650	13.46
79	71,215	2,082	0.02924	12.81
80	69,133	2,321	0.03357	12.19
81	66,812	2,477	0.03708	11.59
82	64,335	2,622	0.04076	11.02
83	61,713	2,751	0.04457	10.47
84	58,962	2,988	0.05068	9.93
85	55,974	3,077	0.05498	9.43
86	52,897	3,157	0.05968	8.95
87	49,740	3,219	0.06472	8.49
88	46,521	3,265	0.07019	8.04
89	43,256	3,288	0.07602	7.61
90	39,968	3,325	0.08318	7.20
91	36,643	3,445	0.09401	6.81
92	33,198	3,341	0.10064	6.46
93	29,857	3,207	0.10740	6.13
94	26,650	3,059	0.11478	5.80
95	23,591	2,915	0.12357	5.49
96	20,676	2,747	0.13284	5.20
97	17,929	2,556	0.14257	4.91
98	15,373	2,349	0.15279	4.65
99	13,024	2,129	0.16349	4.40
100	10,895	1,903.2	0.17469	4.16
101	8,991.8	1,676.2	0.18641	3.93
102	7,315.6	1,453.2	0.19865	3.72
103	5,862.4	1,239.4	0.21142	3.52
104	4,623.0	1,039.0	0.22474	3.33
105	3,584.0	855.2	0.23861	3.15
106	2,728.8	690.5	0.25305	2.97
107	2,038.3	546.4	0.26806	2.81
108	1,491.9	423.2	0.28366	2.66
109	1,068.7	320.46	0.29986	2.51
110	748.24	236.95	0.31667	2.38
111	511.29	170.82	0.33409	2.25
112	340.47	119.90	0.35216	2.12
113	220.57	81.80	0.37085	2.01
114	138.77	54.148	0.39020	1.90
115	84.622	34.713	0.41021	1.79
116	49.909	21.505	0.43089	1.68
117	28.404	12.846	0.45226	1.58
118	15.558	7.3795	0.47432	1.47
119	8.1785	4.0654	0.49708	1.35
120	4.1131	2.1412	0.52057	1.20
121	1.9719	1.0742	0.54477	0.96
122	0.8977	0.8977	1.00000	0.50
123				
124				
125				
126				

Standard Mortality Table 2007 (After Annuityization) - Female

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	47	0.00047	92.82
1	99,953	22	0.00022	91.87
2	99,931	15	0.00015	90.89
3	99,916	10	0.00010	89.90
4	99,906	7	0.00007	88.91
5	99,899	6	0.00006	87.91
6	99,893	6	0.00006	86.92
7	99,887	5	0.00005	85.92
8	99,882	4	0.00004	84.93
9	99,878	4	0.00004	83.93
10	99,874	4	0.00004	82.94
11	99,870	4	0.00004	81.94
12	99,866	4	0.00004	80.94
13	99,862	4	0.00004	79.95
14	99,858	5	0.00005	78.95
15	99,853	6	0.00006	77.95
16	99,847	9	0.00009	76.96
17	99,838	10	0.00010	75.96
18	99,828	12	0.00012	74.97
19	99,816	13	0.00013	73.98
20	99,803	14	0.00014	72.99
21	99,789	16	0.00016	72.00
22	99,773	17	0.00017	71.01
23	99,756	18	0.00018	70.02
24	99,738	18	0.00018	69.04
25	99,720	18	0.00018	68.05
26	99,702	18	0.00018	67.06
27	99,684	18	0.00018	66.07
28	99,666	20	0.00020	65.09
29	99,646	20	0.00020	64.10
30	99,626	22	0.00022	63.11
31	99,604	24	0.00024	62.12
32	99,580	26	0.00026	61.14
33	99,554	28	0.00028	60.16
34	99,526	29	0.00029	59.17
35	99,497	31	0.00031	58.19
36	99,466	34	0.00034	57.21
37	99,432	36	0.00036	56.23
38	99,396	39	0.00039	55.25
39	99,357	43	0.00043	54.27
40	99,314	47	0.00047	53.29
41	99,267	53	0.00053	52.32
42	99,214	59	0.00059	51.34
43	99,155	64	0.00065	50.37
44	99,091	70	0.00071	49.41
45	99,021	76	0.00077	48.44
46	98,945	80	0.00081	47.48
47	98,865	87	0.00088	46.52
48	98,778	96	0.00097	45.56
49	98,682	104	0.00105	44.60
50	98,578	116	0.00118	43.65
51	98,462	126	0.00128	42.70
52	98,336	133	0.00135	41.75
53	98,203	146	0.00149	40.81
54	98,057	154	0.00157	39.87
55	97,903	162	0.00165	38.93
56	97,741	174	0.00178	37.99
57	97,567	184	0.00189	37.06
58	97,383	192	0.00197	36.13
59	97,191	201	0.00207	35.20

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
60	96,990	211	0.00218	34.27
61	96,779	219	0.00226	33.35
62	96,560	231	0.00239	32.42
63	96,329	249	0.00258	31.50
64	96,080	270	0.00281	30.58
65	95,810	288	0.00301	29.66
66	95,522	309	0.00324	28.75
67	95,213	323	0.00339	27.84
68	94,890	347	0.00366	26.93
69	94,543	360	0.00381	26.03
70	94,183	386	0.00410	25.13
71	93,797	402	0.00429	24.23
72	93,395	420	0.00450	23.33
73	92,975	470	0.00506	22.44
74	92,505	512	0.00553	21.55
75	91,993	581	0.00632	20.66
76	91,412	664	0.00726	19.79
77	90,748	733	0.00808	18.93
78	90,015	845	0.00939	18.08
79	89,170	976	0.01094	17.25
80	88,194	1,124	0.01275	16.44
81	87,070	1,294	0.01486	15.64
82	85,776	1,480	0.01726	14.87
83	84,296	1,618	0.01920	14.12
84	82,678	1,845	0.02231	13.39
85	80,833	2,100	0.02598	12.68
86	78,733	2,280	0.02896	12.01
87	76,453	2,583	0.03378	11.35
88	73,870	2,772	0.03752	10.73
89	71,098	3,105	0.04367	10.13
90	67,993	3,298	0.04851	9.57
91	64,695	3,477	0.05375	9.03
92	61,218	3,814	0.06230	8.52
93	57,404	3,894	0.06783	8.05
94	53,510	3,929	0.07343	7.60
95	49,581	4,008	0.08084	7.16
96	45,573	4,044	0.08873	6.75
97	41,529	4,033	0.09712	6.35
98	37,496	3,975	0.10602	5.98
99	33,521	3,870	0.11545	5.63
100	29,651	3,718	0.12540	5.30
101	25,933	3,525	0.13592	4.99
102	22,408	3,294	0.14700	4.70
103	19,114	3,032	0.15865	4.42
104	16,082	2,748	0.17090	4.16
105	13,334	2,450	0.18376	3.92
106	10,884	2,146.8	0.19724	3.69
107	8,737.2	1,846.6	0.21135	3.47
108	6,890.6	1,558.1	0.22612	3.26
109	5,332.5	1,288.0	0.24154	3.07
110	4,044.5	1,042.0	0.25764	2.89
111	3,002.5	824.0	0.27443	2.72
112	2,178.5	636.0	0.29193	2.56
113	1,542.5	478.4	0.31014	2.41
114	1,064.1	350.18	0.32909	2.27
115	713.92	249.00	0.34878	2.13
116	464.92	171.66	0.36923	2.00
117	293.26	114.50	0.39045	1.88
118	178.76	73.73	0.41246	1.77
119	105.03	45.716	0.43527	1.66
120	59.314	27.219	0.45890	1.56
121	32.095	15.513	0.48334	1.46
122	16.582	8.4343	0.50864	1.36
123	8.1477	4.3573	0.53479	1.25
124	3.7904	2.1295	0.56182	1.12
125	1.6609	0.9795	0.58972	0.91
126	0.6814	0.6814	1.00000	0.50

Standard Mortality Table 2007 (For Medical Insurance) - Male

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	58	0.00058	81.15
1	99,942	41	0.00041	80.20
2	99,901	26	0.00026	79.23
3	99,875	17	0.00017	78.25
4	99,858	11	0.00011	77.26
5	99,847	9	0.00009	76.27
6	99,838	9	0.00009	75.28
7	99,829	8	0.00008	74.29
8	99,821	8	0.00008	73.29
9	99,813	7	0.00007	72.30
10	99,806	6	0.00006	71.30
11	99,800	6	0.00006	70.31
12	99,794	7	0.00007	69.31
13	99,787	9	0.00009	68.32
14	99,778	14	0.00014	67.32
15	99,764	21	0.00021	66.33
16	99,743	28	0.00028	65.35
17	99,715	35	0.00035	64.36
18	99,680	39	0.00039	63.39
19	99,641	42	0.00042	62.41
20	99,599	43	0.00043	61.44
21	99,556	42	0.00042	60.46
22	99,514	41	0.00041	59.49
23	99,473	40	0.00040	58.51
24	99,433	39	0.00039	57.54
25	99,394	38	0.00038	56.56
26	99,356	37	0.00037	55.58
27	99,319	37	0.00037	54.60
28	99,282	37	0.00037	53.62
29	99,245	38	0.00038	52.64
30	99,207	40	0.00040	51.66
31	99,167	42	0.00042	50.68
32	99,125	45	0.00045	49.70
33	99,080	48	0.00048	48.72
34	99,032	51	0.00051	47.75
35	98,981	55	0.00056	46.77
36	98,926	60	0.00061	45.80
37	98,866	66	0.00067	44.83
38	98,800	73	0.00074	43.86
39	98,727	80	0.00081	42.89
40	98,647	87	0.00088	41.92
41	98,560	97	0.00098	40.96
42	98,463	106	0.00108	40.00
43	98,357	119	0.00121	39.04
44	98,238	133	0.00135	38.09
45	98,105	148	0.00151	37.14
46	97,957	165	0.00168	36.19
47	97,792	183	0.00187	35.25
48	97,609	203	0.00208	34.32
49	97,406	226	0.00232	33.39
50	97,180	252	0.00259	32.47
51	96,928	280	0.00289	31.55
52	96,648	311	0.00322	30.64
53	96,337	343	0.00356	29.74
54	95,994	376	0.00392	28.84

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
55	95,618	411	0.00430	27.95
56	95,207	449	0.00472	27.07
57	94,758	488	0.00515	26.20
58	94,270	527	0.00559	25.33
59	93,743	569	0.00607	24.47
60	93,174	613	0.00658	23.62
61	92,561	663	0.00716	22.77
62	91,898	720	0.00783	21.93
63	91,178	785	0.00861	21.10
64	90,393	861	0.00952	20.28
65	89,532	948	0.01059	19.47
66	88,584	1,048	0.01183	18.67
67	87,536	1,156	0.01321	17.89
68	86,380	1,271	0.01471	17.12
69	85,109	1,387	0.01630	16.37
70	83,722	1,505	0.01798	15.63
71	82,217	1,626	0.01978	14.91
72	80,591	1,751	0.02173	14.20
73	78,840	1,883	0.02388	13.50
74	76,957	2,023	0.02629	12.82
75	74,934	2,178	0.02906	12.15
76	72,756	2,344	0.03222	11.50
77	70,412	2,515	0.03572	10.87
78	67,897	2,683	0.03952	10.25
79	65,214	2,862	0.04388	9.66
80	62,352	3,041	0.04877	9.08
81	59,311	3,216	0.05423	8.52
82	56,095	3,385	0.06035	7.97
83	52,710	3,542	0.06719	7.45
84	49,168	3,679	0.07483	6.96
85	45,489	3,792	0.08335	6.48
86	41,697	3,872	0.09286	6.02
87	37,825	3,913	0.10344	5.59
88	33,912	3,907	0.11520	5.17
89	30,005	3,848	0.12825	4.78
90	26,157	3,733	0.14272	4.41
91	22,424	3,559	0.15872	4.06
92	18,865	3,327	0.17637	3.74
93	15,538	3,042	0.19580	3.43
94	12,496	2,713.3	0.21713	3.14
95	9,782.7	2,352.3	0.24046	2.87
96	7,430.4	1,975.7	0.26589	2.63
97	5,454.7	1,601.0	0.29350	2.40
98	3,853.7	1,246.1	0.32334	2.18
99	2,607.6	926.8	0.35543	1.99
100	1,680.8	655.1	0.38974	1.81
101	1,025.7	437.13	0.42618	1.65
102	588.57	273.45	0.46460	1.50
103	315.12	159.07	0.50478	1.36
104	156.05	85.269	0.54642	1.24
105	70.781	41.699	0.58912	1.12
106	29.082	18.391	0.63240	1.02
107	10.691	7.2238	0.67569	0.92
108	3.4672	2.4907	0.71835	0.78
109	0.9765	0.9765	1.00000	0.50

Standard Mortality Table 2007 (For Medical Insurance) - Female

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	51	0.00051	87.82
1	99,949	36	0.00036	86.87
2	99,913	23	0.00023	85.90
3	99,890	14	0.00014	84.92
4	99,876	9	0.00009	83.93
5	99,867	7	0.00007	82.94
6	99,860	7	0.00007	81.94
7	99,853	6	0.00006	80.95
8	99,847	6	0.00006	79.95
9	99,841	6	0.00006	78.96
10	99,835	6	0.00006	77.96
11	99,829	5	0.00005	76.97
12	99,824	5	0.00005	75.97
13	99,819	6	0.00006	74.98
14	99,813	7	0.00007	73.98
15	99,806	8	0.00008	72.99
16	99,798	10	0.00010	71.99
17	99,788	11	0.00011	71.00
18	99,777	12	0.00012	70.01
19	99,765	13	0.00013	69.01
20	99,752	13	0.00013	68.02
21	99,739	14	0.00014	67.03
22	99,725	14	0.00014	66.04
23	99,711	15	0.00015	65.05
24	99,696	16	0.00016	64.06
25	99,680	17	0.00017	63.07
26	99,663	17	0.00017	62.08
27	99,646	18	0.00018	61.09
28	99,628	19	0.00019	60.10
29	99,609	20	0.00020	59.11
30	99,589	22	0.00022	58.13
31	99,567	23	0.00023	57.14
32	99,544	25	0.00025	56.15
33	99,519	27	0.00027	55.17
34	99,492	29	0.00029	54.18
35	99,463	31	0.00031	53.20
36	99,432	35	0.00035	52.21
37	99,397	39	0.00039	51.23
38	99,358	42	0.00042	50.25
39	99,316	46	0.00046	49.27
40	99,270	50	0.00050	48.29
41	99,220	55	0.00055	47.32
42	99,165	59	0.00060	46.34
43	99,106	66	0.00067	45.37
44	99,040	73	0.00074	44.40
45	98,967	81	0.00082	43.43
46	98,886	90	0.00091	42.47
47	98,796	99	0.00100	41.51
48	98,697	110	0.00111	40.55
49	98,587	120	0.00122	39.59
50	98,467	133	0.00135	38.64
51	98,334	146	0.00148	37.69
52	98,188	158	0.00161	36.75
53	98,030	171	0.00174	35.81
54	97,859	182	0.00186	34.87

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
55	97,677	193	0.00198	33.93
56	97,484	204	0.00209	33.00
57	97,280	213	0.00219	32.07
58	97,067	224	0.00231	31.14
59	96,843	238	0.00246	30.21
60	96,605	255	0.00264	29.28
61	96,350	276	0.00286	28.36
62	96,074	300	0.00312	27.44
63	95,774	328	0.00342	26.52
64	95,446	360	0.00377	25.61
65	95,086	395	0.00415	24.70
66	94,691	434	0.00458	23.81
67	94,257	476	0.00505	22.91
68	93,781	521	0.00556	22.03
69	93,260	569	0.00610	21.15
70	92,691	621	0.00670	20.27
71	92,070	688	0.00747	19.41
72	91,382	765	0.00837	18.55
73	90,617	852	0.00940	17.70
74	89,765	950	0.01058	16.87
75	88,815	1,061	0.01195	16.04
76	87,754	1,187	0.01353	15.23
77	86,567	1,329	0.01535	14.43
78	85,238	1,487	0.01745	13.65
79	83,751	1,664	0.01987	12.88
80	82,087	1,860	0.02266	12.13
81	80,227	2,075	0.02587	11.40
82	78,152	2,310	0.02956	10.69
83	75,842	2,564	0.03381	10.00
84	73,278	2,835	0.03869	9.33
85	70,443	3,120	0.04429	8.69
86	67,323	3,415	0.05073	8.07
87	63,908	3,714	0.05811	7.47
88	60,194	4,007	0.06656	6.90
89	56,187	4,283	0.07622	6.36
90	51,904	4,529	0.08726	5.84
91	47,375	4,730	0.09984	5.35
92	42,645	4,868	0.11415	4.89
93	37,777	4,926	0.13040	4.46
94	32,851	4,888	0.14880	4.05
95	27,963	4,741	0.16956	3.67
96	23,222	4,480	0.19291	3.32
97	18,742	4,106	0.21906	3.00
98	14,636	3,633	0.24821	2.70
99	11,003	3,086.6	0.28052	2.42
100	7,916.4	2,502.5	0.31611	2.17
101	5,413.9	1,922.2	0.35504	1.94
102	3,491.7	1,387.0	0.39724	1.74
103	2,104.7	931.4	0.44255	1.55
104	1,173.3	575.70	0.49067	1.39
105	597.60	323.36	0.54109	1.24
106	274.24	162.66	0.59314	1.11
107	111.58	72.076	0.64596	0.99
108	39.504	27.593	0.69848	0.89
109	11.911	8.9275	0.74952	0.80
110	2.9835	2.3803	0.79781	0.70
111	0.6032	0.6032	1.00000	0.50

Standard Mortality Table 1996 (For Life Insurance) - Male

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	110	0.00110	76.74
1	99,890	76	0.00076	75.82
2	99,814	50	0.00050	74.88
3	99,764	33	0.00033	73.91
4	99,731	24	0.00024	72.94
5	99,707	22	0.00022	71.96
6	99,685	22	0.00022	70.97
7	99,663	21	0.00021	69.99
8	99,642	19	0.00019	69.00
9	99,623	17	0.00017	68.02
10	99,606	15	0.00015	67.03
11	99,591	14	0.00014	66.04
12	99,577	15	0.00015	65.05
13	99,562	22	0.00022	64.06
14	99,540	34	0.00034	63.07
15	99,506	52	0.00052	62.09
16	99,454	73	0.00073	61.12
17	99,381	93	0.00094	60.17
18	99,288	108	0.00109	59.22
19	99,180	114	0.00115	58.29
20	99,066	113	0.00114	57.35
21	98,953	106	0.00107	56.42
22	98,847	98	0.00099	55.48
23	98,749	91	0.00092	54.53
24	98,658	87	0.00088	53.58
25	98,571	85	0.00086	52.63
26	98,486	84	0.00085	51.68
27	98,402	84	0.00085	50.72
28	98,318	83	0.00084	49.76
29	98,235	83	0.00084	48.80
30	98,152	82	0.00084	47.84
31	98,070	83	0.00085	46.88
32	97,987	86	0.00088	45.92
33	97,901	90	0.00092	44.96
34	97,811	96	0.00098	44.00
35	97,715	103	0.00105	43.05
36	97,612	110	0.00113	42.09
37	97,502	119	0.00122	41.14
38	97,383	130	0.00133	40.19
39	97,253	140	0.00144	39.24
40	97,113	151	0.00156	38.30
41	96,962	166	0.00171	37.36
42	96,796	182	0.00188	36.42
43	96,614	201	0.00208	35.49
44	96,413	221	0.00229	34.56
45	96,192	241	0.00251	33.64
46	95,951	262	0.00273	32.72
47	95,689	283	0.00296	31.81
48	95,406	306	0.00321	30.90
49	95,100	331	0.00348	30.00
50	94,769	359	0.00379	29.10
51	94,410	392	0.00415	28.21
52	94,018	430	0.00457	27.33
53	93,588	474	0.00507	26.45
54	93,114	525	0.00564	25.58

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
55	92,589	583	0.00630	24.73
56	92,006	647	0.00703	23.88
57	91,359	714	0.00781	23.04
58	90,645	783	0.00864	22.22
59	89,862	855	0.00951	21.41
60	89,007	910	0.01022	20.61
61	88,097	970	0.01101	19.82
62	87,127	1,049	0.01204	19.03
63	86,078	1,135	0.01319	18.26
64	84,943	1,216	0.01431	17.50
65	83,727	1,291	0.01542	16.74
66	82,436	1,396	0.01694	16.00
67	81,040	1,511	0.01864	15.27
68	79,529	1,634	0.02054	14.55
69	77,895	1,766	0.02267	13.84
70	76,129	1,908	0.02506	13.15
71	74,221	2,058	0.02773	12.48
72	72,163	2,217	0.03072	11.82
73	69,946	2,382	0.03406	11.18
74	67,564	2,553	0.03779	10.55
75	65,011	2,729	0.04197	9.95
76	62,282	2,904	0.04663	9.36
77	59,378	3,078	0.05184	8.80
78	56,300	3,245	0.05764	8.25
79	53,055	3,401	0.06411	7.72
80	49,654	3,541	0.07132	7.22
81	46,113	3,659	0.07935	6.73
82	42,454	3,747	0.08827	6.27
83	38,707	3,800	0.09817	5.83
84	34,907	3,810	0.10916	5.41
85	31,097	3,773	0.12133	5.01
86	27,324	3,683	0.13479	4.63
87	23,641	3,538	0.14965	4.28
88	20,103	3,337	0.16601	3.94
89	16,766	3,085	0.18400	3.63
90	13,681	2,787	0.20372	3.33
91	10,894	2,454.2	0.22528	3.06
92	8,439.8	2,099.7	0.24878	2.80
93	6,340.1	1,739.2	0.27431	2.56
94	4,600.9	1,389.1	0.30191	2.34
95	3,211.8	1,065.2	0.33164	2.14
96	2,146.6	780.3	0.36349	1.95
97	1,366.3	543.01	0.39743	1.78
98	823.29	356.78	0.43336	1.62
99	466.51	219.79	0.47113	1.48
100	246.72	125.96	0.51052	1.34
101	120.76	66.568	0.55124	1.23
102	54.192	32.131	0.59291	1.12
103	22.061	14.0105	0.63508	1.02
104	8.0505	5.4520	0.67722	0.91
105	2.5985	1.8676	0.71874	0.78
106	0.7309	0.7309	1.00000	0.50
107				
108				
109				

Standard Mortality Table 1996 (For Life Insurance) - Female

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
0	100,000	94	0.00094	82.94
1	99,906	69	0.00069	82.02
2	99,837	48	0.00048	81.08
3	99,789	31	0.00031	80.12
4	99,758	20	0.00020	79.14
5	99,738	14	0.00014	78.16
6	99,724	13	0.00013	77.17
7	99,711	13	0.00013	76.18
8	99,698	13	0.00013	75.19
9	99,685	12	0.00012	74.20
10	99,673	11	0.00011	73.21
11	99,662	10	0.00010	72.22
12	99,652	10	0.00010	71.22
13	99,642	13	0.00013	70.23
14	99,629	17	0.00017	69.24
15	99,612	21	0.00021	68.25
16	99,591	25	0.00025	67.26
17	99,566	29	0.00029	66.28
18	99,537	31	0.00031	65.30
19	99,506	32	0.00032	64.32
20	99,474	33	0.00033	63.34
21	99,441	33	0.00033	62.36
22	99,408	34	0.00034	61.38
23	99,374	36	0.00036	60.40
24	99,338	37	0.00037	59.43
25	99,301	38	0.00038	58.45
26	99,263	39	0.00039	57.47
27	99,224	40	0.00040	56.49
28	99,184	42	0.00042	55.51
29	99,142	44	0.00044	54.54
30	99,098	46	0.00046	53.56
31	99,052	49	0.00049	52.59
32	99,003	52	0.00053	51.61
33	98,951	56	0.00057	50.64
34	98,895	62	0.00063	49.67
35	98,833	68	0.00069	48.70
36	98,765	75	0.00076	47.73
37	98,690	82	0.00083	46.77
38	98,608	89	0.00090	45.81
39	98,519	96	0.00097	44.85
40	98,423	103	0.00105	43.89
41	98,320	112	0.00114	42.94
42	98,208	122	0.00124	41.98
43	98,086	131	0.00134	41.04
44	97,955	143	0.00146	40.09
45	97,812	155	0.00158	39.15
46	97,657	165	0.00169	38.21
47	97,492	178	0.00183	37.27
48	97,314	194	0.00199	36.34
49	97,120	209	0.00215	35.41
50	96,911	226	0.00233	34.49
51	96,685	244	0.00252	33.57
52	96,441	260	0.00270	32.65
53	96,181	276	0.00287	31.74
54	95,905	293	0.00306	30.83

Age x	Lives l_x	Deaths d_x	Mortality rate q_x	Average life expectancy e_x
55	95,612	314	0.00328	29.92
56	95,298	336	0.00353	29.02
57	94,962	359	0.00378	28.12
58	94,603	385	0.00407	27.22
59	94,218	413	0.00438	26.33
60	93,805	440	0.00469	25.45
61	93,365	470	0.00503	24.56
62	92,895	499	0.00537	23.68
63	92,396	543	0.00588	22.81
64	91,853	592	0.00645	21.94
65	91,261	648	0.00710	21.08
66	90,613	710	0.00784	20.23
67	89,903	781	0.00869	19.38
68	89,122	861	0.00966	18.55
69	88,261	950	0.01076	17.73
70	87,311	1,049	0.01202	16.91
71	86,262	1,160	0.01345	16.11
72	85,102	1,283	0.01508	15.33
73	83,819	1,420	0.01694	14.55
74	82,399	1,571	0.01906	13.79
75	80,828	1,735	0.02147	13.05
76	79,093	1,915	0.02421	12.33
77	77,178	2,109	0.02733	11.62
78	75,069	2,318	0.03088	10.93
79	72,751	2,540	0.03491	10.27
80	70,211	2,773	0.03949	9.62
81	67,438	3,014	0.04469	8.99
82	64,424	3,259	0.05059	8.39
83	61,165	3,503	0.05727	7.81
84	57,662	3,739	0.06484	7.26
85	53,923	3,958	0.07341	6.73
86	49,965	4,152	0.08309	6.22
87	45,813	4,307	0.09401	5.74
88	41,506	4,413	0.10631	5.28
89	37,093	4,457	0.12015	4.85
90	32,636	4,428	0.13567	4.44
91	28,208	4,317	0.15305	4.06
92	23,891	4,120	0.17246	3.71
93	19,771	3,837	0.19406	3.37
94	15,934	3,474	0.21802	3.06
95	12,460	3,046.3	0.24449	2.78
96	9,413.7	2,575.7	0.27361	2.52
97	6,838.0	2,088.7	0.30546	2.28
98	4,749.3	1,615.2	0.34010	2.06
99	3,134.1	1,179.6	0.37637	1.86
100	1,954.5	809.8	0.41434	1.69
101	1,144.7	520.37	0.45459	1.53
102	624.33	310.22	0.49688	1.38
103	314.11	169.89	0.54085	1.25
104	144.22	84.522	0.58606	1.13
105	59.698	37.726	0.63195	1.03
106	21.972	14.8933	0.67783	0.93
107	7.0787	5.1177	0.72297	0.84
108	1.9610	1.5031	0.76652	0.73
109	0.4579	0.4579	1.00000	0.50

Standard Mortality Table 1996 (After Annuityization)

<Male>

Age x	Mortality rate q_x	Average life expectancy e_x	Age x	Mortality rate q_x	Average life expectancy e_x
15	—	—	65	0.01007	18.33
16	0.00038	63.86	66	0.01099	17.51
17	0.00044	62.88	67	0.01217	16.70
18	0.00046	61.91	68	0.01368	15.90
19	0.00044	60.94	69	0.01552	15.11
20	0.00040	59.97	70	0.01763	14.35
21	0.00037	58.99	71	0.01992	13.59
22	0.00034	58.01	72	0.02240	12.86
23	0.00032	57.03	73	0.02517	12.14
24	0.00031	56.05	74	0.02842	11.44
25	0.00032	55.07	75	0.03233	10.76
26	0.00033	54.08	76	0.03702	10.11
27	0.00034	53.10	77	0.04257	9.48
28	0.00036	52.12	78	0.04895	8.88
29	0.00038	51.14	79	0.05601	8.31
30	0.00040	50.16	80	0.06360	7.77
31	0.00043	49.18	81	0.07165	7.26
32	0.00046	48.20	82	0.07999	6.79
33	0.00050	47.22	83	0.08883	6.33
34	0.00057	46.24	84	0.09887	5.90
35	0.00065	45.27	85	0.11076	5.49
36	0.00074	44.30	86	0.12462	5.11
37	0.00084	43.33	87	0.13994	4.77
38	0.00094	42.37	88	0.15579	4.47
39	0.00106	41.41	89	0.17130	4.20
40	0.00119	40.45	90	0.18612	3.96
41	0.00134	39.50	91	0.20035	3.75
42	0.00151	38.55	92	0.21386	3.57
43	0.00172	37.61	93	0.22655	3.41
44	0.00199	36.67	94	0.23836	3.26
45	0.00231	35.74	95	0.24924	3.12
46	0.00264	34.82	96	0.25915	2.99
47	0.00297	33.91	97	0.26811	2.86
48	0.00324	33.01	98	0.27612	2.72
49	0.00346	32.12	99	0.28901	2.57
50	0.00366	31.23	100	0.30839	2.41
51	0.00387	30.34	101	0.32837	2.26
52	0.00411	29.46	102	0.34900	2.12
53	0.00438	28.58	103	0.37030	2.00
54	0.00468	27.70	104	0.39215	1.88
55	0.00499	26.83	105	0.41435	1.76
56	0.00530	25.96	106	0.43731	1.66
57	0.00562	25.10	107	0.46098	1.55
58	0.00595	24.24	108	0.48531	1.46
59	0.00632	23.38	109	0.51023	1.36
60	0.00675	22.52	110	0.53567	1.25
61	0.00725	21.67	111	0.56155	1.12
62	0.00785	20.83	112	0.58775	0.91
63	0.00853	19.99	113	1.00000	0.50
64	0.00927	19.16	114		

<Female>

Age x	Mortality rate q_x	Average life expectancy e_x	Age x	Mortality rate q_x	Average life expectancy e_x
15	—	—	65	0.00415	22.26
16	0.00009	69.68	66	0.00448	21.35
17	0.00010	68.68	67	0.00490	20.44
18	0.00010	67.69	68	0.00548	19.54
19	0.00010	66.70	69	0.00626	18.64
20	0.00010	65.70	70	0.00724	17.76
21	0.00010	64.71	71	0.00839	16.88
22	0.00010	63.72	72	0.00968	16.02
23	0.00010	62.72	73	0.01111	15.18
24	0.00010	61.73	74	0.01276	14.34
25	0.00012	60.74	75	0.01475	13.52
26	0.00013	59.74	76	0.01725	12.71
27	0.00014	58.75	77	0.02041	11.93
28	0.00014	57.76	78	0.02432	11.17
29	0.00015	56.77	79	0.02903	10.43
30	0.00016	55.77	80	0.03458	9.73
31	0.00018	54.78	81	0.04100	9.06
32	0.00020	53.79	82	0.04835	8.43
33	0.00022	52.80	83	0.05673	7.83
34	0.00024	51.82	84	0.06624	7.27
35	0.00027	50.83	85	0.07669	6.75
36	0.00030	49.84	86	0.08766	6.27
37	0.00033	48.86	87	0.09928	5.82
38	0.00037	47.87	88	0.11193	5.41
39	0.00041	46.89	89	0.12575	5.03
40	0.00046	45.91	90	0.14047	4.68
41	0.00052	44.93	91	0.15554	4.36
42	0.00058	43.95	92	0.17053	4.07
43	0.00065	42.98	93	0.18555	3.81
44	0.00073	42.01	94	0.20112	3.56
45	0.00082	41.04	95	0.21748	3.33
46	0.00091	40.07	96	0.23445	3.12
47	0.00100	39.11	97	0.25204	2.92
48	0.00111	38.14	98	0.27023	2.74
49	0.00124	37.19	99	0.28901	2.57
50	0.00138	36.23	100	0.30839	2.41
51	0.00151	35.28	101	0.32837	2.26
52	0.00163	34.33	102	0.34900	2.13
53	0.00176	33.39	103	0.37030	2.00
54	0.00191	32.45	104	0.39215	1.88
55	0.00208	31.51	105	0.41435	1.76
56	0.00222	30.57	106	0.43731	1.66
57	0.00234	29.64	107	0.46098	1.56
58	0.00247	28.71	108	0.48531	1.46
59	0.00263	27.78	109	0.51023	1.37
60	0.00284	26.85	110	0.53567	1.28
61	0.00308	25.92	111	0.56155	1.19
62	0.00332	25.00	112	0.58775	1.07
63	0.00358	24.08	113	0.61417	0.89
64	0.00385	23.17	114	1.00000	0.50