Online supplement

Non-alcoholic fatty liver disease as a mediator of sugar effects; implications for the health and economic benefits of interventions in the US

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Content

Table 1. Selected model parameter values and ranges.

Parameter					
Initialization	**Distribution**	**Mean**	**Min**	**Max**	**Source**
Age distribution	Fixed	OS2*1	-	-	[1]
Sex distribution	Fixed	OS3*2	-	-	[1]
Ethnicity distribution	Fixed	OS4*3	-	-	[1]
Steatosis prevalence	Beta	27.955%*4	18.637%	41.933%	[2-4]
NASH prevalence	Beta	3.141%*4	2.094%	4.712%	[2-4]
Cirrhosis prevalence	Beta	0.314%*4	0.209%	0.471%	[5-8]
HCC prevalence	Beta	0.025%*4	0.017%	0.038%	[9,10]
CHD prevalence	Fixed	6.544%*5	-	-	[11]
T2D prevalence	Fixed	9.447%*6	-	-	[11]
Overweight prevalence	Fixed	33.473%*7	-	-	[11]
Obesity prevalence	Fixed	37.391%*8	-	-	[11]
High sugar consumption	Beta	57.278%*9	38.186%	85.917%	[12,13]
Baseline transition probabilities	**Distribution**	**Mean chance**	**Min**	**Max**	**Source**
Non-NAFLD -> steatosis	Beta	0.0100	0.006700	0.01500	[14-22]
Non-NAFLD -> NASH	Beta	0.0003	0.000201	0.00045	[14-22]
Steatosis -> non-NAFLD	Beta	0.0200	0.013400	0.03000	[14-22]
Steatosis -> NASH	Beta	0.0060	0.004020	0.00900	[14-22]
Steatosis -> cirrhosis	Beta	0.0002	0.000134	0.00030	[14-22]
NASH -> non-NAFLD	Beta	0.0010	0.000670	0.00150	[14-22]
NASH -> steatosis	Beta	0.0200	0.013400	0.03000	[14-22]
NASH -> cirrhosis	Beta	0.0020	0.001340	0.00300	[14-22]
NASH -> HCC	Beta	0.0001*10	0.000067	0.00015	[14-25]
NASH -> liver death	Beta	0.0038	0.002546	0.00570	[26-29]
Cirrhosis -> HCC	Beta	0.0200*10	0.013400	0.03000	[14-25]
Cirrhosis -> liver death	Beta	0.0340	0.022780	0.05100	[26-29]
HCC -> liver death	Beta	0.5000	0.335000	0.75000	[26-29]
Non-CHD -> CHD	Beta	0.0045*11	0.003015	0.00675	[30,31]
CHD -> CHD death	Beta	0.0100*12	0.006700	0.01500	[30-32]
Non-T2D -> T2D	Beta	0.0045*13	0.003015	0.00675	[33,34]
T2D -> T2D death	Beta	0.0100*14	0.006700	0.01500	[32-34]
Healthy weight -> overweight	Beta	0.0500	0.033500	0.07500	[35-38]
Healthy weight -> obese	Beta	0.0060	0.004020	0.00900	[35-38]
Overweight -> healthy weight	Beta	0.0500	0.033500	0.07500	[35-38]
Overweight -> obese	Beta	0.0180	0.012060	0.02700	[35-38]
Obese-> healthy weight	Beta	0.0060	0.004020	0.00900	[35-38]
Obese -> overweight	Beta	0.0350	0.023450	0.05250	[35-38]
Each alive state -> non-disease related death	Beta	0.0100*15	0.006700	0.01500	[32]
Risk factors	**Distribution**	**Mean value**	**Min**	**Max**	**Source**
NHB ethnicity for progression within NAFLD	Beta	0.93	0.70	1.00	[39]
Hispanic ethnicity for progression within NAFLD	Beta	1.67	1.22	2.22	[39]
Overweight for progression within NAFLD	Beta	2.19	1.60	3.38	[15,40-45]
Obesity for progression within NAFLD	Beta	3.14	2.07	5.28	[15,40-45]
High sugar consumption for progression within NAFLD	Beta	2.00	1.50	3.00	[46,47]
NAFLD for TP non-CHD -> CHD	Beta	2.31	1.66	3.62	[48-52]
Overweight for TP non-CHD -> CHD	Beta	1.22	1.12	1.32	[53-60]
Obesity for TP non-CHD -> CHD	Beta	1.60	1.43	1.79	[53-60]
T2D for TP non-CHD -> CHD	Beta	2.24	1.64	3.06	[61]
NAFLD for TP non-T2D -> T2D	Beta	2.73	1.87	4.46	[62-68]
Overweight for TP non-T2D -> T2D	Beta	2.18	1.59	3.36	[69-75]
Obesity for TP non-T2D -> T2D	Beta	3.36	2.18	5.72	[69-75]
NAFLD for progression within the BMI chain	Beta	2.19	1.60	3.38	[15,40-45]
High sugar consumption for progression within the BMI chain	Beta	2.60	1.20	6.00	[76,77]
Regression rates	**Distribution**	**Mean value**	**Min**	**Max**	**Source**
CHD incidence regression rate/year	Beta	0.985	0.970	1.00	[78-81]
CHD mortality regression rate/year	Beta	0.979	0.958	1.00	[78-81]
Non-disease mortality regression rate/year (20-30)	Beta	1.000	0.990	1.00	[32]
Non-disease mortality regression rate/year (30-55)	Beta	0.980	0.960	1.00	[32]
Non-disease mortality regression rate/year (55+)	Beta	0.970	0.940	1.00	[32]

Table 1. Continued					
Costs (annual direct medical, in 2015 USD)	**Distribution**	**Mean value**	**SD**		**Source**
Steatosis	Gamma	134	50		[82-85]
NASH	Gamma	267	100		[82-85]
Cirrhosis	Gamma	2861	1073		[86]
HCC	Gamma	42644	15992		[87,88]
CHD	Gamma	13233	4962		[89]
T2D	Gamma	8170	3064		[90]
Overweight	Gamma	343	129		[91]
Obesity	Gamma	916	344		[91]
Disability weights	**Distribution**	**Mean value**	**Min**	**Max**	**Source**
NASH	Beta	0.033	0.017	0.066	[3,84]
Cirrhosis	Beta	0.194	0.127	0.273	[92]
HCC	Beta	0.294	0.199	0.411	[92]
CHD	Beta	0.066	0.043	0.095	[92]
T2D	Beta	0.150	0.080	0.220	[92]
Obesity	Beta	0.012	0.001	0.022	[93]

SD: standard deviation, CHD: coronary heart disease, T2D: type 2 diabetes, NAFLD: non-alcoholic fatty liver disease (steatosis, NASH & cirrhosis), NASH: non-alcoholic steatohepatitis, HCC: hepatocellular carcinoma, Hisp: Hispanic, NHW: non-Hispanic white, NHB: non-Hispanic black, TP: transition probability, OR: odds ratio

*1 See online supplement table 2. *2 See online supplement table 3. *3 See online supplement table 4. *4 See online supplement table 5. *5 See online supplement table 6. *6 See online supplement table 7. *7 See online supplement table 8. *8 See online supplement table 9. *9 See online supplement table 10. *10 See online supplement table 11. *11 See online supplement table 12. *12 See online supplement table 13. *13 See online supplement table 14. *14 See online supplement table 15. *15 See online supplement table 16.

Table 2. Age distribution.[1]

Age	Percentage
20	1.9194
21	1.9194
22	1.9194
23	1.9194
24	1.9194
25	1.8701
26	1.8701
27	1.8701
28	1.8701
29	1.8701
30	1.7749
31	1.7749
32	1.7749
33	1.7749
34	1.7749
35	1.7757
36	1.7757
37	1.7757
38	1.7757
39	1.7757
40	1.8487
41	1.8487
42	1.8487
43	1.8487
44	1.8487
45	2.0018
46	2.0018
47	2.0018
48	2.0018
49	2.0018
50	1.9767
51	1.9767
52	1.9767
53	1.9767
54	1.9767

Age	Percentage
55	1.7505
56	1.7505
57	1.7505
58	1.7505
59	1.7505
60	1.5024
61	1.5024
62	1.5024
63	1.5024
64	1.5024
65	1.1073
66	1.1073
67	1.1073
68	1.1073
69	1.1073
70	0.8256
71	0.8256
72	0.8256
73	0.8256
74	0.8256
75	0.6473
76	0.6473
77	0.6473
78	0.6473
79	0.6473
80	0.5093
81	0.5093
82	0.5093
83	0.5093
84	0.5093
85+	2.4517

Table 3. Sex distribution.[1]

Sex	Percentage
Male	48.4388
Female	51.5612

Table 4. Ethnic distribution.[1]

Age	Percentage
Hispanic	14.0377
Non-hispanic White	74.3771
Non-hispanic Black	11.5852

Table 5. Non-alcoholic fatty liver disease prevalence percentage at start of simulation.[2-10]

Ethnicity	Steatosis	NASH	Cirrhosis	Hepatocellular carcinoma
Hispanic	40.05	4.5	0.45	0.0363
NH-White	26.70	3.0	0.30	0.0242
NH-Black	21.36	2.4	0.24	0.0194

Table 6. Hepatocellular carcinoma incidence rate from NASH.[14-25]

Age	Incidence rate
40 to 44 years	3.64216E-05
45 to 49 years	4.64842E-05
50 to 54 years	5.93269E-05
55 to 59 years	7.57179E-05
60 to 64 years	9.66373E-05
65 to 69 years	0.000123336
70 to 74 years	0.000157412
75 to 79 years	0.000200902
80 years and over	0.000256408

Table 7. Hepatocellular carcinoma incidence rate from cirrhosis.[14-25]

Age	Incidence rate
40 to 44 years	0.008844339
45 to 49 years	0.011287867
50 to 54 years	0.014406497
55 to 59 years	0.018386746
60 to 64 years	0.023466665
65 to 69 years	0.029950073
70 to 74 years	0.038224725
75 to 79 years	0.048785512
80 years and over	0.062264050

Table 8. Overweight and obesity prevalence percentages at the start of the simulation.[11]

Sex	Ethnicity	Age	Overweight percentage	Obesity percentage
Male	Hispanic	20-44	39.5	36.8
Male	Hispanic	45-64	43.8	41.0
Male	Hispanic	65+	42.8	44.7
Male	White	20-44	35.7	31.6
Male	White	45-64	40.8	39.0
Male	White	65+	42.5	36.9
Male	Black	20-44	28.7	36.9
Male	Black	45-64	34.3	40.6
Male	Black	65+	37.0	36.7
Female	Hispanic	20-44	33.2	36.8
Female	Hispanic	45-64	32.9	52.9
Female	Hispanic	65+	33.0	49.3
Female	White	20-44	25.3	28.0
Female	White	45-64	32.6	37.4
Female	White	65+	29.5	44.3
Female	Black	20-44	22.3	56.1
Female	Black	45-64	27.1	61.8
Female	Black	65+	25.8	53.7

Table 9. Type 2 diabetes prevalence percentage at the start of the simulation.[11]

Sex	Ethnicity	Age	Percentage with T2D
Male	Hispanic	20-24	0.90
Male	Hispanic	25-44	3.50
Male	Hispanic	45-54	14.20
Male	Hispanic	55-64	25.80
Male	Hispanic	65-74	32.80
Male	Hispanic	75-84	31.30
Male	Hispanic	85+	23.80
Male	NH-White	20-24	0.90
Male	NH-White	25-44	2.40
Male	NH-White	45-54	8.20
Male	NH-White	55-64	14.70
Male	NH-White	65-74	20.10
Male	NH-White	75-84	20.50
Male	NH-White	85+	17.90
Male	NH-Black	20-24	1.00
Male	NH-Black	25-44	5.00
Male	NH-Black	45-54	15.00
Male	NH-Black	55-64	24.00
Male	NH-Black	65-74	26.50
Male	NH-Black	75-84	39.00
Male	NH-Black	85+	18.70
Female	Hispanic	20-24	0.90
Female	Hispanic	25-44	3.60
Female	Hispanic	45-54	10.30
Female	Hispanic	55-64	24.00
Female	Hispanic	65-74	34.80
Female	Hispanic	75-84	32.40
Female	Hispanic	85+	22.80
Female	NH-White	20-24	1.20
Female	NH-White	25-44	2.80
Female	NH-White	45-54	7.30
Female	NH-White	55-64	12.10
Female	NH-White	65-74	17.00
Female	NH-White	75-84	17.10
Female	NH-White	85+	12.10
Female	NH-Black	20-24	1.00
Female	NH-Black	25-44	5.20
Female	NH-Black	45-54	10.90
Female	NH-Black	55-64	24.10
Female	NH-Black	65-74	32.60
Female	NH-Black	75-84	31.60
Female	NH-Black	85+	20.20

Table 10. Type 2 diabetes incidence rate.[33,34]

Age	Incidence rate
20-24	0.000447
25-29	0.000762
30-34	0.001090
35-39	0.001625
40-44	0.002880
45-49	0.003575
50-54	0.004957
55-59	0.005071
60-64	0.004662
65-69	0.004450
70-74	0.003925
75-79	0.003609
80+	0.003240

Table 11. Coronary heart disease prevalence percentage at the start of the simulation.[11]

Sex	Ethnicity	Age	Percentage with CHD
Male	Hispanic	20-35	0.00
Male	Hispanic	35-44	1.30
Male	Hispanic	45-54	3.90
Male	Hispanic	55-64	10.60
Male	Hispanic	65-74	19.20
Male	Hispanic	75-84	23.50
Male	Hispanic	85+	23.80
Male	NH-White	20-35	0.00
Male	NH-White	35-44	1.20
Male	NH-White	45-54	6.00
Male	NH-White	55-64	13.80
Male	NH-White	65-74	23.30
Male	NH-White	75-84	31.80
Male	NH-White	85+	38.60
Male	NH-Black	20-35	0.00
Male	NH-Black	35-44	1.70
Male	NH-Black	45-54	7.50
Male	NH-Black	55-64	14.20
Male	NH-Black	65-74	16.90
Male	NH-Black	75-84	22.10
Male	NH-Black	85+	18.80
Female	Hispanic	20-35	0.00
Female	Hispanic	35-44	1.20
Female	Hispanic	45-54	3.00
Female	Hispanic	55-64	6.70
Female	Hispanic	65-74	16.20
Female	Hispanic	75-84	20.30
Female	Hispanic	85+	23.90
Female	NH-White	20-35	0.00
Female	NH-White	35-44	0.90
Female	NH-White	45-54	3.30
Female	NH-White	55-64	6.70
Female	NH-White	65-74	11.20
Female	NH-White	75-84	18.40
Female	NH-White	85+	24.30
Female	NH-Black	20-35	0.00
Female	NH-Black	35-44	1.20
Female	NH-Black	45-54	5.30
Female	NH-Black	55-64	11.20
Female	NH-Black	65-74	17.40
Female	NH-Black	75-84	19.80
Female	NH-Black	85+	21.80

Table 12. Coronary heart disease incidence rate (in %).[30,31]

Year	<35	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
2010	0.0	0.0516	0.0516	0.2007	0.2007	0.3519	0.3519	0.5869	0.5869	1.4447	1.4447	3.0621
2011	0.0	0.0508	0.0508	0.1976	0.1976	0.3466	0.3466	0.5781	0.5781	1.4230	1.4230	3.0162
2012	0.0	0.0501	0.0501	0.1947	0.1947	0.3414	0.3414	0.5694	0.5694	1.4017	1.4017	2.9709
2013	0.0	0.0493	0.0493	0.1918	0.1918	0.3363	0.3363	0.5609	0.5609	1.3806	1.3806	2.9263
2014	0.0	0.0486	0.0486	0.1889	0.1889	0.3312	0.3312	0.5525	0.5525	1.3599	1.3599	2.8825
2015	0.0	0.0478	0.0478	0.1860	0.1860	0.3262	0.3262	0.5442	0.5442	1.3395	1.3395	2.8392
2016	0.0	0.0471	0.0471	0.1833	0.1833	0.3214	0.3214	0.5360	0.5360	1.3194	1.3194	2.7966
2017	0.0	0.0464	0.0464	0.1805	0.1805	0.3165	0.3165	0.5280	0.5280	1.2997	1.2997	2.7547
2018	0.0	0.0457	0.0457	0.1778	0.1778	0.3118	0.3118	0.5201	0.5201	1.2802	1.2802	2.7134
2019	0.0	0.0450	0.0450	0.1751	0.1751	0.3071	0.3071	0.5123	0.5123	1.2610	1.2610	2.6727
2020	0.0	0.0444	0.0444	0.1725	0.1725	0.3025	0.3025	0.5046	0.5046	1.2420	1.2420	2.6326
2021	0.0	0.0437	0.0437	0.1699	0.1699	0.2980	0.2980	0.4970	0.4970	1.2234	1.2234	2.5931
2022	0.0	0.0430	0.0430	0.1674	0.1674	0.2935	0.2935	0.4896	0.4896	1.2051	1.2051	2.5542
2023	0.0	0.0424	0.0424	0.1649	0.1649	0.2891	0.2891	0.4822	0.4822	1.1870	1.1870	2.5159
2024	0.0	0.0418	0.0418	0.1624	0.1624	0.2848	0.2848	0.4750	0.4750	1.1692	1.1692	2.4781
2025	0.0	0.0411	0.0411	0.1600	0.1600	0.2805	0.2805	0.4679	0.4679	1.1516	1.1516	2.4410
2026	0.0	0.0405	0.0405	0.1576	0.1576	0.2763	0.2763	0.4608	0.4608	1.1344	1.1344	2.4043
2027	0.0	0.0399	0.0399	0.1552	0.1552	0.2721	0.2721	0.4539	0.4539	1.1174	1.1174	2.3683
2028	0.0	0.0393	0.0393	0.1529	0.1529	0.2681	0.2681	0.4471	0.4471	1.1006	1.1006	2.3328
2029	0.0	0.0387	0.0387	0.1506	0.1506	0.2640	0.2640	0.4404	0.4404	1.0841	1.0841	2.2978
2030	0.0	0.0381	0.0381	0.1483	0.1483	0.2601	0.2601	0.4338	0.4338	1.0678	1.0678	2.2633
2031	0.0	0.0376	0.0376	0.1461	0.1461	0.2562	0.2562	0.4273	0.4273	1.0518	1.0518	2.2293
2032	0.0	0.0370	0.0370	0.1439	0.1439	0.2523	0.2523	0.4209	0.4209	1.0360	1.0360	2.1959
2033	0.0	0.0364	0.0364	0.1417	0.1417	0.2485	0.2485	0.4146	0.4146	1.0205	1.0205	2.1630
2034	0.0	0.0359	0.0359	0.1396	0.1396	0.2448	0.2448	0.4084	0.4084	1.0052	1.0052	2.1305
2035	0.0	0.0354	0.0354	0.1375	0.1375	0.2411	0.2411	0.4022	0.4022	0.9901	0.9901	2.0986

Table 13. Added sugar consumption distributions.[12,13]

Sex	Ethnicity	Consumption group	% in low vs high risk group
Male	Hispanic	Low sugar consumption	36.40%
Male	Hispanic	High sugar consumption	63.60%
Male	Non-hispanic White	Low sugar consumption	36.40%
Male	Non-hispanic White	High sugar consumption	63.60%
Male	Non-hispanic Black	Low sugar consumption	34.10%
Male	Non-hispanic Black	High sugar consumption	65.90%
Female	Hispanic	Low sugar consumption	52.80%
Female	Hispanic	High sugar consumption	47.20%
Female	Non-hispanic White	Low sugar consumption	49.30%
Female	Non-hispanic White	High sugar consumption	50.70%
Female	Non-hispanic Black	Low sugar consumption	41.70%
Female	Non-hispanic Black	High sugar consumption	58.30%

Table 14. Type 2 diabetes mortality rate.[32-34]

Age	Mortality rate
20-24	0.006177
25-29	0.009399
30-34	0.009399
35-39	0.009399
40-44	0.009399
45-49	0.013706
50-54	0.013706
55-59	0.020137
60-64	0.020137
65-69	0.031904
70-74	0.031904
75-79	0.068313
80+	0.068313

Table 15. Coronary heart disease mortality rate (in %).[30-32]

Year	<35	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
2010	0.0000	0.5067	0.8506	0.9493	1.3778	1.4767	1.4179	1.1071	2.1109	2.2865	3.9970	9.4859
2011	0.0000	0.4960	0.8327	0.9293	1.3489	1.4457	1.3881	1.0839	2.0665	2.2385	3.9130	9.2867
2012	0.0000	0.4856	0.8152	0.9098	1.3205	1.4153	1.3590	1.0611	2.0231	2.1914	3.8309	9.0917
2013	0.0000	0.4754	0.7981	0.8907	1.2928	1.3856	1.3304	1.0388	1.9807	2.1454	3.7504	8.9007
2014	0.0000	0.4654	0.7813	0.8720	1.2657	1.3565	1.3025	1.0170	1.9391	2.1004	3.6717	8.7138
2015	0.0000	0.4557	0.7649	0.8537	1.2391	1.3280	1.2751	0.9956	1.8983	2.0563	3.5946	8.5308
2016	0.0000	0.4461	0.7489	0.8358	1.2131	1.3002	1.2484	0.9747	1.8585	2.0131	3.5191	8.3517
2017	0.0000	0.4367	0.7331	0.8182	1.1876	1.2728	1.2221	0.9543	1.8195	1.9708	3.4452	8.1763
2018	0.0000	0.4275	0.7177	0.8010	1.1626	1.2461	1.1965	0.9342	1.7812	1.9294	3.3728	8.0046
2019	0.0000	0.4186	0.7027	0.7842	1.1382	1.2199	1.1714	0.9146	1.7438	1.8889	3.3020	7.8365
2020	0.0000	0.4098	0.6879	0.7677	1.1143	1.1943	1.1468	0.8954	1.7072	1.8492	3.2326	7.6719
2021	0.0000	0.4012	0.6735	0.7516	1.0909	1.1692	1.1227	0.8766	1.6714	1.8104	3.1648	7.5108
2022	0.0000	0.3927	0.6593	0.7358	1.0680	1.1447	1.0991	0.8582	1.6363	1.7724	3.0983	7.3531
2023	0.0000	0.3845	0.6455	0.7204	1.0456	1.1207	1.0760	0.8402	1.6019	1.7352	3.0332	7.1987
2024	0.0000	0.3764	0.6319	0.7053	1.0236	1.0971	1.0534	0.8225	1.5683	1.6987	2.9695	7.0475
2025	0.0000	0.3685	0.6187	0.6905	1.0021	1.0741	1.0313	0.8052	1.5353	1.6631	2.9072	6.8995
2026	0.0000	0.3608	0.6057	0.6760	0.9811	1.0515	1.0096	0.7883	1.5031	1.6281	2.8461	6.7546
2027	0.0000	0.3532	0.5929	0.6618	0.9605	1.0294	0.9884	0.7718	1.4715	1.5939	2.7864	6.6128
2028	0.0000	0.3458	0.5805	0.6479	0.9403	1.0078	0.9677	0.7556	1.4406	1.5605	2.7278	6.4739
2029	0.0000	0.3385	0.5683	0.6343	0.9206	0.9867	0.9474	0.7397	1.4104	1.5277	2.6706	6.3380
2030	0.0000	0.3314	0.5564	0.6209	0.9012	0.9659	0.9275	0.7242	1.3808	1.4956	2.6145	6.2049
2031	0.0000	0.3245	0.5447	0.6079	0.8823	0.9457	0.9080	0.7090	1.3518	1.4642	2.5596	6.0746
2032	0.0000	0.3176	0.5332	0.5951	0.8638	0.9258	0.8889	0.6941	1.3234	1.4335	2.5058	5.9470
2033	0.0000	0.3110	0.5220	0.5826	0.8456	0.9064	0.8703	0.6795	1.2956	1.4034	2.4532	5.8221
2034	0.0000	0.3044	0.5111	0.5704	0.8279	0.8873	0.8520	0.6652	1.2684	1.3739	2.4017	5.6998
2035	0.0000	0.2981	0.5004	0.5584	0.8105	0.8687	0.8341	0.6513	1.2417	1.3450	2.3513	5.5801

Table 16. Non-disease related mortality rate (in %).[32]

Year	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
2010	0.086	0.093	0.105	0.128	0.178	0.275	0.411	0.583	0.822	1.242	1.909	3.038	4.952	11.162
2011	0.086	0.093	0.105	0.125	0.174	0.269	0.403	0.571	0.797	1.205	1.851	2.947	4.804	10.828
2012	0.086	0.093	0.105	0.123	0.171	0.264	0.395	0.560	0.773	1.169	1.796	2.859	4.660	10.503
2013	0.086	0.093	0.105	0.120	0.167	0.259	0.387	0.548	0.750	1.133	1.742	2.773	4.520	10.188
2014	0.086	0.093	0.105	0.118	0.164	0.253	0.379	0.537	0.728	1.099	1.690	2.690	4.384	9.882
2015	0.086	0.093	0.105	0.115	0.161	0.248	0.372	0.527	0.706	1.066	1.639	2.609	4.253	9.586
2016	0.086	0.093	0.105	0.113	0.158	0.243	0.364	0.516	0.685	1.034	1.590	2.531	4.125	9.298
2017	0.086	0.093	0.105	0.111	0.154	0.239	0.357	0.506	0.664	1.003	1.542	2.455	4.002	9.019
2018	0.086	0.093	0.105	0.109	0.151	0.234	0.350	0.496	0.644	0.973	1.496	2.381	3.881	8.749
2019	0.086	0.093	0.105	0.106	0.148	0.229	0.343	0.486	0.625	0.944	1.451	2.310	3.765	8.486
2020	0.086	0.093	0.105	0.104	0.145	0.225	0.336	0.476	0.606	0.916	1.408	2.241	3.652	8.231
2021	0.086	0.093	0.105	0.102	0.142	0.220	0.329	0.467	0.588	0.888	1.365	2.173	3.543	7.985
2022	0.086	0.093	0.105	0.100	0.140	0.216	0.323	0.457	0.570	0.862	1.324	2.108	3.436	7.745
2023	0.086	0.093	0.105	0.098	0.137	0.211	0.316	0.448	0.553	0.836	1.285	2.045	3.333	7.513
2024	0.086	0.093	0.105	0.096	0.134	0.207	0.310	0.439	0.537	0.811	1.246	1.984	3.233	7.287
2025	0.086	0.093	0.105	0.094	0.131	0.203	0.304	0.430	0.521	0.786	1.209	1.924	3.136	7.069
2026	0.086	0.093	0.105	0.092	0.129	0.199	0.298	0.422	0.505	0.763	1.172	1.866	3.042	6.857
2027	0.086	0.093	0.105	0.090	0.126	0.195	0.292	0.413	0.490	0.740	1.137	1.810	2.951	6.651
2028	0.086	0.093	0.105	0.089	0.124	0.191	0.286	0.405	0.475	0.718	1.103	1.756	2.862	6.451
2029	0.086	0.093	0.105	0.087	0.121	0.187	0.280	0.397	0.461	0.696	1.070	1.703	2.776	6.258
2030	0.086	0.093	0.105	0.085	0.119	0.183	0.275	0.389	0.447	0.675	1.038	1.652	2.693	6.070
2031	0.086	0.093	0.105	0.083	0.116	0.180	0.269	0.381	0.434	0.655	1.007	1.603	2.612	5.888
2032	0.086	0.093	0.105	0.082	0.114	0.176	0.264	0.374	0.421	0.635	0.977	1.555	2.534	5.711
2033	0.086	0.093	0.105	0.080	0.112	0.173	0.258	0.366	0.408	0.616	0.947	1.508	2.458	5.540
2034	0.086	0.093	0.105	0.079	0.110	0.169	0.253	0.359	0.396	0.598	0.919	1.463	2.384	5.374
2035	0.086	0.093	0.105	0.077	0.107	0.166	0.248	0.352	0.384	0.580	0.891	1.419	2.313	5.213

Table 17. IHME health-adjusted life expectancy and discounted life expectancy for females. [94,95]

Age of death	WHO HALE	Discounted by 3%
20	51.138	25.981
21	51.138	25.981
22	51.138	25.981
23	51.138	25.981
24	51.138	25.981
25	46.766	24.966
26	46.766	24.966
27	46.766	24.966
28	46.766	24.966
29	46.766	24.966
30	42.466	23.832
31	42.466	23.832
32	42.466	23.832
33	42.466	23.832
34	42.466	23.832
35	38.214	22.560
36	38.214	22.560
37	38.214	22.560
38	38.214	22.560
39	38.214	22.560
40	34.033	21.144
41	34.033	21.144
42	34.033	21.144
43	34.033	21.144
44	34.033	21.144
45	29.960	19.584
46	29.960	19.584
47	29.960	19.584
48	29.960	19.584
49	29.960	19.584
50	26.017	17.884
51	26.017	17.884
52	26.017	17.884
53	26.017	17.884
54	26.017	17.884
55	22.214	16.045
56	22.214	16.045
57	22.214	16.045
58	22.214	16.045
59	22.214	16.045
60	18.574	14.081
61	18.574	14.081
62	18.574	14.081
63	18.574	14.081
64	18.574	14.081
65	15.167	12.042
66	15.167	12.042
67	15.167	12.042
68	15.167	12.042
69	15.167	12.042
70	12.020	9.968
71	12.020	9.968
72	12.020	9.968
73	12.020	9.968
74	12.020	9.968
75	9.169	7.912
76	9.169	7.912
77	9.169	7.912
78	9.169	7.912
79	9.169	7.912
80	6.646	5.942
81	6.646	5.942
82	6.646	5.942
83	6.646	5.942
84	6.646	5.942
85	4.512	4.159
86	4.512	4.159
87	4.512	4.159
88	4.512	4.159
89	4.512	4.159
90	2.915	2.751
91	2.915	2.751
92	2.915	2.751
93	2.915	2.751
94	2.915	2.751
95	1.868	1.789
96	1.868	1.789
97	1.868	1.789
98	1.868	1.789
99	1.868	1.789
100	1.231	1.189
101	1.231	1.189
102	1.231	1.189
103	1.231	1.189
104	1.231	1.189
105	1.000	0.971
106	1.000	0.971
107	1.000	0.971
108	1.000	0.971
109	1.000	0.971
110	1.000	0.971

Table 18. IHME health-adjusted life expectancy and discounted life expectancy for males.[94,95]

Age of death	WHO HALE	Discounted by 3%
20	48.035	25.275
21	48.035	25.275
22	48.035	25.275
23	48.035	25.275
24	48.035	25.275
25	43.802	24.200
26	43.802	24.200
27	43.802	24.200
28	43.802	24.200
29	43.802	24.200
30	39.589	22.989
31	39.589	22.989
32	39.589	22.989
33	39.589	22.989
34	39.589	22.989
35	35.374	21.616
36	35.374	21.616
37	35.374	21.616
38	35.374	21.616
39	35.374	21.616
40	31.217	20.085
41	31.217	20.085
42	31.217	20.085
43	31.217	20.085
44	31.217	20.085
45	27.195	18.412
46	27.195	18.412
47	27.195	18.412
48	27.195	18.412
49	27.195	18.412
50	23.347	16.614
51	23.347	16.614
52	23.347	16.614
53	23.347	16.614
54	23.347	16.614
55	19.705	14.714
56	19.705	14.714
57	19.705	14.714
58	19.705	14.714
59	19.705	14.714
60	16.256	12.716
61	16.256	12.716
62	16.256	12.716
63	16.256	12.716
64	16.256	12.716
65	13.080	10.688
66	13.080	10.688
67	13.080	10.688
68	13.080	10.688
69	13.080	10.688
70	10.208	8.680
71	10.208	8.680
72	10.208	8.680
73	10.208	8.680
74	10.208	8.680
75	7.680	6.767
76	7.680	6.767
77	7.680	6.767
78	7.680	6.767
79	7.680	6.767
80	5.524	5.019
81	5.524	5.019
82	5.524	5.019
83	5.524	5.019
84	5.524	5.019
85	3.723	3.471
86	3.723	3.471
87	3.723	3.471
88	3.723	3.471
89	3.723	3.471
90	2.388	2.269
91	2.388	2.269
92	2.388	2.269
93	2.388	2.269
94	2.388	2.269
95	1.521	1.462
96	1.521	1.462
97	1.521	1.462
98	1.521	1.462
99	1.521	1.462
100	1.000	0.971
101	1.000	0.971
102	1.000	0.971
103	1.000	0.971
104	1.000	0.971
105	1.000	0.971
106	1.000	0.971
107	1.000	0.971
108	1.000	0.971
109	1.000	0.971
110	1.000	0.971

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