Supplementary material for Brown JS, Cunningham JJ, Gatenby RA, 2015. The multiple facets of Peto's Paradox: a life history model for the evolution of cancer suppression. *Phil. Trans. R. Soc. B.* doi: 10.1098/rstb.2014.0221

A. Definitions

x	Age.
l_x	Probability of a newborn surviving until age *x*, in the absence of cancer.
m_x	Expected number of newborns produced by an individual of age *x*.
$\hat{l}_x$	Adjusted survival probability to age *x* including survival from cancer.
$\hat{m}_x$	Adjusted expected number of newborns due to the cost of cancer suppression adaptations.
f_x	Fraction of total deaths in the population that occur among individuals between the ages of *x*-1 to *x*.
q_x	Probability of NOT dying of cancer at age *x*.
c_x	Probability that a death between ages *x*-1 and *x* is caused by cancer.
$1 - c_x$	Probability that a death between ages *x*-1 and *x* is caused by something else.
R_0 *no cancer*	Net reproductive rate with no cancer suppression adaptations.
r *no cancer*	Per capita growth rate in the absence of cancer suppression adaptations.
R_0	Adjusted net reproductive rate with inclusion of cancer suppression adaptations.
r	Adjusted per capita growth rate with cancer suppression adaptations.
u^*	Fitness maximizing level of cancer suppression as an adaptation.
C	Probability that a newborn dies from cancer over the course of its lifetime.

B. Life Tables

Type 2 Beaver Life Table $(r = 0.2046, u^* = 0.101, C = 0.022)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.4971	0.5	0.4956	0.4895	0.5044	0.997	0.006	0.994
2	0.3129	1.5	0.3101	1.4684	0.1856	0.994	0.016	0.984
3	0.2115	2	0.2077	1.9579	0.1023	0.991	0.027	0.973
4	0.1259	2	0.1222	1.9579	0.0856	0.988	0.0288	0.9712
5	0.096	2	0.0918	1.9579	0.0304	0.985	0.0593	0.9407
6	0.0735	2	0.069	1.9579	0.0228	0.9821	0.0711	0.9289
7	0.0614	2	0.0564	1.9579	0.0126	0.9791	0.1122	0.8878
8	0.0477	2	0.0428	1.9579	0.0136	0.9762	0.0966	0.9034
9	0.0439	2	0.0383	1.9579	0.0045	0.9732	0.2513	0.7487
10	0.0348	2	0.0295	1.9579	0.0088	0.9703	0.1262	0.8738
11	0.0215	2	0.0176	1.9579	0.0119	0.9674	0.0782	0.9218
12	0.0187	2	0.0148	1.9579	0.0028	0.9645	0.2153	0.7847
13	0.0115	2	0.0087	1.9579	0.006	0.9616	0.0909	0.9091
14	0.01	2	0.0073	1.9579	0.0014	0.9587	0.2419	0.7581

Type 1 Beaver Life Table $(r = 0.2754, u^* = 0.0808, C = 0.0217)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.5	0.5	0.4981	0.4916	0.5019	0.9962	0.0075	0.9925
2	0.45	1.5	0.4449	1.4749	0.0532	0.9925	0.0699	0.9301
3	0.36	2	0.3519	1.9666	0.093	0.9888	0.0532	0.9468
4	0.18	2	0.1733	1.9666	0.1786	0.985	0.0291	0.9709
5	0.036	2	0.034	1.9666	0.1393	0.9813	0.0228	0.9772
6	0.00648	2	0.006	1.9666	0.028	0.9776	0.0265	0.9735
7	0.0010368	2	0.0009	1.9666	0.0051	0.974	0.0301	0.9699
8	0.000145152	2	0.0001	1.9666	0.0008	0.9703	0.0334	0.9666
9	1.74E-05	2	0	1.9666	0.0001	0.9666	0.0365	0.9635
10	1.74E-06	2	0	1.9666	0	0.963	0.0395	0.9605
11	1.39E-07	2	0	1.9666	0	0.9594	0.0423	0.9577
12	8.36E-09	2	0	1.9666	0	0.9558	0.0449	0.9551
13	3.34E-10	2	0	1.9666	0	0.9522	0.0474	0.9526
14	6.68E-12	2	0	1.9666	0	0.9486	0.0498	0.9502

Type 3 Beaver Life Table $(r = 0.175, u^* = 0.1212, C = 0.0192)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	*0.5000*	0.5	0.4987	0.4872	0.5013	0.9975	0.005	0.995
2	*0.2750*	1.5	0.2729	1.4617	0.2258	0.995	0.011	0.989
3	*0.1705*	2	0.1679	1.949	0.105	0.9925	0.0194	0.9806
4	*0.1108*	2	0.1081	1.949	0.0599	0.99	0.0278	0.9722
5	*0.0831*	2	0.08	1.949	0.028	0.9875	0.0476	0.9524
6	*0.0665*	2	0.0631	1.949	0.0169	0.985	0.0697	0.9303
7	*0.0565*	2	0.0527	1.949	0.0104	0.9826	0.1039	0.8961
8	*0.0509*	2	0.0465	1.949	0.0062	0.9801	0.1672	0.8328
9	*0.0463*	2	0.0413	1.949	0.0051	0.9776	0.1984	0.8016
10	*0.0426*	2	0.0371	1.949	0.0042	0.9752	0.237	0.763
11	*0.0396*	2	0.0335	1.949	0.0036	0.9727	0.2791	0.7209
12	*0.0372*	2	0.0306	1.949	0.003	0.9703	0.3289	0.6711
13	*0.0354*	2	0.0282	1.949	0.0024	0.9679	0.3991	0.6009
14	*0.0340*	2	0.0261	1.949	0.002	0.9654	0.4664	0.5336

Vole Life Table $(r = 0.0576, u^* = 0.0606, C = 0.004)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
0.25	0.18	1	0.1798	0.9876	0.8202	0.9987	0.0015	0.9985
0.5	0.126	2	0.1255	1.9751	0.0542	0.9975	0.0083	0.9917
0.75	0.0882	3	0.0875	2.9627	0.038	0.9962	0.0124	0.9876
1	0.0617	3	0.0609	2.9627	0.0266	0.995	0.0164	0.9836
1.25	0.0432	3	0.0424	2.9627	0.0185	0.9937	0.0205	0.9795
1.5	0.03	3	0.0292	2.9627	0.0132	0.9925	0.024	0.976
1.75	0.021	3	0.0203	2.9627	0.0089	0.9912	0.0284	0.9716
2	0.0147	3	0.014	2.9627	0.0062	0.99	0.0323	0.9677
2.25	0.0103	3	0.0097	2.9627	0.0043	0.9888	0.0362	0.9638
2.5	0.007	3	0.0065	2.9627	0.0032	0.9875	0.0375	0.9625

Naked Mole Rat Life Table $(r = 0.003, u^* = 0.4545, C = 0.054)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.5	0	0.4997	0	0.5003	0.9993	0.0013	0.9987
2	0.45	0	0.4491	0	0.0506	0.9987	0.0132	0.9868
3	0.4275	0	0.4258	0	0.0233	0.998	0.0386	0.9614
4	0.406125	0	0.4034	0	0.0224	0.9973	0.0508	0.9492
5	0.385819	0	0.382	0	0.0215	0.9967	0.0627	0.9373
6	0.366528	0.032333	0.3614	0.0286	0.0206	0.996	0.0743	0.9257
7	0.348201	0.034035	0.3417	0.0301	0.0197	0.9953	0.0856	0.9144
8	0.330791	0.071652	0.3229	0.0635	0.0188	0.9947	0.0966	0.9034
9	0.314252	0.075423	0.3049	0.0668	0.018	0.994	0.1073	0.8927
10	0.298539	0.079392	0.2877	0.0703	0.0172	0.9933	0.1178	0.8822
11	0.283612	0.083571	0.2713	0.074	0.0164	0.9927	0.1281	0.8719
12	0.269432	0.175939	0.2557	0.1559	0.0156	0.992	0.1381	0.8619
13	0.25596	0.185199	0.2408	0.1641	0.0149	0.9913	0.1478	0.8522
14	0.243162	0.194946	0.2266	0.1727	0.0142	0.9907	0.1574	0.8426
15	0.231004	0.205206	0.2132	0.1818	0.0135	0.99	0.1667	0.8333
16	0.219454	0.216007	0.2003	0.1913	0.0128	0.9893	0.1758	0.8242
17	0.208481	0.227376	0.1882	0.2014	0.0122	0.9887	0.1847	0.8153
18	0.198057	0.239343	0.1766	0.212	0.0116	0.988	0.1934	0.8066
19	0.188154	0.25194	0.1657	0.2232	0.011	0.9873	0.2019	0.7981
20	0.178746	0.2652	0.1553	0.2349	0.0104	0.9867	0.2103	0.7897
21	0.169809	0.279158	0.1455	0.2473	0.0098	0.986	0.2184	0.7816
22	0.161319	0.440775	0.1362	0.3905	0.0093	0.9854	0.2264	0.7736
23	0.153253	0.618632	0.1274	0.548	0.0088	0.9847	0.2342	0.7658
24	0.14559	0.813989	0.1191	0.7211	0.0083	0.984	0.2419	0.7581
25	0.138311	0.856831	0.1112	0.759	0.0078	0.9834	0.2494	0.7506
26	0.12448	0.761627	0.0984	0.6747	0.0129	0.9827	0.1473	0.8527
27	0.112032	0.846253	0.087	0.7496	0.0114	0.9821	0.152	0.848
28	0.100828	0.940281	0.0768	0.8329	0.0102	0.9814	0.1567	0.8433
29	0.090746	0.783567	0.0678	0.6941	0.009	0.9808	0.1614	0.8386
30	0.081671	0.87063	0.0598	0.7712	0.008	0.9801	0.166	0.834

Elephant Life Table $(r = 0.0099, u^* = 0.5051, C = 0.2156)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.9	0	0.8995	0	0.1005	0.9994	0.006	0.994
2	0.828	0	0.8265	0	0.073	0.9988	0.0148	0.9852
3	0.77004	0	0.7673	0	0.0592	0.9982	0.0252	0.9748
4	0.723838	0	0.7195	0	0.0478	0.9976	0.0386	0.9614
5	0.687646	0	0.6815	0	0.038	0.997	0.0568	0.9432
6	0.66014	0	0.6518	0	0.0296	0.9964	0.0828	0.9172
7	0.640336	0	0.6296	0	0.0222	0.9958	0.1231	0.8769
8	0.627529	0	0.6141	0	0.0156	0.9952	0.194	0.806
9	0.614978	0.015	0.5985	0.013	0.0155	0.9946	0.213	0.787
10	0.602679	0.04	0.583	0.0348	0.0155	0.994	0.2311	0.7689
11	0.590625	0.062	0.5676	0.0539	0.0154	0.9934	0.2485	0.7515
12	0.578813	0.085	0.5522	0.0738	0.0154	0.9928	0.265	0.735
13	0.567236	0.11	0.5369	0.0956	0.0153	0.9922	0.2808	0.7192
14	0.555892	0.125	0.5218	0.1086	0.0152	0.9916	0.296	0.704
15	0.544774	0.125	0.5067	0.1086	0.015	0.991	0.3105	0.6895
16	0.533878	0.125	0.4918	0.1086	0.0149	0.9904	0.3244	0.6756
17	0.523201	0.125	0.4771	0.1086	0.0148	0.9898	0.3378	0.6622
18	0.512737	0.125	0.4625	0.1086	0.0146	0.9892	0.3506	0.6494
19	0.502482	0.125	0.4481	0.1086	0.0144	0.9886	0.3629	0.6371
20	0.492432	0.125	0.4339	0.1086	0.0142	0.988	0.3748	0.6252
21	0.482584	0.125	0.4198	0.1086	0.014	0.9874	0.3862	0.6138
22	0.472932	0.125	0.406	0.1086	0.0138	0.9868	0.3972	0.6028
23	0.463474	0.125	0.3924	0.1086	0.0136	0.9862	0.4079	0.5921
24	0.454204	0.125	0.379	0.1086	0.0134	0.9856	0.4181	0.5819
25	0.44512	0.125	0.3659	0.1086	0.0131	0.985	0.428	0.572
26	0.436218	0.125	0.353	0.1086	0.0129	0.9844	0.4375	0.5625
27	0.427493	0.125	0.3403	0.1086	0.0126	0.9838	0.4468	0.5532
28	0.418943	0.125	0.328	0.1086	0.0124	0.9833	0.4557	0.5443
29	0.410564	0.125	0.3158	0.1086	0.0121	0.9827	0.4643	0.5357
30	0.402353	0.125	0.304	0.1086	0.0119	0.9821	0.4727	0.5273
31	0.394306	0.125	0.2924	0.1086	0.0116	0.9815	0.4808	0.5192
32	0.38642	0.125	0.281	0.1086	0.0113	0.9809	0.4887	0.5113
33	0.378692	0.125	0.27	0.1086	0.011	0.9803	0.4963	0.5037
34	0.371118	0.125	0.2592	0.1086	0.0108	0.9797	0.5037	0.4963
35	0.363695	0.125	0.2487	0.1086	0.0105	0.9791	0.5108	0.4892
36	0.356422	0.125	0.2385	0.1086	0.0102	0.9785	0.5178	0.4822
37	0.349293	0.125	0.2286	0.1086	0.0099	0.9779	0.5246	0.4754
38	0.342307	0.125	0.2189	0.1086	0.0096	0.9773	0.5311	0.4689
39	0.335461	0.125	0.2096	0.1086	0.0094	0.9768	0.5375	0.4625
40	0.325397	0.125	0.1984	0.1086	0.0111	0.9762	0.4427	0.5573
41	0.315635	0.125	0.1878	0.1086	0.0107	0.9756	0.4488	0.5512
42	0.306166	0.125	0.1776	0.1086	0.0102	0.975	0.4547	0.5453
43	0.296981	0.125	0.1679	0.1086	0.0097	0.9744	0.4604	0.5396
44	0.288072	0.112	0.1586	0.0973	0.0093	0.9738	0.4661	0.5339
45	0.27943	0.085	0.1497	0.0738	0.0089	0.9732	0.4716	0.5284
46	0.271047	0.062	0.1412	0.0539	0.0085	0.9726	0.477	0.523
47	0.262915	0.04	0.1332	0.0348	0.0081	0.9721	0.4823	0.5177
48	0.255028	0.025	0.1255	0.0217	0.0077	0.9715	0.4875	0.5125
49	0.247377	0.015	0.1182	0.013	0.0073	0.9709	0.4926	0.5074

Primitive Human Life Table ($r = 0.0032, u^* = 0.3939, C = 0.0998$)

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
12	0.5	0.15	0.4954	0.1357	0.5046	0.9908	0.0181	0.9819
13	0.46	0.18	0.4512	0.1628	0.0442	0.99	0.1111	0.8889
14	0.4232	0.2	0.4106	0.1809	0.0406	0.9892	0.1186	0.8814
15	0.389344	0.22	0.3734	0.199	0.0372	0.9885	0.126	0.874
16	0.358196	0.22	0.3393	0.199	0.0341	0.9877	0.1332	0.8668
17	0.329541	0.22	0.3081	0.199	0.0312	0.9869	0.1403	0.8597
18	0.313064	0.25	0.2887	0.2262	0.0195	0.9862	0.2166	0.7834
19	0.297411	0.25	0.2702	0.2262	0.0184	0.9854	0.2258	0.7742
20	0.28254	0.25	0.2528	0.2262	0.0175	0.9847	0.2348	0.7652
21	0.268413	0.25	0.2363	0.2262	0.0165	0.9839	0.2436	0.7564
22	0.254992	0.22	0.2207	0.199	0.0156	0.9831	0.2522	0.7478
23	0.242243	0.22	0.2059	0.199	0.0147	0.9824	0.2606	0.7394
24	0.230131	0.22	0.192	0.199	0.0139	0.9816	0.2689	0.7311
25	0.218624	0.22	0.1789	0.199	0.0131	0.9809	0.2769	0.7231
26	0.201134	0.22	0.1614	0.199	0.0176	0.9801	0.1992	0.8008
27	0.185043	0.22	0.1454	0.199	0.016	0.9793	0.2052	0.7948
28	0.17024	0.2	0.1309	0.1809	0.0145	0.9786	0.2112	0.7888
29	0.156621	0.2	0.1177	0.1809	0.0131	0.9778	0.217	0.783
30	0.144091	0.2	0.1058	0.1809	0.0119	0.9771	0.2228	0.7772
31	0.132564	0.18	0.0951	0.1628	0.0108	0.9763	0.2284	0.7716
32	0.121959	0.18	0.0853	0.1628	0.0097	0.9756	0.234	0.766
33	0.112202	0.16	0.0765	0.1448	0.0088	0.9748	0.2395	0.7605
34	0.103226	0.16	0.0686	0.1448	0.0079	0.9741	0.2449	0.7551
35	0.092903	0.14	0.0601	0.1267	0.0085	0.9733	0.2107	0.7893
36	0.083613	0.14	0.0526	0.1267	0.0075	0.9725	0.2154	0.7846
37	0.075252	0.14	0.046	0.1267	0.0066	0.9718	0.22	0.78
38	0.067726	0.14	0.0402	0.1267	0.0058	0.971	0.2245	0.7755
39	0.060954	0.14	0.0351	0.1267	0.0051	0.9703	0.229	0.771
40	0.051811	0.14	0.0289	0.1267	0.0062	0.9695	0.1688	0.8312
41	0.044039	0.1	0.0238	0.0905	0.0051	0.9688	0.1722	0.8278
42	0.037433	0.1	0.0196	0.0905	0.0042	0.968	0.1756	0.8244
43	0.031818	0.1	0.0161	0.0905	0.0035	0.9673	0.179	0.821
44	0.027046	0.1	0.0132	0.0905	0.0029	0.9666	0.1823	0.8177
45	0.022989	0.1	0.0109	0.0905	0.0024	0.9658	0.1856	0.8144

Modern Human Life Table $(r = -0.0111, u^* = 0.5152, C = 0.4909)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
15	0.993	0.01155	0.9842	0.01	0.0158	0.9912	0.5578	0.4422
16	0.993	0.01155	0.975	0.01	0.0093	0.9906	1	0
17	0.9921	0.01155	0.9643	0.01	0.0106	0.99	0.9169	0.0831
18	0.9921	0.01155	0.9541	0.01	0.0102	0.9894	1	0
19	0.9921	0.01155	0.9435	0.01	0.0107	0.9888	1	0
20	0.99174	0.04305	0.932	0.0372	0.0114	0.9882	0.9701	0.0299
21	0.9912	0.04305	0.92	0.0372	0.012	0.9877	0.9577	0.0423
22	0.9912	0.04305	0.9081	0.0372	0.0119	0.9871	1	0
23	0.9912	0.04305	0.8959	0.0372	0.0123	0.9865	1	0
24	0.9912	0.04305	0.8833	0.0372	0.0126	0.9859	1	0
25	0.9903	0.063	0.8695	0.0545	0.0138	0.9853	0.9417	0.0583
26	0.9894	0.063	0.8555	0.0545	0.014	0.9847	0.9438	0.0562
27	0.9894	0.063	0.8419	0.0545	0.0135	0.9842	1	0
28	0.9894	0.063	0.8281	0.0545	0.0138	0.9836	1	0
29	0.9894	0.063	0.814	0.0545	0.0141	0.983	1	0
30	0.9885	0.0672	0.799	0.0581	0.015	0.9824	0.9508	0.0492
31	0.9876	0.0672	0.7838	0.0581	0.0152	0.9818	0.9523	0.0477
32	0.9876	0.0672	0.7691	0.0581	0.0147	0.9813	1	0
33	0.9867	0.0672	0.7535	0.0581	0.0155	0.9807	0.955	0.045
34	0.9867	0.0672	0.7385	0.0581	0.015	0.9801	1	0
35	0.9858	0.0441	0.7227	0.0382	0.0158	0.9795	0.9574	0.0426
36	0.9849	0.0441	0.7069	0.0382	0.0159	0.9789	0.9585	0.0415
37	0.984	0.0441	0.6909	0.0382	0.0159	0.9784	0.9595	0.0405
38	0.9831	0.0441	0.675	0.0382	0.016	0.9778	0.9605	0.0395
39	0.9822	0.0441	0.659	0.0382	0.016	0.9772	0.9614	0.0386
40	0.9813	0.0126	0.643	0.0109	0.016	0.9766	0.9623	0.0377
41	0.9795	0.0126	0.6264	0.0109	0.0166	0.976	0.9289	0.0711
42	0.9777	0.0126	0.6099	0.0109	0.0165	0.9755	0.9303	0.0697
43	0.9768	0.0126	0.5941	0.0109	0.0159	0.9749	0.9646	0.0354
44	0.975	0.0126	0.5778	0.0109	0.0163	0.9743	0.933	0.067
45	0.9741	0.00315	0.5621	0.0027	0.0157	0.9737	0.966	0.034
46	0.9714	0.00315	0.5455	0.0027	0.0166	0.9732	0.9064	0.0936
47	0.9687	0.00315	0.5291	0.0027	0.0164	0.9726	0.9079	0.0921
48	0.966	0.00315	0.5128	0.0027	0.0162	0.972	0.9094	0.0906
49	0.9633	0.00315	0.4968	0.0027	0.016	0.9714	0.9108	0.0892
50	0.9615	0.00315	0.4814	0.0027	0.0154	0.9709	0.9397	0.0603

Modern Human Life Table w/Primitive u* ($r = -0.0125, u^* = 0.3939, C = 0.5856$)

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
15	0.993	0.01155	0.9815	0.0116	0.0185	0.9885	0.6223	0.3777
16	0.993	0.01155	0.9695	0.0116	0.0121	0.9877	1	0
17	0.9921	0.01155	0.956	0.0116	0.0135	0.9869	0.9351	0.0649
18	0.9921	0.01155	0.9427	0.0116	0.0132	0.9862	1	0
19	0.9921	0.01155	0.929	0.0116	0.0137	0.9854	1	0
20	0.99174	0.04305	0.9144	0.043	0.0146	0.9847	0.9769	0.0231
21	0.9912	0.04305	0.8992	0.043	0.0152	0.9839	0.9673	0.0327
22	0.9912	0.04305	0.884	0.043	0.0152	0.9831	1	0
23	0.9912	0.04305	0.8684	0.043	0.0156	0.9824	1	0
24	0.9912	0.04305	0.8525	0.043	0.016	0.9816	1	0
25	0.9903	0.063	0.8354	0.063	0.0171	0.9809	0.9547	0.0453
26	0.9894	0.063	0.818	0.063	0.0174	0.9801	0.9563	0.0437
27	0.9894	0.063	0.8011	0.063	0.0169	0.9793	1	0
28	0.9894	0.063	0.7839	0.063	0.0172	0.9786	1	0
29	0.9894	0.063	0.7666	0.063	0.0174	0.9778	1	0
30	0.9885	0.0672	0.7483	0.0672	0.0183	0.9771	0.9618	0.0382
31	0.9876	0.0672	0.7299	0.0672	0.0184	0.9763	0.963	0.037
32	0.9876	0.0672	0.7121	0.0672	0.0178	0.9756	1	0
33	0.9867	0.0672	0.6935	0.0672	0.0186	0.9748	0.9651	0.0349
34	0.9867	0.0672	0.6755	0.0672	0.018	0.9741	1	0
35	0.9858	0.0441	0.6569	0.0441	0.0186	0.9733	0.967	0.033
36	0.9849	0.0441	0.6383	0.0441	0.0186	0.9725	0.9678	0.0322
37	0.984	0.0441	0.6197	0.0441	0.0186	0.9718	0.9686	0.0314
38	0.9831	0.0441	0.6012	0.0441	0.0185	0.971	0.9694	0.0306
39	0.9822	0.0441	0.5828	0.0441	0.0184	0.9703	0.9701	0.0299
40	0.9813	0.0126	0.5645	0.0126	0.0183	0.9695	0.9708	0.0292
41	0.9795	0.0126	0.5459	0.0126	0.0186	0.9688	0.9445	0.0555
42	0.9777	0.0126	0.5275	0.0126	0.0184	0.968	0.9456	0.0544
43	0.9768	0.0126	0.5098	0.0126	0.0177	0.9673	0.9726	0.0274
44	0.975	0.0126	0.4918	0.0126	0.018	0.9665	0.9478	0.0522
45	0.9741	0.00315	0.4746	0.0032	0.0173	0.9658	0.9737	0.0263
46	0.9714	0.00315	0.4567	0.0032	0.0179	0.9651	0.9265	0.0735
47	0.9687	0.00315	0.4392	0.0032	0.0175	0.9643	0.9278	0.0722
48	0.966	0.00315	0.422	0.0032	0.0172	0.9636	0.9289	0.0711
49	0.9633	0.00315	0.4052	0.0032	0.0168	0.9628	0.9301	0.0699
50	0.9615	0.00315	0.3891	0.0032	0.0161	0.9621	0.953	0.047

C. Fecundity Schedule and Cancer Suppression

Here we discuss four variations of the baseline beaver life table adjusting the age at first reproduction, age at last reproduction, and the change in fecundity with age.

Halved m_x - Cut all m_x in half. This cuts R_0 in half. This also selects for a larger u^*, 0.1414 vs the original 0.1010, as survivorship is now more important than fecundity.

Doubled m_x - Double all m_x. This doubles R_0. This also selects for a smaller u^*, 0.0808 vs the original 0.1010, as fecundity is now more important than survivorship.

Early Reproduction - Frontloading m_x where early values of m_x are doubled and later values of m_x are halved. The pivot point that matched the R_0 occurred by just doubling the first two values of m_x and halving the rest. This early increased fecundity decreases u^*, 0.0707.

Late Reproduction - Backloading m_x where early values of m_x are halved and later values of m_x are doubled. The pivot point that matched the R_0 occurred by just halving the first four values of m_x and doubling the rest. This late increased fecundity increases u^*, 0.1414.

	Baseline Beaver Life Table	Halved m_x	Doubled m_x	Early Reproduction	Late Reproduction
R_0-no cancer	2.2306	1.1153	4.4612	2.1922	2.7497
r – no cancer	0.2198	0.0252	0.4841	0.3288	0.2001
R_0	2.0802	1.0446	4.1309	2.0773	2.5313
r	0.2046	0.0102	0.4691	0.3133	0.1858
u^*	0.101	0.1414	0.0808	0.0707	0.1414
C	0.022	0.0161	0.0270	0.0305	0.0161

x	Baseline Beaver m_x	Halved m_x	Doubled m_x	Early Reproduction	Late Reproduction
1	0.5	0.25	1	1	0.25
2	1.5	0.75	3	3	0.75
3	2	1	4	1	1
4	2	1	4	1	4
5	2	1	4	1	4
6	2	1	4	1	4
7	2	1	4	1	4
8	2	1	4	1	4
9	2	1	4	1	4
10	2	1	4	1	4
11	2	1	4	1	4
12	2	1	4	1	4
13	2	1	4	1	4
14	2	1	4	1	4

Baseline Life Table $(r = 0.2046, u^* = 0.101, C = 0.022)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.4971	0.5	0.4956	0.4895	0.5044	0.997	0.006	0.994
2	0.3129	1.5	0.3101	1.4684	0.1856	0.994	0.016	0.984
3	0.2115	2	0.2077	1.9579	0.1023	0.991	0.027	0.973
4	0.1259	2	0.1222	1.9579	0.0856	0.988	0.0288	0.9712
5	0.096	2	0.0918	1.9579	0.0304	0.985	0.0593	0.9407
6	0.0735	2	0.069	1.9579	0.0228	0.9821	0.0711	0.9289
7	0.0614	2	0.0564	1.9579	0.0126	0.9791	0.1122	0.8878
8	0.0477	2	0.0428	1.9579	0.0136	0.9762	0.0966	0.9034
9	0.0439	2	0.0383	1.9579	0.0045	0.9732	0.2513	0.7487
10	0.0348	2	0.0295	1.9579	0.0088	0.9703	0.1262	0.8738
11	0.0215	2	0.0176	1.9579	0.0119	0.9674	0.0782	0.9218
12	0.0187	2	0.0148	1.9579	0.0028	0.9645	0.2153	0.7847
13	0.0115	2	0.0087	1.9579	0.006	0.9616	0.0909	0.9091
14	0.01	2	0.0073	1.9579	0.0014	0.9587	0.2419	0.7581

Halved m_x Life Table $(r = 0.0102, u^* = 0.1414, C = 0.0161)$

x x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.4971	0.25	0.4961	0.2425	0.5039	0.9978	0.0043	0.9957
2	0.3129	0.75	0.3109	0.7275	0.1852	0.9957	0.0115	0.9885
3	0.2115	1	0.2088	0.9700	0.1021	0.9936	0.0195	0.9805
4	0.1259	1	0.1232	0.9700	0.0856	0.9914	0.0207	0.9793
5	0.0960	1	0.0930	0.9700	0.0303	0.9893	0.0432	0.9568
6	0.0735	1	0.0703	0.9700	0.0227	0.9872	0.0519	0.9481
7	0.0614	1	0.0578	0.9700	0.0125	0.9850	0.0830	0.9170
8	0.0477	1	0.0441	0.9700	0.0136	0.9829	0.0712	0.9288
9	0.0439	1	0.0398	0.9700	0.0043	0.9808	0.1940	0.8060
10	0.0348	1	0.0310	0.9700	0.0089	0.9787	0.0939	0.9061
11	0.0215	1	0.0186	0.9700	0.0123	0.9766	0.0574	0.9426
12	0.0187	1	0.0158	0.9700	0.0028	0.9745	0.1646	0.8354
13	0.0115	1	0.0095	0.9700	0.0063	0.9724	0.0670	0.9330
14	0.0100	1	0.0080	0.9700	0.0015	0.9703	0.1865	0.8135

Doubled m_x Life Table $(r = 0.4691, u^* = 0.0808, C = 0.0270)$

x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.4971	1	0.4953	0.9833	0.5047	0.9962	0.0074	0.9926
2	0.3129	3	0.3094	2.9499	0.1859	0.9925	0.0199	0.9801
3	0.2115	4	0.2068	3.9332	0.1026	0.9888	0.0335	0.9665
4	0.1259	4	0.1212	3.9332	0.0856	0.9850	0.0356	0.9644
5	0.0960	4	0.0907	3.9332	0.0305	0.9813	0.0729	0.9271
6	0.0735	4	0.0679	3.9332	0.0228	0.9776	0.0871	0.9129
7	0.0614	4	0.0552	3.9332	0.0127	0.9740	0.1361	0.8639
8	0.0477	4	0.0416	3.9332	0.0136	0.9703	0.1176	0.8824
9	0.0439	4	0.0370	3.9332	0.0046	0.9666	0.2948	0.7052
10	0.0348	4	0.0283	3.9332	0.0087	0.9630	0.1524	0.8476
11	0.0215	4	0.0167	3.9332	0.0116	0.9594	0.0956	0.9044
12	0.0187	4	0.0139	3.9332	0.0028	0.9558	0.2545	0.7455
13	0.0115	4	0.0082	3.9332	0.0058	0.9522	0.1106	0.8894
14	0.0100	4	0.0067	3.9332	0.0014	0.9486	0.2841	0.7159

Early Reproduction

Pivot point	R_0	r	u	C	R_0 – without cancer	r – without cancer
Original m_x	2.0802	0.2046	0.101	0.022	2.2306	0.2198
All m_x Halved - 0	1.0446	0.0102	0.1414	0.0161	1.1153	0.0252
1	1.4040	0.1124	0.1010	0.0220	1.4882	0.1288
2	**2.0773**	**0.3133**	**0.0707**	**0.0305**	**2.1922**	**0.3288**
3	2.6867	0.4147	0.0707	0.0305	2.8268	0.4296
4	3.0432	0.4452	0.0707	0.0305	3.2044	0.4600
5	3.3177	0.4581	0.0808	0.0270	3.4925	0.4729
6	3.5181	0.4637	0.0808	0.0270	3.7130	0.4786
7	3.6810	0.4665	0.0808	0.0270	3.8971	0.4815
8	3.8038	0.4678	0.0808	0.0270	4.0401	0.4828
9	3.9130	0.4685	0.0808	0.0270	4.1717	0.4835
10	3.9965	0.4689	0.0808	0.0270	4.2763	0.4839
11	4.0459	0.4690	0.0808	0.0270	4.3406	0.4840
12	4.0870	0.4690	0.0808	0.0270	4.3967	0.4841
13	4.1110	0.4691	0.0808	0.0270	4.4312	0.4841
All m_x Doubled - 14	4.1309	0.4691	0.0808	0.0270	4.4612	0.4841

Early reproduction m_x according to pivot point.

x	Original m_x	0	1	**2**	3	4	5	6	7	8	9	10	11	12	13	14
1	0.5	0.25	1	**1**	1	1	1	1	1	1	1	1	1	1	1	1
2	1.5	0.75	0.75	**3**	3	3	3	3	3	3	3	3	3	3	3	3
3	2	1	1	**1**	4	4	4	4	4	4	4	4	4	4	4	4
4	2	1	1	**1**	1	4	4	4	4	4	4	4	4	4	4	4
5	2	1	1	**1**	1	1	4	4	4	4	4	4	4	4	4	4
6	2	1	1	**1**	1	1	1	4	4	4	4	4	4	4	4	4
7	2	1	1	**1**	1	1	1	1	4	4	4	4	4	4	4	4
8	2	1	1	**1**	1	1	1	1	1	4	4	4	4	4	4	4
9	2	1	1	**1**	1	1	1	1	1	1	4	4	4	4	4	4
10	2	1	1	**1**	1	1	1	1	1	1	1	4	4	4	4	4
11	2	1	1	**1**	1	1	1	1	1	1	1	1	4	4	4	4
12	2	1	1	**1**	1	1	1	1	1	1	1	1	1	4	4	4
13	2	1	1	**1**	1	1	1	1	1	1	1	1	1	1	4	4
14	2	1	1	**1**	1	1	1	1	1	1	1	1	1	1	1	4

Early reproduction life table at Pivot = 2 ($r = 0.3133, u^* = 0.0707, C = 0.0305$)

x x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.4971	1	0.4950	0.9854	0.5050	0.9957	0.0085	0.9915
2	0.3129	3	0.3089	2.9563	0.1861	0.9914	0.0226	0.9774
3	0.2115	1	0.2061	0.9854	0.1027	0.9872	0.0381	0.9619
4	0.1259	1	0.1206	0.9854	0.0856	0.9829	0.0405	0.9595
5	0.0960	1	0.0900	0.9854	0.0306	0.9787	0.0824	0.9176
6	0.0735	1	0.0671	0.9854	0.0229	0.9745	0.0982	0.9018
7	0.0614	1	0.0544	0.9854	0.0128	0.9703	0.1524	0.8476
8	0.0477	1	0.0408	0.9854	0.0136	0.9661	0.1319	0.8681
9	0.0439	1	0.0361	0.9854	0.0047	0.9620	0.3228	0.6772
10	0.0348	1	0.0275	0.9854	0.0086	0.9578	0.1701	0.8299
11	0.0215	1	0.0161	0.9854	0.0114	0.9537	0.1075	0.8925
12	0.0187	1	0.0133	0.9854	0.0028	0.9496	0.2800	0.7200
13	0.0115	1	0.0078	0.9854	0.0056	0.9455	0.1241	0.8759
14	0.0100	1	0.0064	0.9854	0.0014	0.9415	0.3112	0.6888

Late reproduction

Pivot point	R_0	r	u	C	R_0 – without cancer	r – without cancer
Original m_x	2.0802	0.2046	0.101	0.022	2.2306	0.2198
All m_x Doubled - 0	4.1309	0.4691	0.0808	0.0270	4.4612	0.4841
1	3.7965	0.3758	0.1010	0.0220	4.0883	0.3902
2	3.1308	0.2639	0.1212	0.0186	3.3843	0.2781
3	**2.5313**	**0.1858**	**0.1414**	**0.0161**	**2.7497**	**0.2001**
4	2.1758	0.1451	0.1515	0.0151	2.3720	0.1594
5	1.9074	0.1161	0.1616	0.0142	2.0840	0.1306
6	1.7028	0.0945	0.1616	0.0142	1.8635	0.1091
7	1.5342	0.0763	0.1616	0.0142	1.6794	0.0912
8	1.4061	0.0618	0.1717	0.0134	1.5364	0.0768
9	1.2884	0.0476	0.1616	0.0142	1.4047	0.0628
10	1.1974	0.0354	0.1616	0.0142	1.3002	0.0508
11	1.1426	0.0273	0.1616	0.0142	1.2358	0.0427
12	1.0958	0.0197	0.1515	0.0151	1.1798	0.0350
13	1.0680	0.0147	0.1515	0.0151	1.1453	0.0299
All m_x Halved - 14	1.0446	0.0102	0.1414	0.0161	1.1153	0.0252

Late reproduction m_x according to pivot point.

x	Original m_x	0	1	2	**3**	4	5	6	7	8	9	10	11	12	13	14
1	0.5	1	0.25	0.25	**0.25**	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2	1.5	3	3	0.75	**0.75**	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
3	2	4	4	4	**1**	1	1	1	1	1	1	1	1	1	1	1
4	2	4	4	4	**4**	1	1	1	1	1	1	1	1	1	1	1
5	2	4	4	4	**4**	4	1	1	1	1	1	1	1	1	1	1
6	2	4	4	4	**4**	4	4	1	1	1	1	1	1	1	1	1
7	2	4	4	4	**4**	4	4	4	1	1	1	1	1	1	1	1
8	2	4	4	4	**4**	4	4	4	4	1	1	1	1	1	1	1
9	2	4	4	4	**4**	4	4	4	4	4	1	1	1	1	1	1
10	2	4	4	4	**4**	4	4	4	4	4	4	1	1	1	1	1
11	2	4	4	4	**4**	4	4	4	4	4	4	4	1	1	1	1
12	2	4	4	4	**4**	4	4	4	4	4	4	4	4	1	1	1
13	2	4	4	4	**4**	4	4	4	4	4	4	4	4	4	1	1
14	2	4	4	4	**4**	4	4	4	4	4	4	4	4	4	4	1

Late reproduction life table at Pivot = 3 ($r = 0.1858, u^* = 0.1414, C = 0.0161$)

x x	l_x	m_x	$\hat{l}_x$	$\hat{m}_x$	f_x	q_x	c_x	$1 - c_x$
1	0.4971	0.25	0.4961	0.2425	0.5039	0.9978	0.0043	0.9957
2	0.3129	0.75	0.3109	0.7275	0.1852	0.9957	0.0115	0.9885
3	0.2115	1	0.2088	0.9700	0.1021	0.9936	0.0195	0.9805
4	0.1259	4	0.1232	3.8799	0.0856	0.9914	0.0207	0.9793
5	0.0960	4	0.0930	3.8799	0.0303	0.9893	0.0432	0.9568
6	0.0735	4	0.0703	3.8799	0.0227	0.9872	0.0519	0.9481
7	0.0614	4	0.0578	3.8799	0.0125	0.9850	0.0830	0.9170
8	0.0477	4	0.0441	3.8799	0.0136	0.9829	0.0712	0.9288
9	0.0439	4	0.0398	3.8799	0.0043	0.9808	0.1940	0.8060
10	0.0348	4	0.0310	3.8799	0.0089	0.9787	0.0939	0.9061
11	0.0215	4	0.0186	3.8799	0.0123	0.9766	0.0574	0.9426
12	0.0187	4	0.0158	3.8799	0.0028	0.9745	0.1646	0.8354
13	0.0115	4	0.0095	3.8799	0.0063	0.9724	0.0670	0.9330
14	0.0100	4	0.0080	3.8799	0.0015	0.9703	0.1865	0.8135

D. *Q*, *a*, and *b* Parameter Study

Effect of changes on *b*. When $b = 0$, there is no penalty so the maximum will occur at $u = 1$. As b increases, cancer resistance becomes more costly, forcing the optimal u to be smaller and decreasing the maximum r the population can sustain. r never switches to negative.

$Q = 0.97$
$a = 0.01$

b	u_{max}	r_{max}
0	---	---
0.1	0.1414	0.2089
0.2	0.1010	0.2046
0.5	0.0707	0.1961
1	0.0505	0.1865
2	0.0303	0.1726
5	0.0202	0.1459

Effect of changes on *a*. If a is small, no cancer prevention is necessary. As a increases, cancer prevention becomes important, though does cause a decrease in r. The point where r switches from positive to negative occurs at $a = 0.1259$.

$Q = 0.97$
$b = 0.2$

a	u_{max}	r_{max}
0	0.0101	0.2191
0.1	0.2929	0.1691
0.2	0.3838	0.1455
0.5	0.5253	0.0941
1	0.6263	0.0288
0.1259	0.6667	0
2	0.7273	-0.0764
5	0.8283	-0.3268
10	0.8788	-0.6705
20	0.9192	-1.2597

Effect of changes on *Q*. If Q is large then cancer prevention is a trivial because the organism has a very small chance of dying from cancer. As Q approaches 0 cancer prevention becomes necessary though the penalty in r can be seen again. r never switches to negative.

$a = 0.01$
$b = 0.2$

Q	u_{max}	r_{max}
0.0	---	---
0.1	0.5859	0.0589
0.2	0.5354	0.0899
0.3	0.4848	0.1103
0.4	0.4444	0.1262
0.5	0.4040	0.1399
0.6	0.3636	0.1524
0.7	0.3131	0.1645
0.8	0.2626	0.1769
0.9	0.1818	0.1910
1.0	0.0101	0.2191