Table IV.D.3 Computation of uncertainty distribution for ERR at 1 Sv. 3. Likelihood profile distributions for α, for all exposure ages and attained ages: sites for which a lognormal approximation was not appropriate for the statistical uncertainty distribution for α, and for which γ=0 and δ=0 were assumed.

Profile quantiles	Lung		Female genital less ovary
	Males	Females	Females
0.9975	1.114	3.449	0.172
0.995	1.053	3.307	0.136
0.9875	0.9680	3.109	0.0866
0.975	0.8987	2.948	0.0791
0.95	0.8237	2.775	0.0607
0.875	0.7112	2.516	0.0463
0.8413	0.6783	2.441	0.0030
0.5	0.4740	1.973	-0.189
0.1587	0.2953	1.563	-0.278
0.125	0.2681	1.504	-0.289
0.05	0.1885	1.323	>0
0.025	0.1408	1.214	>0
0.0125	0.1000	1.119	>0
0.005	0.0537	1.012	>0
0.0025	0.0239	0.9406	>0

DRAFT

Table IV.D.4. Computation of uncertainty distribution for ERR at 1 Sv. 4. Leukemia other than chronic lymphocytic, combined sexes: Likelihood profile distributions, by representative values for exposure age and time since exposure.

Profile quantiles	Exposure age 20						Exposure age 30					
	5 yr	10 yr	15 yr	25 yr	35 yr	45 yr	5 yr	10 yr	15 yr	25 yr	35 yr	45 yr
0.9975	72.69	29.87	13.54	3.967	1.671	0.8029	37.55	18.19	9.412	3.361	1.672	0.9342
0.995	65.99	27.68	12.71	3.744	1.538	0.7102	34.69	17.09	8.944	3.206	1.556	0.8387
0.9875	57.46	24.83	11.62	3.438	1.358	0.5913	30.97	15.62	8.311	2.991	1.400	0.7154
0.975	51.20	22.68	10.78	3.194	1.217	0.5038	28.16	14.49	7.816	2.818	1.277	0.6239
0.95	45.05	20.51	9.922	2.934	1.071	0.4180	25.33	13.33	7.299	2.633	1.149	0.5334
0.875	36.94	17.57	8.719	2.554	0.8658	0.3065	21.47	11.70	6.559	2.358	0.9676	0.4137
0.8413	34.80	16.76	8.385	2.445	0.8091	0.2778	20.42	11.25	6.350	2.278	0.9168	0.3820
0.5	23.55	12.35	6.481	1.784	0.4911	0.1352	14.65	8.662	5.121	1.789	0.6253	0.2185
0.1587	16.10	9.173	5.015	1.239	0.2730	0.0585	10.52	6.674	4.124	1.366	0.4060	0.1173
0.125	15.21	8.776	4.824	1.168	0.2480	0.0511	10.01	6.416	3.991	1.308	0.3786	0.1062
0.05	12.65	7.592	4.244	0.9509	0.1783	0.0320	8.481	5.633	3.580	1.127	0.2979	0.0755
0.025	11.25	6.925	3.907	0.8277	0.1428	0.0234	7.627	5.180	3.338	1.019	0.2535	0.0601
0.0125	10.14	6.380	3.627	0.7271	0.1161	0.0175	6.933	4.804	3.134	0.9281	0.2181	0.0486
0.005	8.959	5.788	3.315	0.6185	0.0898	0.0123	6.184	4.389	2.905	0.8259	0.1809	0.03[illegible]
0.0025	8.227	5.412	3.113	0.5503	0.0745	0.0095	5.709	4.120	2.754	0.7591	0.1581	0.03[illegible]

DRAFT

Table IV.D.5. Computation of uncertainty distribution for ERR at 1 Sv. 5. Acute lymphocytic leukemia, combined sexes: Likelihood profile distributions, by exposure age and time since exposure.

Profile quantiles	Exposure age < 20									Exposure age≥20
	5 yr	10 yr	15 yr	20 yr	25 yr	30 yr	35 yr	40 yr	45 yr	>5 yr
0.9975	701.7	200.8	67.53	28.30	14.29	8.290	5.268	3.53	2.450	11.33
0.995	588.5	171.7	58.43	24.50	12.25	6.957	4.284	2.770	1.840	9.970
0.9875	456.8	137.3	47.48	19.89	9.761	5.347	3.133	1.907	1.188	8.277
0.975	369.5	114.0	39.93	16.66	8.016	4.241	2.373	1.371	0.806	7.068
0.95	291.8	92.82	32.93	13.64	6.383	3.230	1.708	0.926	0.509	5.909
0.875	202.0	67.56	24.37	9.876	4.372	2.039	0.9773	0.4743	0.2332	4.426
0.8413	180.3	61.32	22.20	8.913	3.864	1.751	0.8125	0.3877	0.1835	4.038
0.5	86.69	32.91	11.99	4.342	1.570	0.5679	0.2053	0.0742	0.02679	2.117
0.1587	41.68	17.81	6.167	1.810	0.4935	0.1263	0.02979	0.00846	0.00241	0.9546
0.125	37.68	16.34	5.557	1.566	0.4102	0.1042	0.02524	0.00649	0.00159	0.8295
0.05	26.27	12.10	3.803	0.9047	0.1964	0.0413	0.008466	0.00175	0.00035	0.4806
0.025	20.90	9.989	2.908	0.6069	0.1149	0.0210	0.003768	0.00066	0.00012	0.3074
0.0125	17.01	8.405	2.231	0.4054	0.06711	0.0107	0.001663	0.00026	0.00004	0.1803
0.005	13.30	6.828	1.561	0.2348	0.03213	0.00424	.0005558	0.00007	0.00001	.0602
0.0025	11.21	5.903	1.177	0.1523	0.01814	0.00209	.0002290	0.00003	0.000003	

DRAFT

Table IV.D.6. Computation of uncertainty distribution for ERR at 1 Sv. 6. Acute myelogenous leukemia, combined sexes: Likelihood profile distributions, by time since exposure.

Profile quantiles	Time since exposure									
	5 yr	10 yr	15 yr	20 yr	25 yr	30 yr	35 yr	40 yr	45 yr	50 yr
0.9975	28.57	16.54	10.10	6.666	4.903	4.071	3.707	3.563	3.527	3.550
0.995	25.57	15.12	9.385	6.266	4.627	3.819	3.428	3.232	3.129	3.075
0.9875	21.79	13.28	8.443	5.729	4.253	3.478	3.057	2.802	2.626	2.493
0.975	19.05	11.91	7.727	5.314	3.959	3.210	2.771	2.479	2.261	2.085
0.95	16.40	10.55	7.001	4.884	3.651	2.931	2.477	2.157	1.907	1.701
0.875	12.96	8.719	5.997	4.277	3.208	2.530	2.067	1.722	1.450	1.228
0.8413	12.06	8.229	5.722	4.108	3.082	2.416	1.953	1.605	1.331	1.110
0.5	7.453	5.579	4.176	3.126	2.340	1.752	1.311	0.9810	0.7346	0.5499
0.1587	4.548	3.742	3.024	2.356	1.734	1.217	0.8329	0.5627	0.3776	0.2523
0.125	4.215	3.518	2.877	2.255	1.653	1.147	0.7734	0.5140	0.3390	0.2226
0.05	3.267	2.860	2.435	1.947	1.401	0.9314	0.5961	0.3745	0.2329	0.1440
0.025	2.765	2.497	2.183	1.768	1.252	0.8064	0.4978	0.3010	0.1800	0.1069
0.0125	2.374	2.206	1.976	1.618	1.126	0.7024	0.4188	0.2443	0.1408	0.0806
0.005	1.972	1.895	1.749	1.453	0.9829	0.5880	0.3354	0.1870	0.1029	0.0562
0.0025	1.728	1.700	1.603	1.345	0.8885	0.5146	0.2839	0.1531	0.0815	0.0430

DRAFT

Table IV.D.7. Computation of uncertainty distribution for ERR at 1 Sv. 7. Chronic myelogenous leukemia: Likelihood profile distributions, by sex and time since exposure.

Profile quantiles	Time since exposure									
	5	10	15	20	25	30	35	40	45	50
Males										
0.9975	134.6	34.15	14.49	7.474	4.262	2.573	1.606	1.023	0.6598	0.4290
0.995	120.7	30.82	12.86	6.480	3.588	2.091	1.254	0.7654	0.4720	0.2931
0.9875	103.0	26.62	10.82	5.242	2.762	1.519	0.8548	0.4875	0.2803	0.1620
0.975	90.12	23.56	9.337	4.355	2.187	1.138	0.6030	0.3230	0.1742	0.09427
0.95	77.60	20.58	7.899	3.506	1.655	0.8031	0.3954	0.1962	0.09779	0.04890
0.875	61.29	16.67	6.021	2.428	1.020	0.4363	0.1881	0.08147	0.03539	0.01540
0.8413	57.03	15.64	5.528	2.155	0.8702	0.3565	0.1470	0.06087	0.02526	0.01050
0.5	35.09	10.19	2.960	0.8598	0.2497	0.0725	0.0211	0.006119	0.001777	0.00052
0.1587	21.24	6.515	1.354	0.2548	0.04696	0.00859	0.00157	0.0002850	0.000052	0.00001
0.125	19.66	6.071	1.182	0.2057	0.03498	0.00590	0.00099	0.0001664	0.000028	0.000005
0.05	15.18	4.764	0.7191	0.09384	0.01191	0.00150	0.00019	0.00002	0.000003	0
0.025	12.81	4.038	0.5020	0.05319	0.00547	0.00056	0.00006	0.000006	0	0
0.0125	10.98	3.450	0.3518	0.03034	0.00254	0.00021	0.00002	0.000001	0	0
0.005	9.105	2.814	0.2193	0.01440	0.000918	0.00006	0.000004	0	0	0
0.0025	7.972	2.412	0.1523	0.00812	0.000420	0.00002	0.000001	0	0	0

DRAFT

Females										
0.9975	46.16	31.20	23.24	18.77	16.29	15.08	14.83	15.44	16.95	19.56
0.995	40.32	27.45	20.49	16.54	14.31	13.18	12.87	13.24	14.30	16.12
0.9875	33.14	22.87	17.14	13.83	11.91	10.87	10.48	10.58	11.13	12.10
0.975	28.06	19.63	14.79	11.92	10.22	9.259	8.804	8.728	8.957	9.443
0.95	23.24	16.55	12.55	10.12	8.630	7.733	7.231	7.003	6.973	7.086
0.875	17.18	12.64	9.728	7.851	6.625	5.813	5.265	4.886	4.614	4.411
0.8413	15.64	11.63	9.003	7.269	6.112	5.323	4.768	4.361	4.048	3.796
0.5	8.040	6.543	5.325	4.334	3.527	2.871	2.336	1.901	1.547	1.259
0.1587	3.697	3.385	3.000	2.500	1.919	1.393	0.9830	0.6838	0.4718	0.3239
0.125	3.239	3.027	2.729	2.289	1.736	1.231	0.8466	0.5729	0.3843	0.2563
0.05	2.005	2.020	1.948	1.686	1.212	0.7861	0.4901	0.2998	0.1815	0.1092
0.025	1.410	1.501	1.526	1.366	0.9354	0.5658	0.3280	0.1865	0.1048	0.0585
0.0125	0.9859	1.109	1.192	1.115	0.7207	0.4049	0.2181	0.1151	0.06011	0.0312
0.005	0.5983	0.7262	0.8444	0.8553	0.5006	0.2530	0.1229	0.05860	0.02765	0.0130
0.0025	0.3972	0.5123	0.6350	0.6968	0.3686	0.1702	0.07589	0.03326	0.01444	0.00623

DRAFT

Table IV.D.8. Computation of uncertainty distribution for ERR at 1 Sv. 8. Thyroid cancer, combined sexes: Lognormal theory geometric mean (GM) and geometric standard deviation (GSD), by exposure age.

Exposure age	GM	GSD
0	9.463	1.290
5	6.262	1.229
10	4.136	1.277
15	2.732	1.409
20	1.804	1.591
25	1.192	1.812
30	0.788	2.074
35	0.521	2.379
40	0.345	2.732
45	0.228	3.140
50	0.151	3.611

DRAFT

Table IV.D.9. Computation of uncertainty distribution for ERR at 1 Sv. 9. Likelihood profile distributions for non-melanoma skin cancer, both sexes combined. Basal cell carcinoma: exposure ages 0-9, 20, 30, and 40 or older, and all attained ages; for intermediate ages at exposure, logarithms of specific quantiles are to be interpolated by age. Other non-melanoma skin cancers: combined sexes, all exposure ages and all attained ages.

Profile quantiles	Basal cell skin cancer, by age at exposure				Other non-melanoma skin cancer
	0-9.99	20	30	≥40	
0.9975	149.7	23.79	5.872	2.342	0.8243
0.995	129.1	21.34	5.360	2.095	0.7156
0.9875	104.3	18.26	4.687	1.773	0.5715
0.975	87.30	16.02	4.175	1.531	0.4613
0.95	71.53	13.84	3.655	1.288	0.3489
0.875	52.35	11.01	2.938	0.9613	0.1940
0.8413	47.61	10.27	2.742	0.8744	0.1519
0.5	25.22	6.441	1.645	0.4200	-0.08068
0.1587	13.14	3.970	0.8365	0.1495	<0
0.125	11.88	3.677	0.7399	0.1235	<0
0.05	8.467	2.837	0.4556	0.0579	<0
0.025	6.778	2.376	0.3132	0.0323	<0
0.0125	5.524	1.998	0.2125	0.0178	<0
0.005	4.295	1.576	0.1245	0.0078	<0
0.0025	3.584	1.301	0.0814	0.0041	<0

DRAFT

Table IV.D.10. Likelihood profiles for $ERR_{1\,wlm}$ for radon-related lung cancer, by smoking history, age at diagnosis, and time since last exposure. ERR is assumed to be linear in $wlm^{0.82}$, where *wlm* is cumulative radon exposure in working level months.

Profile quantiles	Age ≤ 45 at diagnosis			Age 63 at diagnosis			Age ≥75 at diagnosis		
	Time since last exposure:			Time since last exposure:			Time since last exposure:		
	≤ 5 years	15 years	≥ 25 years	≤ 5 years	15 years	≥ 25 years	≤ 5 years	15 years	≥ 25 years
Smokers									
0.9975	6.73608	2.2048	0.771368	0.629928	0.196976	0.06683	0.22048	0.067267	0.022121
0.995	5.33416	1.7472	0.608608	0.521352	0.163592	0.055349	0.178776	0.054798	0.018013
0.9875	3.81576	1.25008	0.432952	0.396552	0.125112	0.042172	0.13208	0.040799	0.013406
0.975	2.88392	0.945672	0.325624	0.314912	0.099798	0.03355	0.102346	0.031845	0.010462
0.95	2.1112	0.693056	0.23712	0.243152	0.07749	0.025969	0.076887	0.024128	0.00793
0.875	1.3	0.427128	0.144664	0.161616	0.052	0.017337	0.048974	0.01559	0.005126
0.8413	1.12216	0.368992	0.124592	0.142792	0.046093	0.015309	0.042661	0.013645	0.004487
0.5	0.414544	0.136552	0.04498	0.060788	0.02002	0.006597	0.0169	0.005569	0.001835
0.1587	0.163072	0.05381	0.017243	0.025574	0.008601	0.0028	0.006397	0.002182	0.000719
0.125	0.141232	0.046613	0.014872	0.02236	0.007544	0.002451	0.005542	0.001891	0.000623
0.05	0.087953	0.029078	0.009145	0.014279	0.004868	0.001571	0.003384	0.001171	0.000385
0.025	0.06501	0.021518	0.006702	0.01067	0.003662	0.001177	0.002454	0.000857	0.000282
0.0125	0.049566	0.016422	0.005073	0.008191	0.002828	0.000906	0.001835	0.000646	0.000212
0.005	0.035849	0.011898	0.003638	0.005947	0.002069	0.000659	0.001289	0.000458	0.00015
0.0025	0.02861	0.009508	0.002887	0.004747	0.00166	0.000528	0.001006	0.00036	0.000118

DRAFT

Nonsmokers									
0.9975	25.2603	8.268	2.89263	0.655125	0.204855	0.069504	0.229299	0.069958	0.023006
0.995	20.0031	6.552	2.28228	0.542206	0.170136	0.057563	0.185927	0.05699	0.018733
0.9875	14.3091	4.6878	1.62357	0.412414	0.130116	0.043859	0.137363	0.042431	0.013942
0.975	10.8147	3.54627	1.22109	0.327508	0.10379	0.034892	0.10644	0.033119	0.010881
0.95	7.917	2.59896	0.8892	0.252878	0.08059	0.027008	0.079963	0.025093	0.008247
0.875	4.875	1.60173	0.54249	0.168081	0.05408	0.01803	0.050933	0.016213	0.005331
0.8413	4.2081	1.38372	0.46722	0.148504	0.047937	0.015921	0.044367	0.014191	0.004666
0.5	1.55454	0.51207	0.168675	0.06322	0.020821	0.006861	0.017576	0.005792	0.001908
0.1587	0.61152	0.201786	0.064662	0.026597	0.008945	0.002912	0.006653	0.002269	0.000748
0.125	0.52962	0.174798	0.05577	0.023254	0.007846	0.002549	0.005764	0.001966	0.000648
0.05	0.329823	0.109044	0.034293	0.01485	0.005063	0.001634	0.00352	0.001218	0.000401
0.025	0.243789	0.080691	0.025132	0.011097	0.003808	0.001224	0.002553	0.000891	0.000293
0.0125	0.185874	0.061581	0.019024	0.008519	0.002941	0.000942	0.001908	0.000671	0.000221
0.005	0.134433	0.044616	0.013642	0.006185	0.002151	0.000686	0.00134	0.000476	0.000156
0.0025	0.107289	0.035654	0.010826	0.004936	0.001726	0.000549	0.001046	0.000374	0.000123

DRAFT

Table IV.H.1. Photons and electrons: Summary of probability distributions of radiation effectiveness factors to be used in estimating cancer risks and assigned shares in accordance with eq. (IV.H.1), (IV.H.3), or (IV.H.4)[a]

DRAFT

Radiation type	Exposure	Probability distribution of radiation effectiveness factor (REF_L)
Photons	Chronic or acute[b]	
E > 250 keV		Single-valued at 1.0 (higher-energy photons are assumed reference radiation)
E = 30-250 keV		Hybrid distribution with – 25% probability assigned to value 1.0; 75% probability assigned to lognormal distribution with 95% confidence interval between 1.0 and 5.0
E < 30 keV		Product of two distributions – (1) hybrid distribution for E = 30-250 keV; and (2) triangular distribution with minimum of 1.0, mode of 1.3, and maximum of 1.6
Electrons	Chronic or acute[b]	
E > 15 keV		Single-valued at 1.0 (assumed to be same as value for reference higher-energy photons)
E < 15 keV[c]		Lognormal distribution with 95% confidence interval between 1.2 and 5.0

[a]The equations are given in Section IV.H of the report. Equation (IV.H.1) applies to solid tumors, eq. (IV.H.3) applies to leukemias under conditions of chronic exposure, and eq. (IV.H.4) applies to leukemias under conditions of acute exposure.

[b]When eq. (IV.H.1) is used, DDREF is always applied under conditions of chronic exposure. At acute doses greater than 0.2 cGy, DDREF is assumed to be 1.0. At acute doses less than 0.2 cGy, a DDREF that can exceed 1.0 is applied, and the distribution of possible values approaches the probability distribution of DDREF that applies to all chronic exposures as the dose approaches zero.

[c]Probability distribution is based on data on RBE for low-energy beta particles emitted in decay of tritium (^3H); distribution is applied to other electrons of energy less than 15 keV, except low-energy Auger electrons emitted by radionuclides that are incorporated into DNA are excluded.

Table IV.H.2. Alpha particles: Summary of probability distributions of radiation effectiveness factors to be used in estimating cancer risks and assigned shares in accordance with eq. (IV.H.1) or (IV.H.3)[a]

DRAFT

Cancer type	Exposure	Probability distribution of radiation effectiveness factor (REF_L)
Leukemias[b]	Chronic[c]	
All energies of alpha particles		Hybrid distribution with – 25% probability assigned to value 1.0; 50% probability assigned to lognormal distribution with 95% confidence interval between 1.0 and 15; 25% probability assigned to lognormal distribution with 95% confidence interval between 2.0 and 60[d]
Solid tumors	Chronic[c]	
All energies of alpha particles		Lognormal distribution with 95% confidence interval between 3 and 80
Correction for inverse dose-rate effect for all exposures to alpha particles – Discrete distribution with – 70% probability assigned to value 1.0; 20% probability assigned to value 1.5; 7.5% probability assigned to value 2.0; 2.5% probability assigned to value 3.0		

[a]The equations are given in Section IV.H of the report. Equation (IV.H.1) applies to solid tumors, and eq. (IV.H.3) applies to leukemias.

[b]Assumed probability distribution applies to leukemias, lymphomas, and lymphocytic cancers.

[c]Acute exposures to alpha particles emitted by radionuclides generally should not occur; correction factor to account for inverse dose-rate effect under conditions of chronic exposure to alpha particles is applied in all cases.

[d]Distribution is the same as that assumed for leukemias induced by acute exposure to 0.1-2 MeV neutrons (see Table IV.H.3).

Table IV.H.3. Neutrons: Summary of probability distributions of radiation effectiveness factors to be used in estimating cancer risks and assigned shares in accordance with eq. (IV.H.2) or (IV.H.3)[a]

Cancer type	Exposure	Probability distribution of radiation effectiveness factor (REF_L)
Leukemia[b]	Chronic or acute[c]	
Neutron energies		
E = 0.1-2 MeV[d]		Lognormal distribution with 95% confidence interval between 2.0 and 60
E = 10-100 keV; E = 2-20 MeV		Stepwise uniform distribution with – 30% probability assigned to values from 1.0 to 4.0; 50% probability assigned to values from 4.0 to 8.0; 20% probability assigned to values from 8.0 to 40
E < 10 keV; E > 20 MeV		Stepwise uniform distribution with – 30% probability assigned to values from 1.0 to 2.3; 50% probability assigned to values from 2.3 to 3.5; 20% probability assigned to values from 3.5 to 25

Table is continued on following page.

DRAFT

Table IV.H.3. Neutrons: Summary of probability distributions of radiation effectiveness factors (continued)

Cancer type	Exposure	Probability distribution of radiation effectiveness factor (REF_H)
Solid tumors	Chronic or acute[c]	DRAFT
Neutron energies		
E = 0.1-2 MeV[d]		Lognormal distribution with 95% confidence interval between 2.0 and 30
E = 10-100 keV; E = 2-20 MeV		Stepwise uniform distribution with – 30% probability assigned to values from 1.0 to 3.0; 50% probability assigned to values from 3.0 to 5.0; 20% probability assigned to values from 5.0 to 20
E < 10 keV; E > 20 MeV		Stepwise uniform distribution with – 30% probability assigned to values from 1.0 to 1.6; 50% probability assigned to values from 1.6 to 2.4; 20% probability assigned to values from 2.4 to 12
Correction for inverse dose-rate effect for chronic exposures to neutrons – Discrete distribution with – 50% probability assigned to value 1.0; 30% probability assigned to value 1.5; 15% probability assigned to value 2.0; 5% probability assigned to value 3.0		

[a]The equations are given in Section IV.H of the report. Equation (IV.H.2) applies to solid tumors, and eq. (IV.H.3) applies to leukemias.

[b]Assumed probability distributions apply to leukemias, lymphomas, and lymphocytic cancers.

[c]Under conditions of chronic exposure only, correction factor to account for inverse dose-rate effect is applied.

[d]Energy range includes spectrum of fission neutrons.

Table IV.I.1. Factors for adjusting the lung cancer ERR_{1Sv} for smoking status under the assumption of an additive interaction model.

	Used in the 1985 report		Used in deriving uncertainty distribution for this report (W_S*)	
Smoking category (S)	Males	Females	Males	Females
Total	1.00	1.00	1.00	1.00
Never smokers	6.81	4.64	4.74	3.90
Former smokers	1.71	1.17	1.19	0.98
Present smokers (all)	0.604	0.411	0.42	0.35
<10 cigarettes/day	1.75	1.19	1.22	1.00
10-20 cigarettes/day	0.71	0.48	0.49	0.41
21-39 cigarettes/day	0.41	0.28	0.28	0.23
40+ cigarettes/day	0.29	0.20	0.20	0.16
Ever smoker (Present and former smokers)	0.73	0.47	0.51	0.41

DRAFT

Table IV.I.2. Percentage of the U.S. population in various smoking categories

	Used in the 1985 report (Status in 1964-65)		Used in this report (Status in 1993)	
Smoking category (S)	Males	Females	Males	Females
Never smokers	29.8	59.0	42.4	57.8
Former smokers	19.2	7.8	29.9	19.7
Current smokers (all)	51.0	33.2	27.7	22.5
<10 cigarettes/day	13.6	13.5	7.4*	9.2*
10-20 cigarettes/day	24.7	15.0	13.4*	10.2*
21-39 cigarettes/day	11.2	4.4	6.1*	3.0*
40+ cigarettes/day	1.4	0.3	0.8*	0.2*

*These percentages were obtained by assuming distribution by amount smoked among current smokers was the same as that used in the 1985 report (p.50)

Appendix Table C.1. Comparison of approach 1 and approach 2 for estimating the 99% upper statistical uncertainty limit for assigned share, by ages at exposure and at diagnosis. Tabulated values are the approach 2 estimate, in percent, for a 50% approach 1 estimate.

Sex, cancer site		Age at	Age at cancer diagnosis					
corr(log α, γ)	*corr(log α, δ)*	exposure	25	30	35	40	45	≥50
Male, all digestive cancers		18	50.9	51.5	52.2	52.8	53.3	53.5
		20		51.0	51.7	52.3	52.7	53.0
.314	*-.082*	25			50.3	50.8	51.2	51.6
		≥30				49.3	49.7	50.0
Female, all digestive cancers		18	51.8	52.4	53.0	53.5	53.6	53.3
		20		51.9	52.5	53.0	53.2	53.0
.343	*-.011*	25			51.1	51.5	51.7	51.7
		≥30				49.9	50.0	50.0
Female, stomach cancer		18	52.4	52.8	53.2	53.3	53.2	52.9
		20		52.4	52.7	52.9	52.8	52.5
.279	*.031*	25			51.5	51.6	51.6	51.4
		≥30				50.2	50.1	50.0
Both sexes, liver cancer		18	50.2	51.0	51.8	52.5	53.1	53.5
		20		50.5	51.2	51.9	52.5	53.0
.307	*-.115*	25			49.8	50.4	51.0	51.6
		≥30				49.0	49.5	50.0
Female, breast cancer		18	52.1	53.2	54.6	56.0	56.6	56.5
		20		52.4	53.6	54.9	55.8	55.8
.589	*-.107*	25			51.1	51.9	52.7	53.2
		≥30				49.2	49.6	50.0

DRAFT

Appendix Table E.1. Comparison of ERR values as calculated using CIRRPC and IREP. Tabulated ERR values are for a male (female in the case of breast cancer) who developed cancer at age 55 (unless indicated otherwise) following exposure to a chronic dose of 1cSv at age 20.

(1) Type of Cancer	(2) ERR85[1] at 1 cSv, ×100	(3) Dose and linearity factor[2], FDL	(4) **FDL ×ERR85 at 1 cSv, ×100**	(5) Baseline factor[3]	(6) FDL × FB× ERR85 at 1 cSv, ×100	(7) **IREP ERR at 1 cSv, ×100**
Leukemia except CLL						
Peak[6]	6.13	2.43	**14.9**	1.2	17.9	**16.8**
15 years afer exposure	2.05	2.43	**5.0**	1.2	6.0	**4.6**
30 years after exposure	0.23	2.43	**0.56**	1.2	0.68	**0.67**
Acute Myeloid Leuk.						
Peak[6]	5.96	2.43	**14.5**	1.2	17.4	**5.1**
15 years after exposure	1.87	2.43	**4.6**	1.2	5.5	**2.9**
30 years after exposure	0.15	2.43	**0.35**	1.2	0.42	**1.2**
Chronic Myeloid Leuk.						
Peak[6]	6.35	2.43	**15.4**	1.2	18.5	**26.9**
15 years after exposure	2.51	2.43	**6.1**	1.2	7.3	**2.3**
30 years after exposure	0.62	2.43	**1.5**	1.2	1.8	**0.06**
Esophagus	0.207	2.43	**0.50**	2.3	1.16	**0.34**
Stomach	0.569	2.43	**1.5**	1.9	2.6	**0.22**
Colon	0.167	2.43	**0.41**	2.4	0.97	**0.47**
Liver	2.81	2.43	**6.9**	2.6	17.9	**1.28**
Pancreas	0.446	2.43	**1.1**	1.9	2.1	**0.10**
Lung (Non-smoker)	0.831	2.43	**2.0**	2.2	4.44	**0.38**
Lung (Smoker)	0.074	2.43	**0.18**	2.2	0.40	**0.16**
Urinary	0.124	2.43	**0.30**	4.1	1.24	**0.46 or 0.35[5]**
Female Breast	0.606	1.00	**0.61**	1.9	1.15	**0.38**
Thyroid	2.82	1.00	**2.8**	2.7	6.3	**1.2**

[1]The ERR at 1 cSv as given by NIH (1985)

[2]For non-linear estimates based on the A-bomb survivor data, the factor includes 1.62 to correct for dosimetry-related bias and 1.5 to correct for a one-third probability of a linear dose-response.

[3]To calculate CIRRPC screening doses, ERRs were adjusted upward to consider the possibility that a subject might have an exceptionally low baseline risk. These factors were obtained as ratio of average U.S. rate divided by the 10th percentile of the distribution for all U.S. counties.

[4]These are ERRs based on 5000 iterations with IREP.

[5]The first value is that for all urinary cancers; the second is that for bladder cancer.

[6]This the maximum ERR for all time periods after exposure. For the NIH tables, this occurred in the period 3-8 years following exposure. For IREP, the maximum occurred five years after exposure.

DRAFT

Appendix Table E.2. Comparison of ERR values as calculated using CIRRPC and IREP. Tabulated ERR values are for a male (female in the case of breast cancer) who developed cancer at age 55 (unless indicated otherwise) following exposure to a chronic dose of 1cSv at age 30.

(1) Type of Cancer	(2) ERR85[1] at 1 cSv, ×100	(3) Dose and linearity factor[2], FDL	**(4) FDL ×ERR85 at 1 cSv, ×100**	(5) Baseline Factor[3], FB	(6) FDL × FB× ERR85 at 1 cSv, ×100	**(7) IREP ERR at 1 cSv, ×100**
Leukemia except CLL						
Peak[6]	3.95	2.43	**9.6**	1.2	11.5	**10.4**
15 years afer exposure	1.73	2.43	**4.2**	1.2	5.0	**3.7**
30 years after exposure	0.17	2.43	**0.41**	1.2	0.50	**0.75**
Acute Myeloid Leuk.						
Peak[6]	3.75	2.43	**9.0**	1.2	10.8	**5.1**
15 years after exposure	1.63	2.43	**3.9**	1.2	4.7	**2.9**
30 years after exposure	0.15	2.43	**0.36**	1.2	0.44	**1.2**
Chronic Myeloid Leuk.						
Peak[6]	5.49	2.43	**13.3**	1.2	16.0	**26.9**
15 years after exposure	2.15	2.43	**5.2**	1.2	6.3	**2.3**
30 years after exposure	0.27	2.43	**0.66**	1.2	0.79	**0.06**
Esophagus	0.077	2.43	**0.19**	2.3	0.43	**0.21**
Stomach	0.270	2.43	**0.66**	1.9	1.25	**0.13**
Colon	0.077	2.43	**0.19**	2.4	0.45	**0.28**
Liver	0.843	2.43	**2.05**	2.6	5.3	**0.76**
Pancreas	0.176	2.43	**0.43**	1.9	0.81	**0.06**
Lung (Non-smoker)	0.366	2.43	**0.89**	2.2	2.0	**0.38**
Lung (Smoker)	0.032	2.43	**0.08**	2.2	0.17	**0.16**
Urinary	0.064	2.43	**0.16**	4.1	0.64	**0.27 or 0.20[5]**
Female Breast	0.268	1.00	**0.27**	1.9	0.51	**0.26**
Thyroid	1.19	1.00	**1.19**	2.7	3.2	**0.53**

Footnotes are the same as in Appendix Table E.1

DRAFT

Appendix Table E.3. Comparison of ERR values as calculated using CIRRPC and IREP. Tabulated ERR values are for a male (female in the case of breast cancer) who developed cancer at age 55 (unless indicated otherwise) following exposure to a chronic dose of 1cSv at age 40.

(1) Type of Cancer	(2) ERR85[1] at 1 cSv, ×100	(3) Dose and linearity factor[2], FDL	(4) **FDL ×ERR85 at 1 cSv, ×100**	(5) Baseline Factor[3], FB	(6) FDL × FB× ERR85 at 1 cSv, ×100	(7) **IREP ERR at 1 cSv, ×100**
Leukemia except CLL						
Peak[6]	2.04	2.43	**4.9**		5.8	**6.5**
15 years afer exposure	1.21	2.43	**2.9**	1.2	3.5	**2.9**
30 years after exposure	0.16	2.43	**0.39**	1.2	0.47	**0.85**
Acute Myeloid Leuk.						
Peak[6]	1.63	2.43	**4.0**	1.2	4.8	**5.1**
15 years after exposure	1.21	2.43	**2.9**	1.2	3.5	**2.9**
30 years after exposure	0.16	2.43	**0.39**	1.2	0.47	**1.2**
Chronic Myeloid Leuk.						
Peak[6]	4.93	2.43	**12.0**	1.2	14.4	**26.9**
15 years after exposure	1.10	2.43	**2.7**	1.2	3.2	**2.3**
30 years after exposure	0.18	2.43	**0.44**	1.2	0.52	**0.06**
Esophagus	0.044	2.43	**0.11**	2.3	0.25	**0.21**
Stomach	0.150	2.43	**0.36**	1.9	0.69	**0.13**
Colon	0.038	2.43	**0.09**	2.4	0.22	**0.28**
Liver	0.331	2.43	**0.80**	2.6	2.1	**0.76**
Pancreas	0.094	2.43	**0.23**	1.9	0.43	**0.06**
Lung (Non-smoker)	0.221	2.43	**0.54**	2.2	1.2	**0.38**
Lung (Smoker)	0.032	2.43	**0.08**	2.2	0.17	**0.16**
Urinary	0.040	2.43	**0.10**	4.1	0.40	**0.27 or 0.20[5]**
Female Breast	0.100	1.00	**0.10**	1.9	0.19	**0.26**
Thyroid	1.11	1.00	**1.11**	2.7	3.0	**0.23**

DRAFT

Footnotes are the same as in Appendix Table E.1

Appendix Table E.4. Comparison of 99% screening doses (in cSv) from CIRRPC and IREP for males (except breast cancer) exposed to a chronic dose at age 20, 30, or 40 and who developed cancer at age 55 (unless indicated otherwise)

Type of Cancer	99% screening doses for exposure at age 20		99% screening doses for exposure at age 30		99% screening doses for exposure at age 40	
	CIRRPC[1]	IREP[2]	CIRRPC[1]	IREP[2]	CIRRPC[1]	IREP[2]
Leukemia except CLL						
Peak[3]	1.1 (1.3)	2.2	1.7 (2.0)	4.2	3.3 (4.0)	6.5
15 years after exposure[4]	3.3 (3.9)	11	3.9 (4.6)	15	5.5 (6.6)	19
Acute Myeloid Leuk.						
Peak[3]	1.1 (1.3)	5.8	[illegible]	5.8	4.1 (4.9)	5.8
15 years after exposure[4]	3.5 (4.2)	16	[illegible] (4.9)	16	5.5 (6.6)	16
Chronic Myeloid Leuk.						
Peak[3]	0.9 (1.1)	1.2	1.3 (1.6)	1.2	1.4 (1.7)	1.2
15 years after exposure[4]	2.7 (3.2)	11	3.2 (3.8)	11	5.9 (7.1)	11
Esophagus	3.9 (8.6)	45	9.9 (21)	80	17 (34)	80
Stomach	6.9 (12)	34	14 (24)	64	23 (41)	64
Colon	17 (36)	49	33 (65)	90	58 (108)	90
Liver	1.0 (2.6)	14	3.3 (8.2)	23	8.2 (20)	23
Pancreas	5.8 (11)	122	14 (24)	226	24 (41)	226
Lung (Non-smoker)[5]	4.3 (9.1)	51	9.3 (19)	51	15 (30)	51
Urinary	13 (44)	55 or 62[6]	23 (71)	99 or 111[6]	35 (100)	99 or 111[6]
Female Breast	22[7] (41)	63	49[7] (93)	80	132[7] (251)	80
Thyroid	3.4[7] (9.2)	8.5	7.9[7] (21)	21	9.5[7] (26)	34

[1]The main entries are the screening doses (in cSv) as given by CIRRPC, Table 3. The entries in parentheses are the screening doses that would have been obtained without the assumption that subjects had exceptionally low baseline risks.

[2]These screening doses were based on 5000 iterations with IREP. No uncertainty was included for the dose estimate.

[3]CIRRPC screening doses for leukemia within 20 years of exposure were based on the time since exposure that resulted in the maximum ERR. For IREP, the maximum occurred five years after exposure.

[4]CIRRPC screening doses for leukemia 20 or more years after exposure were based on ERRs 15 years after exposure.

[5]CIRRPC screening doses for lung cancer in persons for whom smoking status was unknown at the time of screening were based on non-smokers. CIRRPC screening doses for lung cancer for persons known to be smokers at the time of screening were based on the assumption that smoking status was unknown, a category that was not available in IREP.

[6]The first screening dose is based on all urinary cancers (used in IREP for urinary cancer other than bladder), and the second screening dose is based on bladder cancer.

[7]The CIRRPC screening doses for female breast and thyroid cancer were incorrectly based on a linear-quadratic dose-response function. The values above correct this error and are based on a linear dose-response function.

DRAFT