

**Table S1:** Study population by year of birth, lifetime dose and gender (female numbers are in parenthesis) based on unlagged data.

Period	Dose range (mSv)				Total number of workers (female)	Number of Cases (females)	Mean dose (mSv)
	<10	10.0-	50.0-	100+			
Before 1915	5,587 (963)	2,993 (690)	780 (185)	903 (218)	1,0263 (321)	2,456 (65)	44.3
1915-19	2,564 (456)	1,392 (268)	482 (115)	710 (171)	5,148 (206)	1,067 (41)	62.1
1920-24	4,820 (1148)	2,506 (687)	875 (241)	1,195 (316)	9,396 (439)	2,582 (107)	54.0
1925-29	5,495 (1381)	2,822 (730)	1,014 (304)	1,326 (419)	10,657 (545)	2,956 (122)	51.5
1930-34	6,754 (1332)	3,023 (740)	996 (263)	1,273 (290)	12,046 (782)	2,730 (151)	42.5
1935-39	8,683 (1444)	3,196 (576)	910 (174)	1,015 (190)	13,804 (1037)	2,501 (179)	29.5
1940-44	10,839 (1255)	3,180 (395)	846 (94)	850 (113)	15,715 (1196)	1,944 (159)	22.9
1945-49	14,154 (1392)	3,501 (305)	959 (95)	855 (67)	19,469 (1442)	1,973 (127)	18.7
1950-54	12,358 (412)	3,169 (123)	770 (37)	741 (29)	17,038 (1664)	640 (104)	18.0
1955-59	13,962 (454)	3,095 (87)	796 (15)	547 (10)	18,400 (2206)	640 (153)	13.8
1960-64	14,186 (186)	2,509 (28)	497 (7)	209 (2)	17,401 (2363)	278 (71)	8.7
1965-69	11,557 (95)	1,440 (7)	195 (0)	27 (0)	13,220 (2323)	147 (58)	5.3
1970-74	7,105 (36)	476 (2)	32 (0)	1 (0)	7,614 (1687)	57 (21)	2.9
1975+	2,215 (5)	66 (0)	-	-	2281 (485)	13 (5)	1.6
Total	120,279 (10,559)	33,369 (4,638)	9,152 (1,530)	9,652 (1,825)	172,452 (16,696)	19,984 (1,363)	24.9

**Table S2:** The interaction effect between radiation and various temporal factors of interest for solid cancer and for solid cancer excluding lung cancer (lagged by 10 years).

	All solid cancers		All solid cancers excluding lung			
	ERR/Sv <sup>a</sup> (95% CI)	P-value <sup>b</sup>	Cases	ERR/Sv <sup>a</sup> (95% CI)	P-value <sup>b</sup>	Mean dose (mSv)
<b>Sex:</b>						
Male	0.21 (0.005, 0.43)	>0.50	13,923	0.25 (0.02, 0.51)	0.45	61
Female	-0.06 (-1.88, 2.38)		1,112	-0.53 (-2.21, 1.84)		11
<b>Attained age (years)</b>						
<50	-0.63 (<-1.59; 0.58)	0.49	1,330	-0.44 (-1.54; 0.93)	>0.50	18
50- <60	0.26 (-0.29; 0.91)		2,724	0.18 (-0.42; 0.89)		39
60- <69	0.15 (-0.15; 0.49)		5,065	0.26 (-0.09; 0.66)		57
70+	0.25 (0.01; 0.53)		5,916	0.26 (-0.01; 0.57)		73
<b>Age at first exposure (years)</b>						
<25	-0.19 (-0.50; 0.23)	0.04	2,464	0.02 (-0.35; 0.46)	0.26	55
25- <30	0.004 (-0.30; 0.36)		3,399	0.01 (-0.33; 0.41)		70
30- <40	0.35 (0.06; 0.66)		5,137	0.42 (0.09; 0.79)		65
40+	0.50 (0.07; 0.97)		4,035	0.37 (-0.11; 0.91)		40
<b>Duration of exposure (years)</b>						
<10	0.85 (-0.20; 2.05)	0.05	7,977	0.54 (-0.55; 1.86)	0.22	12
10- <20	0.34 (-0.11; 0.83)		3,990	0.20 (-0.29; 0.74)		41
20- <30	0.38 (0.11; 0.67)		2,422	0.43 (0.13; 0.77)		107
30+	-0.15 (-0.41; 0.17)		646	-0.06 (-0.36; 0.32)		227
<b>Industrial classification:</b>						
Industrial	0.23 (-0.007, 0.49)	>0.50	8416	0.25 (-0.02; 0.55)	>0.5	98
Non-industrial	0.15 (-0.15, 0.48)		6442	0.21 (-0.11; 0.59)		85
Unknown	1.78 (-3.04, 8.16)		177	3.63 (-1.67; 11.1)		28
<b>Monitoring for internal exposure:</b>						
Yes	0.13 (-0.08; 0.37)	0.14	4,034	0.15 (-0.09; 0.42)	0.10	96
No	0.44 (0.07; 0.85)		11,001	0.53 (0.11; 0.99)		32
<b>Alternative lag period:</b>						
5 years	0.19 (0.002; 0.41)			0.23 (0.01; 0.47)		
15 years	0.20 (-0.02; 0.44)			0.25 (0.006; 0.53)		
20 years	0.20 (-0.05; 0.47)			0.26 (-0.01; 0.57)		

a: Background rates adjusted (Eq.1); b: Test of heterogeneity of the ERR/Sv across categories; c: results for all solid cancer combined

**Table S3:** Relative risk (RR), ERR/Sv with 95% confidence interval (CI) for individual solid cancer sites with adjustment for baseline rates (lagged by 10 years).

<b>Cancer site (ICD-9 code)</b>		<b>&lt;20 mSv</b>	<b>20-50 mSv</b>	<b>50-500 mSv</b>	<b>≥500 mSv</b>	<b>Total (no of female)</b>	<b>ERR/Sv (95% CI)</b>	<b>P-value</b>
<i>Oral cavity and pharynx (140-149)</i>	<i>Cases</i> <i>RR (95% CI)</i>	290 1.00	39 0.87 (0.61; 1.21)	47 0.02 (<0.00; 0.88)	0 -	376 (14)	-0.57 (-1.13; 0.15)	0.08
<i>Oesophagus (150)</i>	<i>Cases</i> <i>RR (95% CI)</i>	404 1.00	81 0.93 (0.72; 1.19)	96 0.91 (0.70; 1.17)	5 0.83 (0.29; 1.84)	586 (21)	-0.02 (-0.88; 1.16) *	>0.5
<i>Stomach (151)</i>	<i>Cases</i> <i>RR (95% CI)</i>	539 1.00	131 1.01 (0.82; 1.22)	169 1.08 (0.88; 1.30)	8 0.85 (0.38; 1.64)	847 (16)	0.06 (-0.62; 1.00) *	>0.5
<i>Colon (153)</i>	<i>Cases</i> <i>RR (95% CI)</i>	1,072 1.00	234 1.03 (0.89; 1.19)	303 1.14 (0.99; 1.31)	23 1.51 (0.96; 2.28)	1,632 (78)	0.58 (-0.02; 1.35) *	0.06
<i>Rectum (154)</i>	<i>Cases</i> <i>RR (95% CI)</i>	756 1.00	151 0.98 (0.82; 1.18)	195 1.19 (0.99; 1.42)	18 1.45 (1.41; 4.02)	1,120 (41)	1.20 (0.20; 2.53)	<b>0.015</b>
<i>Colorectal (153-154)</i>	<i>Cases</i> <i>RR (95% CI)</i>	1828 1.00	385 1.01 (0.90; 1.13)	498 1.14 (1.02; 1.28)	41 1.75 (1.23; 2.44)	2,752 (119)	0.68 (0.11; 1.34)	<b>0.013</b>
<i>Liver (155)</i>	<i>Cases</i> <i>RR (95% CI)</i>	225 1.00	52 1.24 (0.82; 1.81)	55 1.15 (0.75; 1.72)	2 0.83 (0.00; 3.93)	334 (7)	-0.34 (-1.31; 2.49) *	0.42
<i>Gallbladder (156)</i>	<i>Cases</i> <i>RR (95% CI)</i>	61 1.00	13 0.94 (0.48; 1.69)	11 0.60 (0.28; 1.18)	1 0.98 (0.00; 5.03)	86 (5)	-0.11 (-2.08; 3.32) *	>0.50
<i>Pancreas (157)</i>	<i>Cases</i> <i>RR (95% CI)</i>	351 1.00	71 0.93 (0.71; 1.20)	95 1.10 (0.84; 1.43)	5 1.19 (0.41; 2.76)	522 (22)	0.14 (-0.92; 1.75)	>0.50
<i>Larynx (161)</i>	<i>Cases</i> <i>RR (95% CI)</i>	179 1.00	32 0.82 (0.55; 1.20)	39 0.79 (0.50; 1.16)	4 1.46 (0.41; 4.05)	254 (2)	0.29 (-1.08; 2.45)	>0.50
<i>Lung (162)</i>	<i>Cases</i> <i>RR (95% CI)</i>	2,099 1.00	506 1.10 (1.00; 1.20)	643 1.20 (1.08; 1.32)	27 0.90 (0.59; 1.32)	3,275 (112)	0.16 (-0.27; 0.70)	>0.50
<i>Pleura (163)</i>	<i>Cases</i> <i>RR (95% CI)</i>	249 1.00	61 1.17 (0.87; 1.56)	80 1.39 (1.04; 1.84)	7 2.56 (1.05; 5.28)	397 (3)	2.28 (0.39; 5.12) *	<b>0.012</b>
<i>Bone and soft tissue (170-171)</i>	<i>Cases</i> <i>RR (95% CI)</i>	99 1.00	16 1.13 (0.74; 1.70)	24 0.38 (0.00; 1.34)	0 -	139 (9)	-0.57 (-1.35; 2.26)	0.40
<i>Malignant melanoma (172)</i>	<i>Cases</i> <i>RR (95% CI)</i>	485 1.00	79 1.08 (0.84; 1.37)	82 1.13 (0.86; 1.46)	4 1.52 (0.45; 3.88)	650 (65)	0.53 (-0.93; 2.64)	>0.50
<i>Female Breast (174)</i>	<i>Cases</i> <i>RR (95% CI)</i>	468 1.00	35 1.23 (0.85; 1.71)	12 0.93 (0.46; 1.48)	0 -	515	-0.56 (-0.88; 3.99)	>0.50
<i>Female Uterus (179-182)</i>	<i>Cases</i> <i>RR (95% CI)</i>	104 1.00	6 0.82 (0.32; 1.72)	5 1.14 (0.35; 2.75)	0 -	115	0.73 (-5.46; 12.5)	>0.50
<i>Female Ovarian (183)</i>	<i>Cases</i> <i>RR (95% CI)</i>	58 1.00	5 1.38 (0.48; 3.15)	1 0.56 (0.00; 2.57)	1 53 (0.00; 263)	65	4.30 (-4.00; 23.9)	0.29
<i>Male Prostate (185)</i>	<i>Cases</i> <i>RR (95% CI)</i>	2,580 1.00	553 0.97 (0.88; 1.07)	660 1.04 (0.94; 1.15)	25 0.80 (0.52; 1.18)	3,818	-0.14 (-0.50; 0.31)	>0.50
<i>Male Testis (186)</i>	<i>Cases</i> <i>RR (95% CI)</i>	144 1.00	13 0.81 (0.00; 1.28)	17 1.34 (1.18; 2.10)	0 -	174	1.88 (-2.93; 9.55)	0.43
<i>Bladder (188)</i>	<i>Cases</i> <i>RR (95% CI)</i>	773 1.00	157 0.92 (0.88; 1.17)	213 1.18 (0.99; 1.41)	17 1.95 (1.11; 3.22)	1,160 (20)	1.35 (0.35; 2.67)	<b>0.005</b>

<i>Kidney (189)</i>	<i>Cases</i> <i>RR (95% CI)</i>	382 1.00	62 0.77 (0.58; 1.01)	89 0.93 (0.70; 1.21)	7 1.31 (0.52; 2.81)	540 (14)	0.38 (-0.44; 1.78)	0.44
<i>All brain and CNS (191-192)</i>	<i>Cases</i> <i>RR (95% CI)</i>	412 1.00	71 0.99 (0.76; 1.28)	71 0.91 (0.68; 1.21)	3 0.84 (0.20; 2.39)	557 (41)	-0.10 (-0.98; 1.35)	>0.50
<i>Thyroid (193)</i>	<i>Cases</i> <i>RR (95% CI)</i>	70 1.00	7 0.68 (0.28; 1.42)	7 0.63 (0.24; 1.40)	2 4.57 (0.00; 2.43)	86 (14)	0.96 (-1.68; 6.91)	>0.50
<i>Other, ill-defined &amp; secondary can. (194-199)</i>	<i>Cases</i> <i>RR (95% CI)</i>	569 1.00	131 1.04(0.85; 1.27)	184 1.22(1.00; 1.48)	10 1.07 (0.51; 1.99)	894 (45)	0.73 (-0.19; 2.04)	0.14
<b>Solid Cancers</b>	<i>Cases</i> <i>RR (95% CI)</i>	12,485 1.00	2,589 0.99 (0.95; 1.04)	3,125 1.08 (1.03; 1.13)	171 1.12 (0.95; 1.32)	18,310 (1,224)	0.20 ( -0.001; 0.43)	<i>0.05</i>
<i>Person-years at risk</i>	-	2,173,49 85	393,847	377,126	12,363	3,556,834 (303,299)		

**Abbreviations:** ERR=excess relative risk; ICD=International Classification of Diseases; RR=relative risk; **Bold:** Statistically significant. *Italic:* Borderline statistical significance; \*: Adjusted for age, sex, industrial classification, birth cohort, first employer institutes of employment.