Magnetic fields and leukaemia risks in UK electricity supply workers

Sorahan, Thomas

[Link to publication on Research at Birmingham portal](#)

Table S1. Relative risks of leukaemia[a] by levels of estimated cumulative magnetic field exposure (four separate analyses), UK electricity generation workers first employed in power stations, 1973-2010.

Exposure to magnetic fields (μT.y)[b]	n	RR[c]	(95 % CI)	RR[d]	(95% CI)
Model 1. Occupational cumulative lifetime exposure to magnetic field.					
0-	101	1.0		1.0	
2.5-	34	0.92	(0.62 to 1.36)	0.94	(0.64 to 1.40)
5.0-	57	0.96	(0.69 to 1.34)	0.98	(0.70 to 1.36)
10.0-	46	0.95	(0.67 to 1.35)	0.97	(0.68 to 1.39)
≥20.0	18	0.86	(0.52 to 1.42)	0.86	(0.52 to 1.43)
RR per 10 μT.y[e]		0.96	(0.85 to 1.10)	0.97	(0.85 to 1.10)
Model 2. Occupational exposure to magnetic fields received more than ten years ago (lagged exposure)					
0-	109	1.0		1.0	
2.5-	39	1.11	(0.76 to 1.60)	1.10	(0.76 to 1.60)
5.0-	53	1.02	(0.73 to 1.43)	1.00	(0.71 to 1.42)
10.0-	42	1.07	(0.74 to 1.56)	1.06	(0.72 to 1.56)
≥20.0	13	0.81	(0.45 to 1.46)	0.79	(0.43 to 1.46)
RR per 10 μT.y[f]		0.95	(0.82 to 1.10)	0.94	(0.81 to 1.08)
Occupational exposure to magnetic fields received less than ten years ago (lugged exposure)					
Zero	154	1.0		1.0	
0.01-	53	0.94	(0.68 to 1.30)	0.95	(0.67 to 1.34)
0.5-	17	0.68	(0.41 to 1.15)	0.69	(0.38 to 1.23)
2.0-	16	0.78	(0.45 to 1.34)	0.83	(0.45 to 1.54)
≥5.0	16	1.03	(0.59 to 1.78)	1.11	(0.59 to 2.07)
RR per 10 μT.y[g]		1.04	(0.66 to 1.64)	1.20	(0.74 to 1.94)

a. cancer registration or any part of death certificate coded to ICD-9 204-208.
b. one year refers to a working year, approx. 250 8-hour shifts.
c. analysed simultaneously with sex and attained age (5 year age groups)
d. analysed simultaneously with sex, attained age, calendar period (5 year periods), and negotiating body (NJM, NJB, NJC, NJIC + NJ(B+C)E).
e. five exposure categories scored by the mean value in each category, namely 0.76, 3.72, 7.27, 13.92, 38.50 μT.y.
f. five exposure categories scored by the mean value in each category, namely 0.71, 3.70, 7.25, 13.75, 37.82 μT.y.
g. five exposure categories scored by the mean value in each category, namely zero, 0.19, 1.11, 3.29, 12.26 μT.y.

Table S2. Relative risks of chronic myeloid leukaemia (CML)[a] by levels of estimated cumulative magnetic field exposure (four separate analyses), UK electricity generation workers first employed in power stations, 1973-2010.

Exposure to magnetic fields (μT.y)[b]	n	RR[c]	(95 % CI)	RR[d]	(95% CI)
Model 1. Occupational cumulative lifetime exposure to magnetic field.					
0-	9	1.0		1.0	
2.5-	6	1.73	(0.62 to 4.86)	1.69	(0.60 to 4.75)
5.0-	10	1.77	(0.72 to 4.36)	1.71	(0.69 to 4.26)
10.0-	5	1.08	(0.36 to 3.23)	1.05	(0.35 to 3.18)
≥20.0	2	0.97	(0.21 to 4.51)	1.04	(0.22 to 4.88)
RR per 10 μT.y[e]		0.95	(0.67 to 1.36)	0.97	(0.67 to 1.39)
Model 2. Occupational exposure to magnetic fields received more than ten years ago (lagged exposure)					
0-	10	1.0		1.0	
2.5-	8	2.31	(0.90 to 5.94)	2.54	(0.97 to 6.63)
5.0-	8	1.54	(0.59 to 4.01)	1.85	(0.69 to 4.98)
10.0-	5	1.29	(0.42 to 3.93)	1.72	(0.54 to 5.45)
≥20.0	1	0.62	(0.08 to 4.99)	0.97	(0.11 to 8.15)
RR per 10 μT.y[f]		0.89	(0.58 to 1.35)	0.94	(0.61 to 1.46)
Occupational exposure to magnetic fields received less than ten years ago (lugged exposure)					
Zero	16	1.0		1.0	
0.01-	6	0.94	(0.36 to 2.45)	0.59	(0.21 to 1.66)
0.5-	5	1.58	(0.55 to 4.50)	0.64	(0.18 to 2.29)
2.0-	2	1.74	(0.16 to 3.41)	0.31	(0.06 to 1.73)
≥5.0	3	1.58	(0.41 to 6.00)	0.68	(0.14 to 3.24)
RR per 10 μT.y[g]		1.48	(0.51 to 4.24)	1.11	(0.34 to 3.61)

a. cancer registration or any part of death certificate coded to ICD-9 205.1.
b. one year refers to a working year, approx. 250 8-hour shifts.
c. analysed simultaneously with sex and attained age (5 year age groups)
d. analysed simultaneously with sex, attained age, calendar period (5 year periods), and negotiating body (NJM, NJB, NJC, NJIC + NJ(B+C)E).
e. five exposure categories scored by the mean value in each category, namely 0.76, 3.72, 7.27, 13.92, 38.50 μT.y.
f. five exposure categories scored by the mean value in each category, namely 0.71, 3.70, 7.25, 13.75, 37.82 μT.y.
g. five exposure categories scored by the mean value in each category, namely zero, 0.19, 1.11, 3.29, 12.26 μT.y.

Table S3. Relative risks of acute myeloid leukaemia (AML)[a] by levels of estimated cumulative magnetic field exposure (four separate analyses), UK electricity generation workers first employed in power stations, 1973-2010.

Exposure to magnetic fields (μT.y)[b]	n	RR[c]	(95 % CI)	RR[d]	(95% CI)
Model 1. Occupational cumulative lifetime exposure to magnetic field.					
0-	27	1.0		1.0	
2.5-	9	0.96	(0.45 to 2.06)	1.04	(0.48 to 2.23)
5.0-	14	0.97	(0.50 to 1.88)	1.06	(0.54 to 2.07)
10.0-	16	1.39	(0.73 to 2.63)	1.53	(0.80 to 2.93)
≥20.0	4	0.81	(0.28 to 2.33)	0.84	(0.29 to 2.45)
RR per 10 μT.y[e]		1.00	(0.78 to 1.27)	1.01	(0.80 to 1.28)
Model 2. Occupational exposure to magnetic fields received more than ten years ago (lagged exposure)					
0-	29	1.0		1.0	
2.5-	10	1.17	(0.56 to 2.43)	1.17	(0.56 to 2.45)
5.0-	14	1.13	(0.58 to 2.22)	1.15	(0.58 to 2.28)
10.0-	14	1.50	(0.75 to 3.00)	1.53	(0.75 to 3.15)
≥20.0	3	0.79	(0.23 to 2.67)	0.77	(0.22 to 2.73)
RR per 10 μT.y[f]		1.02	(0.79 to 1.33)	1.02	(0.78 to 1.33)
Occupational exposure to magnetic fields received less than ten years ago (lugged exposure)					
Zero	39	1.0		1.0	
0.01-	19	1.28	(0.72 to 2.28)	1.30	(0.70 to 2.42)
0.5-	5	0.75	(0.29 to 1.97)	0.80	(0.27 to 2.34)
2.0-	3	0.52	(0.16 to 1.77)	0.64	(0.17 to 2.39)
≥5.0	4	0.86	(0.29 to 2.59)	1.05	(0.31 to 3.53)
RR per 10 μT.y[g]		0.79	(0.31 to 2.01)	0.98	(0.37 to 2.57)

a. cancer registration or any part of death certificate coded to ICD-9 205.0.
b. one year refers to a working year, approx. 250 8-hour shifts.
c. analysed simultaneously with sex and attained age (5 year age groups)
d. analysed simultaneously with sex, attained age, calendar period (5 year periods), and negotiating body (NJM, NJB, NJC, NJIC + NJ(B+C)E).
e. five exposure categories scored by the mean value in each category, namely 0.76, 3.72, 7.27, 13.92, 38.50 μT.y.
f. five exposure categories scored by the mean value in each category, namely 0.71, 3.70, 7.25, 13.75, 37.82 μT.y.
g. five exposure categories scored by the mean value in each category, namely zero, 0.19, 1.11, 3.29, 12.26 μT.y.

Table S4. Relative risks of chronic lymphatic leukaemia (CLL)[a] by levels of estimated cumulative magnetic field exposure (four separate analyses), UK electricity generation workers first employed in power stations, 1973-2010.

Exposure to magnetic fields $(\mu T.y)^{b}$	n	RR[c]	(95 % CI)	RR[d]	(95% CI)
Model 1. Occupational cumulative lifetime exposure to magnetic field.					
0-	57	1.0		1.0	
2.5-	13	0.61	(0.33 to 1.11)	0.61	(0.33 to 1.11)
5.0-	26	0.73	(0.46 to 1.17)	0.72	(0.45 to 1.16)
10.0-	19	0.65	(0.38 to 1.10)	0.64	(0.38 to 1.09)
≥20.0	10	0.79	(0.40 to 1.56)	0.79	(0.40 to 1.55)
RR per 10 $\mu T.y^{e}$		0.93	(0.77 to 1.12)	0.93	(0.77 to 1.12)
Model 2. Occupational exposure to magnetic fields received more than ten years ago (lagged exposure)					
0-	59	1.0		1.0	
2.5-	16	0.81	(0.46 to 1.41)	0.82	(0.47 to 1.43)
5.0-	24	0.81	(0.49 to 1.31)	0.81	(0.49 to 1.32)
10.0-	17	0.76	(0.44 to 1.34)	0.78	(0.44 to 1.37)
≥20.0	9	1.00	(0.48 to 2.05)	1.04	(0.50 to 2.16)
RR per 10 $\mu T.y^{f}$		0.96	(0.78 to 1.17)	0.96	(0.78 to 1.17)
Occupational exposure to magnetic fields received less than ten years ago (lugged exposure)					
Zero	93	1.0		1.0	
0.01-	22	0.76	(0.46 to 1.23)	0.76	(0.46 to 1.26)
0.5-	5	0.41	(0.16 to 1.04)	0.39	(0.15 to 1.04)
2.0-	9	0.93	(0.45 to 1.92)	0.84	(0.39 to 1.84)
≥5.0	6	0.82	(0.34 to 1.97)	0.74	(0.30 to 1.84)
RR per 10 $\mu T.y^{g}$		0.91	(0.44 to 1.85)	0.89	(0.43 to 1.85)

a. cancer registration or any part of death certificate coded to ICD-9 204.1.
b. one year refers to a working year, approx. 250 8-hour shifts.
c. analysed simultaneously with sex and attained age (5 year age groups)
d. analysed simultaneously with sex, attained age, calendar period (5 year periods), and negotiating body (NJM, NJB, NJC, NJIC + NJ(B+C)E).
e. five exposure categories scored by the mean value in each category, namely 0.76, 3.72, 7.27, 13.92, 38.50 μT.y.
f. five exposure categories scored by the mean value in each category, namely 0.71, 3.70, 7.25, 13.75, 37.82 μT.y.
g. five exposure categories scored by the mean value in each category, namely zero, 0.19, 1.11, 3.29, 12.26 μT.y.

Table S5. Relative risks of acute lymphatic leukaemia (ALL)[a] by levels of estimated cumulative magnetic field exposure (four separate analyses), UK electricity generation workers first employed in power stations, 1973-2010.

Exposure to magnetic fields $(\mu T.y)^{b}$	n	RR[c]	(95 % CI)	RR[d]	(95% CI)
Model 1. Occupational cumulative lifetime exposure to magnetic field.					
0-	1	1.0		1.0	
2.5-	3	8.77	(0.91 to 84.5)	8.97	(0.93 to 86.5)
5.0-	1	2.20	(0.14 to 35.6)	2.26	(0.14 to 36.8)
10.0-	3	9.06	(0.91 to 90.2)	9.30	(0.93 to 92.9)
≥20.0	2	13.56	(1.19 to 155)	13.19	(1.15 to 151)
RR per 10 $\mu T.y^{e}$		1.58	(1.03 to 2.43)	1.57	(1.02 to 2.41)
Model 2. Occupational exposure to magnetic fields received more than ten years ago (lagged exposure)					
0-	4	1.0		1.0	
2.5-	2	1.90	(0.32 το 11.2)	1.51	(0.25 to 9.02)
5.0-	1	0.75	(0.07 το 7.44)	0.53	(0.05 to 5.52)
10.0-	2	2.16	(0.32 το 14.6)	1.30	(0.17 to 9.89)
≥20.0	1	2.60	(0.23 το 28.8)	1.20	(0.09 to 16.5)
RR per 10 $\mu T.y^{f}$		1.32	(0.74 to 2.35)	1.23	(0.67 to 2.26)
Occupational exposure to magnetic fields received less than ten years ago (lugged exposure)					
Zero	2	1.0		1.0	
0.01-	2	2.07	(0.27 to 15.6)	3.10	(0.38 to 25.6)
0.5-	2	3.94	(0.46 to 33.7)	8.50	(0.75 to 96.2)
2.0-	2	4.09	(0.46 to 36.3)	10.10	(0.79 to 129)
≥5.0	2	4.41	(0.46 to 42.1)	11.74	(0.79 to 176)
RR per 10 $\mu T.y^{g}$		2.02	(0.51 to 7.99)	2.47	(0.56 to 11.0)

a. cancer registration or any part of death certificate coded to ICD-9 204.0.
b. one year refers to a working year, approx. 250 8-hour shifts.
c. analysed simultaneously with sex and attained age (5 year age groups)
d. analysed simultaneously with sex, attained age, calendar period (5 year periods), and negotiating body (NJM, NJB, NJC, NJIC + NJ(B+C)E).
e. five exposure categories scored by the mean value in each category, namely 0.76, 3.72, 7.27, 13.92, 38.50 µT.y.
f. five exposure categories scored by the mean value in each category, namely 0.71, 3.70, 7.25, 13.75, 37.82 µT.y.
g. five exposure categories scored by the mean value in each category, namely zero, 0.19, 1.11, 3.29, 12.26 µT.y.