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Supplemental Material

Occupational Lead Exposure and Associations with Selected Cancers: The Shanghai Men's and Women's Health Study Cohorts

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Table S1. Top ten jobs exposed to lead fume or dust in the Shanghai Women's Health Study and the Shanghai Men's Health Study.

Occupation	N exposed person-years	%
<u>SWHS</u>		
863: Install/Assembly Electric/Electron Equip	43589	42.1
882: Welders	11814	11.4
869: Other Electric/Electron Equip Install/Maint	8208	7.9
961: Examiners/Inspectors (Workers)	4170	4.0
823: Printing Workers	4006	3.9
723: Foundry Workers	3685	3.6
844: Metal-cut Machine Tools, Blade Sharpen	3074	3.0
994: Warehouse Workers	2912	2.8
523: Odds-and-Ends Workers	2198	2.1
093: Accounting Personnel ^a	2094	2.0
		82.9
<u>SMHS</u>		
863: Install/Assemble Electric/Electron Equip	10931	14.2
722: Rolling Mill & Machinery Operators	9227	12.0
721: Smelters	6481	8.4
852: Machinery Maintenance Workers (casting, welding, etc.)	6193	8.0
869: Other Electric/Electron Equip Install/Maint (Lead Battery)	4159	5.4
842: Fitters	3577	4.6
864: Electricians	3449	4.5
844: Metal-cut Machine Tools, Blade Sharpen	3140	4.1
961: Examiners/Inspectors	2825	3.7
994: Warehouse Workers (dust in hump field)	2537	3.3
		68.1

^a Includes only accounting personnel working in industries with a high probability of lead dust exposure (e.g. smelting/metalworking, electronic assembly). Lead levels for these subjects were estimated to be very low (mean lead fume = <0.001 mg/m³; mean lead dust = 0 mg/m³).

Table S2. Relationship between lead and cancer risk in the Shanghai Women's Health Study.

Exposure	Kidney cancer cases (N)	RR (95% CI) ^a	Lung cancer cases (N)	RR (95% CI) ^a	Stomach cancer cases (N)	RR (95% CI) ^a	Brain cancer cases (N)	RR (95% CI) ^a	Meningioma cases (N)	RR (95% CI) ^a
Ever fume/dust										
Never	76	1.00	440	1.00	292	1.00	34	1.00	38	1.00
Ever	8	1.25 (0.60, 2.61)	27	0.68 (0.46, 1.00)	19	0.69 (0.43, 1.10)	8	2.58 (1.18, 5.63)	9	2.39 (1.14, 4.98)
Low	4	1.27 (0.46, 3.48)	10	0.56 (0.30, 1.05)	7	0.55 (0.26, 1.17)	6	4.21 (1.75, 10.1)	3	1.66 (0.51, 5.40)
High	4	1.24 (0.45, 3.41)	17	0.78 (0.48, 1.27)	12	0.81 (0.46, 1.45)	2	1.19 (0.28, 4.98)	6	3.07 (1.28, 7.35)
Ever dust										
No	81	1.00	455	1.00	304	1.00	39	1.00	42	1.00
Yes	3	1.05 (0.33, 3.33)	12	0.70 (0.39, 1.24)	7	0.57 (0.27, 1.22)	3	1.99 (0.61, 6.47)	5	2.88 (1.13, 7.31)
Lead Dust estimates										
No	81	1.00	455	1.00	304	1.00	39	1.00	42	1.00
≤median	1	0.84 (0.12, 6.04)	3	0.46 (0.15, 1.44)	3	0.64 (0.20, 1.98)	1	1.73 (0.24, 12.6)	1	1.46 (0.20, 10.62)
>median	2	1.20 (0.29, 4.89)	9	0.84 (0.43, 1.63)	4	0.54 (0.20, 1.44)	2	2.15 (0.51, 8.97)	4	3.81 (1.35, 10.72)
Ever dust-10 y lag										
No	81	1.00	455	1.00	304	1.00	39	1.00	42	1.00
Yes	3	1.05 (0.33, 3.33)	12	0.70 (0.39, 1.24)	7	0.57 (0.27, 1.22)	3	1.99 (0.61, 6.48)	5	2.88 (1.13, 7.31)
Lead Dust estimates - 10 y lag										
No	81	1.00	455	1.00	304	1.00	39	1.00	42	1.00
≤median	2	1.68 (0.41, 6.85)	3	0.46 (0.15, 1.44)	3	0.64 (0.20, 1.98)	1	1.73 (0.24, 12.6)	1	1.46 (0.20, 10.62)
>median	1	0.60 (0.08, 4.30)	9	0.84 (0.43, 1.63)	4	0.54 (0.20, 1.44)	2	2.15 (0.51, 8.97)	4	3.81 (1.35, 10.72)
Ever dust-20 y lag										
No	82	1.00	455	1.00	304	1.00	39	1.00	42	1.00
Yes	2	0.72 (0.18, 2.94)	12	0.72 (0.40, 1.28)	7	0.60 (0.28, 1.26)	3	2.07 (0.64, 6.75)	5	3.04 (1.19, 7.72)
Lead Dust estimates - 20 y lag										
No	82	1.00	455	1.00	304	1.00	39	1.00	42	1.00
≤median	1	0.84 (0.12, 6.06)	4	0.63 (0.23, 1.68)	3	0.65 (0.21, 2.02)	1	1.76 (0.24, 12.8)	1	1.48 (0.20, 10.77)
>median	1	0.63 (0.09, 4.55)	8	0.78 (0.38, 1.56)	4	0.56 (0.21, 1.51)	2	2.27 (0.54, 9.52)	4	4.14 (1.47, 11.67)

Exposure	Kidney cancer cases (N)	RR (95% CI) ^a	Lung cancer cases (N)	RR (95% CI) ^a	Stomach cancer cases (N)	RR (95% CI) ^a	Brain cancer cases (N)	RR (95% CI) ^a	Meningioma cases (N)	RR (95% CI) ^a
Ever fume										
No	76	1.00	442	1.00	294	1.00	35	1.00	38	1.00
Yes	8	1.37 (0.66, 2.86)	25	0.67 (0.45, 1.01)	17	0.66 (0.41, 1.09)	7	2.37 (1.04, 5.40)	9	2.57 (1.23, 5.37)
Lead Fume estimates										
No	76	1.00	442	1.00	294	1.00	35	1.00	38	1.00
≤median	5	1.63 (0.65, 4.06)	10	0.56 (0.30, 1.06)	7	0.56 (0.26, 1.19)	5	3.47 (1.34, 8.97)	4	2.21 (0.78, 6.26)
>median	3	1.08 (0.34, 3.46)	15	0.78 (0.46, 1.30)	10	0.76 (0.41, 1.44)	2	1.32 (0.31, 5.55)	5	2.96 (1.15, 7.64)
Ever fume-10 y lag										
No	76	1.00	442	1.00	294	1.00	35	1.00	38	1.00
Yes	8	1.37 (0.66, 2.86)	25	0.67 (0.45, 1.01)	17	0.66 (0.41, 1.09)	7	2.37 (1.04, 5.40)	9	2.57 (1.23, 5.37)
Lead Fume estimates-10 y lag										
No	76	1.00	442	1.00	294	1.00	35	1.00	38	1.00
≤median	5	1.63 (0.65, 4.06)	10	0.56 (0.30, 1.06)	7	0.56 (0.26, 1.19)	5	3.47 (1.34, 8.97)	4	2.21 (0.78, 6.26)
>median	3	1.08 (0.34, 3.46)	15	0.78 (0.46, 1.30)	10	0.76 (0.41, 1.44)	2	1.32 (0.31, 5.55)	5	2.96 (1.15, 7.64)
Ever fume-20 y lag										
No	78	1.00	444	1.00	294	1.00	35	1.00	38	1.00
Yes	6	1.03 (0.45, 2.38)	23	0.63 (0.41, 0.96)	17	0.68 (0.42, 1.12)	7	2.44 (1.07, 5.56)	9	2.68 (1.28, 5.60)
Lead Fume estimates-20 y lag										
No	78	1.00	444	1.00	294	1.00	35	1.00	38	1.00
≤median	3	0.97 (0.30, 3.08)	10	0.57 (0.30, 1.07)	8	0.65 (0.32, 1.32)	5	3.52 (1.36, 9.08)	5	2.84 (1.11, 7.29)
>median	3	1.10 (0.34, 3.51)	13	0.69 (0.40, 1.20)	9	0.71 (0.37, 1.39)	2	1.38 (0.33, 5.80)	4	2.50 (0.88, 7.11)

^aAdjusted for education, income level, lifetime pack-years of cigarette use, and menopause status (women only).

Table S3. Relationship between lead and cancer risk in the Shanghai Men's Health Study.

Exposure	Kidney cancer cases (N)	RR (95% CI) ^a	Lung cancer cases (N)	RR (95% CI) ^a	Stomach cancer cases (N)	RR (95% CI) ^a	Brain cancer cases (N)	RR (95% CI) ^a	Meningioma cases (N)	RR (95% CI) ^a
Ever fume/dust										
Never	81	1.00	460	1.00	293	1.00	33	1.00	12	1.00
Ever	9	1.56 (0.78, 3.11)	47	1.24 (0.91, 1.67)	30	1.35 (0.92, 1.96)	2	0.90 (0.22, 3.78)	0	-
Low	1	0.45 (0.06, 3.23)	12	0.95 (0.53, 1.68)	7	0.91 (0.43, 1.92)	1	1.16 (0.16, 8.53)	0	-
High	8	2.26 (1.09, 4.70)	35	1.38 (0.98, 1.95)	23	1.58 (1.03, 2.42)	1	0.74 (0.10, 5.42)	0	-
Ever dust										
No	87	1.00	493	1.00	315	1.00	33	1.00	12	1.00
Yes	3	1.50 (0.48, 4.76)	14	1.12 (0.66, 1.91)	8	1.06 (0.52, 2.14)	2	2.89 (0.69, 12.1)	0	-
Lead Dust estimates										
No	87	1.00	493	1.00	315	1.00	33	1.00	12	1.00
≤median	0	-	10	1.57 (0.84, 2.94)	4	0.98 (0.37, 2.62)	1	2.40 (0.33, 17.6)	0	-
>median	3	3.68 (1.16, 11.7)	4	0.65 (0.24, 1.74)	4	1.15 (0.43, 3.10)	1	3.63 (0.49, 26.7)	0	-
Ever dust-10 y lag										
No	87	1.00	493	1.00	315	1.00	33	1.00	12	1.00
Yes	3	1.50 (0.48, 4.76)	14	1.12 (0.66, 1.91)	8	1.06 (0.52, 2.14)	2	2.89 (0.69, 12.1)	0	-
Lead Dust estimates - 10 y lag										
No	87	1.00	493	1.00	315	1.00	33	1.00	12	1.00
≤median	0	-	10	1.57 (0.84, 2.94)	4	0.98 (0.37, 2.62)	1	2.40 (0.33, 17.6)	0	-
>median	3	3.68 (1.16, 11.7)	4	0.65 (0.24, 1.74)	4	1.15 (0.43, 3.10)	1	3.63 (0.49, 26.7)	0	-
Ever dust-20 y lag										
No	87	1.00	493	1.00	315	1.00	33	1.00	12	1.00
Yes	3	1.50 (0.48, 4.76)	14	1.12 (0.66, 1.91)	8	1.06 (0.52, 2.14)	2	2.89 (0.69, 12.1)	0	-
Lead Dust estimates - 20 y lag										
No	87	1.00	493	1.00	315	1.00	33	1.00	12	1.00
≤median	0	-	10	1.57 (0.84, 2.94)	4	0.98 (0.37, 2.62)	1	2.40 (0.33, 17.6)	0	-
>median	3	3.68 (1.16, 11.7)	4	0.65 (0.24, 1.74)	4	1.15 (0.43, 3.10)	1	3.63 (0.49, 26.7)	0	-

Exposure	Kidney cancer cases (N)	RR (95% CI) ^a	Lung cancer cases (N)	RR (95% CI) ^a	Stomach cancer cases (N)	RR (95% CI) ^a	Brain cancer cases (N)	RR (95% CI) ^a	Meningioma cases (N)	RR (95% CI) ^a
Ever fume										
No	81	1.00	460	1.00	293	1.00	33	1.00	12	1.00
Yes	9	1.62 (0.81, 3.24)	47	1.27 (0.94, 1.71)	30	1.39 (0.95, 2.03)	2	0.94 (0.23, 3.94)	0	-
Lead Fume estimates										
No	81	1.00	460	1.00	293	1.00	33	1.00	12	1.00
≤median	1	0.47 (0.07, 3.39)	12	0.98 (0.55, 1.74)	7	0.95 (0.45, 2.01)	1	1.23 (0.17, 9.01)	0	-
>median	8	2.34 (1.13, 4.86)	35	1.41 (1.00, 1.99)	23	1.62 (1.06, 2.48)	1	0.76 (0.10, 5.60)	0	-
Ever fume-10 y lag										
No	81	1.00	461	1.00	293	1.00	33	1.00	12	1.00
Yes	9	1.64 (0.82, 3.28)	46	1.25 (0.92, 1.69)	30	1.40 (0.96, 2.04)	2	0.95 (0.23, 3.98)	0	-
Lead Fume estimates-10 y lag										
No	81	1.00	461	1.00	293	1.00	33	1.00	12	1.00
≤median	1	0.48 (0.07, 3.47)	11	0.91 (0.50, 1.66)	7	0.97 (0.46, 2.05)	1	1.26 (0.17, 9.24)	0	-
>median	8	2.35 (1.13, 4.88)	35	1.41 (1.00, 1.99)	23	1.63 (1.06, 2.49)	1	0.77 (0.10, 5.62)	0	-
Ever fume-20 y lag										
No	82	1.00	462	1.00	296	1.00	33	1.00	12	1.00
Yes	8	1.51 (0.73, 3.14)	45	1.27 (0.93, 1.72)	27	1.30 (0.88, 1.93)	2	1.00 (0.24, 4.18)	0	-
Lead Fume estimates-20 y lag										
No	82	1.00	462	1.00	296	1.00	33	1.00	12	1.00
≤median	0	-	10	0.89 (0.47, 1.66)	6	0.88 (0.39, 1.98)	1	1.35 (0.18, 9.90)	0	-
>median	8	2.41 (1.16, 5.01)	35	1.44 (1.02, 2.04)	21	1.51 (0.97, 2.35)	1	0.79 (0.11, 5.81)	0	-

^aAdjusted for education, income level, and lifetime pack-years of cigarette use.