

Supplemental Material

**Associations of Mortality with Long-Term Exposures to Fine and
Ultrafine Particles, Species and Sources: Results from the California
Teachers Study Cohort**

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Table S1. Correlations between PM_{2.5} and various chemical species calculated from model predictions.

Exposure	Mass	Cu	EC	Fe	Mn	Oth Mtl	Nit	OC	Oth Spc	S_ant	S_bio
Mass	-										
Cu	0.64	-									
EC	0.74	0.44	-								
Fe	0.86	0.69	0.58	-							
Mn	0.83	0.74	0.55	0.96	-						
Oth Mtl	0.85	0.68	0.56	1.00	0.95	-					
Nit	0.81	0.65	0.55	0.80	0.79	0.81	-				
OC	0.73	0.38	0.90	0.52	0.49	0.49	0.43	-			
Oth Spc	0.83	0.70	0.48	0.97	0.94	0.98	0.80	0.42	-		
S_ant	0.76	0.51	0.54	0.62	0.61	0.61	0.84	0.42	0.59	-	
S_bio	0.62	0.53	0.38	0.65	0.65	0.65	0.75	0.33	0.66	0.79	-

Oth Mtl = Other metals; Oth Spc = Other species; Nit = Nitrate; S_ant = anthropogenic; S_bio = biogenic secondary organics.

Table S2. Correlations between UF and various chemical species calculated from model predictions.

Exposure	Mass	Cu	EC	Fe	Mn	Oth Mtl	Nit	OC	Oth Spc	S_ant	S_bio
Mass	-										
Cu	0.48	-									
EC	0.74	0.19	-								
Fe	0.77	0.64	0.69	-							
Mn	0.27	0.50	0.19	0.63	-						
Oth Mtl	0.94	0.71	0.70	0.86	0.34	-					
Nit	-	-	-	-	-	-	-				
OC	0.99	0.48	0.67	0.73	0.25	0.42	-	-			
Oth Spc	0.71	0.87	0.62	0.81	0.40	0.93	-	0.68	-		
S_ant	0.64	0.37	0.40	0.53	0.20	0.88	-	0.62	0.41	-	
S_bio	0.70	0.22	0.42	0.56	0.15	0.62	-	0.69	0.34	0.75	-

Oth Mtl = Other metals; Oth Spc = Other species; Nit = Nitrate; S_ant = anthropogenic; S_bio = biogenic secondary organics.

Table S3. Hazard ratios (HR) and 95% confidence interval (CI) for association of PM_{2.5} and mortality outcomes.

Exposure	IQR (µg/m ³)	All-cause mortality HR ^a (95% CI)	p-value	Cardiovascular mortality HR ^a (95% CI)	p-value	Pulmonary mortality HR ^a (95% CI)	p-value
Pollutant							
Mass	9.6	1.01 (0.98, 1.05)	0.47	1.05 (0.99, 1.12)	0.10	0.99 (0.90, 1.09)	0.87
Cu	0.4 ^b	1.00 (0.98, 1.03)	0.77	1.02 (0.98, 1.06)	0.32	1.00 (0.94, 1.08)	0.92
Fe	0.2	1.00 (0.97, 1.04)	0.83	1.00 (0.95, 1.06)	0.93	0.99 (0.90, 1.09)	0.87
Mn	4.0 ^b	1.00 (0.96, 1.03)	0.80	1.00 (0.95, 1.06)	0.98	0.98 (0.90, 1.08)	0.72
Nitrate	3.9	1.03 (0.99, 1.08)	0.13	1.10 (1.02, 1.18)	<0.01	1.02 (0.90, 1.14)	0.80
EC	0.8	1.00 (0.97, 1.04)	0.95	1.04 (0.98, 1.09)	0.22	1.00 (0.91, 1.09)	0.96
OC	2.8	1.00 (0.97, 1.04)	0.92	1.01 (0.96, 1.07)	0.66	0.99 (0.90, 1.09)	0.83
Other compounds	1.4	1.01 (0.98, 1.04)	0.46	1.01 (0.96, 1.06)	0.61	1.01 (0.93, 1.09)	0.85
Other metals ^c	0.5	1.01 (0.97, 1.05)	0.63	1.01 (0.95, 1.07)	0.69	1.00 (0.90, 1.10)	0.92
SOA biogenic	0.1	1.03 (0.99, 1.06)	0.10	1.04 (0.98, 1.09)	0.18	1.05 (0.96, 1.15)	0.26
SOA anthropogenic	0.1	1.02 (0.98, 1.06)	0.41	1.06 (0.99, 1.13)	0.10	1.00 (0.89, 1.12)	0.99
Sources of primary particles							
On-road gasoline	0.3	0.99 (0.95, 1.02)	0.46	1.01 (0.96, 1.07)	0.60	0.94 (0.86, 1.03)	0.21
Off-road gasoline	0.2	0.99 (0.96, 1.03)	0.65	1.03 (0.97, 1.09)	0.31	0.97 (0.88, 1.07)	0.58
On-road diesel	0.4	1.00 (0.97, 1.04)	0.87	1.02 (0.96, 1.09)	0.47	0.98 (0.88, 1.08)	0.67
Off-road diesel	0.8	1.00 (0.97, 1.04)	0.98	1.04 (0.98, 1.09)	0.20	1.00 (0.92, 1.10)	0.97
Wood smoke	1.3	1.01 (0.98, 1.04)	0.36	0.99 (0.95, 1.04)	0.71	1.02 (0.94, 1.10)	0.63
Meat cooking	1.2	0.98 (0.95, 1.02)	0.33	1.01 (0.96, 1.07)	0.73	1.00 (0.92, 1.09)	0.97
High sulfur fuel combustion	0.4	1.03 (1.01, 1.05)	<0.005	1.05 (1.02, 1.09)	<0.004	1.01 (0.95, 1.07)	0.75
Other anthropogenic	3.8	1.01 (0.97, 1.04)	0.76	1.01 (0.95, 1.07)	0.75	0.99 (0.90, 1.09)	0.85

^aHRs stratified for age and race and adjusted for smoking status, smoking pack-years, adult second-hand smoke exposure, BMI, marital status, alcohol consumption, physical activity, menopausal status and HT use combined, family history of heart disease, hypertension medication/aspirin use, dietary fat, fiber and caloric intake. ^bConcentrations x1000. ^cMetals other than Cu, Fe, and Mn.

Table S4. Hazard ratios (HR) and 95% confidence interval (CI) for association of UF and mortality outcomes.

Exposure	IQR ($\mu\text{g}/\text{m}^3$)	All-cause mortality HR^a (95% CI)	p-value	Cardiovascular mortality HR^a (95% CI)	p-value	Pulmonary mortality HR^a (95% CI)	p-value
Pollutant							
Mass	969	1.01 (0.98, 1.05)	0.38	1.03 (0.97, 1.08)	0.33	1.01 (0.93, 1.10)	0.82
Cu	0.02	1.00 (0.99, 1.02)	0.89	1.03 (1.00, 1.05)	0.02	0.98 (0.93, 1.02)	0.29
Fe	0.8	1.00 (0.98, 1.02)	0.98	1.01 (0.98, 1.04)	0.53	0.99 (0.93, 1.06)	0.76
Mn	0.03	1.00 (0.99, 1.00)	0.31	1.00 (0.99, 1.01)	0.80	0.99 (0.96, 1.02)	0.45
Nitrate	-	-		-	-	-	-
EC	93	1.01 (0.97, 1.04)	0.72	1.04 (0.98, 1.10)	0.20	1.01 (0.92, 1.11)	0.88
OC	731	1.01 (0.98, 1.04)	0.43	1.02 (0.97, 1.07)	0.47	1.01 (0.93, 1.09)	0.83
Other compounds	29	1.00 (0.98, 1.03)	0.71	1.04 (1.00, 1.08)	0.05	0.98 (0.91, 1.05)	0.52
Other metals ^b	17	1.01 (0.98, 1.04)	0.51	1.04 (0.99, 1.09)	0.14	0.98 (0.90, 1.07)	0.63
SOA biogenic	14	1.03 (1.00, 1.07)	0.08	1.04 (0.99, 1.10)	0.12	1.06 (0.97, 1.15)	0.21
SOA anthropogenic	24	1.02 (0.98, 1.07)	0.29	1.07 (0.99, 1.14)	0.07	1.01 (0.90, 1.13)	0.84
Sources of primary particles							
On-road gasoline	108	0.99 (0.95, 1.02)	0.49	1.02 (0.96, 1.07)	0.59	0.94 (0.86, 1.03)	0.21
Off-road gasoline	33	0.99 (0.96, 1.03)	0.69	1.03 (0.97, 1.09)	0.31	0.98 (0.88, 1.08)	0.63
On-road diesel	56	1.01 (0.97, 1.05)	0.75	1.02 (0.96, 1.09)	0.44	0.98 (0.89, 1.08)	0.70
Off-road diesel	73	1.00 (0.97, 1.04)	0.91	1.04 (0.98, 1.09)	0.21	1.01 (0.92, 1.10)	0.89
Wood smoke	332	1.01 (0.99, 1.05)	0.33	0.98 (0.94, 1.03)	0.53	1.02 (0.95, 1.10)	0.59
Meat cooking	128	0.99 (0.95, 1.02)	0.42	1.02 (0.97, 1.08)	0.47	0.99 (0.91, 1.08)	0.87
High sulfur fuel combustion	54	1.01 (0.99, 1.03)	0.25	1.04 (1.01, 1.07)	<0.005	0.99 (0.94, 1.04)	0.73
Other anthropogenic	400	1.01 (0.99, 1.03)	0.39	1.02 (0.99, 1.05)	0.30	1.01 (0.96, 1.06)	0.75

^aHRs stratified for age and race and adjusted for smoking status, smoking pack-years, adult second-hand smoke exposure, BMI, marital status, alcohol consumption, physical activity, menopausal status and HT use combined, family history of heart disease, hypertension medication/aspirin use, dietary fat, fiber and caloric intake. ^bMetals other than Cu, Fe, and Mn.