

Supplementary materials

Effects of particulate **matter** on inflammatory markers in the general adult population

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Supplementary Material, Table 1. Levels of inflammatory markers overall and by selected subgroups

	hs-CRP (µg/mL)		IL-1β (pg/mL)		IL-6 (pg/mL)		TNF-α (pg/mL)		
	Subjects [n(%)]	N	Median (P25-P75)	N	Median (P25-P75)	N	Median (P25-P75)	N	Median (P25-P75)
All subjects	6183	6171	1.30(0.60-2.70)	3794	1.17(0.48-3.90)	5626	1.47(0.71-3.52)	6034	2.89(1.82-4.52)
Sex									
Female	3251(52.6)	3247	1.30(0.60-2.90)	2049	1.28(0.52-3.76)	2933	1.37(0.67-3.22)	3172	2.75(1.72-4.40)
Male	2932(47.4)	2924	1.20(0.60-2.60)	1745	1.08(0.45-3.96)	2693	1.59(0.77-3.79)	2862	3.05(1.90-4.65)
p-value			0.01		0.04		<0.01		<0.01
Age (Years)									
<55	3506(56.7)	3500	1.00(0.50-2.40)	2274	1.29(0.51-4.16)	3140	1.39(0.67-3.53)	3414	2.71(1.71-4.27)
≥55	2677(43.3)	2671	1.60(0.80-3.20)	1520	1.05(0.45-3.42)	2486	1.60(0.78-3.47)	2620	3.15(2.01-4.83)
p-value			<0.01		<0.01		<0.01		<0.01
BMI									
<25	2970(48.0)	2963	0.80(0.40-1.70)	1872	1.32(0.53-4.09)	2648	1.35(0.64-3.45)	2896	2.70(1.71-4.21)
≥25	3213(52.0)	3208	1.90(0.90-3.80)	1922	1.05(0.45-3.64)	2978	1.59(0.80-3.53)	3183	3.11(1.93-4.82)
p-value			<0.01		<0.01		<0.01		<0.01
Smoking									
No	4510(72.9)	4506	1.20(0.60-2.70)	2763	1.14(0.48-3.79)	4083	1.38(0.67-3.30)	4412	2.86(1.79-4.47)
Yes	1673(27.1)	1665	1.40(0.70-2.90)	1031	1.27(0.49-4.46)	1543	1.72(0.86-4.02)	1622	2.99(1.87-4.79)
p-value			<0.01		0.05		<0.01		0.01
Diabetes									
No	5764(93.2)	5764	1.20(0.60-2.60)	3588	1.19(0.49-3.91)	5237	1.45(0.70-3.46)	5635	2.86(1.79-4.48)
Yes	407(6.8)	407	2.10(1.00-4.50)	206	0.93(0.43-3.58)	388	1.93(0.92-3.86)	398	3.55(2.21-5.37)
p-value			<0.01		0.17		<0.01		<0.01
Hypertension									
No	3960(47.9)	3953	1.10(0.50-2.30)	2527	1.23(0.50-4.09)	3569	1.37(0.66-3.39)	3860	2.74(1.72-4.30)
Yes	2223(52.1)	2218	1.80(0.90-3.60)	1267	1.07(0.45-3.49)	2057	1.67(0.83-3.65)	2174	3.19(2.04-4.92)
p-value			<0.01		0.01		<0.01		<0.01
Alcohol									
No	4613(74.6)	4606	1.20(0.60-2.70)	2875	1.19(0.48-3.93)	4183	1.42(0.70-3.40)	4505	2.86(1.80-4.50)
Yes	1567(25.4)	1567	1.40(0.70-2.70)	918	1.14(0.47-3.78)	1441	1.59(0.79-3.94)	1527	2.99(1.86-4.61)
p-value			<0.01		0.36		<0.01		0.09

Note: by Wilcoxon rank sum test

Supplementary Material, Table 2. Change (and 95% CI) in inflammatory markers associated with a 10 µg/m³ change in ambient 24h average PM₁₀ concentration

	Crude effects	p-value	Adjusted effects ^a	p-value
hs-CRP (µg/mL)	0.0004 (-0.016, 0.016)	0.961	-0.002 (-0.017, 0.013)	0.820
IL-1β (pg/mL)	0.016 (-0.009, 0.040)	0.226	0.017 (-0.010, 0.044)	0.220
IL-6 (pg/mL)	0.026 (0.008, 0.043)	0.004	0.023 (0.005, 0.042)	0.014
TNF-α (pg/mL)	0.015 (0.004, 0.025)	0.005	0.024 (0.013, 0.035)	<0.001

[§] Covariates included in the model: sex, age, BMI, alcohol consumption, smoking status, education levels, zip code, statin, diabetes, hypertension, season, outdoor air temperature, and outdoor air pressure. Data are coefficients from robust regression models.

Supplementary Material, Table 3. Association of short-term exposure to 24h average PM10 with inflammatory markers on the day of examination, and with 1-day to 6-day lags from adjusted robust regression models[§]

	hs-CRP	p-value	IL-1 β	p-value	IL-6	p-value	TNF- α	p-value
Lag 0 (Same day)	-0.002 (-0.017, 0.013)	0.820	0.017 (-0.010, 0.044)	0.220	0.023 (0.005, 0.042)	0.014	0.024 (0.013, 0.035)	<0.001
Lag 1	0.001 (-0.013, 0.016)	0.854	0.014 (-0.012, 0.041)	0.290	0.023 (0.005, 0.004)	0.013	0.022 (0.012, 0.033)	<0.001
Lag 2	0.002 (-0.013, 0.017)	0.798	0.020 (-0.007, 0.047)	0.146	0.026 (0.008, 0.044)	0.005	0.023 (0.013, 0.034)	<0.001
Lag 3	-0.001 (-0.015, 0.014)	0.944	0.017 (-0.010, 0.044)	0.207	0.029 (0.011, 0.047)	0.002	0.023 (0.012, 0.034)	<0.001
Lag 4	0.002 (-0.013, 0.017)	0.784	0.017 (-0.009, 0.043)	0.206	0.031 (0.012, 0.049)	0.001	0.022 (0.011, 0.033)	<0.001
Lag 5	0.003 (-0.011, 0.018)	0.662	0.017 (-0.010, 0.043)	0.221	0.029 (0.010, 0.047)	0.002	0.019 (0.008, 0.030)	0.001
Lag 6	0.002 (-0.012, 0.017)	0.753	0.013 (-0.013, 0.040)	0.325	0.031 (0.013, 0.050)	0.001	0.019 (0.008, 0.030)	0.001

[§]Adjusted for: sex, age, BMI, alcohol consumption, smoking status, education levels, zip code, statin, diabetes, hypertension, season, outdoor air temperature, and outdoor air pressure.

Supplementary Material, Table 4. Associations of short-term exposure to 24h average PM₁₀ with inflammatory markers, by selected strata

	hs-CRP	p-value	IL-1β	p-value	IL-6	p-value	TNF-α	p-value
Female	-0.008 (-0.028, 0.012)	0.439	0.010 (-0.026, 0.046)	0.582	0.012 (-0.013, 0.037)	0.354	0.023 (0.008, 0.038)	0.002
Male	0.009 (-0.013, 0.031)	0.416	0.028 (-0.013, 0.069)	0.183	0.038 (0.010, 0.066)	0.007	0.025 (0.009, 0.041)	0.002
Interaction p-value[§]		0.560		0.999		0.371		0.627
Age<55	-0.007 (-0.027, 0.013)	0.511	0.026 (-0.009, 0.061)	0.149	0.033 (0.008, 0.059)	0.011	0.027 (0.013, 0.042)	<0.001
Age\geq55	0.007 (-0.015, 0.029)	0.527	0.004 (-0.039, 0.046)	0.866	0.013 (-0.014, 0.040)	0.360	0.020 (0.003, 0.037)	0.021
Interaction p-value[§]		0.404		0.315		0.079		0.624
Healthy[†]	0.025 (-0.009, 0.058)	0.151	0.048 (-0.017, 0.112)	0.150	0.062 (0.015, 0.108)	0.009	0.035 (0.009, 0.061)	0.009
Non-healthy[†]	-0.007 (-0.024, 0.009)	0.400	0.012 (-0.018, 0.041)	0.437	0.014 (-0.006, 0.034)	0.175	0.022 (0.010, 0.034)	<0.001
Interaction p-value[§]		0.620		0.331		0.391		0.778
No statins	-0.002 (-0.018, 0.014)	0.806	0.007 (-0.022, 0.036)	0.645	0.023 (0.003, 0.043)	0.027	0.024 (0.012, 0.036)	<0.001
With statins	0.006 (-0.036, 0.049)	0.773	0.083 (0.004, 0.161)	0.040	0.031 (-0.017, 0.081)	0.196	0.020 (-0.011, 0.051)	0.200
Interaction p-value[§]		0.843		0.130		0.699		0.809

Data are coefficients (95% CI) from robust regression models. Coefficients represent change in cytokine per 10 $\mu\text{g}/\text{m}^3$ increase in PM₁₀. [§] P-value for interaction between the strata variable and PM₁₀ for their effects on the inflammatory marker.

[†] Sample sizes for healthy and non-healthy are 993 and 5190, respectively.