Online Supplement

Effects of short-term exposure to air pollution on hospital admissions for autism spectrum disorder in Korean school-aged children: A nationwide time-series study

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levels at lag day 5, and O_3 levels at lag day 4, respectively.

Online Supplementary Figure 3. Daily concentrations of $PM_{2.5}$ and counts of hospital admissions for autism spectrum disorder in Seoul, in January 2015.

Online Supplementary Table 1. Demographic and meteorological features of the regions in the Republic of Korea

Region	Area (km^2)	Population[a]	Temperature (°C)[b]	Relative humidity (%)[b]
Seoul	605	9,794,304	12.8	59.8
Busan	770	3,414,950	15.0	61.8
Daegu	884	2,446,418	14.5	59.0
Incheon	1,063	2,662,509	11.6	71.5
Gwangju	501	1,475,745	14.2	67.1
Daejeon	539	1,501,859	13.2	69.5
Ulsan	1,061	1,082,567	14.4	63.6
Gyeonggi-do	10,187	11,379,459	11.8	67.3
Gangwon-do	16,828	1,471,513	11.2	66.1
Chungcheongbuk-do	7,408	1,512,157	11.7	66.7
Chungcheongnam-do	8,691	2,028,002	12.3	72.2
Jeollabuk-do	8,069	1,777,220	12.7	71.8
Jeollanam-do	12,335	1,741,499	13.6	72.5
Gyeongsangbuk-do	19,033	2,600,032	12.4	65.5
Gyeongsangnam-do	10,540	3,160,154	13.8	65.5
Jeju-do	1,850	531,905	16.1	72.7

[a] 2010 census

[b] Means during the study period (2011–2015)

Online Supplementary Table 2. Associations between $PM_{2.5}$, NO_2, and O_3 levels and hospital admissions for autism spectrum disorder in seven metropolitan cities and nine non-metropolitan regions[a]

	Seven metropolitan cities			Nine non-metropolitan regions		
	$PM_{2.5}$	NO_2	O_3	$PM_{2.5}$	NO_2	O_3
	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Lag day 0	0.91 (0.78, 1.05)	0.75 (0.55, 1.01)	1.00 (0.87, 1.14)	0.79 (0.71, 0.87)*	0.88 (0.69, 1.13)	0.98 (0.89, 1.07)
Lag day 1	1.16 (1.01, 1.34)*	1.07 (0.80, 1.43)	1.11 (0.97, 1.26)	1.19 (1.08, 1.31)*	1.13 (0.89, 1.43)	1.01 (0.92, 1.10)
Lag day 2	0.98 (0.89, 1.07)	0.81 (0.68, 0.97)*	0.97 (0.89, 1.06)	1.03 (0.96, 1.09)	1.23 (1.06, 1.42)*	0.92 (0.87, 0.98)*
Lag day 3	0.91 (0.83, 1.003)	0.83 (0.69, 0.99)*	0.92 (0.84, 1.00)*	0.95 (0.89, 1.02)	1.22 (1.05, 1.41)*	0.97 (0.91, 1.03)
Lag day 4	0.96 (0.89, 1.04)	1.03 (0.90, 1.19)	0.94 (0.87, 1.01)	1.00 (0.94, 1.05)	1.16 (1.03, 1.31)*	1.08 (1.03, 1.14)*
Lag day 5	0.99 (0.90, 1.08)	1.16 (0.98, 1.37)	0.97 (0.89, 1.05)	1.03 (0.96, 1.09)	1.09 (0.95, 1.25)	1.11 (1.05, 1.17)*
Lag day 6	0.96 (0.89, 1.03)	1.08 (0.96, 1.22)	0.98 (0.92, 1.05)	1.01 (0.96, 1.06)	1.03 (0.93, 1.14)	1.01 (0.97, 1.05)

[a]The results are presented for a 10.0 $\mu g/m^3$ increase for $PM_{2.5}$ and 10.0 ppb for NO_2 and O_3, respectively, in models adjusted for region, day, temperature, relative humidity, and population.

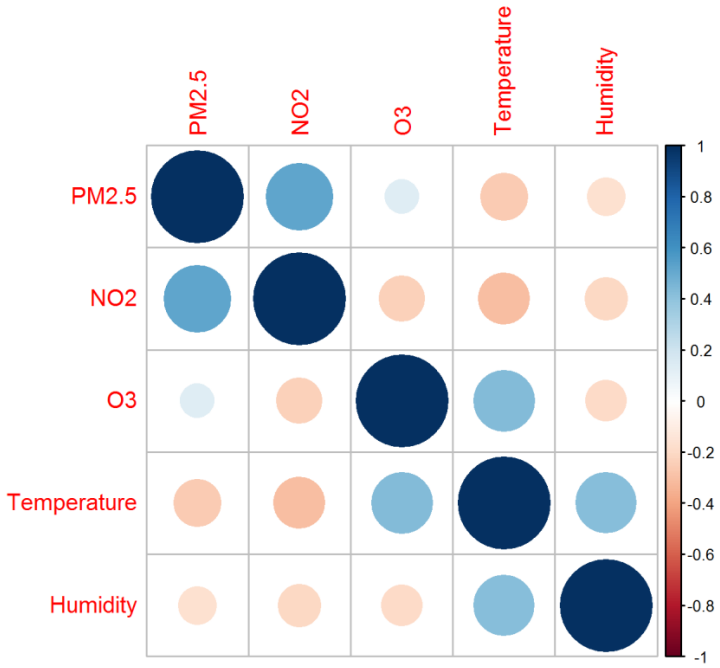
RR = relative risk; CI = confidence interval.

*p <0.05.

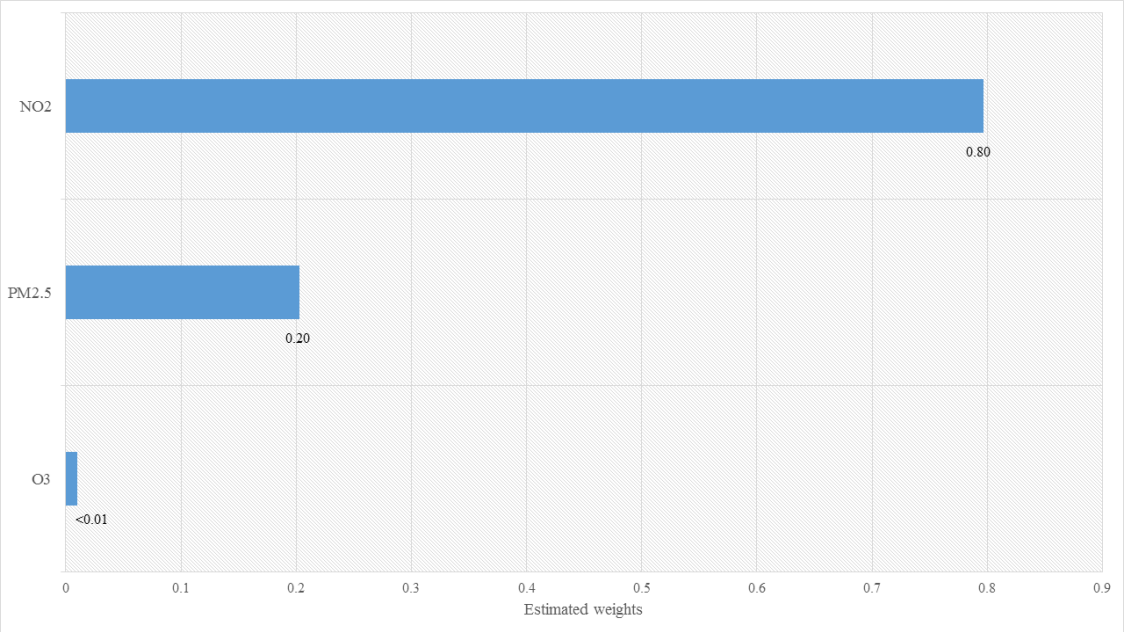
Online Supplementary Table 3. Associations of $PM_{2.5}$, NO_2, and O_3 levels with hospital admissions for autism spectrum disorder in a multiple-pollutant model[a]

	$PM_{2.5}$	NO_2	O_3
	RR (95% CI)	RR (95% CI)	RR (95% CI)
Lag day 0	0.84 (0.78, 0.90)	0.93 (0.81, 1.08)	1.00 (0.95, 1.06)
Lag day 1	1.13 (1.06, 1.21)	1.00 (0.87, 1.15)	1.07 (1.01, 1.13)
Lag day 2	1.05 (1.01, 1.10)	0.93 (0.85, 1.01)	1.01 (0.97, 1.05)
Lag day 3	1.00 (0.95, 1.04)	0.96 (0.88, 1.05)	0.99 (0.96, 1.03)
Lag day 4	0.99 (0.96, 1.03)	1.05 (0.98, 1.13)	1.01 (0.98, 1.04)
Lag day 5	0.99 (0.94, 1.03)	1.09 (1.00, 1.18)	1.01 (0.97, 1.05)
Lag day 6	0.95 (0.92, 0.99)	1.03 (0.97, 1.09)	0.99 (0.97, 1.02)

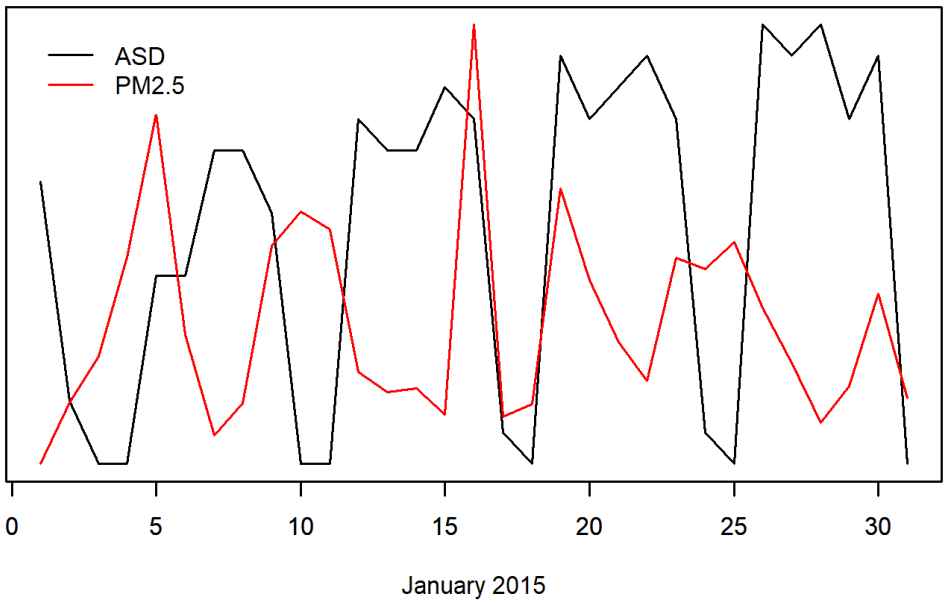
[a] The results are presented for a 10.0 $\mu g/m^3$ increase for $PM_{2.5}$ and 10.0 ppb for NO_2 and O_3 from the model incorporating all three air pollution exposures ($PM_{2.5}$, NO_2, and O_3) and adjusted for region, day, temperature, relative humidity, and population. RR = relative risk; CI = confidence interval.



Online Supplementary Figure 1. Correlations among air pollutant levels ($PM_{2.5}$, NO_2, and O_3).



Online Supplementary Figure 2. Estimated weights of air pollution exposures in the weighted quantile sum regression analysis. $PM_{2.5}$, NO_2, and O_3 represent $PM_{2.5}$ levels at lag day 1, NO_2 levels at lag day 5, and O_3 levels at lag day 4, respectively.



Online Supplementary Figure 3. Daily concentrations of $PM_{2.5}$ and counts of hospital admissions for autism spectrum disorder in Seoul, in January 2015. ASD, autism spectrum disorder.