Supplemental Material

Association between short-term exposure to air pollution and ischemic stroke onset: a time-stratified case-crossover analysis using a distributed lag nonlinear model in Shenzhen, China

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to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value. The elderly and adult were subgroups according to age (adult: 18-64 years; the elderly: $\geq$ 65 years).

Figure S4 Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at lag0-1, lag0-6 and lag0-14 using two-pollutant model in Shenzhen, 2008-2014.

Figure S5 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at different lags using two-pollutant model by changing the df (2-6) of air pollution in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value.

Figure S6 Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at lag0-14 using two-pollutant model by changing the df (2-6) of air pollution in Shenzhen, 2008-2014.

Figure S7 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at different lags using two-pollutant model by changing the df (2-6) of lag space in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value.

Figure S8 Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at lag0-14 using two-pollutant model by changing the df (2-6) of lag space in Shenzhen, 2008-2014.

Figure S9 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at different lags using two-pollutant model by changing the maximum lag days (12-21 days) for air pollution in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value.

Figure S10 Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at lag0-14 using two-pollutant model by changing the maximum lag days (12-21 days) for air pollution in Shenzhen, 2008-2014.

Table S1 Extreme influence analysis of different air pollution factors from 2008 to 2014 using two-pollutant models. Relative risk (*RR*) and 95% confidence interval (*CI*) were used to estimate the single lag day and cumulative influence of air pollution factors in total cases.

pollutant	extreme-low influence			extreme-high influence		
	lag0	lag1	lag0-1	lag0	lag1	lag0-1
SO_2	0.99(0.96,1.02)	0.99(0.97,1.02)	0.98(0.92,1.03)	0.97(0.93,1.01)	0.99(0.95,1.02)	0.95(0.88,1.03)
NO_2	0.97(0.94,1.00)	0.97(0.95,1.00)	0.95(0.89,1.01)	1.06(1.01,1.11)	1.05(1.02,1.09)	1.11(1.03,1.20)
PM_{10}	0.96(0.92,1.00)	0.96(0.93,0.99)	0.92(0.86,0.99)	0.98(0.94,1.02)	0.99(0.96,1.03)	0.97(0.91,1.05)
O_3	1.02(0.99,1.05)	1.02(0.99,1.04)	1.04(0.96,1.13)	1.01(0.98,1.03)	1.01(0.99,1.03)	1.01(0.95,1.08)

Note: Estimates were generated using a quasi-Poisson regression model combined with time-stratified case-crossover design and distributed lag non-linear model (DLNM), adjusting for meteorological factors, holiday, and time stratum. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value.

Figure S1 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for all groups at different lags using single-pollutant model in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily a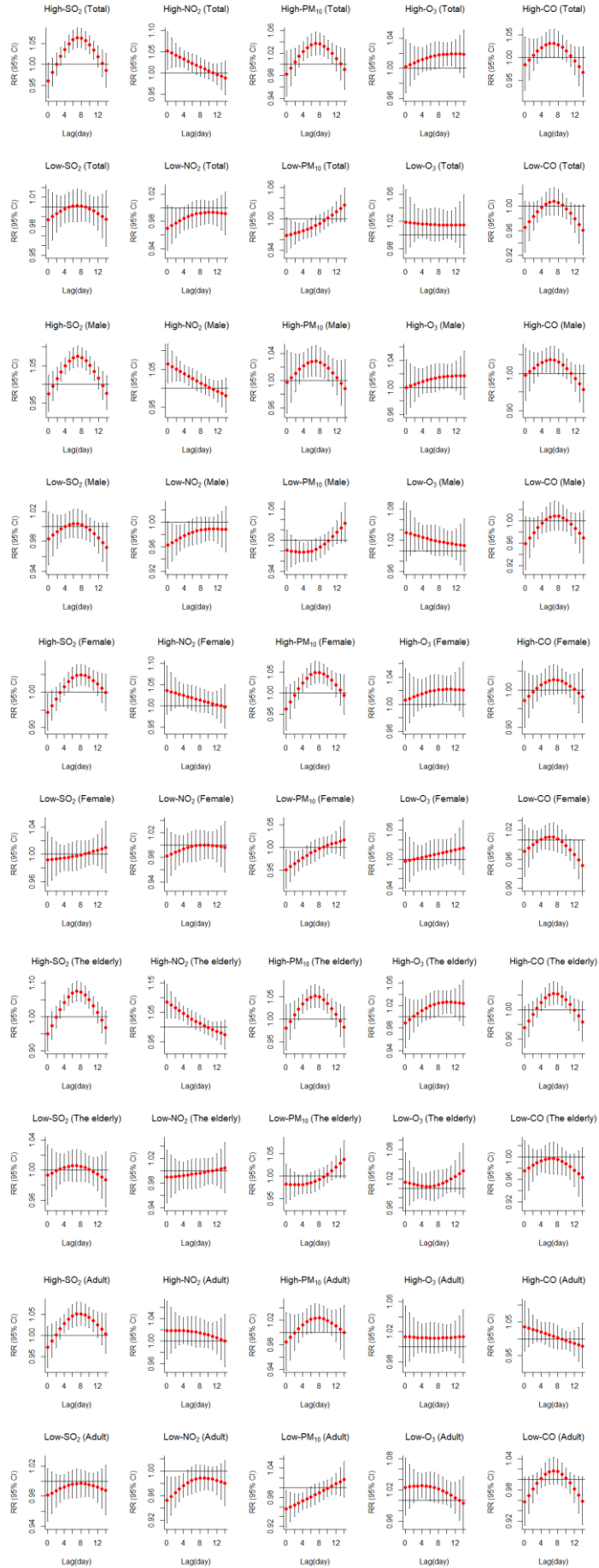ir pollution value to the median value. The elderly and adult were subgroups according to age (adult: 18-64 years; the elderly: $\geq$ 65 years).
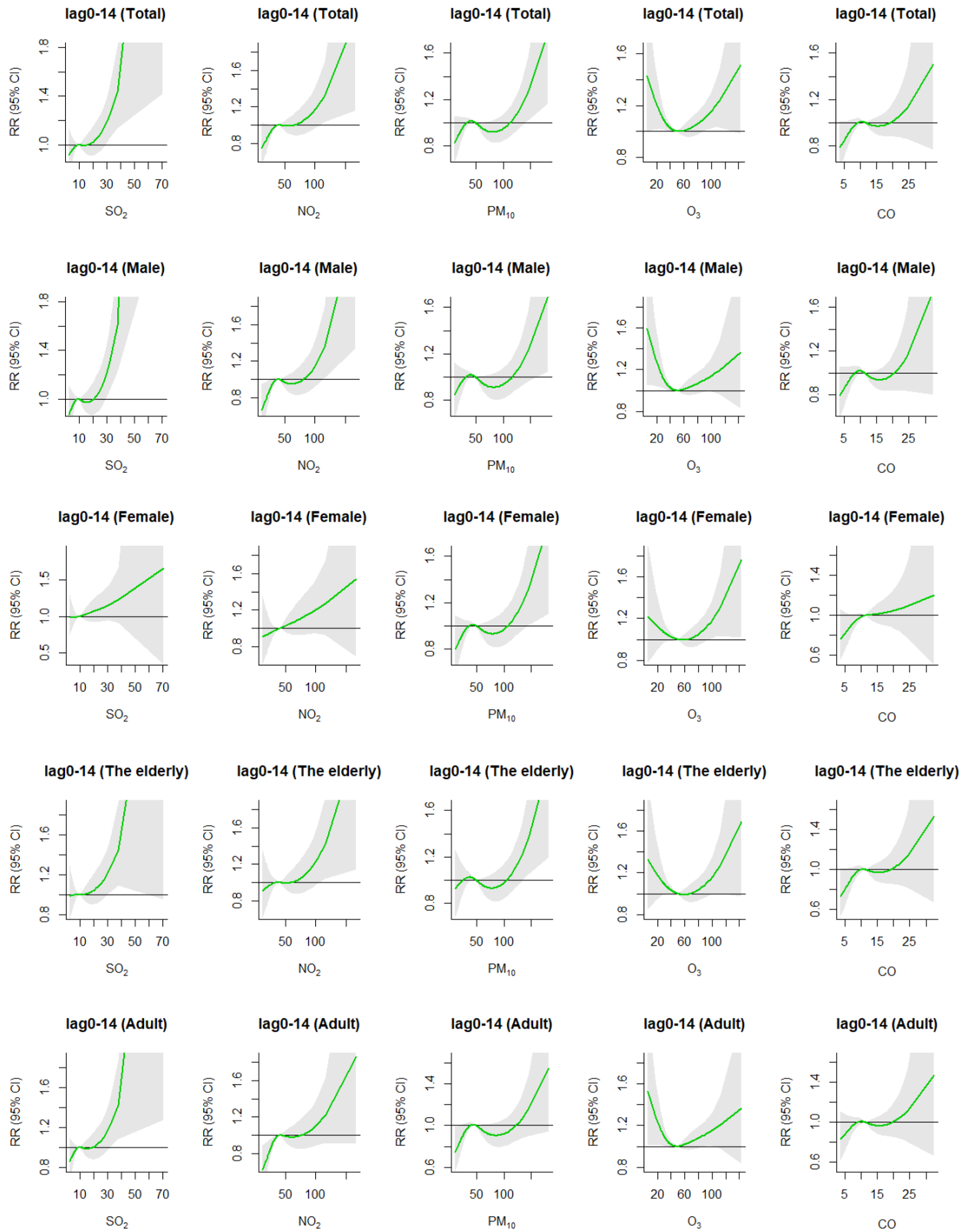
Figure S2 Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for all groups at lag0-14 using single-pollutant model in Shenzhen, 2008-2014. Male and female were subgroups according to gender. The elderly and adult were subgroups according to age (adult: 18-64 years; the elderly: $\geq$ 65 years).
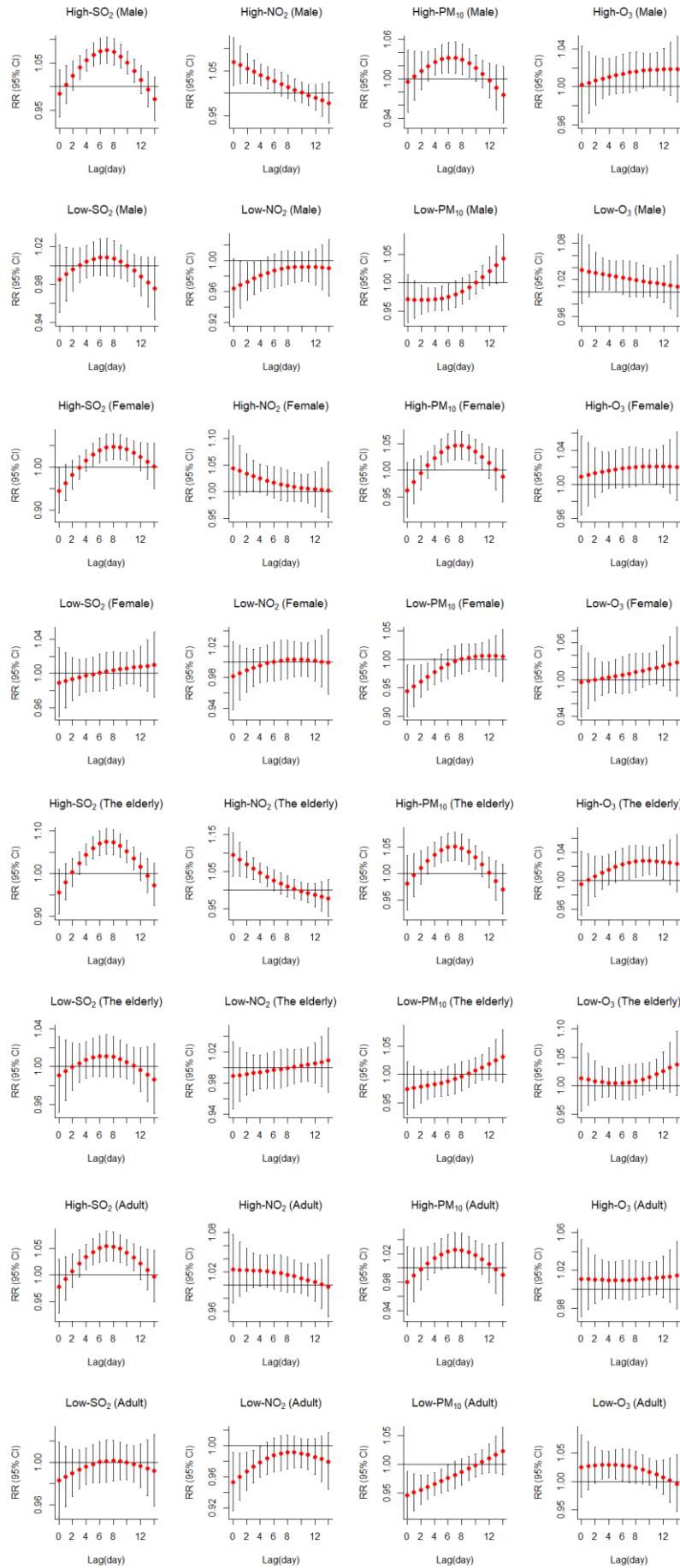
Figure S3 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO$_2$, NO$_2$, PM$_{10}$ and O$_3$) for subgroups at different lags using two-pollutant model in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value. The elderly and adult were subgroups according to age (adult: 18-64 years; the elderly: ≥ 65 years).
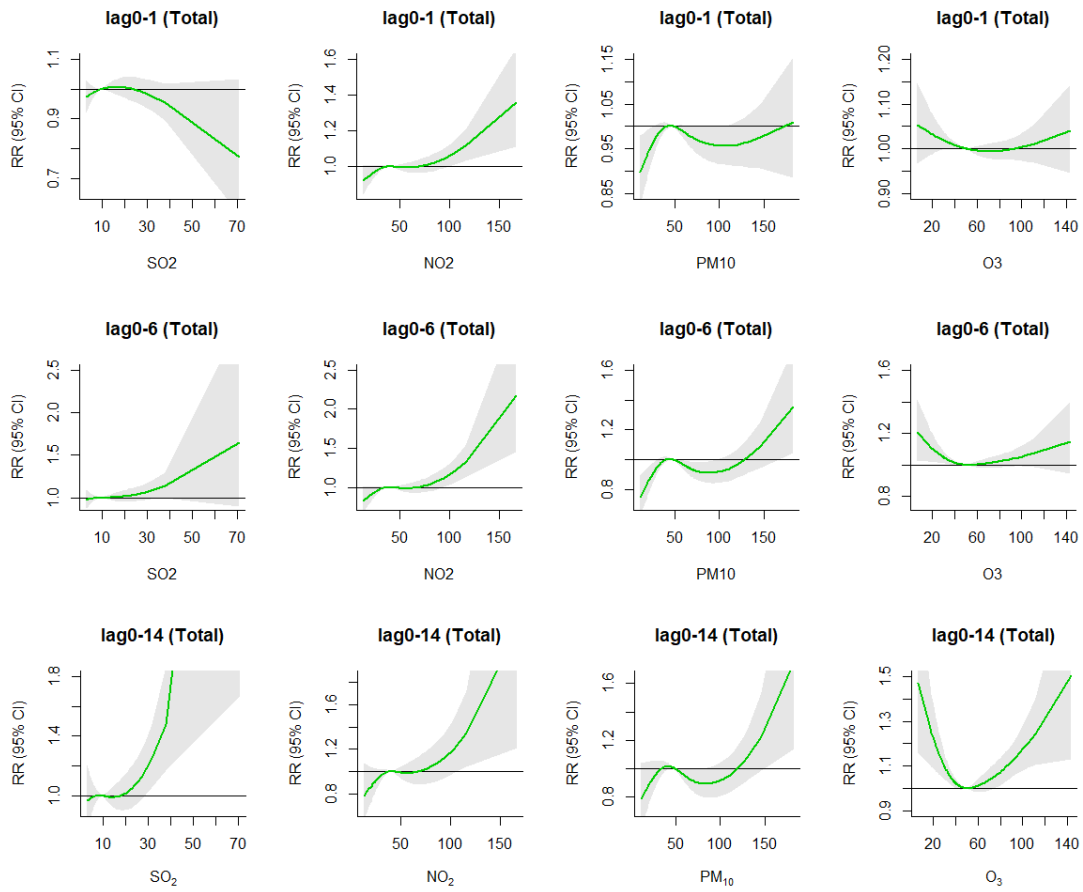
Figure S4 Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO$_2$, NO$_2$, PM$_{10}$ and O$_3$) for total cases at lag0-1, lag0-6 and lag0-14 using two-pollutant model in Shenzhen, 2008-2014.
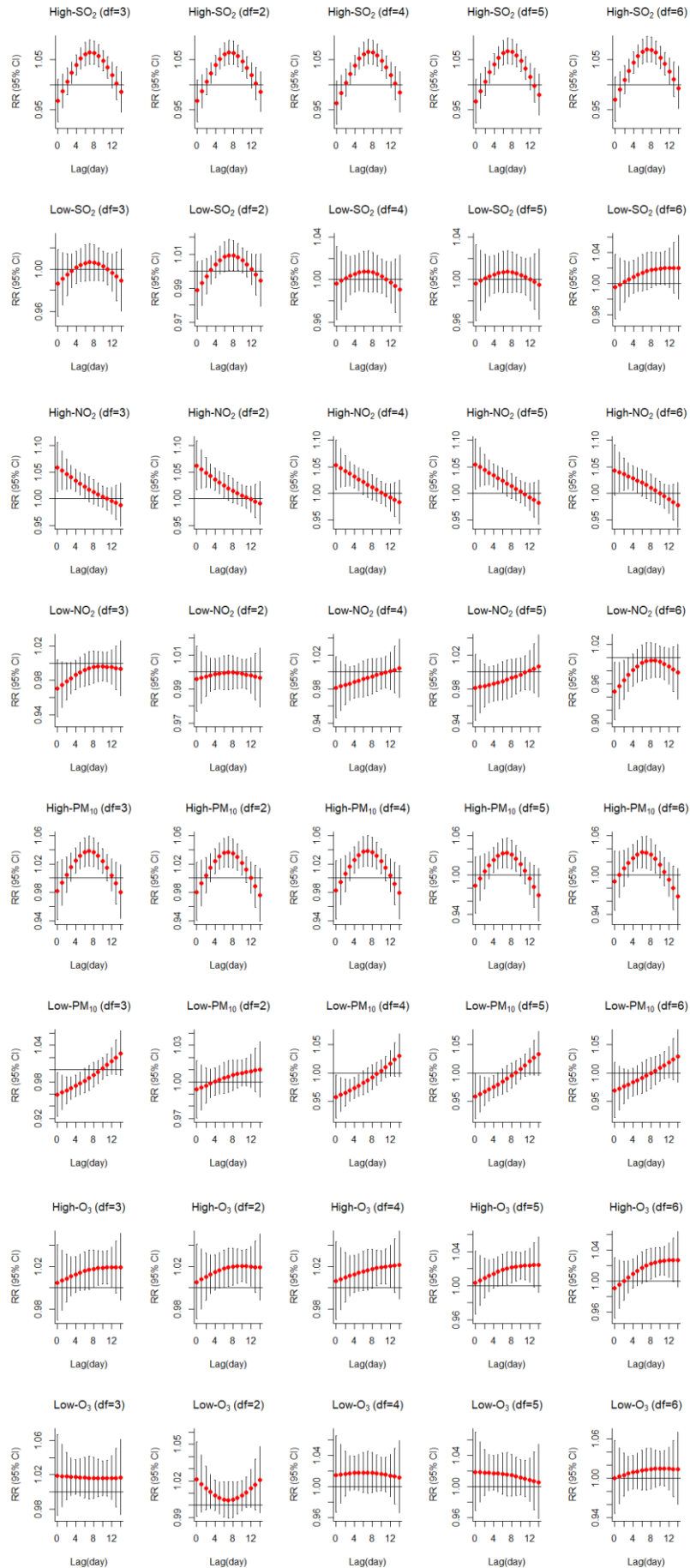
Figure S5 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at different lags using two-pollutant model by changing the df (2-6) of air pollution in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value.

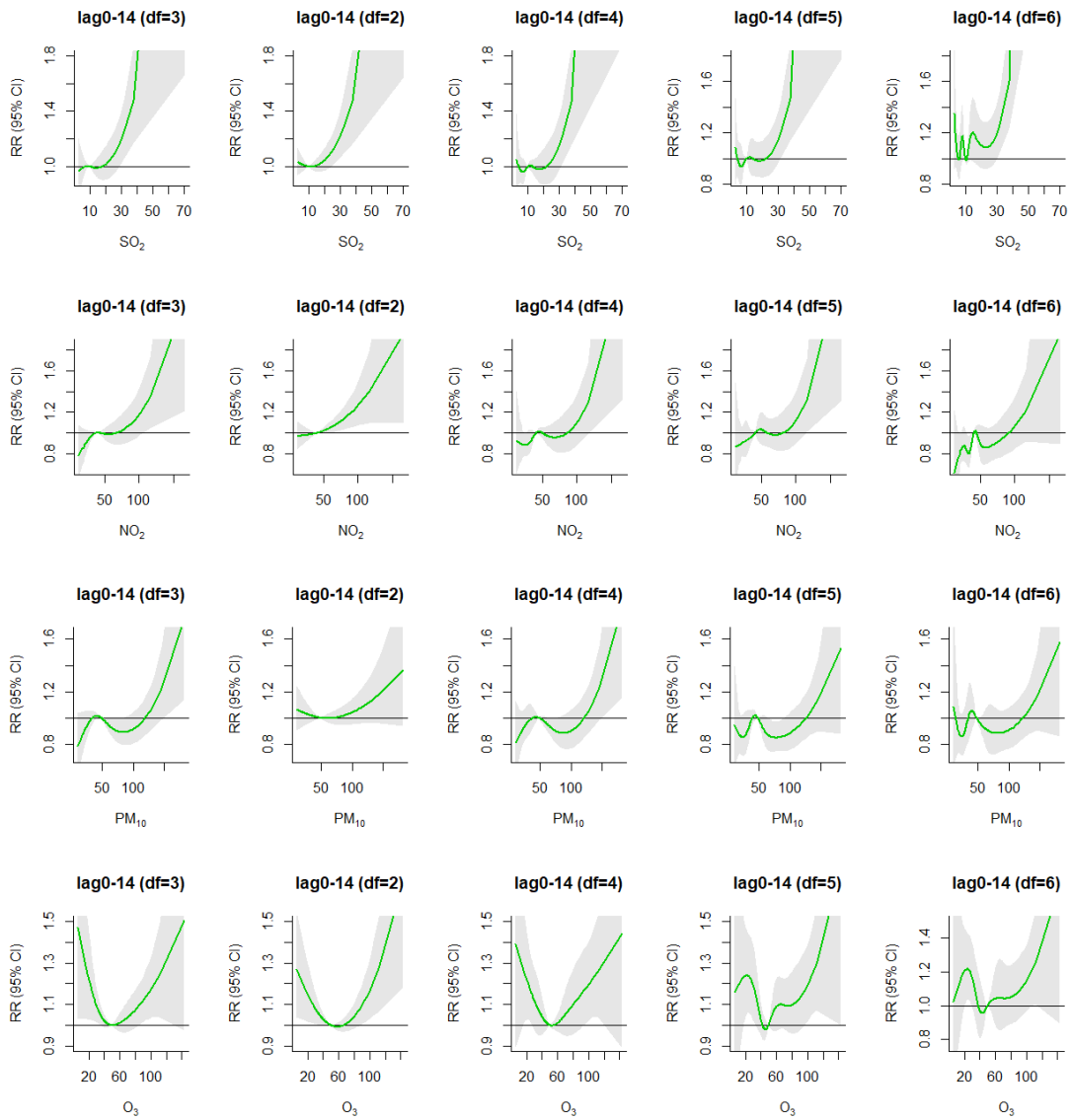**Figure S6** Summary of cumulative exposure-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at lag0-14 using two-pollutant model by changing the df (2-6) of air pollution in Shenzhen, 2008-2014.
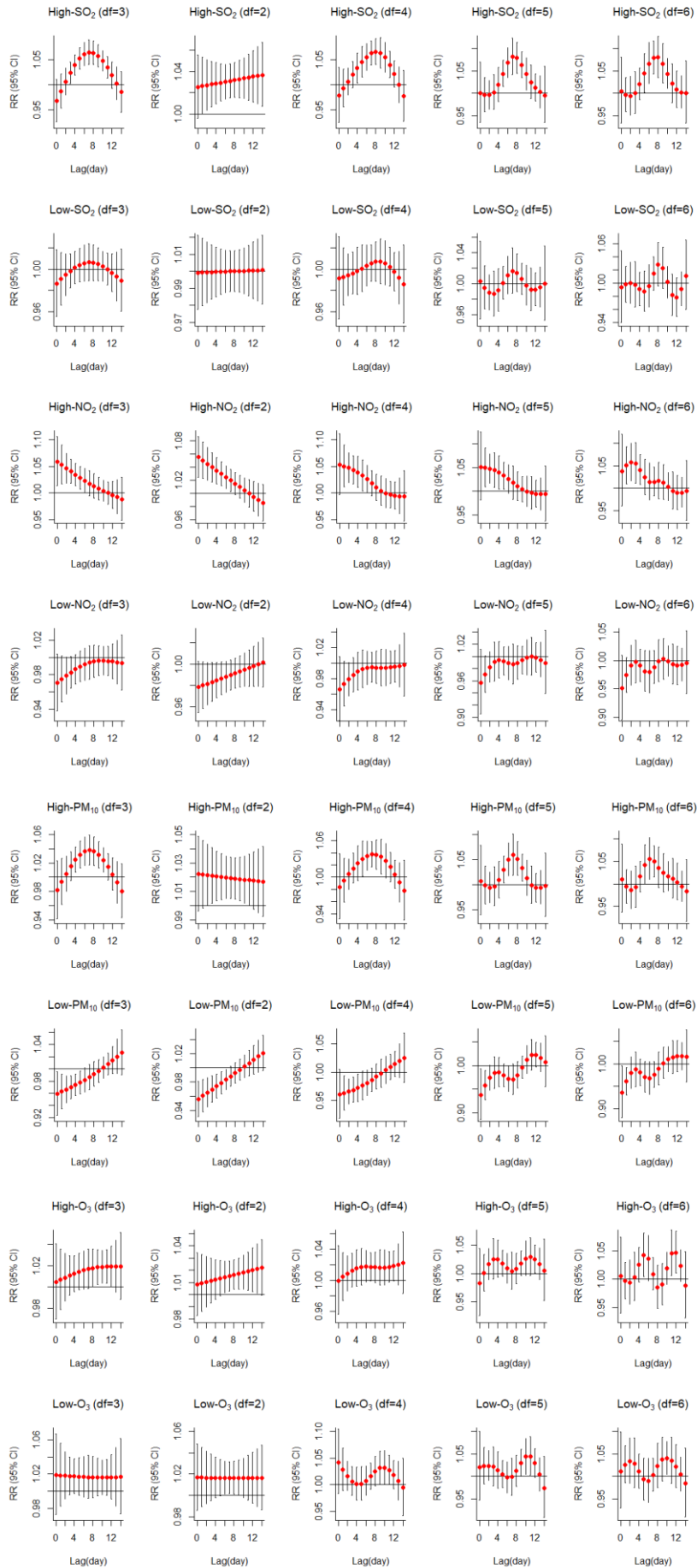
High-SO₂ (df=3) — High-SO₂ (df=2) — High-SO₂ (df=4) — High-SO₂ (df=5) — High-SO₂ (df=6)

Low-SO₂ (df=3) — Low-SO₂ (df=2) — Low-SO₂ (df=4) — Low-SO₂ (df=5) — Low-SO₂ (df=6)

High-NO₂ (df=3) — High-NO₂ (df=2) — High-NO₂ (df=4) — High-NO₂ (df=5) — High-NO₂ (df=6)

Low-NO₂ (df=3) — Low-NO₂ (df=2) — Low-NO₂ (df=4) — Low-NO₂ (df=5) — Low-NO₂ (df=6)

High-PM₁₀ (df=3) — High-PM₁₀ (df=2) — High-PM₁₀ (df=4) — High-PM₁₀ (df=5) — High-PM₁₀ (df=6)

Low-PM₁₀ (df=3) — Low-PM₁₀ (df=2) — Low-PM₁₀ (df=4) — Low-PM₁₀ (df=5) — Low-PM₁₀ (df=6)

High-O₃ (df=3) — High-O₃ (df=2) — High-O₃ (df=4) — High-O₃ (df=5) — High-O₃ (df=6)

Low-O₃ (df=3) — Low-O₃ (df=2) — Low-O₃ (df=4) — Low-O₃ (df=5) — Low-O₃ (df=6)

Figure S7 Summary of single day lag-response curves on ischemic stroke for air pollution factors (SO_2, NO_2, PM_{10} and O_3) for total cases at different lags using two-pollutant model by changing the df (2-6) of lag space in Shenzhen, 2008-2014. The extreme-high influence was estimated by the *RR* of ischemic stroke by comparing the 99th percentile of daily air pollution value to the median value, whereas the extreme-low influence was estimated by comparing the 1st percentile of daily air pollution value to the median value.
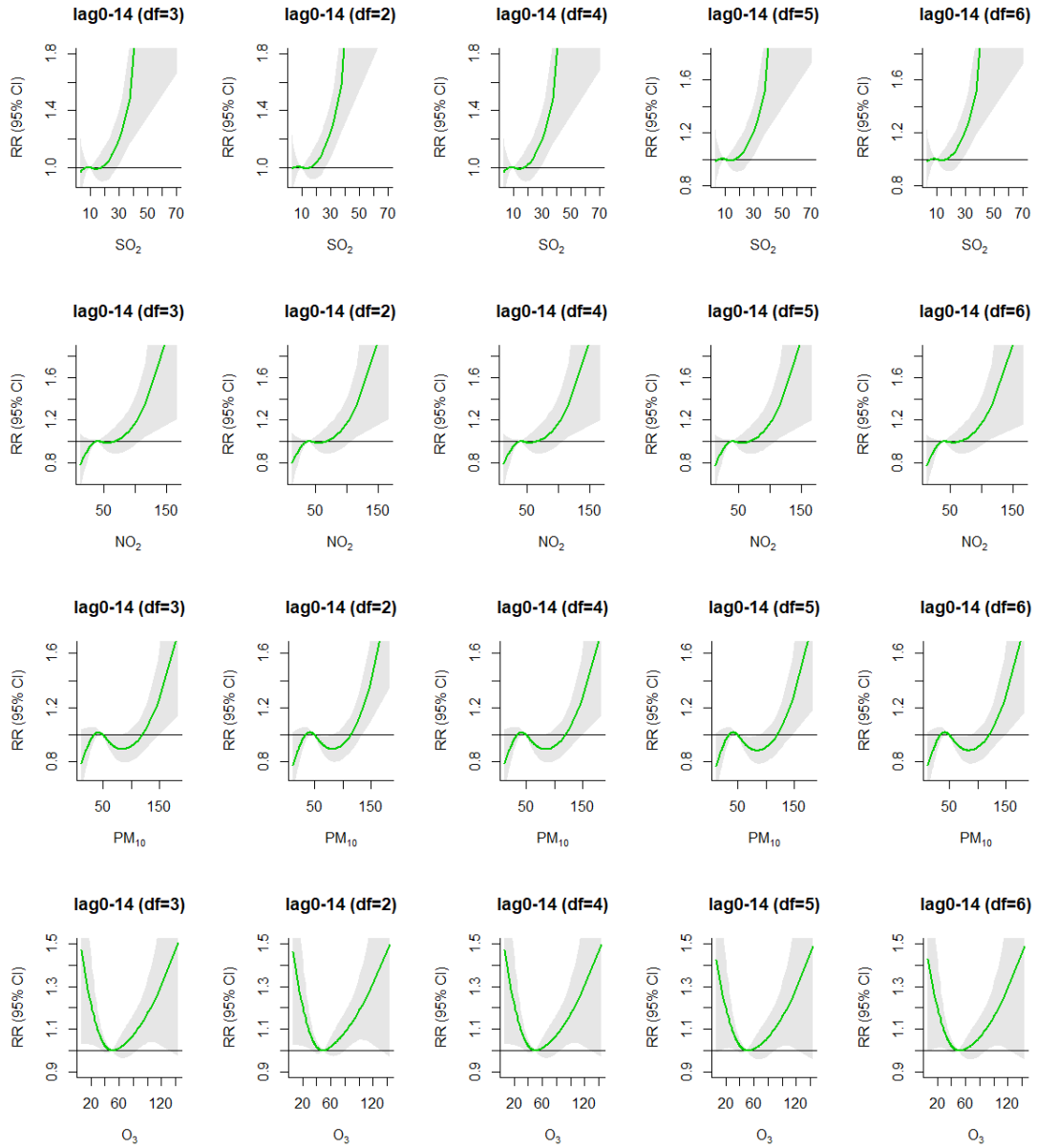
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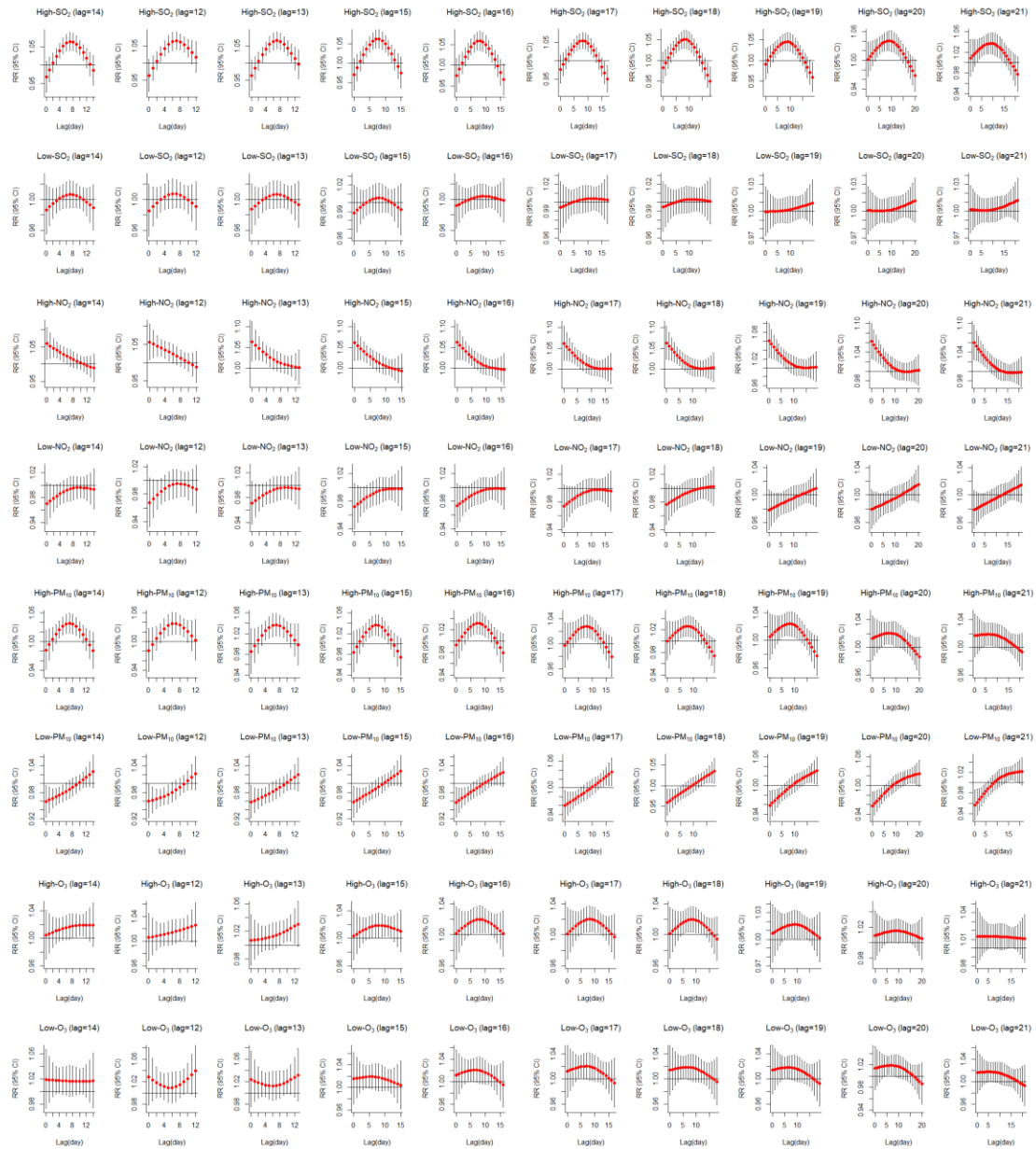
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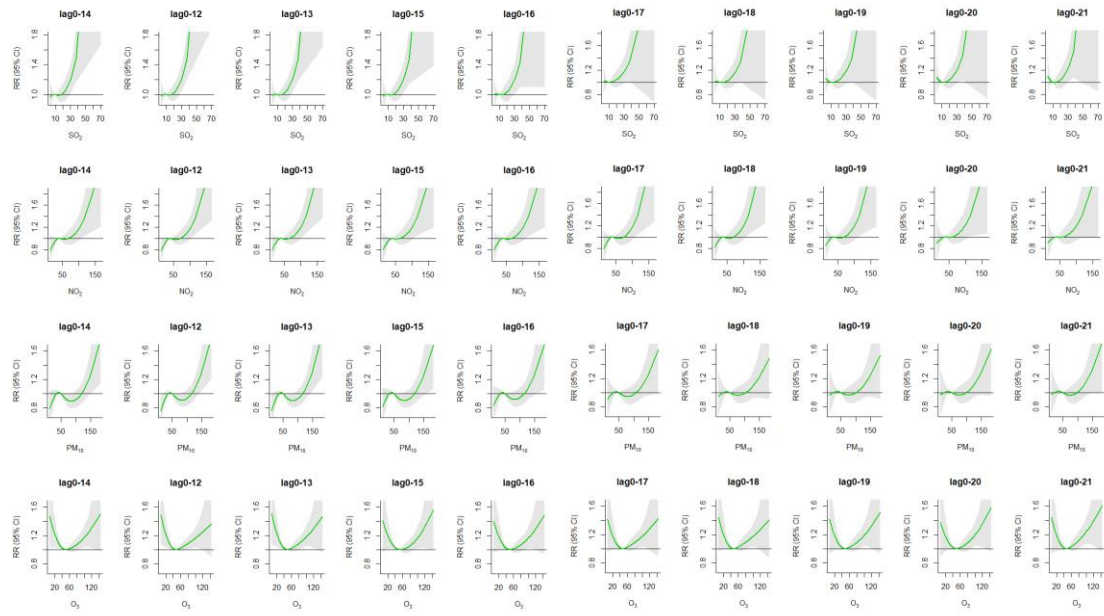
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