

Short-Term Effects of PM₁₀, NO₂, SO₂ and O₃ on Cardio-Respiratory Mortality in Cape Town, South Africa, 2006–2015

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Time-Series Analysis Results

This document tabulates the correlations among environmental variables and provides estimates for the two-day means of the four pollutants by age group, sex and season, and for the lag structures of effects over 21 days by age group.

Table S1. Temporal spearman rank correlation coefficients among daily mean concentrations of ambient air pollutants and meteorological variables during the year and by seasons.

	PM ₁₀	NO ₂	SO ₂	O ₃	Temperature	Humidity
PM ₁₀	1	0.38	0.27	0.12	0.17	-0.25
NO ₂		1	0.4	0.06	-0.35	0.07
SO ₂			1	-0.11	-0.12	-0.01
O ₃				1	-0.13	0.01
Temperature					1	-0.41
Humidity						1
Warm /dry season				November - March		
PM ₁₀	1	0.29	0.28	0.23	0.33	-0.27
NO ₂		1	0.32	0.09	-0.22	-0.03
SO ₂			1	-0.07	0.01	-0.07
O ₃				1	-0.14	-0.02
Temperature					1	-0.26
Humidity						1
Cold / wet season				April – October		
PM ₁₀	1	0.54	0.27	-0.09	0.03	-0.3
NO ₂		1	0.46	-0.15	-0.11	-0.15
SO ₂			1	-0.25	-0.05	-0.11
O ₃				1	0.01	-0.01
Temperature					1	-0.02
Humidity						1

The relative risk presented in the following table were estimated from Quasi-Poisson regression models of respiratory and cardiovascular disease deaths, adjusting for time trends and seasonal variation, day of the week, public holiday, and meteorological factors including temperature and relative humidity.

Table S2. Single and multiple pollutant model adjusted relative risk (RR) for an interquartile range increase in the two-day moving average of PM₁₀ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006–31 December 2015.

	Pollutant IQR (16 $\mu\text{g}/\text{m}^3$)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	PM ₁₀	1.003	0.978	1.029	1.024	1.009	1.039
Age 15 - 64		1.003	0.969	1.039	1.011	0.986	1.036
Age >65		1.003	0.969	1.038	1.033	1.014	1.052
Female		1.009	0.973	1.047	1.032	1.012	1.053
Male		1	0.967	1.033	1.015	0.994	1.037
All ages and sex	PM ₁₀ NO ₂	0.98	0.951	1.011	1.019	1	1.037
Age 15 - 64		0.975	0.934	1.018	1.004	0.974	1.035
Age >65		0.985	0.944	1.027	1.028	1.005	1.052
Female		0.98	0.937	1.025	1.026	1.001	1.051
Male		0.981	0.942	1.021	1.011	0.986	1.038
All ages and sex	PM ₁₀ SO ₂	0.999	0.973	1.027	1.022	1.006	1.039
Age 15 - 64		0.996	0.96	1.034	1.01	0.984	1.037
Age >65		1.003	0.966	1.04	1.03	1.01	1.051
Female		1.003	0.965	1.043	1.034	1.012	1.056
Male		0.997	0.963	1.033	1.01	0.988	1.033
All ages and sex	PM ₁₀ O ₃	0.999	0.968	1.031	1.028	1.01	1.047
Age 15 - 64		1.005	0.963	1.05	1.008	0.979	1.039
Age >65		0.994	0.952	1.038	1.042	1.018	1.066
Female		0.99	0.946	1.037	1.044	1.018	1.07
Male		1.005	0.964	1.047	1.013	0.987	1.04
All ages and sex	PM ₁₀ NO ₂ SO ₂	0.98	0.95	1.012	1.018	0.999	1.037
Age 15 - 64		0.974	0.932	1.018	1.003	0.972	1.035

Age >65		0.986	0.944	1.03	1.028	1.004	1.052
Female		0.975	0.931	1.021	1.028	1.002	1.055
Male		0.984	0.944	1.026	1.007	0.98	1.034
All ages and sex	PM ₁₀ SO ₂ O ₃	0.996	0.964	1.03	1.03	1.01	1.05
Age 15 - 64		1.001	0.956	1.048	1.006	0.975	1.038
Age >65		0.994	0.949	1.04	1.046	1.021	1.072
Female		0.988	0.941	1.037	1.048	1.021	1.076
Male		1.002	0.959	1.046	1.013	0.985	1.041
All ages and sex	PM ₁₀ NO ₂ O ₃	0.984	0.948	1.023	1.019	0.996	1.042
Age 15 - 64		0.996	0.944	1.05	0.989	0.953	1.026
Age >65		0.973	0.923	1.026	1.038	1.009	1.067
Female		0.983	0.929	1.04	1.03	0.999	1.062
Male		0.984	0.936	1.034	1.007	0.975	1.039
All ages and sex	PM ₁₀ NO ₂ SO ₂ O ₃	0.985	0.947	1.024	1.02	0.997	1.044
Age 15 - 64		0.996	0.943	1.052	0.984	0.947	1.022
Age >65		0.974	0.922	1.029	1.043	1.013	1.074
Female		0.979	0.924	1.038	1.033	1.001	1.067
Male		0.987	0.937	1.039	1.006	0.973	1.039

Table S3. Single and multiple pollutant model adjusted relative risk (RR) for an interquartile range increase in the two-day moving average of NO₂ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant IQR (11 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	NO ₂	1.045	1.014	1.076	1.022	1.004	1.041
Age 15 - 64		1.041	0.997	1.085	1.01	0.981	1.041
Age >65		1.049	1.007	1.093	1.031	1.008	1.054
Female		1.049	1.004	1.096	1.026	1.001	1.051
Male		1.042	1.002	1.083	1.019	0.993	1.045
All ages and sex	NO ₂ PM ₁₀	1.058	1.022	1.095	1.01	0.989	1.031
Age 15 - 64		1.055	1.004	1.108	1.007	0.973	1.042
Age >65		1.061	1.012	1.113	1.013	0.987	1.04
Female		1.063	1.01	1.119	1.012	0.983	1.041
Male		1.054	1.008	1.103	1.009	0.979	1.039
All ages and sex	NO ₂ SO ₂	1.043	1.011	1.077	1.019	1	1.039
Age 15 - 64		1.042	0.996	1.09	1.007	0.976	1.039
Age >65		1.046	1.001	1.092	1.028	1.004	1.053
Female		1.047	0.999	1.097	1.025	0.999	1.052
Male		1.043	1	1.088	1.013	0.987	1.041
All ages and sex	NO ₂ O ₃	1.031	0.992	1.07	1.031	1.009	1.054
Age 15 - 64		1.018	0.965	1.074	1.026	0.989	1.063
Age >65		1.042	0.99	1.098	1.038	1.01	1.068
Female		1.003	0.948	1.061	1.039	1.008	1.071
Male		1.053	1.002	1.106	1.027	0.995	1.06
All ages and sex	NO ₂ PM ₁₀ O ₃	1.041	0.996	1.088	1.017	0.991	1.044
Age 15 - 64		1.018	0.956	1.084	1.03	0.988	1.075

Age >65		1.063	1.001	1.129	1.013	0.98	1.046
Female		1.015	0.95	1.084	1.021	0.985	1.058
Male		1.063	1.003	1.126	1.016	0.979	1.055
All ages and sex	NO ₂ PM ₁₀ SO ₂	1.055	1.018	1.093	1.008	0.987	1.03
Age 15 - 64		1.054	1.002	1.109	1.004	0.97	1.04
Age >65		1.056	1.005	1.109	1.012	0.986	1.04
Female		1.063	1.008	1.12	1.011	0.982	1.041
Male		1.052	1.003	1.102	1.006	0.976	1.036
All ages and sex	NO ₂ SO ₂ O ₃	1.031	0.991	1.074	1.035	1.011	1.059
Age 15 - 64		1.018	0.961	1.078	1.025	0.987	1.065
Age >65		1.043	0.987	1.102	1.044	1.014	1.075
Female		0.999	0.941	1.061	1.045	1.012	1.078
Male		1.059	1.005	1.116	1.027	0.994	1.062
All ages and sex	NO ₂ PM ₁₀ SO ₂ O ₃	1.04	0.994	1.088	1.021	0.994	1.049
Age 15 - 64		1.017	0.954	1.084	1.031	0.988	1.077
Age >65		1.061	0.997	1.129	1.019	0.985	1.054
Female		1.012	0.946	1.082	1.028	0.991	1.066
Male		1.065	1.004	1.13	1.018	0.98	1.057

Table S4. Single and multiple pollutant model adjusted relative risk (RR) for an interquartile range increase in the two-day moving average of SO₂ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant IQR (6 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	SO ₂	1.013	0.99	1.036	1.014	1	1.028
Age 15 - 64		1.01	0.979	1.042	1.01	0.988	1.032
Age >65		1.016	0.985	1.047	1.017	0.999	1.034
Female		1.021	0.988	1.055	1.007	0.989	1.026
Male		1.005	0.976	1.035	1.022	1.003	1.041
All ages and sex	SO ₂ PM ₁₀	1.013	0.99	1.037	1.008	0.993	1.022
Age 15 - 64		1.011	0.978	1.045	1.007	0.984	1.03
Age >65		1.015	0.983	1.048	1.008	0.99	1.026
Female		1.02	0.985	1.055	0.998	0.979	1.018
Male		1.007	0.976	1.039	1.019	0.998	1.039
All ages and sex	SO ₂ NO ₂	1.002	0.977	1.027	1.01	0.995	1.025
Age 15 - 64		0.997	0.963	1.033	1.012	0.988	1.036
Age >65		1.007	0.973	1.042	1.008	0.989	1.027
Female		1.013	0.976	1.05	1.003	0.984	1.024
Male		0.992	0.96	1.025	1.017	0.997	1.039
All ages and sex	SO ₂ O ₃	1.002	0.972	1.033	1.007	0.988	1.026
Age 15 - 64		1.007	0.965	1.05	0.999	0.97	1.03
Age >65		0.999	0.958	1.043	1.012	0.988	1.036
Female		1.004	0.959	1.05	1.003	0.978	1.028
Male		1	0.961	1.04	1.012	0.986	1.039
All ages and sex	SO ₂ PM ₁₀ O ₃	1.004	0.973	1.037	0.996	0.977	1.016
Age 15 - 64		1.007	0.963	1.053	0.999	0.968	1.03

Age >65		1.003	0.959	1.048	0.995	0.971	1.02
Female		1.008	0.961	1.058	0.987	0.961	1.014
Male		1.001	0.96	1.044	1.007	0.98	1.036
All ages and sex	SO ₂ PM ₁₀ NO ₂	1.005	0.98	1.031	1.007	0.992	1.022
Age 15 - 64		1.001	0.966	1.038	1.012	0.988	1.038
Age >65		1.009	0.975	1.045	1.003	0.984	1.022
Female		1.016	0.979	1.055	0.998	0.978	1.019
Male		0.996	0.963	1.03	1.017	0.996	1.039
All ages and sex	SO ₂ NO ₂ O ₃	0.995	0.962	1.03	0.997	0.977	1.018
Age 15 - 64		0.996	0.95	1.045	1.004	0.971	1.037
Age >65		0.996	0.95	1.045	0.993	0.967	1.019
Female		1.011	0.96	1.064	0.991	0.964	1.019
Male		0.983	0.94	1.028	1.004	0.975	1.034
All ages and sex	SO ₂ PM ₁₀ NO ₂ O ₃	1	0.965	1.036	0.993	0.972	1.014
Age 15 - 64		0.998	0.95	1.049	1.009	0.975	1.044
Age >65		1.002	0.954	1.053	0.982	0.956	1.009
Female		1.015	0.963	1.071	0.984	0.956	1.013
Male		0.988	0.944	1.034	1.003	0.974	1.034

Table S5. Single and multiple pollutant model adjusted relative risk (RR) for an interquartile range increase in the two-day moving average of O₃ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant IQR (16 $\mu\text{g}/\text{m}^3$)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	O ₃	1.006	0.965	1.049	1.025	1.002	1.048
Age 15 - 64		1.007	0.951	1.067	1.019	0.982	1.057
Age >65		1.004	0.948	1.063	1.029	1	1.059
Female		0.949	0.894	1.008	1.018	0.987	1.05
Male		1.054	0.998	1.113	1.035	1.002	1.069
All ages and sex	O ₃ PM ₁₀	1.002	0.961	1.046	1.03	1.006	1.054
Age 15 - 64		1.005	0.947	1.066	1.019	0.982	1.058
Age >65		1	0.943	1.06	1.037	1.008	1.067
Female		0.944	0.887	1.005	1.025	0.993	1.057
Male		1.051	0.993	1.112	1.038	1.004	1.072
All ages and sex	O ₃ NO ₂	0.998	0.955	1.044	1.025	1.001	1.05
Age 15 - 64		0.989	0.929	1.053	1.02	0.981	1.06
Age >65		1.006	0.945	1.07	1.031	1.001	1.063
Female		0.932	0.873	0.995	1.024	0.991	1.058
Male		1.054	0.994	1.118	1.03	0.996	1.066
All ages and sex	O ₃ SO ₂	1.006	0.965	1.049	1.022	0.998	1.046
Age 15 - 64		1.005	0.948	1.065	1.014	0.977	1.053
Age >65		1.006	0.949	1.065	1.027	0.998	1.058
Female		0.952	0.896	1.012	1.015	0.984	1.047
Male		1.051	0.995	1.111	1.032	0.998	1.066
All ages and sex	O ₃ PM ₁₀ SO ₂	1.002	0.96	1.046	1.027	1.003	1.051
Age 15 - 64		1.001	0.943	1.063	1.014	0.977	1.053

Age >65		1.002	0.944	1.063	1.036	1.006	1.066
Female		0.947	0.889	1.008	1.022	0.99	1.055
Male		1.047	0.989	1.108	1.034	1.001	1.069
All ages and sex	O ₃ PM ₁₀ NO ₂	0.993	0.949	1.038	1.027	1.002	1.052
Age 15 - 64		0.983	0.923	1.047	1.018	0.979	1.059
Age >65		0.999	0.939	1.064	1.035	1.004	1.066
Female		0.928	0.868	0.991	1.026	0.993	1.061
Male		1.046	0.985	1.111	1.03	0.996	1.066
All ages and sex	O ₃ SO ₂ NO ₂	0.999	0.955	1.044	1.025	1.001	1.05
Age 15 - 64		0.989	0.928	1.052	1.018	0.979	1.059
Age >65		1.006	0.946	1.071	1.032	1.001	1.064
Female		0.934	0.875	0.997	1.022	0.989	1.056
Male		1.054	0.993	1.118	1.032	0.998	1.068
All ages and sex	O ₃ PM ₁₀ NO ₂ SO ₂	0.993	0.949	1.039	1.027	1.003	1.052
Age 15 - 64		0.983	0.922	1.047	1.016	0.977	1.057
Age >65		1	0.939	1.065	1.036	1.005	1.068
Female		0.928	0.869	0.992	1.025	0.992	1.059
Male		1.046	0.985	1.111	1.033	0.998	1.069

Table S6. Single and multiple pollutant model adjusted relative risk (RR) for 10 µg/m³ increase in the two-day moving average of PM₁₀ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant (10 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	PM ₁₀	1.002	0.987	1.017	1.015	1.005	1.024
Age 15 - 64		1.002	0.981	1.024	1.007	0.992	1.022
Age >65		1.002	0.981	1.023	1.02	1.008	1.032
Female		1.006	0.983	1.028	1.02	1.007	1.032
Male		1	0.98	1.02	1.009	0.996	1.022
All ages and sex	PM ₁₀ NO ₂	0.988	0.97	1.007	1.011	1	1.023
Age 15 - 64		0.985	0.959	1.011	1.002	0.984	1.021
Age >65		0.991	0.965	1.017	1.017	1.003	1.031
Female		0.988	0.961	1.015	1.016	1	1.031
Male		0.988	0.964	1.013	1.007	0.991	1.023
All ages and sex	PM ₁₀ SO ₂	1	0.983	1.016	1.014	1.004	1.023
Age 15 - 64		0.998	0.975	1.021	1.006	0.99	1.023
Age >65		1.002	0.979	1.024	1.018	1.006	1.031
Female		1.002	0.979	1.026	1.021	1.007	1.034
Male		0.998	0.977	1.02	1.006	0.992	1.02
All ages and sex	PM ₁₀ O ₃	0.999	0.98	1.019	1.017	1.006	1.029
Age 15 - 64		1.003	0.977	1.03	1.005	0.987	1.024
Age >65		0.996	0.97	1.023	1.025	1.011	1.04
Female		0.994	0.967	1.022	1.027	1.011	1.042
Male		1.003	0.978	1.028	1.008	0.992	1.024
All ages and sex	PM ₁₀ NO ₂ SO ₂	0.988	0.969	1.007	1.011	0.999	1.023
Age 15 - 64		0.984	0.958	1.011	1.002	0.983	1.021

Age >65		0.992	0.966	1.018	1.017	1.002	1.032
Female		0.985	0.957	1.013	1.017	1.001	1.033
Male		0.99	0.966	1.016	1.004	0.988	1.021
All ages and sex	PM ₁₀ SO ₂ O ₃	0.998	0.978	1.018	1.018	1.006	1.03
Age 15 - 64		1	0.973	1.029	1.004	0.984	1.023
Age >65		0.996	0.969	1.024	1.028	1.013	1.043
Female		0.992	0.963	1.022	1.029	1.012	1.046
Male		1.001	0.975	1.028	1.008	0.991	1.025
All ages and sex	PM ₁₀ NO ₂ O ₃	0.99	0.968	1.014	1.012	0.998	1.026
Age 15 - 64		0.998	0.966	1.031	0.993	0.971	1.016
Age >65		0.984	0.952	1.016	1.023	1.005	1.041
Female		0.99	0.956	1.025	1.018	0.999	1.038
Male		0.99	0.96	1.021	1.004	0.985	1.024
All ages and sex	PM ₁₀ NO ₂ SO ₂ O ₃	0.991	0.967	1.015	1.012	0.998	1.027
Age 15 - 64		0.997	0.965	1.031	0.99	0.967	1.013
Age >65		0.984	0.952	1.018	1.026	1.008	1.045
Female		0.987	0.953	1.023	1.02	1.001	1.04
Male		0.992	0.961	1.024	1.003	0.983	1.024

Table S7. Single and multiple pollutant model adjusted relative risk (RR) for 10 µg/m³ increase in the two-day moving average of NO₂ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant (10 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	NO ₂	1.042	1.013	1.072	1.021	1.004	1.038
Age 15 - 64		1.038	0.998	1.08	1.01	0.982	1.038
Age >65		1.046	1.007	1.087	1.029	1.007	1.051
Female		1.026	1.002	1.051	1.024	1.001	1.048
Male		1.039	1.002	1.078	1.018	0.994	1.042
All ages and sex	NO ₂ PM ₁₀	1.054	1.02	1.089	1.009	0.99	1.029
Age 15 - 64		1.051	1.004	1.101	1.006	0.974	1.039
Age >65		1.057	1.011	1.106	1.012	0.988	1.037
Female		1.059	1.009	1.111	1.011	0.984	1.038
Male		1.051	1.007	1.097	1.008	0.981	1.036
All ages and sex	NO ₂ SO ₂	1.041	1.01	1.072	1.018	1	1.036
Age 15 - 64		1.039	0.996	1.084	1.007	0.978	1.037
Age >65		1.043	1.001	1.086	1.026	1.004	1.05
Female		1.044	0.999	1.091	1.023	0.999	1.048
Male		1.04	1	1.082	1.013	0.988	1.038
All ages and sex	NO ₂ O ₃	1.029	0.993	1.066	1.029	1.008	1.051
Age 15 - 64		1.017	0.967	1.069	1.024	0.99	1.059
Age >65		1.04	0.99	1.091	1.036	1.009	1.063
Female		1.003	0.951	1.057	1.036	1.007	1.066
Male		1.049	1.002	1.099	1.025	0.995	1.056
All ages and sex	NO ₂ PM ₁₀ O ₃	1.039	0.996	1.082	1.016	0.992	1.041
Age 15 - 64		1.017	0.959	1.078	1.029	0.988	1.07

Age >65		1.059	1.001	1.121	1.012	0.981	1.043
Female		1.014	0.953	1.079	1.02	0.986	1.055
Male		1.059	1.003	1.118	1.015	0.981	1.051
All ages and sex	NO ₂ PM ₁₀ SO ₂	1.051	1.017	1.087	1.008	0.988	1.028
Age 15 - 64		1.051	1.002	1.102	1.004	0.971	1.037
Age >65		1.052	1.005	1.102	1.011	0.986	1.037
Female		1.059	1.008	1.112	1.011	0.984	1.038
Male		1.048	1.003	1.095	1.005	0.977	1.034
All ages and sex	NO ₂ SO ₂ O ₃	1.029	0.991	1.069	1.032	1.01	1.055
Age 15 - 64		1.017	0.963	1.073	1.024	0.988	1.061
Age >65		1.04	0.988	1.096	1.041	1.013	1.07
Female		0.999	0.945	1.057	1.042	1.011	1.073
Male		1.055	1.004	1.108	1.025	0.994	1.058
All ages and sex	NO ₂ PM ₁₀ SO ₂ O ₃	1.037	0.994	1.082	1.02	0.995	1.046
Age 15 - 64		1.016	0.957	1.079	1.029	0.988	1.072
Age >65		1.057	0.997	1.12	1.018	0.986	1.05
Female		1.011	0.949	1.077	1.026	0.992	1.062
Male		1.061	1.004	1.121	1.017	0.981	1.053

Table S8. Single and multiple pollutant model adjusted relative risk (RR) for 10 µg/m³ increase in the two-day moving average of SO₂ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant (10 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	SO ₂	1.021	0.984	1.06	1.023	1.001	1.047
Age 15 - 64		1.017	0.965	1.071	1.016	0.979	1.054
Age >65		1.026	0.975	1.08	1.028	0.999	1.057
Female		1.036	0.981	1.094	1.012	0.982	1.044
Male		1.009	0.96	1.06	1.037	1.004	1.07
All ages and sex	SO ₂ PM ₁₀	1.022	0.983	1.063	1.013	0.989	1.037
Age 15 - 64		1.018	0.964	1.076	1.012	0.973	1.051
Age >65		1.025	0.972	1.082	1.013	0.983	1.043
Female		1.033	0.975	1.094	0.997	0.966	1.03
Male		1.012	0.961	1.065	1.031	0.997	1.066
All ages and sex	SO ₂ NO ₂	1.003	0.962	1.046	1.016	0.992	1.042
Age 15 - 64		0.995	0.939	1.056	1.02	0.98	1.062
Age >65		1.012	0.956	1.071	1.013	0.983	1.045
Female		1.021	0.961	1.085	1.006	0.973	1.04
Male		0.987	0.934	1.042	1.029	0.994	1.065
All ages and sex	SO ₂ O ₃	1.003	0.954	1.056	1.011	0.981	1.043
Age 15 - 64		1.011	0.942	1.085	0.999	0.951	1.05
Age >65		0.999	0.931	1.072	1.02	0.981	1.06
Female		1.006	0.933	1.085	1.005	0.963	1.048
Male		1	0.936	1.068	1.021	0.977	1.066
All ages and sex	SO ₂ PM ₁₀ O ₃	1.007	0.955	1.063	0.994	0.962	1.027
Age 15 - 64		1.011	0.939	1.089	0.998	0.947	1.051

Age >65		1.005	0.933	1.082	0.992	0.952	1.034
Female		1.014	0.936	1.098	0.979	0.936	1.024
Male		1.002	0.935	1.074	1.012	0.966	1.06
All ages and sex	SO ₂ PM ₁₀ NO ₂	1.009	0.967	1.053	1.012	0.986	1.037
Age 15 - 64		1.002	0.944	1.064	1.021	0.98	1.063
Age >65		1.016	0.958	1.076	1.005	0.973	1.037
Female		1.027	0.965	1.093	0.997	0.964	1.032
Male		0.993	0.939	1.05	1.028	0.993	1.065
All ages and sex	SO ₂ NO ₂ O ₃	0.992	0.937	1.05	0.995	0.962	1.03
Age 15 - 64		0.994	0.917	1.077	1.006	0.952	1.063
Age >65		0.994	0.918	1.076	0.988	0.945	1.032
Female		1.018	0.934	1.109	0.985	0.94	1.033
Male		0.972	0.902	1.047	1.007	0.959	1.057
All ages and sex	SO ₂ PM ₁₀ NO ₂ O ₃	0.999	0.942	1.06	0.988	0.954	1.023
Age 15 - 64		0.997	0.919	1.083	1.015	0.959	1.074
Age >65		1.004	0.925	1.09	0.971	0.928	1.016
Female		1.026	0.939	1.12	0.973	0.927	1.021
Male		0.98	0.908	1.058	1.006	0.957	1.057

Table S9. Single and multiple pollutant model adjusted relative risk (RR) for 10 µg/m³ increase in the two-day moving average of O₃ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, age groups and sex, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant (10 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	O ₃	1.004	0.978	1.031	1.016	1.001	1.031
Age 15 - 64		1.004	0.968	1.042	1.012	0.988	1.036
Age >65		1.003	0.967	1.04	1.019	1	1.037
Female		0.967	0.93	1.005	1.011	0.991	1.032
Male		1.034	0.999	1.071	1.022	1.001	1.043
All ages and sex	O ₃ PM ₁₀	1.002	0.975	1.029	1.016	1.001	1.032
Age 15 - 64		1.003	0.966	1.042	1.013	0.988	1.038
Age >65		1	0.963	1.038	1.02	1	1.04
Female		0.964	0.926	1.003	1.015	0.994	1.037
Male		1.032	0.996	1.07	1.019	0.997	1.042
All ages and sex	O ₃ NO ₂	0.999	0.971	1.028	1.014	1.002	1.027
Age 15 - 64		0.993	0.954	1.033	1.016	0.996	1.038
Age >65		1.004	0.965	1.044	1.014	0.998	1.031
Female		0.956	0.917	0.997	1.013	0.995	1.03
Male		1.034	0.996	1.074	1.018	1	1.037
All ages and sex	O ₃ SO ₂	1.004	0.977	1.031	1.014	0.999	1.029
Age 15 - 64		1.003	0.967	1.041	1.009	0.985	1.033
Age >65		1.004	0.967	1.041	1.017	0.999	1.037
Female		0.969	0.932	1.008	1.01	0.989	1.03
Male		1.032	0.997	1.07	1.02	0.999	1.042
All ages and sex	O ₃ PM ₁₀ SO ₂	1.001	0.974	1.029	1.017	1.002	1.032
Age 15 - 64		1.001	0.963	1.04	1.009	0.985	1.034

Age >65		1.001	0.964	1.04	1.023	1.004	1.042
Female		0.966	0.928	1.005	1.014	0.994	1.035
Male		1.03	0.993	1.068	1.022	1.001	1.044
All ages and sex	O ₃ PM ₁₀ NO ₂	0.995	0.967	1.024	1.017	1.002	1.033
Age 15 - 64		0.989	0.95	1.03	1.012	0.986	1.037
Age >65		1	0.96	1.041	1.022	1.002	1.042
Female		0.953	0.913	0.994	1.017	0.996	1.038
Male		1.029	0.991	1.07	1.019	0.997	1.042
All ages and sex	O ₃ SO ₂ NO ₂	0.999	0.971	1.028	1.016	1.001	1.032
Age 15 - 64		0.993	0.954	1.033	1.012	0.987	1.037
Age >65		1.004	0.965	1.045	1.02	1.001	1.04
Female		0.957	0.918	0.998	1.014	0.993	1.035
Male		1.034	0.995	1.074	1.021	0.999	1.043
All ages and sex	O ₃ PM ₁₀ NO ₂ SO ₂	0.995	0.967	1.025	1.017	1.002	1.033
Age 15 - 64		0.989	0.949	1.03	1.01	0.985	1.036
Age >65		1	0.96	1.041	1.023	1.003	1.043
Female		0.953	0.914	0.995	1.016	0.995	1.038
Male		1.029	0.99	1.07	1.021	0.999	1.043

Table S11. Cold and wet - Season-specific single and multiple pollutant model adjusted relative risk (RR) for 10 µg/m³ increase in the two-day moving average of PM₁₀, NO₂, SO₂ and O₃ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant (10 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	PM ₁₀	1	0.984	1.016	1.016	1.007	1.025
	NO ₂	1.039	1.01	1.07	1.024	1.006	1.041
	SO ₂	1.024	0.985	1.064	1.034	1.01	1.059
	O ₃	0.999	0.972	1.027	1.019	1.004	1.034
All ages and sex							
	PM ₁₀ NO ₂ SO ₂ O ₃	0.991	0.964	1.019	1.015	0.998	1.032
	NO ₂ PM ₁₀ SO ₂ O ₃	1.021	0.973	1.071	1.017	0.988	1.047
	SO ₂ PM ₁₀ NO ₂ O ₃	1.012	0.943	1.086	0.985	0.943	1.028
	O ₃ PM ₁₀ NO ₂ SO ₂	1	0.97	1.032	1.018	1.001	1.035

Table S12. Warm and dry - Season-specific single and multiple pollutant model adjusted relative risk (RR) for an interquartile range increase in the two-day moving average of PM₁₀, NO₂, SO₂ and O₃ concentrations and mortality due to cardiovascular and respiratory diseases in all ages, Cape Town, South Africa, 1 January 2006 - 31 December 2015.

	Pollutant (10 µg/m ³)	Respiratory disease			Cardiovascular disease		
		Relative risk	95% Confidence interval		Relative risk	95% Confidence interval	
			Lower interval	Upper interval		Lower interval	Upper interval
All ages and sex	PM ₁₀	1.016	0.978	1.054	1.004	0.984	1.026
	NO ₂	1.062	1.012	1.114	1.004	0.978	1.032
	SO ₂	1.006	0.972	1.042	0.994	0.975	1.014
	O ₃	1.031	0.976	1.089	1.003	0.976	1.032
All ages and sex							
	PM ₁₀ NO ₂ SO ₂ O ₃	1.013	0.944	1.087	1.011	0.979	1.044
	NO ₂ PM ₁₀ SO ₂ O ₃	1.144	1.047	1.25	1.011	0.978	1.044

Lag structures

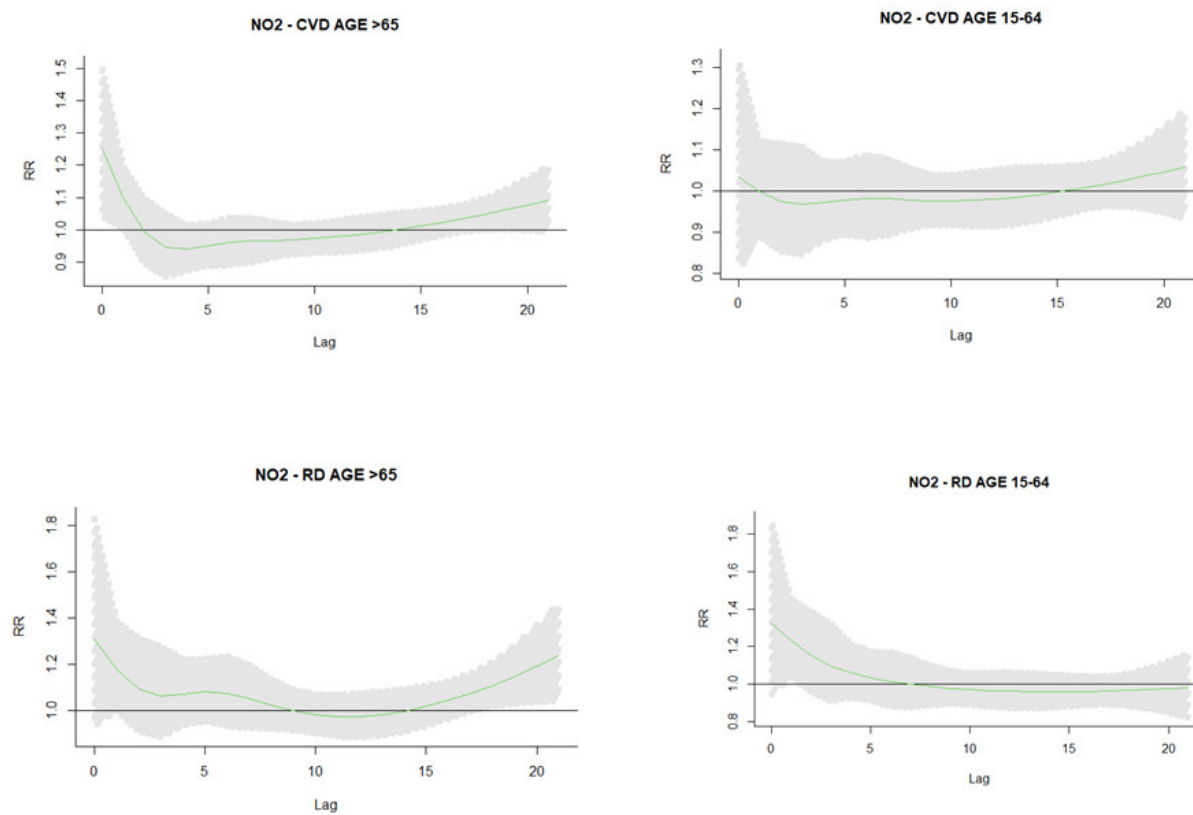


Figure S1. Age-specific Lag structure (0–21) of the estimated effects of a 10 $\mu\text{g}/\text{m}^3$ increase in NO_2 concentrations on cardiovascular and respiratory disease mortality in Cape Town, South Africa, 2006–2015. The green curve gives the RR-estimates and the light grey band their 95% confidence intervals.

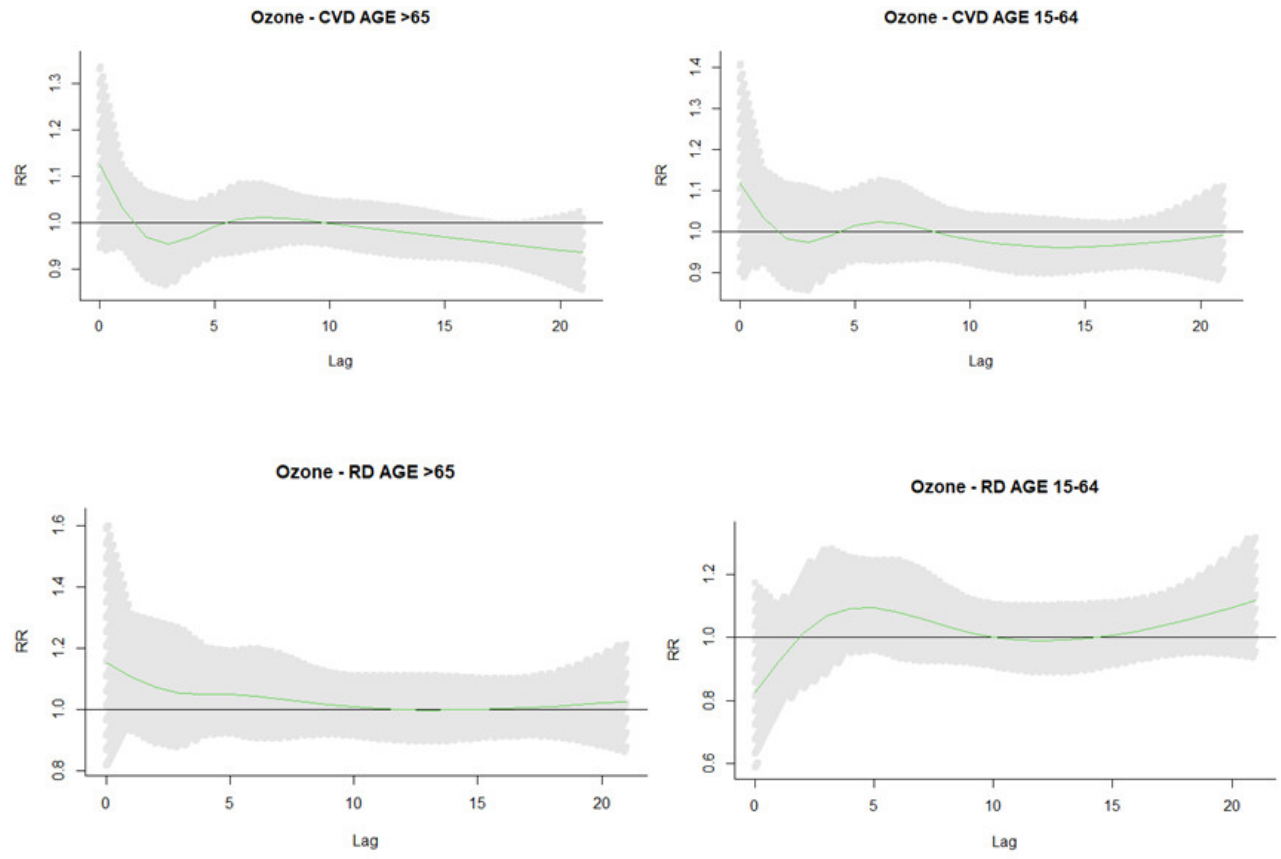


Figure S2. Age-Specific lag structure (0–21) of the estimated effects of a 10 $\mu\text{g}/\text{m}^3$ increase in O_3 concentrations on cardiovascular and respiratory disease mortality in Cape Town, South Africa, 2006–2015. The green curve gives the RR-estimates and the light grey band their 95% confidence intervals.

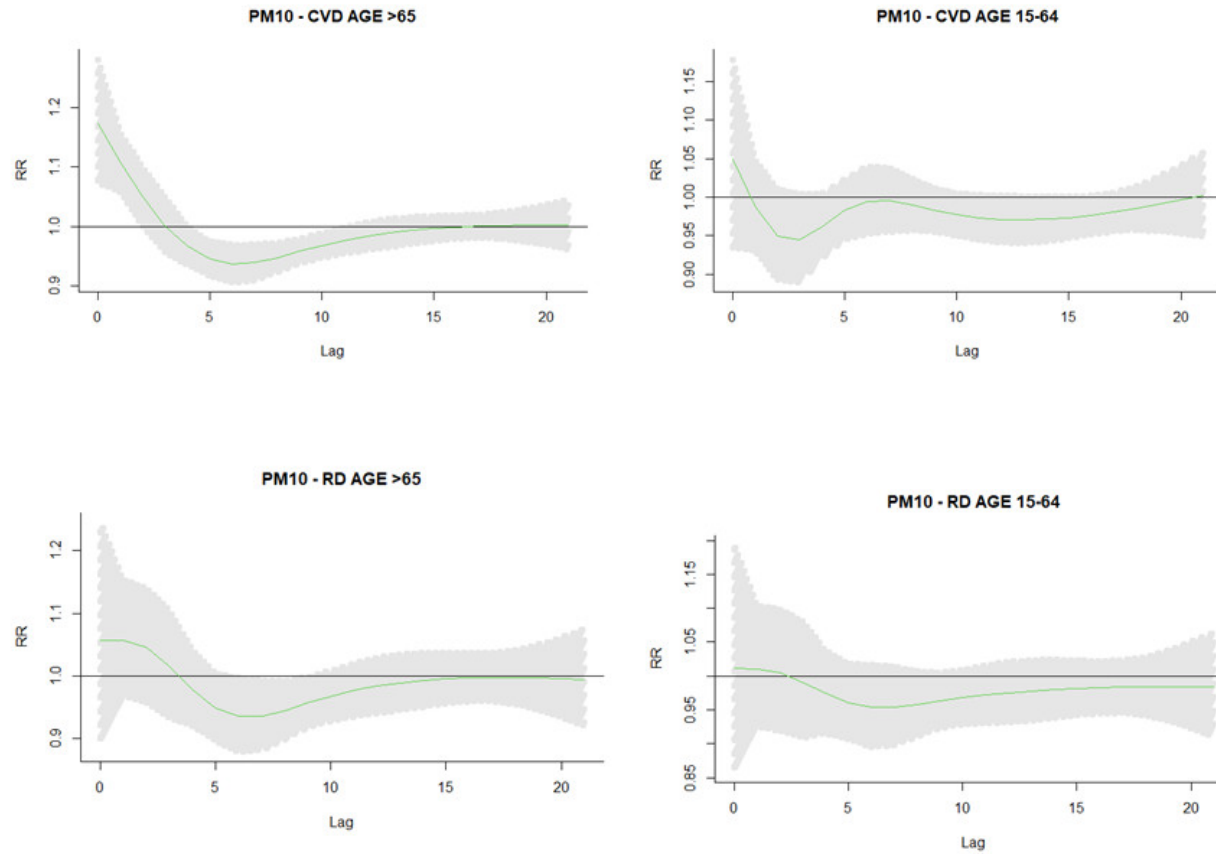


Figure S3i. Age-Specific lag structure (0–21) of the estimated effects of a 10 $\mu\text{g}/\text{m}^3$ increase in PM_{10} concentrations on cardiovascular and respiratory disease mortality in Cape Town, South Africa, 2006–2015. The green curve gives the RR-estimates and the light grey band their 95% confidence intervals

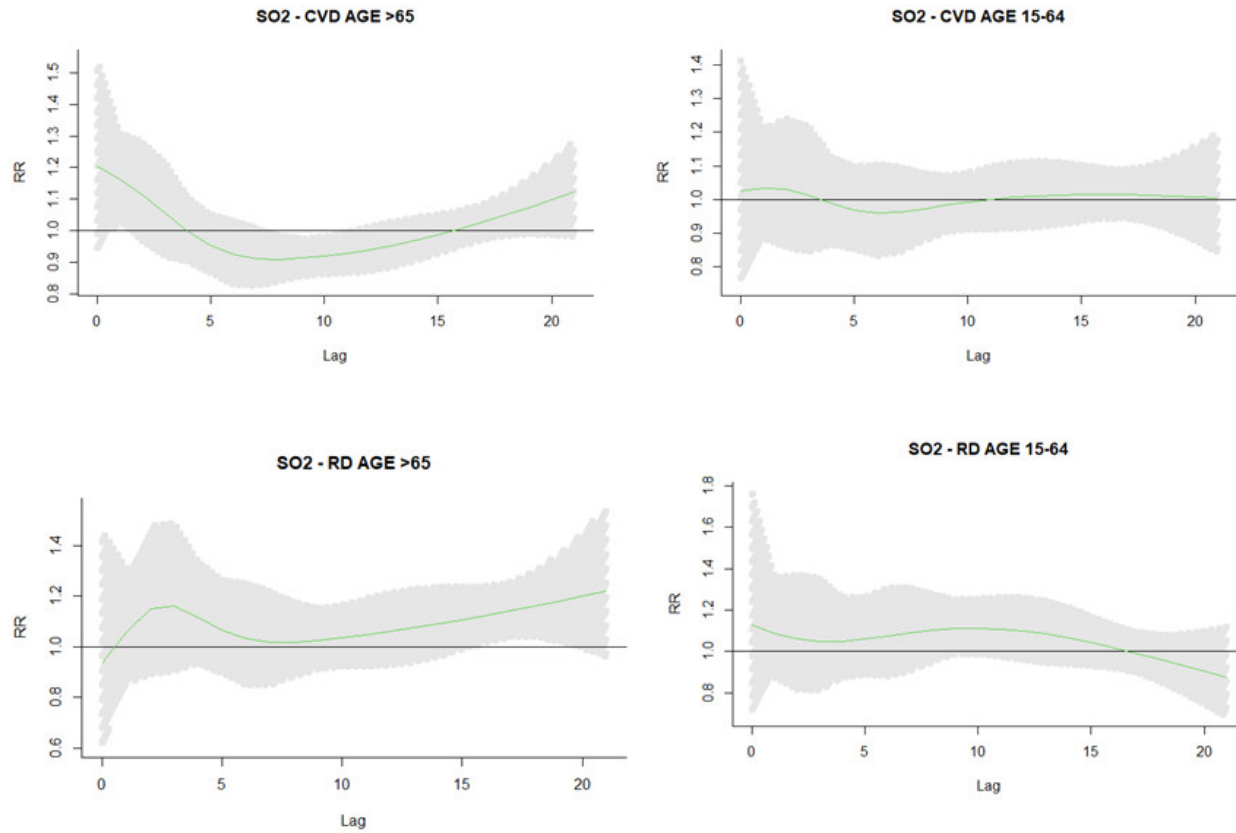


Figure S4. Age-Specific lag structure (0–21) of the estimated effects of a 10 $\mu\text{g}/\text{m}^3$ increase in SO₂ concentrations on cardiovascular and respiratory disease mortality in Cape Town, South Africa, 2006–2015. The green curve gives the RR-estimates and the light grey band their 95% confidence intervals.

PM10 - CVD ALL WITH 45 LAGS

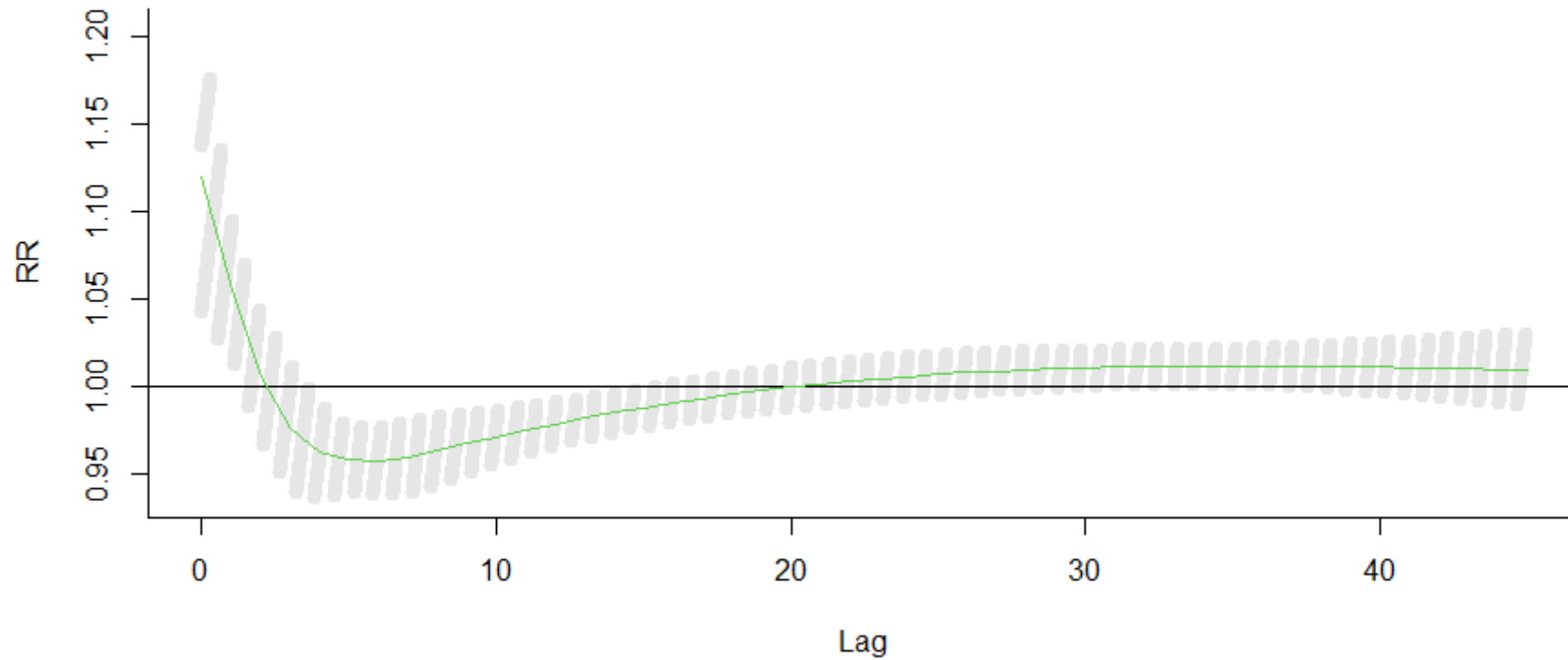


Figure S5. Overall lag structure (0–45) of the estimated effects of a 10 $\mu\text{g}/\text{m}^3$ increase in PM_{10} concentrations on cardiovascular disease mortality in Cape Town, South Africa, 2006–2015. The green curve gives the RR-estimates and the light grey band their 95% confidence intervals.

PM10 - RD ALL WITH 45 LAGS

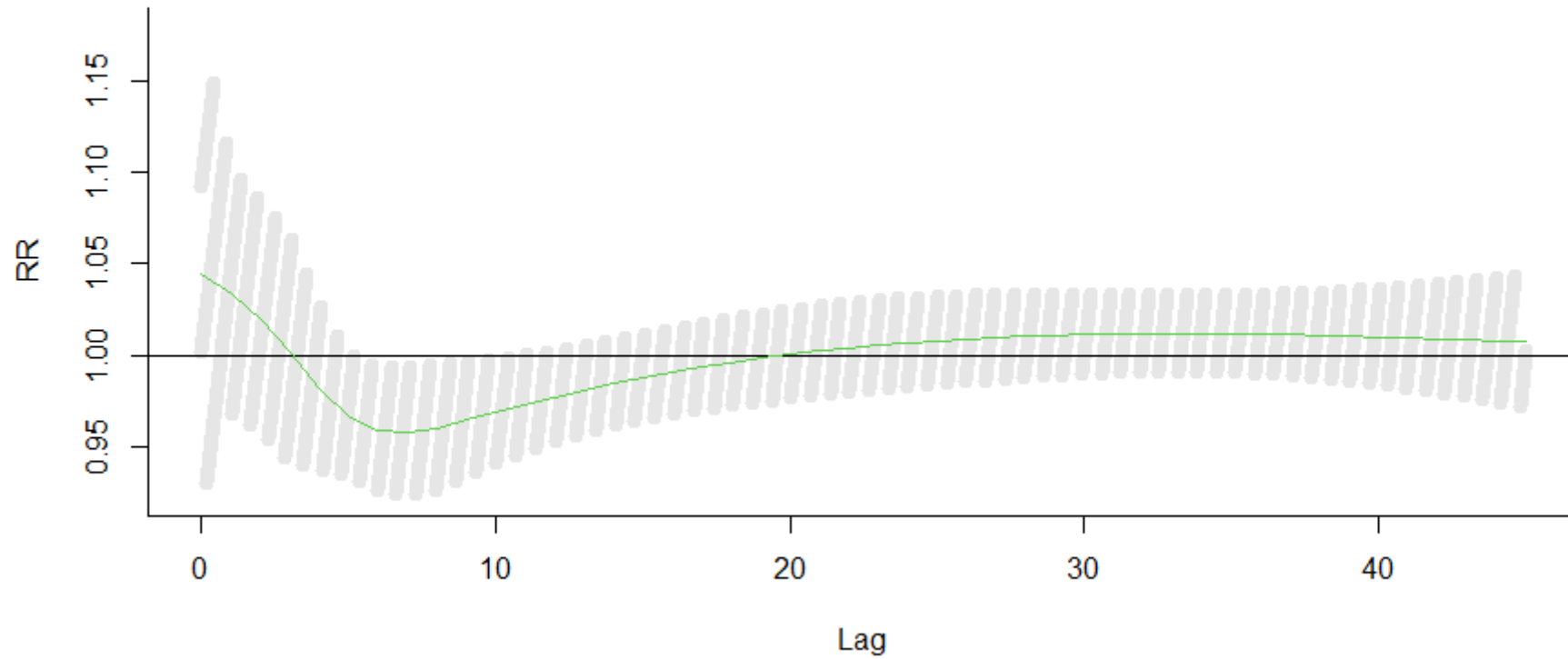


Figure S6. Overall lag structure (0–45) of the estimated effects of a 10 $\mu\text{g}/\text{m}^3$ increase in PM_{10} concentrations on respiratory disease mortality in Cape Town, South Africa, 2006–2015. The green curve gives the RR-estimates and the light grey band their 95% confidence intervals.