Table S1. Crude cause-specific cardiovascular mortality in studied cities 2008–2017.

	Białystok 34005	Łomża 8082	Suwałki 7486	P
Cardiovascular disease, % (N)	40.73 (13851)	39.94 (3328)	36.37 (2723)	<0.001
Acute coronary syndromes, % (N)	14.11 (4799)	13.24 (1070)	11.98 (897)	<0.001
Myocardial infarction, % (N)	3.80 (1293)	3.90 (315)	3.10 (232)	0.359
Ischemic heart disease, % (N)	9.45 (3213)	9.07 (733)	8.46 (633)	<0.001
Unstable angina, % (N)	0.86 (293)	0.27 (22)	0.43 (32)	<0.001
Cerebrovascular disease, % (N)	11.12 (3780)	11.92 (963)	8.10 (606)	<0.001
Cerebral infarction, % (N)	8.02 (2727)	9.21 (744)	5.77 (432)	<0.001
Cerebral hemorrhage, % (N)	3.10 (1053)	2.71 (219)	2.32 (174)	0.021
Other cardiovascular, % (N)	15.5 (5272)	16.02 (1295)	16.3 (1220)	<0.001
Heart disease, % (N)	4.24 (1443)	3.53 (285)	4.97 (372)	<0.001
Hypertensive disease, % (N)	1.00 (341)	1.78 (144)	2.24 (168)	<0.001
Heart failure, % (N)	2.07 (703)	3.41 (276)	1.88 (141)	<0.001
Pulmonary embolism, % (N)	0.73 (248)	0.78 (63)	1.06 (79)	<0.001
Cardiomyopathy, % (N)	0.48 (163)	0.33 (27)	0.63 (47)	0.005
Pulmonary hypertension, % (N)	0.40 (137)	0.31 (25)	0.47 (35)	0.113
Aortic valve disorders, % (N)	0.48 (163)	0.27 (22)	0.41 (31)	<0.001
Dissection of aorta, % (N)	0.83 (282)	0.42 (34)	0.40 (30)	<0.001
Other, % (N)	5.27 (1792)	5.18 (419)	4.23 (317)	<0.001

Table S2. Time-stratified case-crossover model for cities included in the meta-analysis. The odds ratio of cardiovascular mortality with interquartile-range increase in exposure to air pollutants.

	Białystok				Łomża				Suwałki	
	SO_2[d]	NO_2[a]	$PM_{2.5}$[b]	PM_{10}[c]	SO_2	NO_2	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
LAG 0	0.94 0.78-1.15 P=0.56	1.02 0.99-1.04 P=0.26	1.03 1.01-1.06 P=0.02	1.03 1.01-1.05 P=0.01	1.02 0.96-1.09 P=0.50	1.03 0.97-1.09 P=0.35	1.03 1.00-1.06 P=0.04	1.03 0.98-1.08 P=0.23	1.10 1.01-1.2 P=0.03	1.05 1.00-1.11 P=0.053
P*	0.99	0.78	0.56	<0.001	0.71	0.76	0.37	0.17	0.63	0.80
LAG 1	0.98 0.8-1.19 P=0.81	1.02 0.99-1.05 P=0.12	1.02 0.99-1.05 P=0.12	1.01 0.99-1.04 P=0.29	1.02 0.96-1.09 P=0.54	1.01 0.96-1.08 P=0.64	1.02 0.99-1.05 P=0.15	1.04 1.00-1.09 P=0.08	1.04 0.95-1.13 P=0.42	1.00 0.95-1.06 P=0.9
P	0.16	0.96	0.18	0.15	0.81	0.40	0.98	0.90	0.96	0.83
LAG 2	0.89 0.73-1.08 P=0.24	0.98 0.96-1.01 P=0.23	1.01 0.98-1.03 P=0.68	1.00 0.98-1.03 P=0.79	0.99 0.93-1.05 P=0.75	1.03 0.98-1.1 P=0.27	1.00 0.97-1.03 P=0.84	1.02 0.97-1.06 P=0.5	1.01 0.93-1.1 P=0.84	1.03 0.98-1.08 P=0.27
P	0.29	1.00	0.23	0.97	0.37	0.87	0.48	1.00	0.30	0.09
LAG 3	0.95 0.90-1.02 P=0.14	0.98 0.95-1.01 P=0.13	1.00 0.97-1.03 P=0.94	1.00 0.98-1.02 P=0.94	0.95 0.85-1.07 P=0.43	1.01 0.95-1.07 P=0.71	1.01 0.98-1.03 P=0.74	1.03 0.98-1.07 P=0.30	1.11 1.02-1.21 P=0.02	1.02 0.97-1.08 P=0.36
P	0.49	0.63	0.88	0.78	0.39	0.99	0.13	0.47	0.30	0.048
LAG 0-1	0.94 0.77-1.15 P=0.56	1.02 1.00-1.05 P=0.11	1.04 1.01-1.07 P=0.02	1.02 1.00-1.05 P=0.04	1.03 0.96-1.1 P=0.43	1.03 0.97-1.09 P=0.33	1.04 1.01-1.07 P=0.01	1.04 1.00-1.09 P=0.07	1.08 0.99-1.18 P=0.08	1.04 0.98-1.09 P=0.17
	0.31	0.74	0.70	0.85	0.94	0.97	0.32	0.43	0.65	0.52
LAG 0-2	0.82 0.65-1.02 P=0.08	1.00 0.98-1.03 P=0.84	1.04 1.00-1.07 P=0.07	1.02 0.99-1.04 P=0.16	1.01 0.94-1.08 P=0.84	1.04 0.98-1.11 P=0.22	1.03 1.00-1.07 P=0.06	1.05 1.00-1.1 P=0.08	1.10 1.00-1.21 P=0.04	1.05 0.99-1.1 P=0.11
P	0.93	0.59	0.21	0.81	0.39	0.78	0.39	0.45	0.72	0.047

* - P – value for differences in odds ratio between cold and warm seasons.

[a] nitrogen dioxide, [b] particulate matter with a diameter of 2.5 μm or less, [c] particulate matter with a diameter of 10 μm or less, [d] sulfur dioxide

Table S3. Time-stratified case-crossover model for cities included in the meta-analysis. The odds ratio of acute coronary syndromes mortality with interquartile-range increase in exposure to air pollutants.

	Białystok				Łomża				Suwałki	
	SO_2[d]	NO_2[a]	$PM_{2.5}$[b]	PM_{10}[c]	SO_2	NO_2	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
LAG 0	1.01 0.95-1.07 P=0.72	1.03 0.98-1.09 P=0.26	1.06 1.01-1.11 P=0.01	1.05 1.01-1.09 P=0.02	1.04 0.93-1.17 P=0.52	1.09 0.99-1.2 P=0.10	1.02 0.97-1.08 P=0.37	1.03 0.95-1.12 P=0.46	1.07 0.93-1.23 P=0.36	1.05 0.95-1.16 P=0.38
P *	0.91	0.70	0.65	0.27	0.44	0.53	0.44	0.03	0.28	0.54
LAG 1	1.01 0.95-1.08 P=0.68	1.03 0.97-1.08 P=0.39	1.05 1.01-1.10 P=0.03	1.02 0.98-1.06 P=0.39	1.02 0.91-1.15 P=0.71	1.02 0.93-1.13 P=0.66	1.01 0.96-1.06 P=0.79	1.05 0.97-1.14 P=0.26	0.98 0.85-1.14 P=0.83	0.99 0.89-1.1 P=0.83
P	0.32	0.96	0.25	0.14	0.69	0.95	0.98	0.90	0.97	0.79
LAG 2	0.98 0.92-1.04 P=0.52	0.98 0.93-1.04 P=0.54	1.02 0.97-1.07 P=0.48	1.02 0.98-1.06 P=0.37	1.00 0.89-1.12 P=0.97	1.0 0.9-1.1 P=0.94	0.99 0.94-1.04 P=0.55	1.03 0.95-1.12 P=0.53	1.00 0.87-1.16 P=0.95	1.08 0.97-1.19 P=0.15
P	0.09	0.20	0.11	0.18	0.31	0.71	0.29	0.37	0.46	0.46
LAG 3	0.95 0.9-1.02 P=0.14	0.97 0.92-1.03 P=0.31	0.99 0.94-1.03 P=0.56	0.99 0.95-1.03 P=0.46	0.95 0.85-1.07 P=0.43	1.03 0.93-1.13 P=0.58	1.01 0.97-1.07 P=0.58	1.06 0.98-1.15 P=0.15	1.07 0.93-1.24 P=0.36	1.06 0.96-1.18 P=0.23
P	0.10	0.11	0.23	0.48	0.06	0.48	0.09	0.87	0.88	0.08
LAG 0-1	1.01 0.95-1.08 P=0.73	1.05 0.99-1.11 P=0.10	1.06 1.01-1.12 P=0.01	1.04 0.99-1.08 P=0.08	1.03 0.92-1.17 P=0.59	1.07 0.97-1.19 P=0.16	1.02 0.97-1.07 P=0.48	1.05 0.97-1.15 P=0.23	1.04 0.89-1.21 P=0.65	1.02 0.92-1.13 P=0.75
	0.34	0.84	0.39	0.70	0.70	0.08	0.73	0.18	0.47	0.81
LAG 0-3	1.00 0.97-1.03 P=0.84	1.01 0.95-1.07 P=0.69	1.06 1.00-1.12 P=0.049	1.03 0.99-1.08 P=0.16	1.01 0.89-1.15 P=0.88	1.07 0.97-1.19 P=0.19	1.02 0.96-1.08 P=0.5	1.07 0.98-1.17 P=0.14	1.05 0.9-1.24 P=0.55	1.06 0.96-1.18 P=0.25
P	0.06	0.20	0.21	0.41	0.52	0.20	0.84	0.60	0.43	0.09

* - P – value for differences in odds ratio between cold and warm seasons.

[a] nitrogen dioxide, [b] particulate matter with a diameter of 2.5 μm or less, [c] particulate matter with a diameter of 10 μm or less, [d] sulfur dioxide

Table S4. Time-stratified case-crossover model for cities included in the meta-analysis. The odds ratio of cerebrovascular mortality with interquartile-range increase in exposure to air pollutants.

	Białystok				Łomża				Suwałki	
	SO_2[d]	NO_2[a]	$PM_{2.5}$[b]	PM_{10}[c]	SO_2	NO_2	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
LAG 0	0.97 0.93-1.02 P=0.21	0.88 0.60-1.30 P=0.5	1.01 0.95-1.07 P=0.75	1.02 0.97-1.07 P=0.53	1.04 0.92-1.17 P=0.57	1.01 0.90-1.12 P=0.96	0.99 0.92-1.05 P=0.67	0.97 0.88-1.07 P=0.56	1.01 0.83-1.21 P=0.99	1.15 1.01-1.30 P=0.04
P *	0.89	0.41	0.06	0.36	0.60	0.82	0.43	0.82	0.99	0.72
LAG 1	0.98 0.93-1.02 P=0.31	1.41 0.98-2.04 P=0.07	0.98 0.93-1.05 P=0.6	0.99 0.90-1.11 P=0.91	0.97 0.87-1.09 P=0.67	1.02 0.92-1.14 P=0.69	1.04 0.99-1.08 P=0.15	1,01 0.94-1.09 P=0.77	1.47 0.28-1.78 P=0.65	1.10 0.98-1.23 P=0.09
P	0.22	0.93	0.14	0.54	0.38	0.66	0.58	0.38	0.59	0.41
LAG 2	0.79 0.25-2.52 P=0.69	1.67 0.78-3.58 P=0.19	1.37 0.47-2.26 P=0.38	0.95 0.24-3.78 P=0.95	0.85 0.08-1.89 P=0.42	1.06 0.95-1.18 P=0.32	1.11 0.82-1.51 P=0.49	0.48 0.01-1.05 P=0.78	0.83 0.68-1.01 P=0.06	1.101 0.98-1.23 P=0.08
P	0.62	0.41	0.44	0.81	0.23	0.45	0.97	0.99	0.22	0.55
LAG 3	0.85 0.27-2.73 P=0.79	1.05 0.96-1.13 P=0.25	1.06 0.93-1.22 P=0.38	1.00 0.87-1.15 P=0.99	0.85 0.08-1.89 P=0.43	1.08 0.87-1.35 P=0.49	1.07 0.79-1.46 P=0.66	0.94 0.56-1.56 P=0.8	1.11 0.90-1.38 P=0.34	1.12 0.99-1.27 P=0.07
P	0.91	0.57	0.10	0.71	0.63	0.15	0.96	0.68	0.55	0.54
LAG 0-1	0.96 0.77-1.22 P=0.76	1.10 0.95-1.28 P=0.2	1.12 0.85-1.47 P=0.41	0.99 0.76-1.32 P=0.99	0.93 0.01-1.85 P=0.43	1.11 0.81-1.52 P=0.52	1.23 0.69-2.18 P=0.5	0.87 0.32-1.61 P=0.79	1.18 0.91-1.52 P=0.22	1.17 1.02-1.4 P=0.03
	0.91	0.88	0.40	0.76	0.28	0.18	0.56	0.37	0.74	0.78
LAG 0-3	1.07 0.68-1.71 P=0.77	0.84 0.61-1.12 P=0.21	0.78 0.20-1.37 P=0.4	1.11 0.58-1.75 P=0.98	1.34 0.65-1.68 P=0.43	0.87 0.52-1.44 P=0.59	0.68 0.21-2.22 P=0.52	1.07 0.17-1.26 P=0.79	0.92 0.70-1.23 P=0.58	1.25 1.05-1.48 P=0.01
P	0.90	0.87	0.42	0.78	0.45	0.61	0.60	0.67	0.65	0.45

* - P – value for differences in odds ratio between cold and warm seasons.

[a] nitrogen dioxide, [b] particulate matter with a diameter of 2.5 μm or less, [c] particulate matter with a diameter of 10 μm or less, [d] sulfur dioxide

Figure S1. Panel chart. Changes in the concentrations of air pollutants and temperature in Białystok for analyzed period (the red line represents changes in the quartile of the year).

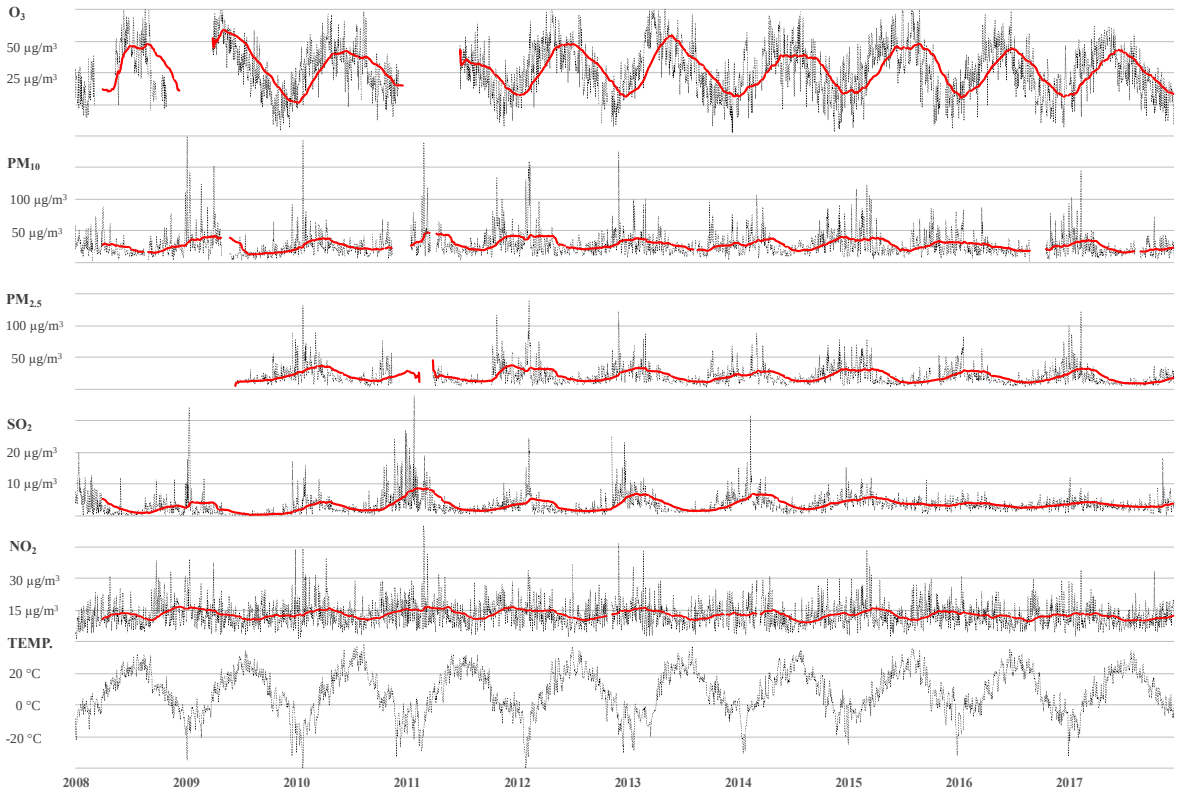

Figure S2. Panel chart. Changes in the concentrations of air pollutants and temperature in Łomża for analyzed period (the red line represents changes in the quartile of the year).

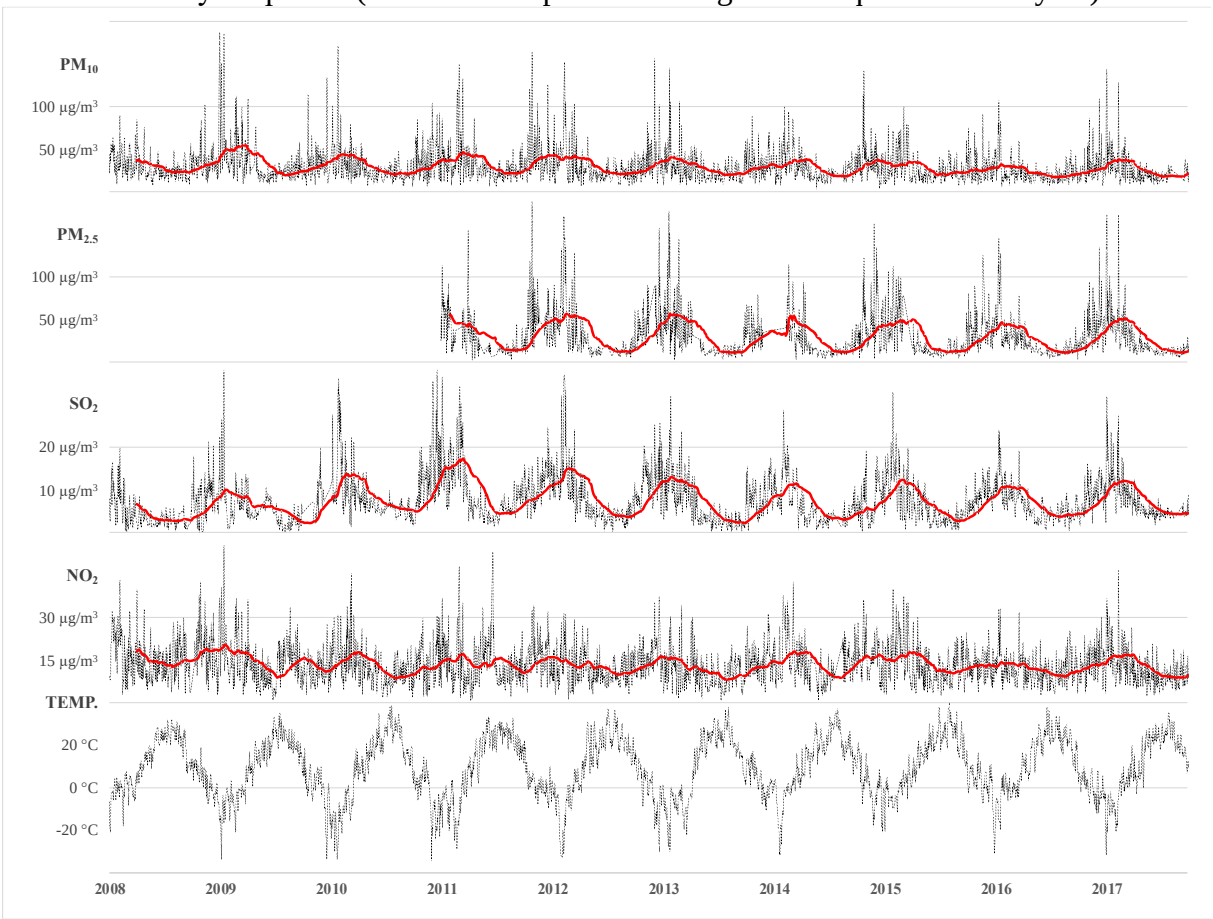

Figure S3. Panel chart. Changes in the concentrations of air pollutants and temperature in Suwałki for analyzed period (the red line represents changes in the quartile of the year).

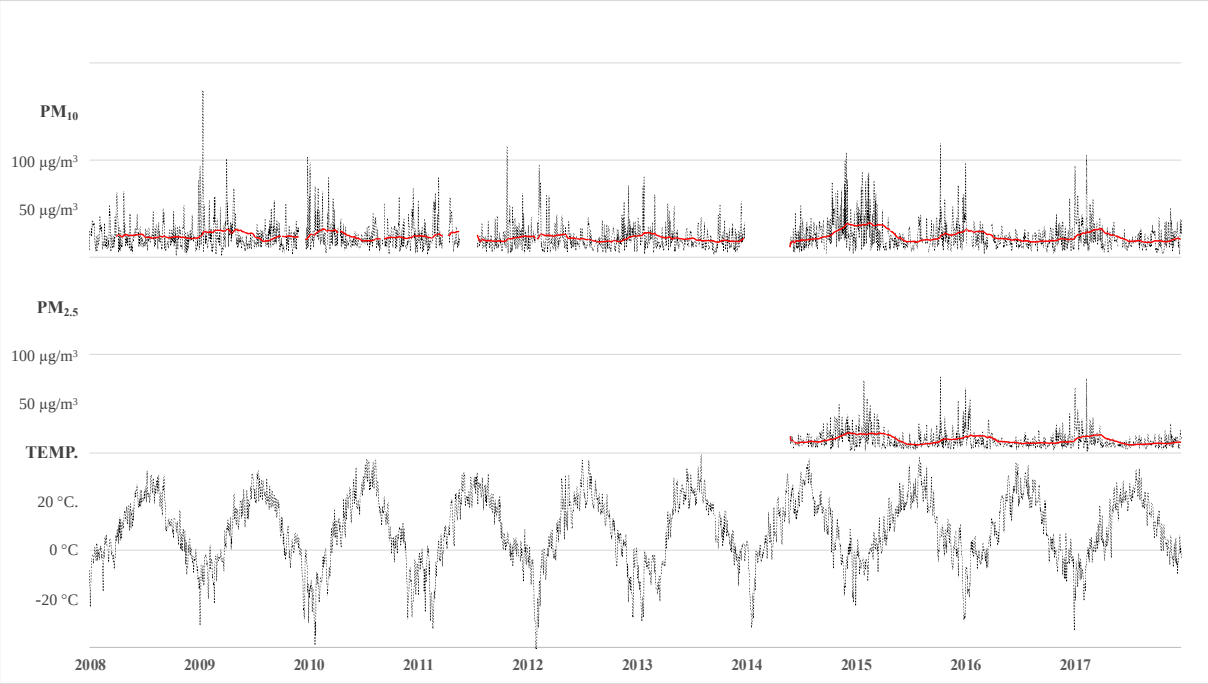

Figure S4. Meta-analysis results for associations between exposure to short-term nitrogen dioxide and cardiovascular-, acute coronary syndromes-, and cerebrovascular-related mortality.

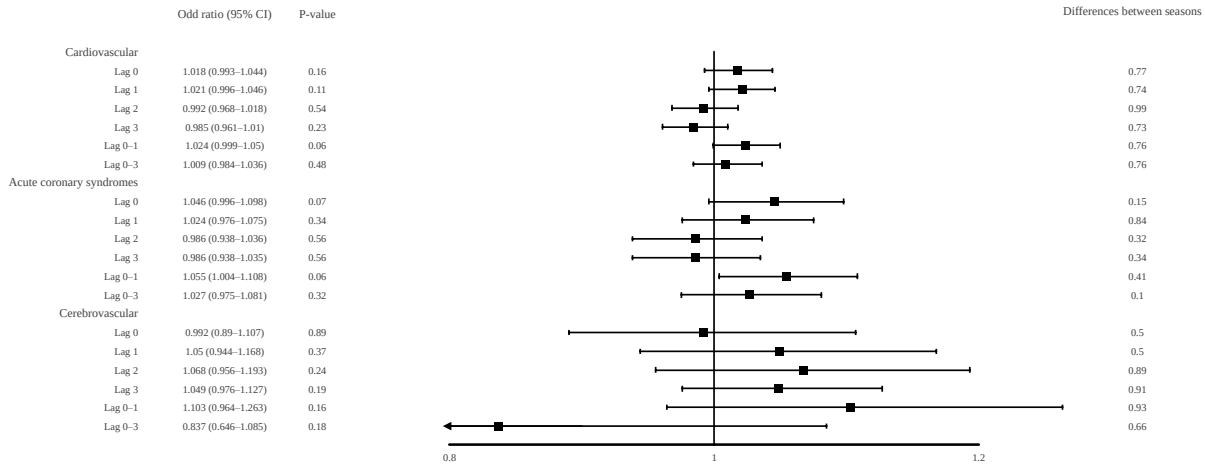

Figure S5. Meta-analysis results for associations between short-term exposure to sulfur dioxide and cardiovascular-, acute coronary syndromes-, and cerebrovascular-related mortality.