1 **Physical activity alleviated associations of combined oxidant capacity, redox-weighted**

2 **oxidant capacity with platelet-based inflammatory indicators: findings from the Henan**

3 **Rural Cohort Study**

4

5 **Authors**

6 Xiaohuan Yang[a†], Gongbo Chen[b†], Wei Liao[a], Ziyuan Zhang[a], Xiaotian Liu[a], Ruiying Li[a],

7 Xiaoyu Hou[a], Yinghao Yuchi[a], Zhenxing Mao[a], Wenqian Huo[a], Yuming Guo[a,c], Shanshan Li[c],

8 Chongjian Wang[a*], Jian Hou[a*]

9

10 **Authors affiliations**

11 [a] Department of Epidemiology and Biostatistics, College of Public Health, Zhengzhou

12 University, Zhengzhou, Henan, PR China.

13 [b] Climate, Air Quality Research Unit, School of Public Health and Preventive Medicine,

14 Monash University, Melbourne, Australia

15 [c] Department of Epidemiology and Preventive Medicine, School of Public Health and

16 Preventive Medicine, Monash University, Melbourne, Australia.

17 [†]These authors contributed equally to this work.

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19 *** Correspondence author**

20 Dr. Jian Hou & Chongjian Wang

21 Department of Epidemiology and Biostatistics

22 College of Public Health, Zhengzhou University

23 100 Kexue Avenue, Zhengzhou, 450001, Henan, *PR* China

24 Phone: +86 371 67781452

25 Fax: +86 371 67781919

26   E-mail: houjian1988@zzu.edu.cn & tjwcj2005@126.com

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Abbreviation

29   BMI: body mass index; T2DM: type 2 diabetes mellitus; CHD: chronic coronary heart

disease; PA: physical activity; PCT: plateletcrit; PLT: platelet count; PLR = PLT/absolute

lymphocyte count; SII = (absolute neutrophil count $\times$ PLT)/absolute lymphocyte count; MLR

= absolute monocyte count divided/absolute lymphocyte count; SIRI = (absolute neutrophil

count $\times$ absolute monocyte count divided)/absolute lymphocyte count; O_3: ozone; O_x = NO_2

+ O_3; O_x^{wt} = (1.07V $\times$ NO_2 + 2.075V $\times$ O_3)/(3.145V); NO_2: nitrogen dioxide.

Definition of covariates

In this study, participant's baseline-survey information were obtained using a questionnaire by the face-to-face interview. For each participant, body weight and height were recorded twice while they were dressed lightly and without shoes. The body mass index (BMI) was calculated as body weight (kg) divided by the square of height (m). Smoking status was defined as smoking at least one cigarette per day for six months, and was categorized into never, former, and current. Drinking status was defined as drinking alcohol at least 12 times/year. High fat diet and high vegetable and fruit diet were defined as ≥75 g/day of white meat (including chicken and duck) or red meat (including lamb, beef, and pork) and ≥ 500 g/day of vegetables, respectively [1].

Type 2 diabetes mellitus (T2DM) was defined by a fasting blood glucose value ≥7.0 mmol/L or by a self-reported history of physician-diagnosed T2DM and receiving anti-hypoglycemic treatment in the last 2 weeks [2]. Personal medical histories concerning chronic coronary heart disease (CHD) and stroke were collected through direct interviews. These reports were then verified by local healthcare providers and validated by an outcomes committee comprising specialists in internal medicine, endocrinology, cardiology, and epidemiology, following the guidelines set by the World Health Organization [3].

Supplementary table 1. Spearman's correlation coefficient of air pollutants and physical activity

	O_3	O_x	O_x^{wt}	NO_2	PA	$PM_{2.5}$
O_3	1					
O_x	0.929***	1				
O_x^{wt}	0.962***	0.995***	1			
NO_2	0.816***	0.972***	0.943***	1		
PA	-0.100***	-0.113***	-0.111***	-0.113***	1	
$PM_{2.5}$	0.808***	0.885***	0.876***	0.870***	-0.028***	1

*** $p < 0.01$ level (2-tailed).

Supplementary table 2 Associations of air pollutants with platelet-based inflammatory indicators grouped by physical activity

	O_3	O_x	O_x^{wt}	NO_2
Low				
PCT	0.124 (0.093, 0.156)*	0.044 (0.031, 0.057)*	0.101 (0.073, 0.129)*	0.057 (0.036, 0.077)*
PLT	21.451 (18.264, 24.637)*	7.356 (6.032, 8.680)*	16.998 (14.155, 19.840)*	9.035 (6.954, 11.116)*
PLR	11.479 (9.216, 13.741)*	3.023 (2.083, 3.963)*	7.660 (5.641, 9.679)*	2.588 (1.111, 4.064)*
SII	27.682 (14.773, 40.590)*	3.911 (-1.442, 9.264)	13.163 (1.659, 24.666)*	-2.072 (-10.468, 6.324)
MLR	0.037 (0.034, 0.041)*	0.018 (0.017, 0.020)*	0.038 (0.035, 0.041)*	0.029 (0.027, 0.031)*
SIRI	0.117 (0.094, 0.141)*	0.057 (0.047, 0.067)*	0.119 (0.098, 0.140)*	0.091 (0.075, 0.106)*
Middle				
PCT	0.080 (0.051, 0.109)*	0.028 (0.016, 0.039)*	0.064 (0.039, 0.089)*	0.034 (0.017, 0.052)*
PLT	17.644 (14.76, 20.528)*	5.794 (4.635, 6.952)*	13.601 (11.083, 16.118)*	6.873 (5.104, 8.642)*
PLR	5.869 (3.701, 8.037)*	0.630 (-0.241, 1.500)	2.437 (0.546, 4.328)*	-0.729 (-2.055, 0.597)
SII	0.970 (-11.535, 13.475)	-6.715 (-11.727, -1.704)*	-10.564 (-21.461, 0.334)	-15.963 (-23.599, -8.328)*
MLR	0.038 (0.035, 0.041)*	0.018 (0.017, 0.019)*	0.038 (0.036, 0.041)*	0.028 (0.026, 0.030)*
SIRI	0.147 (0.092, 0.201)*	0.066 (0.044, 0.088)*	0.142 (0.094, 0.189)*	0.099 (0.065, 0.132)*
High				
PCT	0.072 (0.039, 0.106)*	0.022 (0.008, 0.035)*	0.052 (0.023, 0.081)*	0.024 (0.003, 0.045)*
PLT	19.504 (16.176, 22.831)*	6.361 (5.008, 7.715)*	14.897 (11.975, 17.819)*	7.608 (5.501, 9.715)*
PLR	9.808 (7.444, 12.172)*	2.304 (1.342, 3.265)*	6.069 (3.993, 8.146)*	1.664 (0.169, 3.160)*
SII	19.548 (6.208, 32.888)*	1.765 (-3.650, 7.180)	7.606 (-4.094, 19.306)	-3.509 (-11.924, 4.905)
MLR	0.037 (0.034, 0.040)*	0.018 (0.017, 0.020)*	0.038 (0.035, 0.041)*	0.030 (0.027, 0.032)*
SIRI	0.122 (0.100, 0.144)*	0.061 (0.052, 0.070)*	0.127 (0.108, 0.146)*	0.099 (0.085, 0.113)*

* P<0.05.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke in total population.

Abbreviation: BMI: body mass index; T2DM: type 2 diabetes mellitus; CHD: chronic coronary heart disease; PA: physical activity; PCT: plateletcrit; PLT: platelet count; PLR = PLT / absolute lymphocyte count; SII = (absolute neutrophil count × PLT)/absolute lymphocyte count; MLR = absolute monocyte count divided /

absolute lymphocyte count; SIRI = (absolute neutrophil count × absolute monocyte count divided)/absolute lymphocyte count; O_3: ozone; $O_x = NO_2 + O_3$; $O_x^{wt} = (1.07V \times NO_2 + 2.075V \times O_3)/(3.145V)$; NO_2: nitrogen dioxide.

Supplementary table 3 Associations of air pollutants or PA with platelet-based inflammatory indicators after excluding outliers defined with three times of SD from the mean.

	O₃	Oₓ	Oₓʷᵗ	NO₂	PA
Total					
PCT	0.085 (0.068, 0.101)*	0.028 (0.021, 0.034)*	0.065 (0.051, 0.079)*	0.033 (0.022, 0.043)*	0.005 (0.002, 0.008)*
PLT	18.820 (17.151, 20.489)*	6.191 (5.510, 6.873)*	14.498 (13.026, 15.971)*	7.358 (6.300, 8.416)*	0.167 (-0.160, 0.495)
PLR	8.564 (7.453, 9.676)*	1.800 (1.346, 2.254)*	4.981 (4.000, 5.962)*	0.907 (0.203, 1.611)*	0.225 (0.008, 0.442)*
SII	16.145 (10.823, 21.467)*	0.343 (-1.827, 2.513)	4.544 (-0.144, 9.233)	-5.607 (-8.967, -2.247)*	-0.745 (-1.780, 0.291)
MLR	0.034 (0.033, 0.036)*	0.017 (0.016, 0.017)*	0.035 (0.034, 0.037)*	0.027 (0.026, 0.028)*	-0.001 (-0.001, -0.001)*
SIRI	0.100 (0.091, 0.109)*	0.049 (0.046, 0.053)*	0.103 (0.095, 0.111)*	0.078 (0.073, 0.084)*	-0.006 (-0.008, -0.004)*
Men					
PCT	0.125 (0.100, 0.149)*	0.043 (0.033, 0.053)*	0.106 (0.083, 0.128)*	0.099 (0.077, 0.120)*	0.003 (-0.002, 0.007)
PLT	22.268 (19.767, 24.768)*	7.535 (6.516, 8.553)*	17.92 (15.631, 20.21)*	17.442 (15.244, 19.640)*	0.046 (-0.410, 0.503)
PLR	8.806 (7.111, 10.500)*	1.870 (1.180, 2.559)*	6.406 (4.739, 8.072)*	5.134 (3.644, 6.623)*	0.450 (0.143, 0.757)*
SII	22.978 (14.475, 31.481)*	2.530 (-0.924, 5.984)	16.676 (6.665, 26.687)*	9.665 (2.203, 17.127)*	-0.748 (-2.283, 0.788)
MLR	0.034 (0.032, 0.037)*	0.017 (0.016, 0.018)*	0.042 (0.039, 0.045)*	0.035 (0.033, 0.037)*	-0.001 (-0.001, 0.001)
SIRI	0.112 (0.095, 0.128)*	0.054 (0.048, 0.061)*	0.155 (0.135, 0.176)*	0.114 (0.099, 0.128)*	-0.006 (-0.009, -0.003)*
Women					
PCT	0.060 (0.038, 0.082)*	0.018 (0.009, 0.027)*	0.043 (0.024, 0.063)*	0.019 (0.005, 0.033)*	0.006 (0.001, 0.011)*
PLT	16.619 (14.393, 18.845)*	5.311 (4.400, 6.223)*	12.578 (10.610, 14.547)*	6.059 (4.647, 7.470)*	0.225 (-0.235, 0.684)
PLR	8.553 (7.089, 10.018)*	1.817 (1.217, 2.417)*	5.017 (3.721, 6.313)*	0.928 (-0.001, 1.856)	0.053 (-0.249, 0.355)
SII	12.192 (5.371, 19.012)*	-0.934 (-3.722, 1.855)	1.555 (-4.470, 7.579)	-7.094 (-11.402, -2.786)*	-0.817 (-2.218, 0.583)
MLR	0.035 (0.033, 0.037)*	0.017 (0.016, 0.018)*	0.036 (0.034, 0.037)*	0.027 (0.025, 0.028)*	-0.001 (-0.002, -0.001)*
SIRI	0.093 (0.083, 0.104)*	0.046 (0.042, 0.051)*	0.097 (0.087, 0.106)*	0.073 (0.066, 0.080)*	-0.006 (-0.008, -0.003)*

* $P<0.05$.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke in total population.

Abbreviation: PCT: plateletcrit; PLT: platelet count; PLR = PLT / absolute lymphocyte count; SII = (absolute neutrophil count × PLT)/absolute lymphocyte count;

MLR = absolute monocyte count divided / absolute lymphocyte count; SIRI = (absolute neutrophil count × absolute monocyte count divided)/absolute lymphocyte count; O_3: ozone; $O_x = NO_2 + O_3$; $O_x^{wt} = (1.07V \times NO_2 + 2.075V \times O_3)/(3.145V)$; NO_2: nitrogen dioxide.

Supplementary table 4 Associations of air pollutants with platelet-based inflammatory indicators grouped by physical activity after excluding outliers defined with three times of SD from the mean

	O_3	O_x	O_x^{wt}	NO_2
Low				
PCT	0.121 (0.092, 0.150)*	0.045 (0.032, 0.057)*	0.101 (0.075, 0.127)*	0.058 (0.039, 0.077)*
PLT	20.832 (17.867, 23.797)*	7.219 (5.985, 8.453)*	16.627 (13.978, 19.275)*	8.949 (7.006, 10.892)*
PLR	10.470 (8.492, 12.448)*	2.759 (1.936, 3.583)*	6.992 (5.225, 8.760)*	2.355 (1.060, 3.651)*
SII	24.669 (15.183, 34.156)*	3.810 (-0.133, 7.752)	12.249 (3.782, 20.716)*	-1.087 (-7.278, 5.104)
MLR	0.033 (0.030, 0.036)*	0.016 (0.015, 0.017)*	0.034 (0.031, 0.036)*	0.026 (0.024, 0.028)*
SIRI	0.100 (0.083, 0.117)*	0.048 (0.041, 0.055)*	0.101 (0.086, 0.116)*	0.076 (0.065, 0.087)*
Middle				
PCT	0.073 (0.045, 0.100)*	0.025 (0.014, 0.036)*	0.058 (0.034, 0.082)*	0.031 (0.014, 0.048)*
PLT	17.070 (14.319, 19.821)*	5.650 (4.544, 6.757)*	13.232 (10.829, 15.634)*	6.748 (5.058, 8.438)*
PLR	6.284 (4.460, 8.108)*	0.946 (0.213, 1.680)*	3.049 (1.456, 4.642)*	-0.153 (-1.271, 0.966)
SII	1.935 (-6.677, 10.547)	-4.921 (-8.375, -1.466)*	-7.438 (-14.948, 0.072)	-12.17 (-17.435, -6.904)*
MLR	0.036 (0.033, 0.038)*	0.017 (0.016, 0.018)*	0.036 (0.034, 0.038)*	0.026 (0.025, 0.028)*
SIRI	0.091 (0.076, 0.106)*	0.045 (0.039, 0.051)*	0.094 (0.081, 0.107)*	0.070 (0.061, 0.079)*
High				
PCT	0.078 (0.048, 0.109)*	0.025 (0.013, 0.038)*	0.060 (0.032, 0.087)*	0.030 (0.011, 0.050)*
PLT	19.449 (16.326, 22.571)*	6.549 (5.278, 7.820)*	15.175 (12.432, 17.918)*	8.093 (6.111, 10.075)*
PLR	9.357 (7.298, 11.416)*	2.221 (1.383, 3.060)*	5.826 (4.017, 7.636)*	1.644 (0.338, 2.950)*
SII	19.872 (9.977, 29.766)*	2.450 (-1.571, 6.471)	8.774 (0.090, 17.457)*	-2.000 (-8.257, 4.257)
MLR	0.033 (0.030, 0.036)*	0.016 (0.015, 0.018)*	0.034 (0.032, 0.037)*	0.026 (0.025, 0.028)*
SIRI	0.098 (0.081, 0.115)*	0.049 (0.042, 0.056)*	0.103 (0.087, 0.118)*	0.081 (0.070, 0.091)*

* $P<0.05$.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke in total population.

Abbreviation: BMI: body mass index; T2DM: type 2 diabetes mellitus; CHD: chronic coronary heart disease; PA: physical activity; PCT: plateletcrit; PLT: platelet
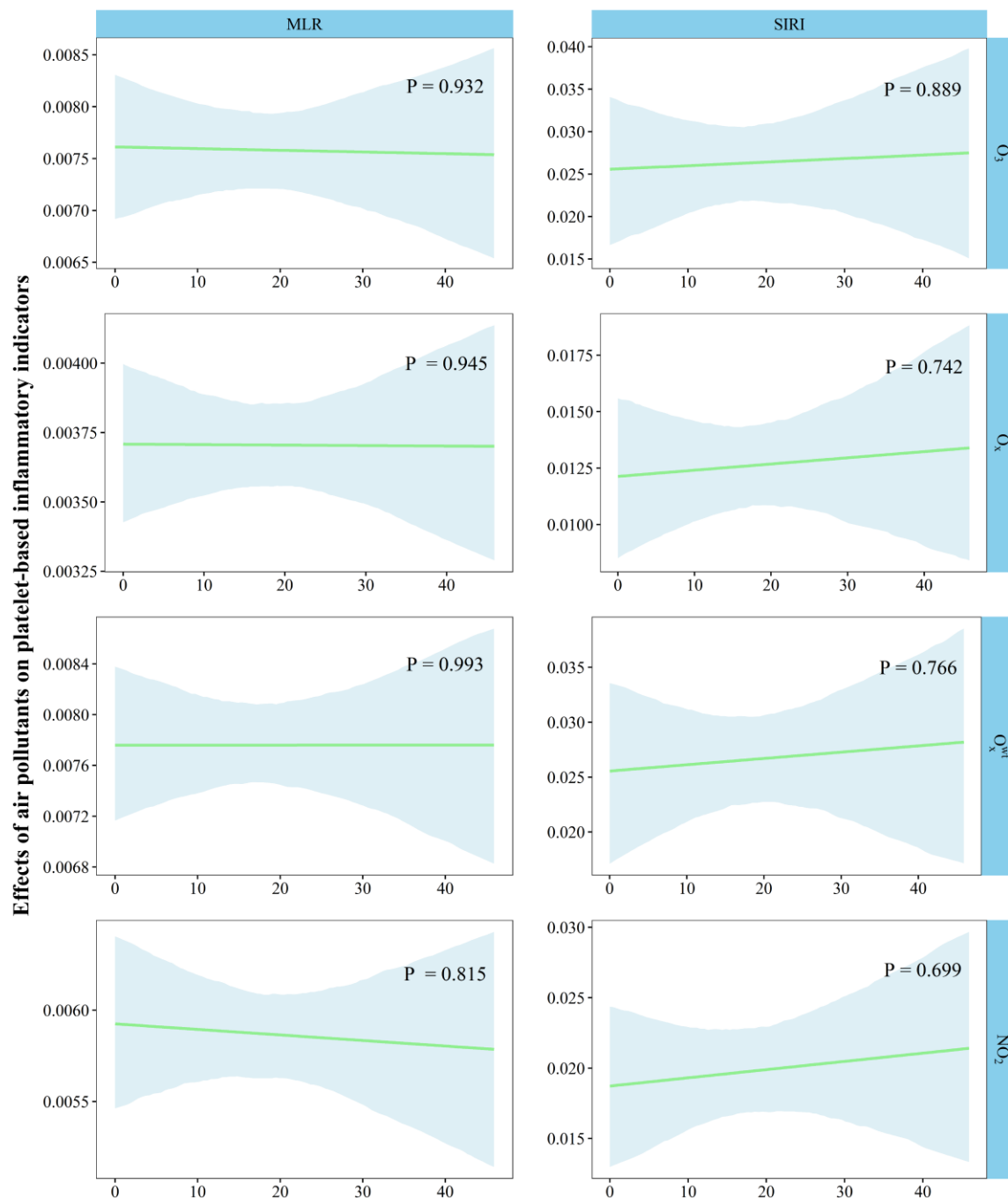
count; PLR = PLT / absolute lymphocyte count; SII = (absolute neutrophil count × PLT)/absolute lymphocyte count; MLR = absolute monocyte count divided / absolute lymphocyte count; SIRI = (absolute neutrophil count × absolute monocyte count divided)/absolute lymphocyte count; O_3: ozone; O_x = NO_2 + O_3; O_x^{wt} = (1.07V × NO_2 + 2.075V × O_3)/(3.145V); NO_2: nitrogen dioxide.

Group		Total		Men		Women	
Inflammatory indicators	Air pollutants	β value (95%CI)	P value	β value (95%CI)	P value	β value (95%CI)	P value
PCT	O_3	0.087 (0.070, 0.105)	<0.001	0.134 (0.109, 0.160)	<0.001	0.057 (0.033, 0.081)	<0.001
	O_x	0.028 (0.020, 0.035)	<0.001	0.046 (0.035, 0.056)	<0.001	0.016 (0.006, 0.025)	0.002
	O_x^{wt}	0.065 (0.050, 0.081)	<0.001	0.106 (0.083, 0.128)	<0.001	0.039 (0.018, 0.06)	<0.001
	NO_2	0.031 (0.020, 0.043)	<0.001	0.057 (0.041, 0.073)	<0.001	0.014 (-0.001, 0.029)	0.062
	PA	0.006 (0.002, 0.009)	0.001	0.003 (-0.001, 0.008)	0.148	0.007 (0.002, 0.012)	0.006
PLT	O_3	19.267 (17.493, 21.041)	<0.001	23.023 (20.414, 25.633)	<0.001	16.809 (14.42, 19.198)	<0.001
	O_x	6.226 (5.502, 6.950)	<0.001	7.721 (6.661, 8.781)	<0.001	5.218 (4.240, 6.197)	<0.001
	O_x^{wt}	14.664 (13.101, 16.227)	<0.001	17.920 (15.631, 20.210)	<0.001	12.481 (10.368, 14.593)	<0.001
	NO_2	7.268 (6.145, 8.390)	<0.001	9.509 (7.860, 11.158)	<0.001	5.756 (4.243, 7.269)	<0.001
	PA	0.232 (-0.115, 0.579)	0.190	0.145 (-0.332, 0.623)	0.550	0.255 (-0.237, 0.747)	0.310
PLR	O_3	8.899 (7.606, 10.191)	<0.001	10.491 (8.591, 12.391)	<0.001	7.945 (6.207, 9.682)	<0.001
	O_x	1.788 (1.261, 2.315)	<0.001	2.412 (1.641, 3.183)	<0.001	1.408 (0.697, 2.119)	<0.001
	O_x^{wt}	5.043 (3.904, 6.182)	<0.001	6.406 (4.739, 8.072)	<0.001	4.216 (2.680, 5.753)	<0.001
	NO_2	0.752 (-0.064, 1.569)	0.071	1.671 (0.473, 2.869)	0.006	0.195 (-0.904, 1.294)	0.728
	PA	0.241 (-0.011, 0.493)	0.061	0.417 (0.072, 0.762)	0.018	0.115 (-0.242, 0.471)	0.528
SII	O_3	17.074 (9.673, 24.474)	<0.001	33.212 (21.782, 44.641)	<0.001	6.961 (-2.734, 16.656)	0.159
	O_x	-0.349 (-3.361, 2.664)	0.821	5.372 (0.742, 10.002)	0.023	-4.030 (-7.991, -0.069)	0.046
	O_x^{wt}	3.668 (-2.844, 10.180)	0.270	16.676 (6.665, 26.687)	0.001	-4.670 (-13.231, 3.890)	0.285
	NO_2	-7.604 (-12.265, -2.944)	0.001	-0.160 (-7.345, 7.024)	0.965	-12.384 (-18.499, -6.269)	<0.001
	PA	-1.359 (-2.798, 0.079)	0.064	-1.444 (-3.512, 0.624)	0.171	-1.468 (-3.454, 0.517)	0.147
MLR	O_3	0.038 (0.036, 0.040)	<0.001	0.041 (0.038, 0.045)	<0.001	0.036 (0.034, 0.038)	<0.001
	O_x	0.019 (0.018, 0.019)	<0.001	0.020 (0.019, 0.021)	<0.001	0.018 (0.017, 0.019)	<0.001
	O_x^{wt}	0.039 (0.037, 0.041)	<0.001	0.042 (0.039, 0.045)	<0.001	0.037 (0.035, 0.039)	<0.001
	NO_2	0.029 (0.028, 0.031)	<0.001	0.032 (0.030, 0.034)	<0.001	0.028 (0.027, 0.029)	<0.001
	PA	-0.001 (-0.002, -0.001)	<0.001	-0.001 (-0.001, -0.001)	0.009	-0.001 (-0.002, -0.001)	<0.001
SIRI	O_3	0.134 (0.111, 0.156)	<0.001	0.155 (0.131, 0.178)	<0.001	0.120 (0.086, 0.155)	<0.001
	O_x	0.064 (0.055, 0.073)	<0.001	0.074 (0.064, 0.083)	<0.001	0.058 (0.044, 0.072)	<0.001
	O_x^{wt}	0.135 (0.115, 0.155)	<0.001	0.155 (0.135, 0.176)	<0.001	0.122 (0.092, 0.152)	<0.001
	NO_2	0.101 (0.086, 0.115)	<0.001	0.116 (0.102, 0.131)	<0.001	0.090 (0.069, 0.112)	<0.001
	PA	-0.008 (-0.013, -0.004)	<0.001	-0.009 (-0.013, -0.005)	<0.001	-0.007 (-0.015, -0.001)	0.037

Fig S1. Associations of air pollutants or PA with platelet-based inflammatory indicators.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke in total population.

Abbreviation: BMI: body mass index; T2DM: type 2 diabetes mellitus; CHD: chronic coronary heart disease; PA: physical activity; PCT: plateletcrit; PLT: platelet count; PLR = PLT / absolute lymphocyte count; SII = (absolute neutrophil count × PLT)/absolute lymphocyte count; MLR = absolute monocyte count divided / absolute lymphocyte count; SIRI = (absolute neutrophil count × absolute monocyte count divided)/absolute lymphocyte count; O_3: ozone; $O_x = NO_2 + O_3$; $O_x^{wt} = (1.07V × NO_2 + 2.075V × O_3)/(3.145V)$; NO_2: nitrogen dioxide.
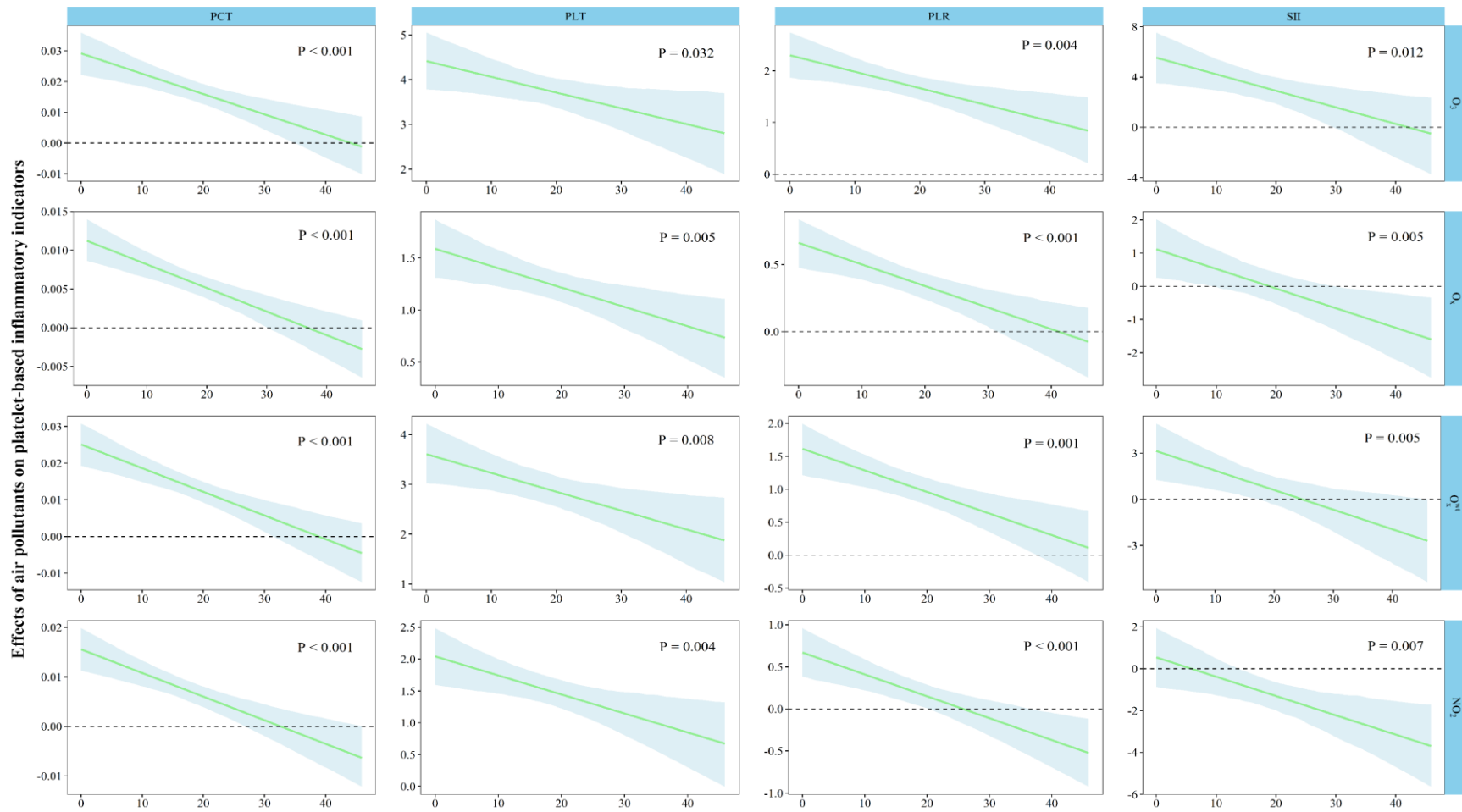
Fig S2. Interactive effects of air pollutants and PA on platelet-based inflammatory indicators.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke.

The X-axis indicates PA, and the Y-axis represents estimated effect of ozone on platelet-based inflammatory indicators. Estimated β values and 95%CIs of associations of ozone exposure with platelet-based inflammatory indicators were represented by the corresponding red lines and gray area, respectively.
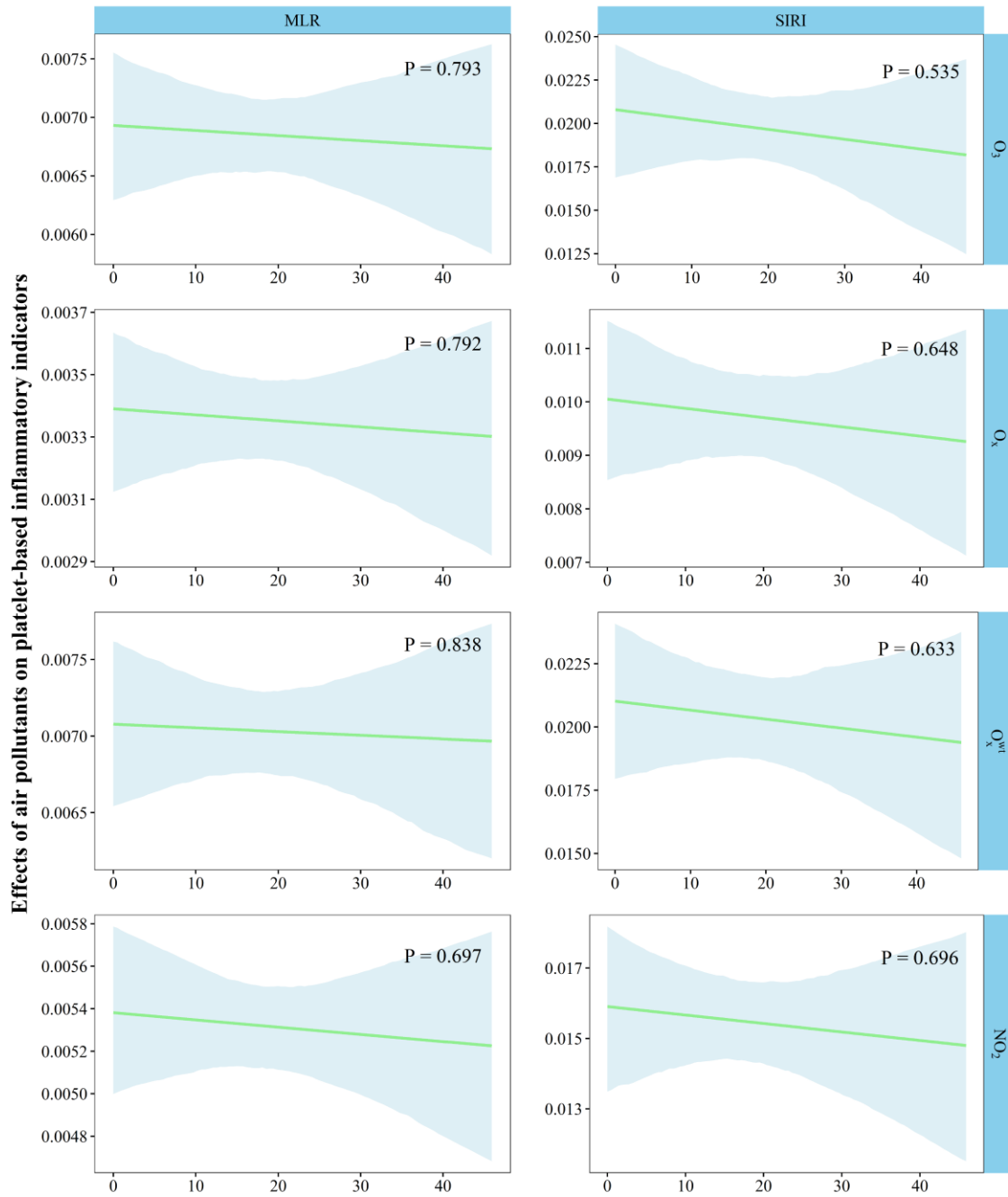
Abbreviation: PA: physical activity; MLR = absolute monocyte count divided / absolute lymphocyte count; SIRI = (absolute neutrophil count × absolute monocyte count divided)/ absolute lymphocyte count; O_3: ozone; $O_x = NO_2 + O_3$; $O_x^{wt} = (1.07V × NO_2 + 2.075V × O_3)/(3.145V)$; NO_2: nitrogen dioxide.

Fig S3. Interactive effects of air pollutants and PA on platelet-based inflammatory indicators after excluding outliers defined with three times of SD from the mean.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke.

The X-axis indicates PA, and the Y-axis represents estimated effect of ozone on platelet-based inflammatory indicators. Estimated β values and 95%CIs of associations of ozone exposure with platelet-based inflammatory indicators were represented by the corresponding red lines and gray area, respectively. Abbreviation: PA: physical activity; PCT: plateletcrit; PLT: platelet count; PLR = PLT / absolute lymphocyte count; SII = (absolute neutrophil count $\times$ PLT)/absolute lymphocyte count; O_3: ozone; $O_x = NO_2 + O_3$; $O_x^{wt} = (1.07V \times NO_2 + 2.075V \times O_3)/(3.145V)$; NO_2: nitrogen dioxide.

Fig S4. Interactive effects of air pollutants and PA on platelet-based inflammatory indicators after excluding outliers defined with three times of SD from the mean.

The model was adjusted for age, gender, BMI, marital status, education level, average monthly income, smoking status, drinking status, high-fat diet, vegetables intake, diseases of T2DM, CHD and stroke.

The X-axis indicates PA, and the Y-axis represents estimated effect of ozone on platelet-based inflammatory indicators. Estimated β values and 95%CIs of associations of ozone exposure with platelet-based inflammatory indicators were represented by the corresponding red lines and gray area, respectively.

Abbreviation: PA: physical activity; MLR = absolute monocyte count divided / absolute lymphocyte count; SIRI = (absolute neutrophil count × absolute monocyte count divided)/absolute lymphocyte count; O_3: ozone; $O_x = NO_2 + O_3$; $O_x^{wt} = (1.07V \times NO_2 + 2.075V \times O_3)/(3.145V)$; NO_2: nitrogen dioxide.

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