Supplemental Material

The role of liver enzymes in the association between ozone exposure and diabetes risk: a cross-sectional study of ethnic minority populations in China

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Fig. S1. The flowchart for participant enrollment

	ozone1	ozone2	ozone3	ozone4	PM2.5	PM10	S02	8	
ozone1	1.00								- 0.8
ozone2	0.87	1.00							- 0.6
ozone3	0.76	0.90	1.00						- 0.4
ozone4	0.33	0.17	0.27	1.00					- 0.2
PM2.5	0.47	0.57	0.69	0.25	1.00				0.2
PM10	0.49	0.62	0.71	0.20	0.96	1.00			0.4
SO2	0.61	0.68	0.65	0.32	0.58	0.56	1.00		0.6
со	-0.15	0.08	0.15	-0.36	0.37	0.35	0.16	1.00	0.8

Fig. S2. Correlation coefficients among air pollutants

Notes: Ozone1, ozone2, ozone3, and ozone4 represent 2-, 3-, 5-year, and peak-season average ozone concentrations, respectively.

Abbreviations: $PM_{2.5}$, particulate matter with an aerodynamic diameter below 2.5 microns; PM_{10} , particulate matter with an aerodynamic diameter below 10 microns; SO_2 , sulfur dioxide; CO, carbon monoxide.



Fig. S3. The exposure–response relationships of long-term (three years) exposure to O₃ with ALT (**A**), AST (**B**), and ALP (**C**)

Abbreviations: O₃, ozone; ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase.

	Percentage change (95% CI) ^a	Adjusted P ^b
ALT (U/L)		
Model 0	0.77% (0.22%, 1.32%)	0.008
Model 1	0.60% (0.08%, 1.13%)	0.029
Model 2	0.68% (0.16%, 1.21%)	0.013
Model 3	0.65% (0.13%, 1.18%)	0.019
Model 4	0.66% (0.14%, 1.19%)	0.017
Model 5	0.62% (0.62%, 0.69%)	0.026
AST (U/L)		
Model 0	0.14% (-0.24%, 0.53%)	0.461
Model 1	0.14% (-0.24%, 0.51%)	0.478
Model 2	0.21% (-0.17%, 0.59%)	0.280
Model 3	0.19% (-0.19%, 0.56%)	0.336
Model 4	0.18% (-0.20%, 0.56%)	0.354
Model 5	0.16% (-0.16%, 0.19%)	0.391
ALP (U/L)		
Model 0	0.58% (0.23%, 0.93%)	0.003
Model 1	0.73% (0.40%, 1.07%)	< 0.001
Model 2	0.75% (0.42%, 1.09%)	< 0.001
Model 3	0.77% (0.44%, 1.11%)	< 0.001
Model 4	0.78% (0.45%, 1.12%)	< 0.001
Model 5	0.79% (0.79%, 0.81%)	< 0.001

Table S1 Association of long-term exposure (three years) to O3 with liver enzyme levels

Abbreviations: O₃, ozone; ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase; CI, confidence intervals; BMI, body mass index; IPW, inverse probability weight.

^a Estimates were scaled to the interquartile range increase in O₃ exposure.

^b The Benjamini–Hochberg procedure was applied to adjust the *P* values.

Madala	Diabetes prevalence (%	FPG (mmol/L)	
widdels	Percentage change (95% CI) ^a	P-value	Change (95% CI) ^a <i>P</i> -value
Model 0	13.87% (0.28%, 29.31%)	0.045	0.144 (0.095, 0.195) <0.001
Model 1	16.21% (0.93%, 33.81%)	0.037	0.155 (0.106, 0.205) <0.001
Model 2	16.11% (0.74%, 33.82%)	0.039	0.152 (0.104, 0.203) <0.001
Model 3	15.69% (0.40%, 33.30%)	0.044	0.152 (0.103, 0.202) <0.001
Model 4	16.07% (0.56%, 33.96%)	0.042	0.153 (0.105, 0.204) <0.001
Model 5	19.07% (4.31%, 35.93%)	0.010	0.170 (0.126, 0.220) <0.001

Table S2 Association of long-term exposure (two years) to O_3 with diabetes prevalence and FPG levels

Abbreviations: O₃, ozone; FPG, fasting plasma glucose; CI, confidence intervals; BMI, body mass index; IPW, inverse probability weight.

Madala	Diabetes prevalence (%)			FPG (mmol/L)		
widdels	Percentage change (95% CI) ^a	P-value	C	Change (95% CI) ^a	P-value	
Model 0	5.03% (1.40%, 8.80%)	0.006	0.0	030 (0.017, 0.043)	< 0.001	
Model 1	5.53% (1.82%, 9.38%)	0.003	0.0	032 (0.019, 0.044)	< 0.001	
Model 2	5.19% (1.49%, 9.04%)	0.006	0.0	031 (0.018, 0.043)	< 0.001	
Model 3	5.13% (1.41%, 8.98%)	0.006	0.0	031 (0.018, 0.044)	< 0.001	
Model 4	5.63% (1.87%, 9.52%)	0.003	0.0	032 (0.019, 0.044)	< 0.001	
Model 5	6.26% (2.73%, 9.91%)	< 0.001	0.0	038 (0.029, 0.048)	< 0.001	

Table S3 Association of long-term exposure (five years) to O_3 with diabetes prevalence and FPG levels

Abbreviations: O₃, ozone; FPG, fasting plasma glucose; CI, confidence intervals; BMI, body mass index; IPW, inverse probability weight.

Madala	Diabetes prevalence (%	FPG (mmol/L)		
Widdels	Percentage change (95% CI) ^a	P-value	Change (95% CI) ^a	P-value
Model 0	4.07% (-6.25%, 18.54%)	0.728	0.055 (0.016, 0.092)	0.004
Model 1	1.45% (-7.11%, 10.79%)	0.749	0.068 (0.032, 0.103)	< 0.001
Model 2	-0.73% (-9.06%, 8.37%)	0.871	0.064 (0.026, 0.100)	0.001
Model 3	-0.96% (-9.37%, 8.23%)	0.831	0.063 (0.026, 0.100)	0.001
Model 4	0.37% (-8.76%, 10.42%)	0.939	0.068 (0.029, 0.105)	0.001
Model 5	5.14% (-6.95%, 18.81%)	0.421	0.060 (0.028, 0.099)	0.002

Table S4 Association of peak-season O3 concentration with diabetes prevalence and FPG levels

Abbreviations: O₃, ozone; FPG, fasting plasma glucose; CI, confidence intervals; BMI, body mass index; IPW, inverse probability weight.

Modela	Diabetes prevalence (%	FPG (mmol/L)		
widdels	Percentage change (95% CI) ^a	P-value	Change (95% CI) ^a	P-value
Model 0	8.88% (3.37%, 14.69%)	0.001	0.043 (0.027, 0.059)	< 0.001
Model 1	9.68% (4.19%, 15.46%)	< 0.001	0.048 (0.032, 0.063)	< 0.001
Model 2	9.29% (3.76%, 15.12%)	0.001	0.046 (0.031, 0.062)	< 0.001
Model 3	9.27% (3.75%, 15.08%)	0.001	0.046 (0.031, 0.062)	< 0.001
Model 4	9.47% (3.93%, 15.31%)	0.001	0.047 (0.032, 0.063)	< 0.001
Model 5	10.44% (5.17%, 15.97%)	< 0.001	0.053 (0.039, 0.068)	< 0.001

Table S5 Association of long-term exposure (three years) to O_3 with diabetes prevalence and FPG levels when identifying diabetic patients based only on FPG levels

Abbreviations: O₃, ozone; FPG, fasting plasma glucose; CI, confidence intervals; BMI, body mass index; IPW, inverse probability weight.

Madala	Diabetes prevalence (%	FPG (mmol/L)		
Widdels	Percentage change (95% CI) ^a	P-value	Change (95% CI) ^a <i>P</i> -value	
Model 0	5.99% (1.42%, 10.76%)	0.010	0.043 (0.027, 0.059) <0.001	
Model 1	7.11% (2.42%, 12.03%)	0.003	0.047 (0.032, 0.063) <0.001	
Model 2	6.73% (2.03%, 11.65%)	0.005	0.046 (0.030, 0.062) <0.001	
Model 3	6.56% (1.85%, 11.48%)	0.006	0.046 (0.030, 0.062) <0.001	
Model 4	7.07% (2.32%, 12.04%)	0.003	0.047 (0.031, 0.063) <0.001	
Model 5	7.58% (3.10%, 12.26%)	0.001	0.053 (0.039, 0.068) <0.001	

Table S6 Association of long-term exposure (three years) to O_3 with diabetes prevalence and FPG levels after excluding people younger than 35 years and older than 74 years

Abbreviations: O₃, ozone; FPG, fasting plasma glucose; CI, confidence intervals; BMI, body mass index; IPW, inverse probability weight.

Modela -	Diabetes prevalence (%)	FPG (mmol/L)		
Widdels	Percentage change (95% CI) ^a	P-value	Change (95% CI) ^a <i>P</i> -value	
PM _{2.5}	5.86% (-0.16%, 12.23%)	0.057	0.045 (0.025, 0.065) <0.001	
PM_{10}	6.61% (0.72%, 12.83%)	0.027	0.046 (0.026, 0.065) <0.001	
SO_2	5.71% (0.10%, 11.63%)	0.046	0.043 (0.024, 0.062) <0.001	
СО	6.73% (1.88%, 11.81%)	0.006	0.048 (0.032, 0.064) <0.001	
$PM_{2.5} \!\!+\! SO_2$	5.82% (-0.25%, 12.26%)	0.060	0.044 (0.024, 0.064) <0.001	
PM _{2.5} +CO	13.47% (3.39%, 24.54%)	0.008	0.023 (-0.011, 0.056) 0.186	
PM ₁₀ +SO2	6.28% (0.27%, 12.64%)	0.040	0.044 (0.024, 0.064) <0.001	
PM ₁₀ +CO	14.40% (5.61%, 23.93%)	0.001	0.034 (0.006, 0.062) 0.018	

Table S7 Association of long-term exposure (three years) to O₃ with diabetes prevalence and FPG levels after adjustment for other air pollutants

Notes: Further adjustments for other air pollutants based on Model 4.

Abbreviations: O_3 , ozone; FPG, fasting plasma glucose; CI, confidence intervals; $PM_{2.5}$, particulate matter with an aerodynamic diameter below 2.5 microns; PM_{10} , particulate matter with an aerodynamic diameter below 10 microns; SO_2 , sulfur dioxide; CO, carbon monoxide.

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Subgroups	Indirect effects	Direct effects	Mediation	P for
Suction	(95% CI) ^a	(95% CI) ^a	proportions	interaction
Age group (%)				0.653
<60 years	0.004 (0.001, 0.007)	0.030 (0.011, 0.050)	10.85%	
≥60 years	0.002 (-0.003, 0.008)	0.051 (0.024, 0.078)	4.25%	
Sex (%)				0.409
Female	0.005 (0.001, 0.009)	0.058 (0.038, 0.079)	7.78%	
Male	0.002 (-0.001, 0.007)	0.017 (-0.009, 0.042)	12.76%	
BMI (%)				0.174
$<24 \text{ kg/m}^2$	0.005 (0.002, 0.009)	0.025 (0.007, 0.045)	17.44%	
$\geq 24 \text{ kg/m}^2$	0.001 (-0.003, 0.006)	0.065 (0.038, 0.093)	2.02%	
Education (%)				0.405
Below primary school	0.005 (0.001, 0.009)	0.064 (0.043, 0.085)	6.83%	
Above primary school	0.002 (-0.001, 0.006)	0.010 (-0.013, 0.033)	19.64%	
Occupation (%)				0.589
Retiree and other	0.005 (-0.0004, 0.011)	0.036 (0.003, 0.069)	12.49%	
Official or worker	0.003 (0.0001, 0.006)	0.044 (0.026, 0.063)	6.77%	
Marital status (%)				0.309
Married	0.003 (0.0002, 0.006)	0.043 (0.027, 0.061)	6.54%	
Widowed/Separate/divorced/	0.008(0.0002,0.010)	0.020(0.010,0.080)	21 70%	
Unmarried	0.008 (-0.0002, 0.019)	0.030 (-0.019, 0.080)	21.7070	
Annual household income (%)				0.113
<30,000 CNY	0.006 (0.003, 0.011)	0.032 (0.011, 0.053)	16.61%	
≥30,000 CNY	0.0004 (-0.003, 0.004)	0.055 (0.031, 0.080)	0.79%	
Residence type (%)				0.708
Urban	0.005 (-0.002, 0.014)	-0.037 (-0.095, 0.020)	-15.54%	
Rural	0.003 (0.0005, 0.006)	0.048 (0.032, 0.065)	6.52%	
Smoking status (%)				0.366
No	0.005 (0.001, 0.008)	0.049 (0.032, 0.068)	8.65%	
Yes	0.002 (-0.003, 0.007)	0.018 (-0.016, 0.051)	9.16%	
Alcohol consumption (%)				0.944
No	0.004 (-0.0001, 0.008)	0.051 (0.032, 0.071)	6.74%	
Yes	0.003 (-0.001, 0.008)	0.027 (0.001, 0.054)	11.35%	
Sleeping time (%)				0.787
≤8 h	0.004 (-0.0001, 0.008)	0.037 (0.016, 0.058)	9.28%	
>8 h	0.003 (-0.001, 0.007)	0.046 (0.022, 0.072)	6.06%	
Family fuel type (%)				0.043
Clean fuels	0.002 (-0.001, 0.005)	0.033 (0.016, 0.051)	5.83%	
Non-clean fuels	0.011 (0.004, 0.021)	0.064 (0.029, 0.101)	15.11%	
Self-catering status (%)				0.465
No	0.006 (-0.001, 0.014)	0.024 (-0.012, 0.061)	20.33%	
Yes	0.003 (0.0003, 0.006)	0.046 (0.028, 0.063)	6.45%	

Table S8 Mediating effect of ALT on the association between O3 exposure and FPG levels in the subgroups

CHD (%)				0.311
No	0.003 (0.001, 0.006)	0.041 (0.024, 0.057)	7.70%	
Yes	0.040 (-0.015, 0.122)	0.091 (-0.075, 0.245)	30.55%	
Stroke (%)				0.245
No	0.003 (0.001, 0.006)	0.038 (0.022, 0.054)	7.85%	
Yes	0.117 (-0.044, 0.330)	0.324 (-0.014, 0.653)	26.54%	
Hypertension (%)				0.025
No	0.005 (0.002, 0.008)	0.031 (0.014, 0.047)	13.54%	
Yes	-0.009 (-0.021, 0.002)	0.104 (0.049, 0.158)	-9.21%	

8	Indirect effects	Direct effects	Mediation	$\frac{B}{P}$ for
Subgroups	(%, 95% CI) ^a	(%, 95% CI) ^a	proportions	interaction
Age group (%)		())	1 1	0.711
<60 years	0.018 (0.0001, 0.127)	-0.045 (-0.702, 0.025)	-69.73%	
≥60 years	0.003 (-0.009, 0.039)	0.012 (-0.011, 0.063)	20.33%	
 Sex (%)		(, , ,		0.476
Female	0.001 (0.0001, 0.005)	0.002 (0.0001, 0.015)	24.03%	
Male	0.047 (-0.044, 0.202)	-0.360 (-1.214, 0.038)	-14.82%	
BMI (%)				0.375
$<24 \text{ kg/m}^2$	0.081 (0.001, 0.322)	-0.228 (-1.306, 0.021)	-55.35%	
$\geq 24 \text{ kg/m}^2$	0.0002 (-0.001, 0.002)	0.004 (0.0001, 0.028)	4.70%	
Education (%)				0.455
Below primary school	0.001 (0.0001, 0.006)	0.004 (0.0001, 0.022)	19.71%	
Above primary school	0.059 (-0.039, 0.250)	-0.329 (-1.289, 0.033)	-21.57%	
Occupation (%)				0.997
Retiree and other	0.002 (-0.0001, 0.127)	0.009 (-0.266, 0.041)	16.27%	
Official or worker	0.002 (0.0001, 0.061)	0.008 (-0.056, 0.024)	20.32%	
Marital status (%)				0.619
Married	0.003 (0.0001, 0.018)	0.009 (0.0004, 0.034)	25.31%	
Widowed/Separate/divorced/	0.059 (0.0001, 0.2(()	0.1(2(1.250, 0.029)	EE 410/	
Unmarried	0.058 (-0.0001, 0.366)	-0.163 (-1.259, 0.038)	-33.41%	
Annual household income (%)				0.786
<30,000 CNY	0.018 (0.001, 0.244)	0.017 (-0.529, 0.024)	51.09%	
≥30,000 CNY	0.0004 (-0.001, 0.004)	0.001 (0.0001, 0.023)	4.30%	
Residence type (%)				0.964
Urban	0.007 (-0.001, 0.476)	-0.067 (-1.579, 0.012)	-12.44%	
Rural	0.001 (0.0001, 0.011)	0.005 (0.0003, 0.027)	14.60%	
Smoking status (%)				0.691
No	0.003 (0.0002, 0.017)	0.006 (0.0002, 0.027)	30.76%	
Yes	0.028 (-0.074, 0.194)	-0.326 (-1.267, 0.043)	-9.35%	
Alcohol consumption (%)				0.744
No	0.004 (-0.0002, 0.03)	0.007 (0.0001, 0.035)	39.28%	
Yes	0.018 (-0.005, 0.135)	-0.067 (-0.949, 0.035)	-37.37%	
Sleeping time (%)				0.934
≤8 h	0.004 (0.0001, 0.082)	0.013 (-0.086, 0.031)	23.74%	
>8 h	0.001 (-0.0002, 0.064)	0.005 (-0.111, 0.030)	13.45%	
Family fuel type (%)				0.969
Clean fuels	0.003 (-0.0004, 0.037)	0.014 (-0.018, 0.036)	15.14%	
Non-clean fuels	0.0004 (0.0001, 0.177)	0.001 (-0.305, 0.015)	26.21%	
Self-catering status (%)				0.399
No	0.101 (-0.010, 0.399)	-0.361 (-1.333, 0.037)	-38.52%	
Yes	0.002 (0.0001, 0.011)	0.006 (0.0002, 0.029)	21.29%	

Table S9 Mediating effect of ALT on the association between O3 exposure and diabetes prevalence in the subgroups

CHD (%)				0.998
No	0.002 (0.0001, 0.038)	0.009 (-0.006, 0.025)	18.24%	
Yes	0.0003 (-0.014, 2.528)	-0.0001 (-2.747, 0.008)	-45.10%	
Stroke (%)				0.996
No	0.002 (0.0001, 0.036)	0.009 (0.0002, 0.027)	18.95%	
Yes	0.0002 (-0.046, 1.198)	0.0004 (-1.352, 0.07)	38.57%	
Hypertension (%)				0.882
No	0.008 (0.0002, 0.175)	0.011 (-0.323, 0.016)	42.19%	
Yes	-0.0003 (-0.058, 0.0002)	0.004 (0.0001, 0.136)	-9.85%	

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Subgroups	Indirect effects	Direct effects	Mediation	P for
	(95% CI) ^a	(95% CI) ^a	proportions	interaction
Age group (%)				0.010
<60 years	-0.003 (-0.006, -0.001)	0.030 (0.011, 0.05)	-12.93%	
≥ 60 years	0.006 (-0.0002, 0.012)	0.051 (0.024, 0.078)	9.75%	
Sex (%)				0.658
Female	-0.001 (-0.005, 0.003)	0.058 (0.038, 0.079)	-1.30%	
Male	-0.002 (-0.006, 0.002)	0.017 (-0.009, 0.042)	-14.41%	
BMI (%)				0.053
$<24 \text{ kg/m}^2$	-0.004 (-0.009, 0.0001)	0.025 (0.007, 0.045)	-20.26%	
\geq 24 kg/m ²	0.001 (-0.002, 0.005)	0.065 (0.038, 0.093)	2.20%	
Education (%)				0.211
Below primary school	0.001 (-0.004, 0.005)	0.064 (0.043, 0.085)	0.87%	
Above primary school	-0.003 (-0.007, 0.0004)	0.010 (-0.013, 0.033)	-48.90%	
Occupation (%)				0.812
Retiree and other	-0.002 (-0.008, 0.003)	0.036 (0.003, 0.069)	-6.49%	
Official or worker	-0.001 (-0.005, 0.002)	0.044 (0.026, 0.063)	-3.13%	
Marital status (%)				0.177
Married	-0.001 (-0.003, 0.002)	0.043 (0.027, 0.061)	-1.51%	
Widowed/Separate/divorced/				
Unmarried	-0.010 (-0.022, 0.002)	0.030 (-0.019, 0.080)	-47.57%	
Annual household income (%)				0.658
<30,000 CNY	-0.002 (-0.006, 0.002)	0.032 (0.011, 0.053)	-6.49%	
≥30,000 CNY	-0.001 (-0.005, 0.004)	0.055 (0.031, 0.080)	-1.14%	
Residence type (%)				0.520
Urban	0.001 (-0.005, 0.007)	-0.037 (-0.095, 0.020)	-2.04%	
Rural	-0.002 (-0.005, 0.002)	0.048 (0.032, 0.065)	-3.31%	
Smoking status (%)				0.479
No	-0.001 (-0.004, 0.003)	0.049 (0.032, 0.068)	-1.08%	
Yes	-0.003 (-0.007, 0.001)	0.018 (-0.016, 0.051)	-17.19%	
Alcohol consumption (%)	(,)	· · · · (· · · ·) · · · ·)		0.433
No	-0.0003 (-0.004, 0.004)	0.051 (0.032, 0.071)	-0.50%	
Yes	-0.003 (-0.007, 0.002)	0.027 (0.001, 0.054)	-11.03%	
Sleeping time (%)				0.893
<8 h	-0.001 (-0.005, 0.003)	0.037 (0.016, 0.058)	-3.14%	
>8 h	-0.002 (-0.006, 0.002)	0.046 (0.022, 0.072)	-3 42%	
Family fuel type (%)	0.002 (0.000, 0.002)	01010 (01022, 01072)	011270	0 246
Clean fuels	-0.0005(-0.003_0.003)	0.033 (0.016, 0.051)	-1 40%	0.2.10
Non-clean fuels	-0.006 (-0.014 0.002)	0.064 (0.029, 0.101)	-9.45%	
Self-catering status (%)			2.1070	0 400
No	-0.005 (-0.014 0.004)	0 024 (-0 012 0 061)	-25 20%	0.100
Yes	-0.001 (-0.004, 0.002)	0.046 (0.028, 0.063)	-1.87%	

Table S10 Mediating effect of AST on the association between O3 exposure and FPG levels in the subgroups

CHD (%)				0.889
No	-0.002 (-0.004, 0.001)	0.041 (0.024, 0.057)	-3.85%	
Yes	0.001 (-0.036, 0.039)	0.091 (-0.075, 0.245)	1.27%	
Stroke (%)				0.441
No	-0.001 (-0.004, 0.001)	0.038 (0.022, 0.054)	-3.43%	
Yes	-0.052 (-0.192, 0.070)	0.327 (-0.016, 0.671)	-19.02%	
Hypertension (%)				0.004
No	-0.004 (-0.007, -0.001)	0.031 (0.014, 0.047)	-13.30%	
Yes	0.013 (0.003, 0.024)	0.104 (0.049, 0.158)	10.86%	

	Indirect effects	Direct effects	Mediation	<i>P</i> for
Subgroups	(%, 95% CI) ^a	(%, 95% CI) ^a	proportions	interaction
Age group (%)				0.463
<60 years	-0.039 (-0.220, -0.0001)	-0.040 (-0.784, 0.076)	49.24%	
≥60 years	0.007 (-0.0001, 0.052)	0.009 (-0.009, 0.051)	44.20%	
Sex (%)				0.448
Female	-0.001 (-0.004, 0.001)	0.006 (0.0001, 0.036)	-10.27%	
Male	-0.065 (-0.258, 0.060)	-0.351 (-1.098, 0.072)	15.59%	
BMI (%)				0.258
<24 kg/m ²	-0.122 (-0.365, 0.001)	-0.248 (-1.005, 0.091)	32.95%	
\geq 24 kg/m ²	0.0002 (-0.0004, 0.003)	0.004 (0.0001, 0.026)	5.09%	
Education (%)				0.282
Below primary school	-0.0001 (-0.003, 0.003)	0.007 (0.0001, 0.037)	-0.10%	
Above primary school	-0.129 (-0.396, 0.008)	-0.310 (-1.035, 0.099)	29.34%	
Occupation (%)				0.967
Retiree and other	-0.002 (-0.142, 0.012)	0.024 (-0.447, 0.100)	-9.43%	
Official or worker	-0.004 (-0.129, 0.001)	0.029 (-0.125, 0.088)	-17.90%	
Marital status (%)				0.481
Married	-0.002 (-0.016, 0.004)	0.017 (0.001, 0.055)	-11.25%	
Widowed/Separate/divorced/	0 126 (0 610 0 007)	0.077 (0.770, 0.251)	61 070/	
Unmarried	-0.120 (-0.019, 0.007)	-0.077 (-0.779, 0.251)	01.9770	
Annual household income (%)				0.684
<30,000 CNY	-0.028 (-0.235, 0.009)	0.071 (-0.742, 0.102)	-65.21%	
≥30,000 CNY	0.0001 (-0.016, 0.0002)	0.002 (0.0001, 0.044)	-5.56%	
Residence type (%)				0.987
Urban	0.0001 (-0.129, 0.296)	-0.020 (-1.344, 0.022)	0.38%	
Rural	-0.002 (-0.033, 0.001)	0.016 (0.001, 0.074)	-11.09%	
Smoking status (%)				0.407
No	-0.001 (-0.012, 0.005)	0.014 (0.0004, 0.053)	-8.03%	
Yes	-0.070 (-0.286, 0.022)	-0.303 (-1.088, 0.084)	18.78%	
Alcohol consumption (%)				0.612
No	-0.002 (-0.021, 0.009)	0.015 (0.0003, 0.062)	-11.02%	
Yes	-0.029 (-0.183, 0.013)	-0.059 (-0.880, 0.078)	32.89%	
Sleeping time (%)				0.940
≤8 h	-0.005 (-0.137, 0.012)	0.041 (-0.178, 0.094)	-15.34%	
>8 h	-0.001 (-0.121, 0.003)	0.014 (-0.193, 0.075)	-10.87%	
Family fuel type (%)				0.987
Clean fuels	-0.002 (-0.058, 0.007)	0.030 (-0.035, 0.066)	-8.22%	
Non-clean fuels	-0.004 (-0.356, -0.0001)	0.017 (-0.547, 0.143)	-29.01%	
Self-catering status (%)				0.402
No	-0.134 (-0.537, 0.066)	-0.283 (-0.979, 0.150)	32.09%	
Yes	-0.001 (-0.008, 0.002)	0.012 (0.0004, 0.048)	-10.05%	

Table S11 Mediating effect of AST on the association between O3 exposure and diabetes prevalence in the subgroups

CHD (%)				0.819
No	-0.004 (-0.082, 0.001)	0.029 (-0.014, 0.075)	-14.73%	
Yes	-0.105 (-0.823, 1.067)	-0.073 (-1.355, 0.731)	58.86%	
Stroke (%)				0.996
No	-0.004 (-0.061, 0.001)	0.029 (0.001, 0.074)	-13.92%	
Yes	-0.001 (-1.943, 0.063)	0.002 (-0.327, 1.654)	-42.42%	
Hypertension (%)				0.639
No	-0.039 (-0.302, -0.001)	0.728 (-0.642, 1.107)	-5.71%	
Yes	0.0001 (0.0001, 0.013)	0.001 (0.0001, 0.025)	14.97%	

0.1	Indirect effects	Direct effects	Mediation	<i>P</i> for
Subgroups	(95% CI) ^a	(95% CI) ^a	proportions	interaction
Age group (%)				0.635
<60 years	0.003 (0.001, 0.006)	0.030 (0.011, 0.050)	10.10%	
≥60 years	0.004 (0.002, 0.008)	0.051 (0.024, 0.078)	7.93%	
Sex (%)				0.163
Female	0.003 (0.0004, 0.005)	0.058 (0.038, 0.079)	4.33%	
Male	0.006 (0.003, 0.009)	0.017 (-0.009, 0.042)	24.93%	
BMI (%)				0.762
<24 kg/m ²	0.004 (0.002, 0.007)	0.025 (0.007, 0.045)	13.90%	
$\geq 24 \text{ kg/m}^2$	0.003 (0.0003, 0.007)	0.065 (0.038, 0.093)	5.04%	
Education (%)				0.963
Below primary school	0.004 (0.001, 0.006)	0.064 (0.043, 0.085)	5.60%	
Above primary school	0.004 (0.001, 0.007)	0.010 (-0.013, 0.033)	27.75%	
Occupation (%)				0.409
Retiree and other	0.005 (0.002, 0.009)	0.036 (0.003, 0.069)	11.99%	
Official or worker	0.003 (0.001, 0.006)	0.044 (0.026, 0.063)	6.43%	
Marital status (%)				0.209
Married	0.003 (0.001, 0.005)	0.043 (0.027, 0.061)	6.98%	
Widowed/Separate/divorced/	0.000 (0.002, 0.01()	0.020 (0.010, 0.000)	01 7(0/	
Unmarried	0.008 (0.002, 0.016)	0.030 (-0.019, 0.080)	21.76%	
Annual household income (%)				0.142
<30,000 CNY	0.005 (0.003, 0.008)	0.032 (0.011, 0.053)	13.43%	
≥30,000 CNY	0.002 (-0.001, 0.005)	0.055 (0.031, 0.080)	3.54%	
Residence type (%)				0.956
Urban	0.004 (-0.0001, 0.010)	-0.037 (-0.095, 0.020)	-12.00%	
Rural	0.004 (0.002, 0.006)	0.048 (0.032, 0.065)	7.38%	
Smoking status (%)				0.096
No	0.003 (0.001, 0.005)	0.049 (0.032, 0.068)	5.31%	
Yes	0.007 (0.003, 0.011)	0.018 (-0.016, 0.051)	27.69%	
Alcohol consumption (%)				0.782
No	0.003 (0.001, 0.006)	0.051 (0.032, 0.071)	6.19%	
Yes	0.004 (0.001, 0.007)	0.027 (0.001, 0.054)	12.65%	
Sleeping time (%)				0.115
≤8 h	0.005 (0.002, 0.008)	0.037 (0.016, 0.058)	12.19%	
>8 h	0.002 (-0.001, 0.005)	0.046 (0.022, 0.072)	4.10%	
Family fuel type (%)				0.897
Clean fuels	0.004 (0.002, 0.006)	0.033 (0.016, 0.051)	10.00%	
Non-clean fuels	0.004 (-0.0001, 0.009)	0.064 (0.029, 0.101)	5.84%	
Self-catering status (%)				0.289
No	0.006 (0.002, 0.011)	0.024 (-0.012, 0.061)	19.92%	
Yes	0.003 (0.001, 0.006)	0.046 (0.028, 0.063)	6.68%	

 S12 Mediating effect of ALP on the association between O3 exposure and FPG levels in the subgroups

CHD (%)				0.673
No	0.004 (0.002, 0.006)	0.041 (0.024, 0.057)	8.75%	
Yes	0.0005 (-0.019, 0.018)	0.091 (-0.075, 0.245)	0.53%	
Stroke (%)				0.487
No	0.004 (0.002, 0.006)	0.038 (0.022, 0.054)	8.91%	
Yes	0.031 (-0.025, 0.134)	0.327 (-0.016, 0.671)	8.70%	
Hypertension (%)				0.974
No	0.004 (0.002, 0.006)	0.031 (0.014, 0.047)	11.23%	
Yes	0.004 (-0.001, 0.010)	0.104 (0.049, 0.158)	3.51%	

0.1	Indirect effects	Direct effects	Mediation	<i>P</i> for
Subgroups	(%, 95% CI) ^a	(%, 95% CI) ^a	proportions	interaction
Age group (%)				0.732
<60 years	0.019 (0.0001, 0.128)	-0.045 (-0.704, 0.021)	-69.82%	
≥60 years	0.004 (0.0001, 0.037)	0.007 (-0.010, 0.038)	40.67%	
Sex (%)				0.276
Female	0.0004 (0.0001, 0.002)	0.003 (0.0001, 0.017)	12.79%	
Male	0.095 (0.001, 0.309)	-0.368 (-1.395, 0.022)	-34.86%	
BMI (%)				0.379
$\leq 24 \text{ kg/m}^2$	0.071 (0.0004, 0.274)	-0.246 (-1.404, 0.017)	-39.81%	
$\geq 24 \text{ kg/m}^2$	0.0004 (0.0001, 0.002)	0.003 (0.0002, 0.022)	11.07%	
Education (%)				0.332
Below primary school	0.001 (0.0001, 0.004)	0.003 (0.0001, 0.02)	17.45%	
Above primary school	0.069 (0.0003, 0.239)	-0.348 (-1.409, 0.021)	-24.68%	
Occupation (%)				0.993
Retiree and other	0.001 (-0.0003, 0.084)	0.010 (-0.406, 0.040)	9.56%	
Official or worker	0.001 (0.0003, 0.045)	0.007 (-0.059, 0.020)	15.77%	
Marital status (%)				0.612
Married	0.002 (0.0001, 0.015)	0.007 (0.0003, 0.027)	25.43%	
Widowed/Separate/divorced/	0.072 (0.0001 0.515)	0 172 (1 400 0 026)	74 220/	
Unmarried	0.075 (0.0001, 0.315)	-0.172 (-1.409, 0.020)	-/4.3370	
Annual household income (%)				0.788
<30,000 CNY	0.012 (0.0005, 0.164)	0.022 (-0.739, 0.026)	35.82%	
≥30,000 CNY	0.0004 (0.0001, 0.005)	0.001 (0.0001, 0.015)	7.03%	
Residence type (%)				0.971
Urban	0.006 (-0.001, 0.558)	-0.056 (-1.696, 0.009)	-12.23%	
Rural	0.001 (0.0001, 0.009)	0.004 (0.0003, 0.023)	10.65%	
Smoking status (%)				0.369
No	0.001 (0.0001, 0.009)	0.006 (0.0002, 0.026)	19.33%	
Yes	0.098 (0.0002, 0.378)	-0.333 (-1.464, 0.024)	-41.52%	
Alcohol consumption (%)				0.653
No	0.003 (0.0001, 0.019)	0.005 (0.0001, 0.028)	34.75%	
Yes	0.025 (0.0003, 0.179)	-0.067 (-0.954, 0.024)	-59.60%	
Sleeping time (%)				0.937
≤8 h	0.003 (0.0001, 0.071)	0.010 (-0.086, 0.022)	21.67%	
>8 h	0.0005 (0.0001, 0.043)	0.005 (-0.139, 0.027)	8.44%	
Family fuel type (%)				0.965
Clean fuels	0.002 (0.0001, 0.036)	0.011 (-0.015, 0.024)	16.10%	
Non-clean fuels	0.0004 (0.0001, 0.124)	0.002 (-0.424, 0.023)	13.97%	
Self-catering status (%)				0.336
No	0.094 (0.0002, 0.323)	-0.376 (-1.372, 0.029)	-33.34%	
Yes	0.001 (0.0001, 0.008)	0.005 (0.0001, 0.023)	21.75%	

Table S13 Mediating effect of ALP on the association between O₃ exposure and diabetes prevalence in the subgroups

CHD (%)				0.959
No	0.002 (0.0001, 0.034)	0.008 (-0.005, 0.021)	16.16%	
Yes	-0.003 (-0.118, 0.155)	-0.073 (-0.811, 0.072)	4.55%	
Stroke (%)				0.996
No	0.002 (0.0001, 0.027)	0.008 (0.0002, 0.022)	16.06%	
Yes	-0.0001 (-0.730, 0.032)	0.0001 (-0.307, 0.596)	-20.24%	
Hypertension (%)				0.879
No	0.006 (0.0001, 0.129)	0.012 (-0.426, 0.016)	32.62%	
Yes	0.0002 (-0.0001, 0.003)	0.001 (0.0001, 0.051)	1.82%	

Study	Raw estimates (95% CI)	Corresponding units (µg/m ³)	Standardized estimates (95% CI)
Yu et al., 2021 ^[1]	13.0% (0.0%, 28.0%)	19.6	0.63% (0.00%, 1.27%)
Renzi et al., 2018 ^[2]	1.5% (0.2%, 2.7%)	10.0	0.15% (0.02%, 0.27%)
Paul et al., 2020 ^[3]	0.5% (0.1%, 0.9%)	12.3	0.04% (0.01%, 0.07%)
Yang et al., 2018 ^[4]	14.0% (5.0%, 25.0%)	22.0	0.60% (0.22%, 1.02%)
Wang et al., 2022 ^[5]	5.7% (0.4%, 11.4%)	10.0	0.56% (0.04%, 1.09%)
Li et al., 2021 ^[6]	5.8% (5.3%, 6.4%)	6.5	0.87% (0.80%, 0.96%)
The present study	7.3% (2.6%, 12.3%)	1.2	6.06% (2.13%, 10.15%)

Table S14 Comparison of effect estimates of O3 exposure on diabetes

Notes: Standardized risk estimates were calculated for each 1 $\mu g/m^3$ increase in O_3 exposure.

Abbreviations: O₃, ozone; CI, confidence intervals.

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