Supplemental Material

Extreme Temperature Exposure and Risks of Preterm Birth Subtypes Based on a Nationwide Survey in China

Guoqi Yu, Ling Yang, Ming Liu, Cuiping Wang, Xiaoli Shen, Lichun Fan, and Jun Zhang

Table of Contents

References

Table S1. The selection basis of the China Labor and Delivery Survey to determine the sample size of deliveries in each hospital according to their levels and types[*].

Province	Total population (million)	Birth rate (‰)	Delivery volume	Secondary hospital			Tertiary hospital			Average delivery volume	
				General hospital	Maternity hospital	Total hospitals	General hospital	Maternity hospital	Total hospitals	Secondary hospital	Tertiary hospital
Anhui	614.4	12.9	792,576	101	16	117	44	4	48	562,008.4	230,567.6
Beijing	217.1	7.96	172,811.6	37	14	51	55	4	59	80,121.7	92,689.9
Chongqing	301.7	11.05	333,378.5	79	22	101	24	2	26	265,127.8	68,250.7
Fujian	383.9	13.9	533,621	120	28	148	51	4	55	389,043.9	144,577.1
Gansu	260	12.36	321,360	154	22	176	35	0	35	268,053.8	53,306.2
Guangdong	1,084.9	11.12	1206,408.8	265	58	323	120	11	131	858,304.1	348,104.7
Guangxi	479.6	14.05	673,838	146	58	204	52	11	63	514,842.5	158,995.5
Guizhou	353	13	458,900	114	21	135	35	3	38	358,101.2	100,798.8
Hainan	91.1	14.57	132,732.7	20	14	34	13	2	15	92,100.2	40,632.5
Hebei	742.5	11.35	842,737.5	334	96	430	57	7	64	733,556.9	109,180.6
Henan	948	12.7	1203,960	314	59	373	83	4	87	976,254.5	227,705.5
Heilongjiang	381.2	6	228,720	132	55	187	72	10	82	158,998.7	69,721.3
Hubei	585.2	10.74	628,504.8	143	64	207	97	12	109	411,710.4	216,794.4
Hunan	678.3	13.58	921,131.4	163	50	213	47	12	59	721,327.2	199,804.2
Jiangsu	797.6	9.05	721,828	54	41	95	52	17	69	418,132.1	303,695.9
Liaoning	438.2	6.17	270,369.4	487	25	512	97	7	104	224,722.6	45,646.8
Neimenggu	251.1	7.72	193,849.2	107	6	113	33	1	34	149,013.3	44,835.9
Shaanxi	379.3	10.1	383,093	225	58	283	48	9	57	318,868.6	64,224.4
Shandong	984.7	12.55	1235,798.5	219	54	273	100	15	115	869,518	366,280.5
Shanxi	366.4	9.98	365,667.2	147	44	191	39	8	47	293,455.6	72,211.6
Shanghai	241.5	7.52	181,608	60	18	78	35	7	42	118,045.2	63,562.8
Sichuan	820.4	10.3	845,012	243	71	314	107	20	127	601,663.9	243,348.1
Xinjiang	236	15.59	367,924	137	34	171	33	3	36	303,937.2	63,986.8
Yunnan	474.2	12.88	610,769.6	164	47	211	40	5	45	503,407.8	107,361.8
Zhejiang	553.9	10.52	582,702.8	198	33	231	103	21	124	379,167.2	203,535.6
Jilin	275.3	5.87	161,601.1	110	20	130	40	4	44	120,736.5	40,864.6
Tianjin	154.7	5.84	90,344.8	37	6	43	38	2	40	46,805.1	43,539.7
Jiangxi	456.6	13.2	60,2712	165	55	220	45	9	54	483,929.3	118,782.7
Xizang	32.4	15.75	51,030	35	6	41	9	0	9	41,844.6	9,185.4
Qinghai	58.8	14.72	86,553.6	43	1	44	13	2	15	64,548.4	22,005.2
Ningxia	66.8	12.62	84,301.6	36	14	50	9	1	10	70,251.3	14,050.3

[*]: These data were extracted from the China Health Statistics Yearbook.

Table S2. Basic characteristics of climate and air pollution by outcomes in the China Labor and Delivery Survey (N=70,818).

Variable	Mean (SD)	Median (IQR)	P_1	P_5	P_{10}	Q1	Q3	P_{90}	P_{95}	P_{99}
Chronic exposure										
All subjects (N=70,818)										
Tem_Total (°C)	15.9 (5.0)	16.4 (6.4)	2.5	6.8	9.3	13.1	19.5	21.6	23.3	25.7
Tem_T1 (°C)	16.5 (8.5)	17.5 (13.4)	-5.3	0.7	5.2	10.6	24	26.2	27.2	28.7
Tem_T2 (°C)	15.4 (8.9)	16.5 (13.3)	-8.4	-1.4	3.2	9.5	22.9	26.0	27.1	28.7
Tem_T3 (°C)	15.9 (9.0)	17.2 (14.1)	-8.7	-0.7	3.3	9.6	23.7	26.6	27.4	28.5
$PM_{2.5}$_Total ($\mu g/m^3$)	53.4 (18.7)	51.3 (26.0)	23.7	28.2	30.8	38.6	64.6	82.1	86.4	98.6
$PM_{2.5}$_T1 ($\mu g/m^3$)	53.0 (21.6)	48.4 (30.1)	20.9	24.5	28.2	36.2	66.3	83.7	94.3	111.3
$PM_{2.5}$_T2 ($\mu g/m^3$)	54.7 (26.1)	48.4 (31.1)	18.8	23.5	27.6	36.0	67.1	92.4	110.1	136.7
$PM_{2.5}$_T3 ($\mu g/m^3$)	52.6 (24.2)	45.9 (33.3)	19.2	24	27.7	34.2	67.6	84.5	102.8	128.2
O_3_Total ($\mu g/m^3$)	51.2 (10.5)	50.0 (13.5)	29.0	36.0	38.4	43.9	57.3	66.0	70.8	77.6
O_3_T1 ($\mu g/m^3$)	51.2 (18.3)	50.7 (24.7)	13.7	22.0	27.8	38.2	62.9	75.2	83.0	94.9
O_3_T2 ($\mu g/m^3$)	50.1 (19.6)	48.1 (27.3)	13.2	20.4	25.1	35.6	62.9	75.8	86.7	94.9
O_3_T3 ($\mu g/m^3$)	52.2 (18.9)	51.5 (26.2)	16.5	21	26.9	39.1	65.2	77.8	86.7	95.3
PTB=0 (N=65,853)										
Tem_Total (°C)	15.9 (4.9)	16.4 (6.4)	2.6	6.9	9.3	13.1	19.5	21.5	23.3	25.7
Tem_T1 (°C)	16.5 (8.5)	17.5 (13.4)	-5.2	0.5	5.1	10.6	24.0	26.3	27.2	28.8
Tem_T2 (°C)	15.4 (8.9)	16.5 (13.4)	-8.4	-1.7	3.0	9.4	22.8	26.0	27.0	28.6
Tem_T3 (°C)	15.9 (9.0)	17.2 (14.1)	-8.8	-0.7	3.3	9.6	23.7	26.6	27.3	28.3
$PM_{2.5}$_Total ($\mu g/m^3$)	53.5 (18.7)	51.4 (26.2)	23.7	28.3	30.8	38.7	64.9	82.3	86.3	98.4
$PM_{2.5}$_T1 ($\mu g/m^3$)	53.1 (21.6)	48.5 (30.2)	20.9	24.5	28.2	36.2	66.4	83.8	94.3	111.2
$PM_{2.5}$_T2 ($\mu g/m^3$)	54.9 (26.2)	48.6 (31.3)	18.8	23.4	27.8	36.1	67.4	92.8	110.6	137.0
$PM_{2.5}$_T3 ($\mu g/m^3$)	52.7 (24.2)	46.0 (33.6)	19.3	24.1	27.7	34.3	67.9	84.6	102.9	128.2
O_3_Total ($\mu g/m^3$)	51.2 (18.3)	50.7 (24.7)	13.7	22.1	27.8	38.2	62.9	75.3	83.0	95.6
O_3_T1 ($\mu g/m^3$)	51.2 (10.4)	50.0 (13.4)	29.2	36.2	38.5	44.0	57.4	66.0	70.8	77.4
O_3_T2 ($\mu g/m^3$)	50.1 (19.6)	48.0 (27.2)	13.2	20.3	25.1	35.7	62.9	76.1	86.8	95.0
O_3_T3 ($\mu g/m^3$)	52.3 (18.8)	51.5 (26.2)	16.7	21.1	27.2	39.1	65.4	77.9	86.9	95.3
PTB=1 (N=4,965)										
Tem_Total (°C)	16.3 (5.3)	16.9 (6.8)	0.7	6.3	9.4	13.2	20.0	22.5	23.7	26.4
Tem_T1 (°C)	16.6 (8.3)	18.3 (13.3)	-6.9	2.2	5.6	10.4	23.8	26.0	27.0	28.3
Tem_T2 (°C)	16.0 (8.5)	16.9 (12.6)	-8.9	0.6	5.0	10.3	22.9	26.3	27.7	28.8
Tem_T3 (°C)	16.2 (9.2)	17.9 (14.5)	-8.4	-0.2	3.7	9.5	24	27	27.9	28.8
$PM_{2.5}$_Total ($\mu g/m^3$)	51.6 (18.3)	49.4 (24.6)	23.2	27.1	29.5	37.6	62.2	77.5	87.9	102.2
$PM_{2.5}$_T1 ($\mu g/m^3$)	51.6 (21.5)	46.7 (28.4)	21.1	24.7	27.6	35.7	64.1	80.8	92.4	116.2
$PM_{2.5}$_T2 ($\mu g/m^3$)	52.3 (24.4)	45.9 (28.5)	18.7	23.6	26.6	35.2	63.7	84.0	104.5	134.3
$PM_{2.5}$_T3 ($\mu g/m^3$)	50.4 (24.1)	43.7 (28.9)	18.7	22.7	25.8	33.2	62.2	83.3	100.3	129
O_3_Total ($\mu g/m^3$)	50.1 (17.8)	49.7 (24.3)	14.0	20.9	26.3	37.9	62.1	72.5	82.2	92.9
O_3_T1 ($\mu g/m^3$)	50.0 (11.4)	49.2 (14.8)	26.4	32.8	35.5	42.1	56.9	65.4	71.2	81.0
O_3_T2 ($\mu g/m^3$)	49.5 (18.5)	49.5 (28.3)	14.6	20.5	24.7	35.1	63.4	72.9	80.3	92.5
O_3_T3 ($\mu g/m^3$)	50.8 (19.3)	50.4 (26.2)	15	19.6	23.9	37.5	63.7	75.9	84.8	96.6
Acute exposure										

	Mean (SD)	Median (IQR)	P_1	P_5	P_{10}	Q1	Q3	P_{90}	P_{95}	P_{99}
All subjects (N=70,818)										
Tem_1w (℃)	16.6 (9.6)	18.6 (14.6)	-9.3	-1.0	3.2	9.8	24.4	27.2	28.5	30.8
$PM_{2.5}$_1w (μg/m³)	49.8 (30.1)	41.5 (30.1)	12.3	18.8	22.7	30.1	60.3	87.2	107.7	170.6
O3_1w (μg/m³)	54.1 (23.8)	51.8 (32.7)	9.6	16.7	23.6	37.3	69.9	87.2	94.6	115.6
Tem_2w (℃)	16.6 (9.5)	18.4 (14.9)	-9.0	-1.0	3.5	9.5	24.4	27.2	28.4	30.1
$PM_{2.5}$_2w (μg/m³)	50.2 (27.8)	42.4 (29.9)	13.9	20.3	24.2	31.8	61.7	84.7	108.2	152.6
O3_2w (μg/m³)	54.2 (22.8)	53.2 (31.2)	10.4	18.1	24.5	38.3	69.5	86.2	92.5	110.4
PTB=0 (N=65,853)										
Tem_1w (℃)	16.6 (9.6)	18.6 (14.6)	-9.3	-1.0	3.2	9.8	24.4	27.2	28.5	30.8
$PM_{2.5}$_1w (μg/m³)	49.9 (30.2)	41.5 (30.3)	12.3	18.8	22.7	30.2	60.5	87.6	107.8	170.6
O3_1w (μg/m³)	54.2 (23.9)	52.0 (32.7)	9.6	16.7	23.6	37.4	70.1	87.5	94.8	115.9
Tem_2w (℃)	16.6 (9.5)	18.5 (14.9)	-9.0	-1.0	3.5	9.5	24.4	27.2	28.4	30.0
$PM_{2.5}$_2w (μg/m³)	50.3 (27.9)	42.5 (30.1)	13.9	20.3	24.2	31.8	62.0	84.9	108.6	153.4
O3_2w (μg/m³)	54.4 (22.9)	53.2 (31.4)	10.4	18.1	24.5	38.4	69.8	86.4	92.7	110.6
PTB=1 (N=4,965)										
Tem_1w (℃)	16.5 (9.5)	18.4 (14.9)	-9.5	-0.6	3.6	9.4	24.3	27.2	28.6	31.3
$PM_{2.5}$_1w (μg/m³)	48.4 (28.5)	40.9 (28.6)	12.8	18.9	22.8	29.9	58.5	82.7	104.2	154.2
O3_1w (μg/m³)	52 (22.6)	49.6 (31.2)	9.4	16.6	23.7	36.3	67.5	82.1	91.2	112.5
Tem_2w (℃)	16.5 (9.4)	18.2 (15.1)	-8.6	-0.7	3.8	9.3	24.4	27.2	28.4	30.4
$PM_{2.5}$_2w (μg/m³)	48.6 (26.2)	41.5 (27.4)	14.1	20.2	23.7	31.7	59.1	81.4	102.8	148.5
O3_2w (μg/m³)	51.9 (21.5)	50.6 (28.7)	10.2	17.4	24.1	37.3	65.9	81	88.8	108.5

Notes: PTB: preterm birth; P_1, P_5, P_{10}, Q1, Q3, P_{90}, P_{95}, P_{99} refer to the 1st, 5st, 10st, 25st, 75st, 90st, 95st and 99st percentile of the daily mean temperature for different time windows; Tem_Total: total pregnancy; Tem_T1: the first trimester; Tem_T2: the second trimester; Tem_T3: the third trimester; Tem_1w: one week before delivery.

Table S3. Basic characteristics of temperature exposure by delivery hospitals and geographic regions in the China Labor and Delivery Survey (N=70,818).

Items		Chronic exposure				Acute exposure	
	Region	Whole pregnancy [Mean (SD)]	1st trimester [Mean (SD)]	2nd trimester [Mean (SD)]	3rd trimester [Mean (SD)]	1 week [Mean (SD)]	2 week [Mean (SD)]
Hospital ID							
1 (N=582)	North	12.6 (2.8)	1.3 (5.2)	14.0 (7.2)	21.8 (3.7)	18.9 (8.5)	19.5 (8.3)
2 (N=1,041)	North	9.7 (2.1)	17.6 (8.1)	6.5 (8.8)	5.2 (9.8)	9.8 (12.2)	9.8 (12.2)
3 (N=1,497)	North	11.9 (3.6)	10.4 (9.6)	11.8 (10.6)	13.6 (9.3)	13.3 (10.4)	13.4 (10.2)
4 (N=497)	North	13.8 (3.0)	13.5 (9.3)	12.1 (8.9)	15.7 (8.9)	17.6 (8.8)	17.6 (8.8)
5 (N=100)	North	9.3 (1.0)	14.4 (9.5)	3.5 (4.4)	9.9 (9.6)	16.7 (7.9)	16 (8.8)
6 (N=2,727)	North	14.0 (3.0)	18.7 (8.1)	12.4 (9.4)	11.0 (9.2)	12.7 (7.3)	13 (7.5)
7 (N=975)	North	8.9 (3.3)	7.4 (10.9)	6.4 (10.2)	12.8 (10.7)	15.0 (8.8)	14.8 (9.0)
8 (N=380)	North	7.5 (3.2)	7.7 (12.7)	6.4 (9.9)	8.3 (12.3)	9.9 (12.8)	10.3 (12.7)
9 (N=923)	North	15.1 (0.7)	13.0 (8.1)	21.2 (2.5)	11.0 (9.4)	3.4 (10.1)	4.2 (10.0)
10 (N=241)	North	10.1 (2.8)	10.5 (9.3)	8.2 (8.6)	11.7 (10.0)	13.8 (10.2)	14.1 (10.1)
11 (N=1,471)	North	5.5 (1.2)	22.1 (1.2)	9.9 (4.5)	-14.3 (1.1)	-11.3 (4)	-13.3 (3.3)
12 (N=1,005)	North	11.1 (0.5)	18.4 (2.0)	3.8 (1.0)	11.4 (1.3)	19.9 (1.8)	19.1 (0.8)
13 (N=1,010)	North	14.1 (2.2)	5.4 (4.9)	13.6 (6.6)	23.0 (4.6)	22.5 (7.1)	22.4 (7.0)
14 (N=683)	North	14.3 (2.6)	12.3 (4.7)	10.0 (8.3)	20.2 (3.9)	24.7 (3.2)	24.7 (2.7)
15 (N=101)	North	10.5 (2.6)	12.8 (6.2)	10.1 (8.5)	8.7 (5.6)	9.3 (8.0)	9.1 (7.9)
16 (N=1,029)	North	15.6 (3.1)	20.6 (5.3)	14.5 (9.2)	11.9 (6.3)	14.2 (8.2)	13.8 (8.1)
17 (N=624)	North	15.3 (1.9)	19.1 (8.6)	13.8 (5.7)	13.1 (8.8)	16.4 (6.8)	15.8 (7.0)
18 (N=126)	North	16.6 (1.4)	13.3 (9.4)	21.4 (3.4)	14.9 (10.0)	9.7 (10.1)	9.4 (10.7)
19 (N=507)	North	15.2 (2.6)	17.4 (7.2)	14.0 (8.7)	14.2 (7.7)	15.9 (8.3)	16 (8.2)
20 (N=1,000)	North	13.0 (0.2)	16.8 (1.3)	18.7 (0.7)	4.0 (1.3)	-0.6 (3.0)	0.7 (1.3)
21 (N=135)	North	10.2 (3.5)	13.1 (8.2)	7.0 (11.0)	10.7 (8.3)	13.3 (13.5)	13.1 (13.1)
22 (N=82)	North	9.2 (1.1)	6.0 (8.8)	4.9 (4.1)	16.2 (8.5)	20.7 (8.5)	20.5 (8.5)
23 (N=54)	North	13.4 (3.2)	22.4 (3.1)	13.3 (10.4)	4.9 (3.5)	6.1 (9.7)	6.1 (9.3)
24 (N=472)	North	11.4 (3.7)	14.4 (8.5)	14.0 (10.7)	6.4 (9.5)	4.5 (7.6)	4.3 (7.4)
25 (N=59)	North	9.6 (3.1)	9.2 (10.2)	8.3 (9.6)	11.2 (10.2)	12.7 (10.6)	12.8 (10.4)
26 (N=1,077)	North	5.0 (3.8)	7.0 (12.3)	4.9 (12.1)	3.2 (12.2)	3.8 (13.9)	3.7 (13.8)
27 (N=83)	North	11.9 (2.5)	11.7 (12.5)	13.3 (6.0)	10.4 (13.1)	10.3 (13.1)	10.7 (12.9)
28 (N=75)	North	3.8 (1.7)	9.5 (8.9)	-3.5 (7.4)	5.5 (9.6)	12.9 (11.5)	12.4 (10.8)
29 (N=600)	East	10.2 (0.4)	10.6 (2.4)	3.7 (1.6)	16.2 (1.2)	21.5 (0.4)	21.5 (0.2)
30 (N=1,642)	East	16.7 (2.6)	23.2 (2.0)	15.9 (7.8)	11.1 (1.6)	13.6 (5.8)	13.1 (5.1)
31 (N=1,206)	East	18.1 (2.0)	15.2 (6.7)	17.2 (5.8)	21.6 (5.9)	22.3 (5.1)	22.3 (4.8)
32 (N=93)	East	16.0 (1.3)	17.9 (8.6)	14.2 (4.9)	16.2 (8.4)	18.4 (8.3)	18.8 (8.4)
33 (N=93)	East	19.3 (1.8)	14.4 (5.6)	21.1 (4.9)	22.1 (5.4)	19.0 (8.8)	19.7 (8.4)
34 (N=634)	East	19.3 (0.5)	10.3 (1.2)	22.6 (1.1)	24.6 (0.5)	18.9 (0.6)	19.3 (0.6)
35 (N=935)	East	18.9 (2.4)	16.7 (5.6)	19.1 (7.1)	20.7 (4.9)	19.6 (4.3)	20.2 (3.5)
36 (N=771)	East	16.3 (2.1)	16.5 (7.8)	14.8 (6.1)	17.4 (7.9)	20.3 (7.7)	20.0 (7.6)
37 (N=1,380)	East	17.1 (2.2)	16.5 (7.7)	17.2 (6.3)	17.4 (7.5)	17.3 (2.1)	16.7 (2.6)
38 (N=4,865)	East	20.2 (1.4)	21.4 (6.6)	19.5 (4.3)	19.6 (6.8)	21.1 (6.9)	20.7 (7.0)

39 (N=94)	East	20.5 (1.7)	20.5 (5.1)	19.7 (5.6)	21.3 (5.0)	22.2 (5.6)	22.4 (5.4)
40 (N=758)	East	16.3 (2.1)	13.8 (7.9)	15.9 (6.4)	19.1 (7.9)	20.1 (9.4)	20 (9.4)
41 (N=508)	East	17.3 (1.4)	24.4 (1.7)	18.1 (4.5)	9.4 (1.5)	9.8 (4.9)	9.8 (4.0)
42 (N=467)	East	14.8 (1.2)	20.4 (5.6)	10.7 (4.4)	13.5 (5.6)	17.9 (6.9)	17.4 (6.7)
43 (N=815)	East	20.9 (1.7)	18.3 (6.0)	21.3 (5.0)	23.1 (4.8)	21.8 (5.3)	21.9 (5.2)
44 (N=818)	East	21.5 (1.6)	21.1 (5.2)	21.4 (5.3)	22.0 (4.3)	21.4 (5.6)	21.3 (5.7)
45 (N=69)	East	17.7 (2.5)	12.6 (4.5)	18.5 (7.2)	21.8 (4.1)	18.9 (6.8)	19.2 (6.8)
46 (N=838)	East	16.4 (0.4)	6.4 (0.4)	16.3 (1.6)	26.0 (0.3)	25.5 (0.8)	25.4 (0.2)
47 (N=945)	East	15.7 (2.3)	16.5 (7.4)	14.5 (7.2)	16.0 (8.1)	18.3 (7.4)	18.2 (7.7)
48 (N=1,964)	East	18.9 (1.5)	20.4 (5.5)	21.5 (3.6)	14.9 (6.2)	13.7 (4.8)	13.0 (5.0)
49 (N=807)	East	13.9 (3.4)	18.5 (5.7)	12.3 (10.1)	11.0 (6.2)	13.2 (4.3)	12.9 (4.1)
50 (N=342)	East	13.3 (2.8)	16.3 (6.8)	12.1 (8.4)	11.7 (7.2)	12.7 (6.9)	12.8 (6.9)
51 (N=955)	East	17.1 (2.7)	20.9 (5.6)	17.9 (7.5)	12.5 (6.8)	12.4 (4.9)	12.2 (4.7)
52 (N=129)	East	17.8 (2.5)	14.8 (6.3)	19.8 (6.9)	18.8 (7.4)	15.4 (8.6)	15.2 (8.8)
53 (N=438)	East	16.6 (2.1)	12.6 (7.5)	17.3 (6.2)	19.9 (8.2)	18.6 (9.1)	18.7 (9.1)
54 (N=483)	East	19.0 (0.3)	23.5 (0.9)	24.6 (1.0)	9.3 (0.9)	0.9 (1.5)	2.0 (1.2)
55 (N=939)	East	15.4 (2.5)	17.0 (6.7)	12.5 (7.1)	16.7 (6.4)	19 (6.2)	18.8 (5.8)
56 (N=622)	East	20.4 (1.7)	14.0 (2.1)	20.9 (5.1)	26.1 (1.5)	24.8 (4.1)	25.2 (3.9)
57 (N=1,732)	East	19.3 (1.0)	24.1 (5.2)	16.3 (3.8)	17.8 (5.0)	22.1 (5.3)	21.4 (5.8)
58 (N=103)	South	21.1 (0.3)	28.1 (0.4)	19.4 (1.4)	16.0 (0.6)	22.0 (1.9)	21.3 (0.9)
59 (N=935)	South	21.0 (0.3)	27.9 (0.6)	18.9 (1.4)	16.5 (0.7)	22.5 (2.1)	21.9 (0.6)
60 (N=269)	South	21.6 (0.3)	27.4 (0.9)	16.9 (0.8)	20.5 (0.8)	26.7 (1.7)	25.9 (1.2)
61 (N=810)	South	20.5 (0.5)	16.4 (3.2)	26.3 (0.6)	18.6 (3.4)	10.3 (3.2)	10.5 (3.1)
62 (N=1,244)	South	16.8 (3.1)	13.7 (6.8)	16.6 (7.3)	20.4 (6.7)	20.2 (7.8)	20.3 (7.8)
63 (N=353)	South	18.5 (0.5)	8.0 (1.1)	21.4 (1.2)	25.7 (0.3)	21.4 (1.3)	22.0 (0.9)
64 (N=142)	South	14.0 (0.6)	23.7 (1.6)	9.4 (1.5)	9.2 (0.9)	15.9 (2.5)	14.5 (2.0)
65 (N=1,805)	South	16.5 (1.6)	19.5 (6.2)	15.1 (5.8)	15.0 (6.9)	16.9 (8.3)	16.3 (8.7)
66 (N=718)	South	17.7 (1.9)	18.9 (7.6)	16.6 (5.7)	17.4 (7.8)	19.1 (7.7)	19.1 (7.7)
67 (N=778)	South	17.4 (2.1)	15.7 (6.8)	17.0 (6.8)	19.5 (6.6)	20 (10.8)	19.9 (9.9)
68 (N=118)	South	21.6 (1.7)	21.3 (5.2)	20.9 (5.3)	22.6 (5.5)	24.4 (4.1)	24.2 (4.4)
69 (N=1,172)	South	22.9 (1.6)	20.1 (4.2)	23.6 (4.7)	25.0 (4.0)	24.5 (3.6)	24.4 (3.7)
70 (N=441)	South	24.7 (1.8)	25.8 (1.8)	23.4 (4.6)	24.9 (3.6)	27.6 (1.3)	27.5 (1.5)
71 (N=645)	South	25.7 (0.3)	24.2 (3.5)	28.4 (0.8)	24.4 (3.2)	21.5 (3.9)	21.8 (3.7)
72 (N=475)	South	24.4 (1.4)	22.8 (4.9)	26.8 (2.5)	23.6 (5.3)	22.3 (4.2)	22.5 (4.0)
73 (N=543)	South	25.2 (0.3)	21.9 (1.1)	28.2 (0.2)	25.3 (0.5)	20.6 (2.4)	22.1 (0.9)
74 (N=660)	South	24.4 (0.3)	21.7 (2.0)	27.8 (0.4)	23.6 (1.7)	18.4 (4.2)	18.6 (3.6)
75 (N=634)	South	21.6 (1.6)	24.2 (4.9)	20.9 (5.5)	19.9 (5.2)	19.5 (8.8)	20.1 (7.9)
76 (N=267)	South	26.1 (0.2)	25.2 (1.2)	29.2 (0.3)	23.9 (0.8)	16.6 (1.4)	17 (1.2)
77 (N=1,010)	West	7.6 (0.6)	19.3 (0.4)	10.3 (2.7)	-6.6 (0.8)	-4.9 (2.1)	-5.5 (1.0)
78 (N=717)	West	13.6 (2.8)	14.7 (7.9)	14.9 (7.7)	11.2 (7.7)	10.7 (7.1)	10.5 (6.9)
79 (N=1,406)	West	16.2 (2.0)	14.6 (5.2)	14.5 (6.5)	19.2 (4.8)	19.7 (7.1)	20.0 (6.8)
80 (N=67)	West	18.6 (2.2)	20.1 (6.8)	18.8 (5.8)	16.9 (7.1)	17.6 (6.1)	17 (6.0)
81 (N=516)	West	18.6 (1.7)	17.6 (6.6)	19.3 (4.5)	18.8 (7.0)	17.5 (6.7)	17.8 (7.3)
82 (N=66)	West	16.6 (1.5)	16.1 (3.1)	17.2 (3.7)	16.3 (2.7)	14.2 (5.6)	14.2 (5.4)

83 (N=174)	West	14.5 (0.5)	13.4 (3.8)	11.9 (2.7)	17.9 (2.4)	19.9 (0.9)	19.9 (0.2)
84 (N=78)	West	13.4 (2.0)	12.9 (4.0)	13.8 (5.8)	13.4 (3.6)	11.0 (6.6)	11.2 (6.8)
85 (N=632)	West	19.3 (1.9)	19.0 (6.9)	19.1 (5.2)	19.7 (6.5)	20.3 (7.0)	20.2 (7.0)
86 (N=873)	West	9.6 (1.8)	8.1 (10.1)	13.2 (4.0)	7.5 (11.0)	4.1 (8.6)	4.3 (9.0)
87 (N=675)	West	13.5 (1.5)	15.2 (9.0)	10.8 (6.0)	14.5 (9.5)	18.3 (10.7)	17.9 (10.7)
88 (N=1,538)	West	17.6 (1.4)	16.6 (5.4)	21.1 (3.8)	15.1 (5.9)	10.8 (5.8)	10.8 (5.7)
89 (N=494)	West	19.3 (2.5)	21.0 (4.5)	19.1 (7.4)	17.9 (4.7)	17.5 (8.1)	17.5 (8.1)
90 (N=524)	West	17.7 (2.5)	18.7 (4.6)	17.7 (7.5)	16.7 (5.1)	16.5 (8.1)	16.2 (7.3)
91 (N=881)	West	7.9 (2.1)	7.7 (8.7)	3.8 (6.6)	12.1 (8.3)	17.4 (5.5)	17.1 (5.7)
92 (N=1,504)	West	15.8 (2.1)	18.2 (5.7)	16.2 (5.6)	13.2 (6.7)	14.0 (6.9)	14.0 (6.4)
93 (N=1,325)	West	17.6 (1.3)	12.9 (8.4)	21.9 (4.2)	17.8 (8.7)	12.2 (10.5)	13.1 (10.6)
94 (N=163)	West	17.7 (2.2)	18.4 (4.6)	16.1 (6.3)	18.7 (5.2)	20.4 (5.0)	20.3 (4.1)
95 (N=871)	West	15.1 (1.2)	18.4 (3.1)	14.4 (3.6)	12.5 (3.8)	13.9 (5.5)	13.5 (5.5)
96 (N=794)	West	18.0 (2.2)	18.9 (6.2)	17.9 (6.2)	17.3 (6.5)	17.7 (8.7)	17.7 (7.9)
Geographical region							
North (N=19,927)		11.3 (4.5)	12.9 (10.1)	10.1 (10.4)	10.9 (10.4)	12.4 (11.3)	12.4 (11.2)
East (N=23,640)		17.3 (3.1)	17.7 (7.1)	16.8 (7.2)	17.4 (7.4)	18.0 (7.5)	17.9 (7.5)
South (N=13,192)		20.6 (3.3)	20.3 (6.5)	20.3 (6.4)	21.3 (6.4)	22.2 (6.8)	22.1 (6.7)
West (N=14,059)		15.8 (3.8)	15.9 (7.6)	16.2 (7.0)	15.4 (7.9)	14.9 (8.9)	14.9 (8.8)

Table S4. Extreme climate event exposure by time periods and outcomes in the China Labor and Delivery Survey (N=70,818).

Variable	1w before delivery [Mean (SD)				2w before delivery [Mean (SD)]			
	Total subjects (N=70,818)	non-PTB (N=65,853)	PTB (N=4,965)	p-value	Total subjects (N=70,818)	non-PTB (N=65,853)	PTB (N=4,965)	p-value
Fifth-days (day)	0.4 (1.1)	0.3 (1.1)	0.4 (1.2)	<0.001	0.7 (2.0)	0.3 (1.0)	0.8 (2.3)	<0.001
Fifth-2D (event)	0.1 (0.3)	0.1 (0.3)	0.1 (0.3)	<0.001	0.3 (0.9)	0.2 (0.5)	0.3 (1.0)	<0.001
10th-days (day)	0.6 (1.5)	0.6 (1.5)	0.7 (1.7)	<0.001	0.3 (0.7)	0.7 (2.0)	0.3 (0.8)	<0.001
10th-3D (event)	0.2 (0.5)	0.2 (0.5)	0.2 (0.6)	<0.001	0.5 (1.3)	0.3 (0.9)	0.6 (1.4)	<0.001
10th-2D (event)	0.2 (0.7)	0.2 (0.7)	0.3 (0.7)	<0.001	1.2 (2.8)	0.3 (0.7)	1.3 (2.8)	<0.001
90th-days (day)	0.6 (1.5)	0.6 (1.5)	0.6 (1.6)	0.56	0.3 (0.7)	0.5 (1.3)	0.3 (0.7)	0.41
90th-3D (event)	0.2 (0.7)	0.2 (0.7)	0.2 (0.7)	0.77	0.5 (1.3)	1.2 (2.8)	0.5 (1.3)	0.87
90th-2D (event)	0.2 (0.7)	0.2 (0.7)	0.2 (0.7)	0.41	0.6 (1.8)	0.3 (0.7)	0.6 (1.8)	0.26
95th-days (day)	0.3 (1.0)	0.3 (1.0)	0.3 (1.1)	0.08	0.2 (0.8)	0.5 (1.2)	0.2 (0.8)	0.04
95th-2D (event)	0.2 (0.5)	0.2 (0.5)	0.3 (0.6)	0.001	0.7 (2.0)	0.6 (1.8)	0.8 (2.3)	0.71

Notes: Group difference was examined by Wilcoxon's rank sum test, where *P*<0.05 was considered to be significant. PTB: preterm birth. Fifth-days, 10th-days, 95th-days, and 90th-days represent the total number of days when the daily mean temperature was lower than the Fifth or the 10th percentile or higher than the 95th or the 90th percentile, respectively. Fifth-2D, 10th-3D, 10th-2D, 95th-2D, 90th-3D and 90th-2D represent the total number of extreme weather events. An extreme weather event can be defined as the daily mean temperature below the Fifth percentile or higher than the 95th percentile for two consecutive days or the daily mean temperature below the 10th percentile or higher than the 90th percentile for two or three consecutive days.

Table S5. Associations of extreme climate events with early and late preterm birth in the China Labor and Delivery Survey.

Extreme events	Early PTB [OR (95% CI)] N=1,983		Late PTB [OR (95% CI)] N=2,982	
	1w before delivery	2w before delivery	1w before delivery	2w before delivery
Fifth-days	1.05 (1.00, 1.10)	1.02 (0.99, 1.05)	1.09 (1.05, 1.13)	1.04 (1.02, 1.07)
Fifth-2D	1.10 (0.90, 1.34)	1.04 (0.98, 1.10)	1.26 (1.08, 1.48)	1.10 (1.05, 1.15)
10th-days	1.04 (1.00, 1.08)	1.02 (1.00, 1.04)	1.08 (1.05, 1.12)	1.04 (1.02, 1.06)
10th-3D	1.04 (0.94, 1.14)	1.03 (0.95, 1.11)	1.13 (1.05, 1.22)	1.13 (1.07, 1.20)
10th-2D	1.07 (0.98, 1.17)	1.03 (0.98, 1.08)	1.17 (1.09, 1.25)	1.08 (1.04, 1.12)
90th-days	0.96 (0.93, 1.00)	0.98 (0.96, 1.01)	0.96 (0.93, 0.99)	0.99 (0.97, 1.01)
90th-3D	0.94 (0.87, 1.03)	0.97 (0.89, 1.04)	0.90 (0.83, 0.97)	0.99 (0.93, 1.06)
90th-2D	0.99 (0.90, 1.07)	0.97 (0.93, 1.02)	0.95 (0.88, 1.02)	0.98 (0.94, 1.02)
95th-days	0.99 (0.94, 1.04)	0.99 (0.96, 1.03)	0.98 (0.93, 1.02)	0.99 (0.97, 1.02)
95th-2D	1.07 (0.98, 1.18)	1.01 (0.94, 1.08)	1.09 (1.01, 1.18)	0.96 (0.91, 1.02)

Notes: Generalized linear mixed model was used to examine the associations. All models were adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3. PTB: preterm birth. Early PTB: preterm birth of 24-34 gestational weeks; Late PTB: preterm birth of 35-36 gestational weeks. Fifth-days, 10th-days, 95th-days, and 90th-days represent the total number of days when the daily mean temperature was lower than the Fifth or the 10th percentile or higher than the 95th or the 90th percentile, respectively. Fifth-2D, 10th-3D, 10th-2D, 95th-2D, 90th-3D and 90th-2D represent the total number of extreme weather events. An extreme weather event can be defined as the daily mean temperature below the Fifth percentile or higher than the 95th percentile for two consecutive days or the daily mean temperature below the 10th percentile or higher than the 90th percentile for two or three consecutive days.

Table S6. Associations of extreme climate events with early and late preterm birth in the China Labor and Delivery Survey, stratified by clinical subtypes.

Variables	Spontaneous PTB [OR (95% CI)]	PPROM [OR (95% CI)]	Iatrogenic PTB [OR (95% CI)]
Early PTBs	N=918	N=536	N=529
1 week before delivery			
Fifth-days	1.06 (0.99, 1.14)	1.04 (0.95, 1.14)	1.03 (0.93, 1.13)
Fifth-2D	1.08 (0.81, 1.44)	1.18 (0.83, 1.70)	1.04 (0.70, 1.55)
10th-days	1.05 (0.99, 1.11)	1.05 (0.97, 1.14)	1.02 (0.94, 1.10)
10th-3D	1.12 (0.99, 1.28)	1.02 (0.84, 1.22)	0.89 (0.73, 1.10)
10th-2D	1.10 (0.97, 1.24)	1.06 (0.89, 1.25)	1.04 (0.87, 1.24)
90th-days	0.99 (0.94, 1.05)	0.88 (0.81, 0.95)	0.97 (0.91, 1.05)
90th-3D	1.01 (0.89, 1.15)	0.79 (0.67, 0.94)	0.96 (0.82, 1.13)
90th-2D	1.08 (0.96, 1.22)	0.77 (0.64, 0.93)	1.02 (0.87, 1.19)
95th-days	1.02 (0.95, 1.10)	0.92 (0.82, 1.02)	0.98 (0.89, 1.07)
95th-2D	1.22 (1.07, 1.39)	1.01 (0.84, 1.21)	0.90 (0.74, 1.09)
2 weeks before delivery			
Fifth-days	1.03 (0.99, 1.07)	1.02 (0.97, 1.08)	1.01 (0.95, 1.06)
Fifth-2D	1.04 (0.96, 1.14)	1.03 (0.92, 1.15)	1.04 (0.92, 1.16)
10th-days	1.02 (0.99, 1.06)	1.03 (0.98, 1.07)	1.01 (0.96, 1.05)
10th-3D	1.02 (0.92, 1.14)	1.07 (0.93, 1.24)	1.01 (0.87, 1.17)
10th-2D	1.04 (0.97, 1.11)	1.04 (0.95, 1.14)	1.01 (0.92, 1.11)
90th-days	1.02 (0.98, 1.05)	0.91 (0.87, 0.96)	0.99 (0.94, 1.03)
90th-3D	1.05 (0.94, 1.17)	0.82 (0.69, 0.96)	0.97 (0.84, 1.12)
90th-2D	1.03 (0.96, 1.11)	0.86 (0.78, 0.96)	0.98 (0.90, 1.07)
95th-days	1.03 (0.99, 1.08)	0.93 (0.87, 1.00)	0.99 (0.93, 1.05)
95th-2D	1.10 (1.00, 1.21)	0.89 (0.77, 1.03)	0.96 (0.85, 1.09)
Late PTBs	N=1,536	N=822	N=624
1 week before delivery			
Fifth-days	1.08 (1.03, 1.13)	1.14 (1.07, 1.22)	1.01 (0.92, 1.11)
Fifth-2D	1.18 (0.95, 1.46)	1.59 (1.20, 2.11)	1.05 (0.73, 1.52)
10th-days	1.07 (1.03, 1.12)	1.14 (1.07, 1.21)	1.02 (0.95, 1.10)
10th-3D	1.16 (1.05, 1.29)	1.16 (1.01, 1.34)	1.00 (0.83, 1.19)
10th-2D	1.16 (1.05, 1.27)	1.25 (1.10, 1.42)	1.09 (0.93, 1.27)

90th-days	0.98 (0.94, 1.03)	0.94 (0.88, 1.00)	0.94 (0.87, 1.01)
90th-3D	0.89 (0.80, 0.99)	0.90 (0.79, 1.03)	0.90 (0.76, 1.07)
90th-2D	0.95 (0.86, 1.05)	0.99 (0.86, 1.13)	0.92 (0.77, 1.09)
95th-days	0.98 (0.92, 1.04)	1.00 (0.93, 1.09)	0.94 (0.84, 1.04)
95th-2D	1.12 (1.01, 1.25)	1.12 (0.96, 1.29)	1.00 (0.84, 1.19)
2 weeks before delivery			
Fifth-days	1.04 (1.01, 1.07)	1.07 (1.03, 1.11)	1.00 (0.95, 1.06)
Fifth-2D	1.10 (1.04, 1.17)	1.14 (1.05, 1.24)	1.01 (0.91, 1.13)
10th-days	1.04 (1.02, 1.07)	1.07 (1.03, 1.10)	1.00 (0.96, 1.05)
10th-3D	1.13 (1.05, 1.23)	1.25 (1.12, 1.39)	0.99 (0.86, 1.14)
10th-2D	1.08 (1.02, 1.13)	1.14 (1.06, 1.22)	1.03 (0.94, 1.12)
90th-days	1.00 (0.97, 1.02)	0.98 (0.94, 1.01)	1.00 (0.96, 1.05)
90th-3D	1.01 (0.92, 1.10)	0.92 (0.81, 1.04)	1.05 (0.91, 1.22)
90th-2D	0.99 (0.94, 1.05)	0.97 (0.90, 1.05)	0.99 (0.90, 1.08)
95th-days	1.00 (0.97, 1.04)	0.98 (0.94, 1.04)	0.98 (0.92, 1.04)
95th-2D	0.98 (0.91, 1.07)	0.96 (0.86, 1.08)	0.92 (0.80, 1.06)

Notes: Generalized linear mixed model was used to examine the associations. All models were adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3. PTB: preterm birth. PPROM: preterm premature rupture of the fetal membranes. Fifth-days, 10th-days, 95th-days and 90th-days represent the total number of days when the daily mean temperature was lower than the Fifth or the 10th percentile or higher than the 95th or the 90th percentile, respectively. Fifth-2D, 10th-3D, 10th-2D, 95th-2D, 90th-3D and 90th-2D represent the total number of extreme weather events. An extreme weather event can be defined as the daily mean temperature below the Fifth percentile or higher than the 95th percentile for two consecutive days or the daily mean temperature below the 10th percentile or higher than the 90th percentile for two or three consecutive days.

Table S7. Associations of extreme climate events with preterm birth in the China Labor and Delivery Survey, stratified by geographic regions.

Variables	1 week before delivery [OR (95% CI)]	2 weeks before delivery [OR (95% CI)]
North (case/obs= 1,104/19,927)		
Fifth-days	1.21 (1.14, 1.30)	1.11 (1.07, 1.16)
Fifth-2D	1.85 (1.36, 2.52)	1.22 (1.12, 1.33)
10th-days	1.29 (1.21, 1.36)	1.14 (1.10, 1.18)
10th-3D	1.49 (1.30, 1.70)	1.37 (1.23, 1.53)
10th-2D	1.60 (1.41, 1.82)	1.27 (1.19, 1.37)
90th-days	0.91 (0.86, 0.96)	0.93 (0.90, 0.97)
90th-3D	0.83 (0.74, 0.94)	0.81 (0.71, 0.92)
90th-2D	0.86 (0.76, 0.98)	0.86 (0.79, 0.93)
95th-days	0.88 (0.81, 0.95)	0.90 (0.85, 0.96)
95th-2D	1.35 (1.18, 1.55)	0.76 (0.66, 0.87)
East (case/obs= 1,520/23,640)		
Fifth-days	0.95 (0.90, 1.01)	0.98 (0.95, 1.01)
Fifth-2D	0.80 (0.62, 1.04)	0.94 (0.87, 1.01)
10th-days	0.97 (0.93, 1.02)	0.99 (0.96, 1.02)
10th-3D	0.90 (0.80, 1.02)	0.98 (0.89, 1.07)
10th-2D	0.92 (0.82, 1.03)	0.97 (0.92, 1.03)
90th-days	1.02 (0.97, 1.07)	1.02 (0.99, 1.04)
90th-3D	1.02 (0.92, 1.13)	1.04 (0.96, 1.13)
90th-2D	1.05 (0.95, 1.17)	1.03 (0.98, 1.09)
95th-days	1.00 (0.95, 1.06)	1.02 (0.99, 1.06)
95th-2D	0.99 (0.88, 1.11)	1.04 (0.97, 1.11)
South (case/obs= 1,040/13,192)		
Fifth-days	1.07 (0.98, 1.16)	1.03 (0.98, 1.09)
Fifth-2D	1.15 (0.82, 1.59)	1.10 (0.98, 1.24)
10th-days	1.01 (0.95, 1.08)	1.00 (0.96, 1.03)
10th-3D	0.97 (0.84, 1.11)	0.98 (0.86, 1.12)
10th-2D	1.03 (0.90, 1.19)	1.00 (0.92, 1.08)
90th-days	0.87 (0.82, 0.93)	0.95 (0.91, 0.98)

90th-3D	0.80 (0.71, 0.91)	0.89 (0.78, 1.01)
90th-2D	0.86 (0.76, 0.97)	0.92 (0.85, 1.00)
95th-days	0.94 (0.87, 1.01)	0.95 (0.89, 1.01)
95th-2D	0.96 (0.84, 1.10)	0.87 (0.76, 1.01)
West (case/obs= 1,301/14,059)		
Fifth-days	1.09 (1.04, 1.14)	1.04 (1.02, 1.07)
Fifth-2D	1.22 (1.01, 1.48)	1.09 (1.03, 1.16)
10th-days	1.08 (1.03, 1.13)	1.04 (1.01, 1.07)
10th-3D	1.13 (1.01, 1.26)	1.12 (1.03, 1.22)
10th-2D	1.16 (1.05, 1.27)	1.08 (1.03, 1.14)
90th-days	1.09 (1.04, 1.15)	1.06 (1.02, 1.09)
90th-3D	1.11 (0.98, 1.25)	1.14 (1.03, 1.26)
90th-2D	1.17 (1.03, 1.32)	1.10 (1.03, 1.18)
95th-days	1.09 (1.03, 1.17)	1.05 (1.01, 1.09)
95th-2D	1.15 (1.02, 1.30)	1.11 (1.02, 1.21)

Notes: Generalized linear mixed model was used to examine the associations. All models were adjusted for maternal age, maternal ethnicity, maternal education, insurance type, parity, GDP per capita, child sex, conception season, conception year, $PM_{2.5}$ and O_3. PTB: preterm birth.

Table S8. Associations of extreme climate events with preterm birth in the China Labor and Delivery Survey, stratified by child sex.

Variables	1 week before delivery [OR (95% CI)]	2 weeks before delivery [OR (95% CI)]
Male (case/obs= 2,863/37,826)		
Fifth-days	1.05 (1.01, 1.10)	1.01 (0.99, 1.04)
Fifth-2D	1.12 (0.94, 1.33)	1.03 (0.98, 1.09)
10th-days	1.05 (1.02, 1.09)	1.02 (1.00, 1.04)
10th-3D	1.08 (0.99, 1.17)	1.04 (0.98, 1.11)
10th-2D	1.12 (1.04, 1.20)	1.03 (0.99, 1.08)
90th-days	0.92 (0.89, 0.95)	0.96 (0.94, 0.98)
90th-3D	0.83 (0.77, 0.90)	0.90 (0.84, 0.97)
90th-2D	0.87 (0.81, 0.94)	0.92 (0.89, 0.96)
95th-days	0.93 (0.89, 0.97)	0.96 (0.94, 0.99)
95th-2D	1.04 (0.96, 1.13)	0.93 (0.87, 0.99)
Female (case/obs= 2,083/32,872)		
Fifth-days	1.09 (1.04, 1.13)	1.06 (1.03, 1.08)
Fifth-2D	1.29 (1.07, 1.55)	1.11 (1.06, 1.17)
10th-days	1.07 (1.04, 1.12)	1.04 (1.02, 1.07)
10th-3D	1.11 (1.02, 1.21)	1.15 (1.07, 1.23)
10th-2D	1.13 (1.04, 1.23)	1.09 (1.04, 1.13)
90th-days	1.04 (1.00, 1.08)	1.03 (1.01, 1.06)
90th-3D	1.08 (0.99, 1.17)	1.11 (1.03, 1.20)
90th-2D	1.14 (1.04, 1.24)	1.08 (1.03, 1.13)
95th-days	1.06 (1.01, 1.11)	1.04 (1.01, 1.08)
95th-2D	1.14 (1.04, 1.25)	1.08 (1.01, 1.15)

Notes: Generalized linear mixed model was used to examine the associations. All models were adjusted for maternal age, maternal ethnicity, maternal education, insurance type, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3. PTB: preterm birth.

Table S9. Estimates from the Cox regression investigating associations of temperature exposure with PTB in the China Labor and Delivery Survey (N=70,818).

Parameter	HR (95% CI)	*P*-value
1st trimester		
TEM_T1_RCS_lin	1.02 (1.01, 1.04)	0.007
TEM_T1_RCS_S1	0.9997 (0.9997, 0.9998)	<0.001
TEM_T1_RCS_S2	1.002 (1.001, 1.002)	<0.001
TEM_T1_RCS_S3	0.995 (0.994, 0.996)	<0.001
Overall_association		<0.001
Non_lin_association		<0.001
2nd trimester		
TEM_T2_RCS_lin	1.02 (1.00, 1.03)	0.051
TEM_T2_RCS_S1	0.999998 (0.99994, 1.00006)	0.947
TEM_T2_RCS_S2	0.9996 (0.9992, 0.9999)	0.013
TEM_T2_RCS_S3	1.002 (1.001, 1.002)	<0.001
Overall_association		<0.001
Non_lin_association		<0.001
3rd trimester		
TEM_T3_RCS_lin	0.99 (0.97, 1.00)	0.038
TEM_T3_RCS_S1	1.00002 (0.99996, 1.0001)	0.523
TEM_T3_RCS_S2	1.00002 (0.9997, 1.0003)	0.903
TEM_T3_RCS_S3	1.00 (0.999, 1.001)	0.963
Overall_association		<0.001
Non_lin_association		<0.001
Whole pregnancy		
TEM_Total_RCS_lin	0.95 (0.93, 0.98)	<0.001
TEM_Total_RCS_S1	0.9997 (0.999, 1.00)	0.047
TEM_Total_RCS_S2	1.003 (1.001, 1.005)	0.005
TEM_Total_RCS_S3	0.995 (0.991, 0.999)	0.027
Overall_association		<0.001
Non_lin_association		<0.001

Notes: Cox proportional hazard regression incorporated with penalized cubic spline was used to examine exposure-response associations. RCS: restricted cubic spline. The RCS function with 5 knots will generate 1

linear spline (RCS_lin) and 3 nonlinear association splines (RCS_S1, RCS_S2, RCS_S3). Overall_association and Non_lin_association indicate the statistical test for the overall and the non-linear components, separately. All models were adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3. *P*<0.05 indicates significant linear or non-linear association.

Table S10. Associations of extreme climate events with preterm birth under different temperature definitions in the China Labor and Delivery Survey.

Extreme events	Model 1			Model 2		
	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]
1w before delivery	N=4,965	N=1,983	N=2,982	N=4,965	N=1,983	N=2,982
Fifth-days	1.07 (1.04, 1.10)	1.05 (1.00, 1.11)	1.09 (1.04, 1.13)	1.05 (1.02, 1.09)	1.02 (0.97, 1.08)	1.07 (1.03, 1.12)
Fifth-2D	1.19 (1.08, 1.30)	1.18 (1.02, 1.36)	1.21 (1.08, 1.36)	1.14 (1.07, 1.22)	1.12 (1.01, 1.24)	1.17 (1.08, 1.27)
10th-days	1.05 (1.02, 1.08)	1.03 (0.99, 1.07)	1.07 (1.04, 1.11)	1.04 (1.02, 1.07)	1.03 (0.99, 1.07)	1.06 (1.02, 1.09)
10th-3D	1.11 (1.05, 1.17)	1.06 (0.98, 1.16)	1.15 (1.07, 1.23)	1.10 (1.04, 1.16)	1.07 (0.98, 1.16)	1.14 (1.06, 1.22)
10th-2D	1.10 (1.04, 1.17)	1.05 (0.96, 1.15)	1.15 (1.07, 1.24)	1.08 (1.03, 1.15)	1.07 (0.98, 1.17)	1.11 (1.03, 1.19)
90th-days	0.98 (0.94, 1.01)	0.98 (0.92, 1.03)	0.98 (0.93, 1.02)	0.97 (0.95, 1.00)	0.97 (0.93, 1.01)	0.97 (0.94, 1.00)
90th-3D	0.94 (0.88, 0.99)	0.97 (0.89, 1.06)	0.90 (0.83, 0.97)	0.93 (0.88, 0.99)	0.93 (0.85, 1.01)	0.92 (0.86, 1.00)
90th-2D	0.95 (0.89, 1.00)	0.95 (0.87, 1.03)	0.93 (0.87, 1.00)	0.98 (0.92, 1.05)	0.97 (0.88, 1.06)	0.99 (0.91, 1.07)
95th-days	0.98 (0.94, 1.01)	0.99 (0.94, 1.03)	0.96 (0.92, 1.01)	0.99 (0.95, 1.03)	1.00 (0.94, 1.06)	0.98 (0.94, 1.03)
95th-2D	0.93 (0.86, 1.00)	0.97 (0.88, 1.08)	0.89 (0.81, 0.97)	0.97 (0.90, 1.04)	1.03 (0.93, 1.15)	0.90 (0.82, 1.00)
2 w before delivery	N=4,965	N=1,983	N=2,982	N=4,965	N=1,983	N=2,982
Fifth-days	1.03 (1.01, 1.05)	1.02 (0.99, 1.04)	1.04 (1.02, 1.07)	1.03 (1.01, 1.05)	1.02 (0.99, 1.05)	1.04 (1.02, 1.07)
Fifth-2D	1.06 (1.03, 1.10)	1.03 (0.97, 1.09)	1.09 (1.05, 1.14)	1.06 (1.02, 1.11)	1.02 (0.95, 1.1)	1.1 (1.04, 1.16)
10th-days	1.02 (1.01, 1.04)	1.01 (0.99, 1.03)	1.04 (1.02, 1.06)	1.02 (1.01, 1.03)	1.01 (0.99, 1.04)	1.03 (1.01, 1.05)
10th-3D	1.08 (1.03, 1.13)	1.03 (0.95, 1.11)	1.12 (1.06, 1.19)	1.06 (1.01, 1.11)	1.04 (0.96, 1.12)	1.09 (1.02, 1.16)
10th-2D	1.05 (1.02, 1.08)	1.02 (0.97, 1.07)	1.08 (1.04, 1.12)	1.04 (1.01, 1.07)	1.03 (0.99, 1.08)	1.05 (1.01, 1.09)
90th-days	0.99 (0.97, 1.00)	0.98 (0.96, 1.00)	0.99 (0.97, 1.00)	0.99 (0.98, 1.01)	0.98 (0.96, 1.01)	1.00 (0.98, 1.02)
90th-3D	0.96 (0.92, 1.01)	0.94 (0.88, 1.02)	0.96 (0.90, 1.02)	1.02 (0.96, 1.08)	1.01 (0.93, 1.11)	1.02 (0.94, 1.10)
90th-2D	0.97 (0.95, 1.00)	0.97 (0.92, 1.01)	0.97 (0.94, 1.01)	1.00 (0.96, 1.03)	0.98 (0.93, 1.03)	1.00 (0.96, 1.05)
95th-days	0.99 (0.97, 1.01)	0.99 (0.97, 1.02)	0.98 (0.96, 1.01)	1.00 (0.98, 1.02)	1.00 (0.96, 1.03)	1.00 (0.97, 1.03)
95th-2D	0.97 (0.93, 1.01)	0.98 (0.93, 1.04)	0.96 (0.91, 1.01)	1.01 (0.96, 1.06)	0.99 (0.91, 1.07)	1.01 (0.95, 1.08)

Notes: Generalized linear mixed model was used to examine the associations. Model 1: the extreme climate events were defined by the extreme value and duration of the apparent temperature; Model 2: the extreme climate events were defined by the extreme value and duration of the daily maximum temperature and minimum temperature. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3.

Table S11. Associations of extreme climate events with subtypes of preterm birth during 3 and 4 weeks before delivery in the China Labor and Delivery Survey.

Extreme events	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]
3w before delivery	N=4,965	N=1,983	N=2,982
Fifth-days	1.02 (1.01, 1.03)	1.02 (1.00, 1.04)	1.03 (1.01, 1.04)
Fifth-2D	1.04 (1.01, 1.07)	1.03 (0.98, 1.08)	1.06 (1.02, 1.10)
10th-days	1.02 (1.01, 1.03)	1.01 (1.00, 1.03)	1.02 (1.01, 1.04)
10th-3D	1.05 (1.02, 1.09)	1.03 (0.98, 1.09)	1.07 (1.03, 1.12)
10th-2D	1.03 (1.01, 1.05)	1.02 (0.99, 1.06)	1.05 (1.02, 1.08)
90th-days	0.99 (0.98, 1.01)	0.99 (0.97, 1.00)	1.00 (0.98, 1.01)
90th-3D	0.99 (0.96, 1.03)	0.97 (0.92, 1.03)	1.00 (0.96, 1.05)
90th-2D	0.99 (0.97, 1.01)	0.98 (0.95, 1.02)	0.99 (0.96, 1.02)
95th-days	1.00 (0.98, 1.01)	0.99 (0.97, 1.01)	1.00 (0.98, 1.02)
95th-2D	0.99 (0.95, 1.02)	0.99 (0.93, 1.04)	0.98 (0.94, 1.03)
4w before delivery	N=4,965	N=1,983	N=2,982
Fifth-days	1.02 (1.01, 1.03)	1.01 (1.00, 1.03)	1.02 (1.01, 1.03)
Fifth-2D	1.03 (1.01, 1.05)	1.02 (0.98, 1.06)	1.04 (1.02, 1.07)
10th-days	1.01 (1.01, 1.02)	1.01 (1.00, 1.03)	1.02 (1.01, 1.03)
10th-3D	1.04 (1.01, 1.06)	1.02 (0.98, 1.07)	1.05 (1.02, 1.09)
10th-2D	1.03 (1.01, 1.04)	1.02 (0.99, 1.05)	1.03 (1.01, 1.06)
90th-days	1.00 (0.99, 1.01)	0.99 (0.98, 1.01)	1.00 (0.99, 1.01)
90th-3D	1.00 (0.98, 1.03)	0.99 (0.95, 1.03)	1.01 (0.98, 1.05)
90th-2D	1.00 (0.98, 1.02)	0.99 (0.96, 1.02)	1.00 (0.98, 1.02)
95th-days	1.00 (0.99, 1.01)	0.99 (0.98, 1.01)	1.00 (0.99, 1.02)
95th-2D	1.00 (0.97, 1.03)	0.99 (0.95, 1.04)	1.00 (0.96, 1.04)

Notes: Generalized linear mixed model was used to examine the associations. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3. PTB: preterm birth.

Table S12. Associations of extreme temperature with preterm birth risks during cold and warm seasons in the China Labor and Delivery Survey.

Extreme events	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]
1w before delivery			
Cold season	N=2,430	N=946	N=1,484
Fifth-days	1.05 (1.02, 1.08)	1.04 (1.00, 1.09)	1.05 (1.01, 1.09)
Fifth-2D	1.12 (0.99, 1.26)	1.08 (0.89, 1.31)	1.15 (0.99, 1.34)
10th-days	1.04 (1.02, 1.07)	1.04 (1.00, 1.08)	1.04 (1.01, 1.07)
10th-3D	1.06 (1.00, 1.13)	1.05 (0.96, 1.16)	1.08 (1.00, 1.16)
10th-2D	1.09 (1.03, 1.15)	1.09 (1.00, 1.18)	1.10 (1.03, 1.17)
Warm season	N=2,535	N=1,037	N=1,498
90th-days	1.02 (1.00, 1.05)	1.02 (0.99, 1.06)	1.02 (0.99, 1.05)
90th-3D	1.01 (0.96, 1.07)	1.04 (0.95, 1.13)	0.99 (0.92, 1.06)
90th-2D	1.05 (1.00, 1.11)	1.06 (0.97, 1.15)	1.04 (0.97, 1.11)
95th-days	1.02 (0.98, 1.05)	1.01 (0.96, 1.06)	1.01 (0.97, 1.06)
95th-2D	1.07 (0.91, 1.26)	1.12 (0.88, 1.42)	1.02 (0.83, 1.25)
2w before delivery			
Cold season	N=2,430	N=946	N=1,484
Fifth-days	1.02 (1.01, 1.04)	1.02 (0.99, 1.05)	1.03 (1.01, 1.05)
Fifth-2D	1.05 (1.01, 1.09)	1.04 (0.98, 1.10)	1.06 (1.02, 1.11)
10th-days	1.02 (1.01, 1.03)	1.02 (1.00, 1.04)	1.02 (1.00, 1.04)
10th-3D	1.06 (1.02, 1.11)	1.04 (0.97, 1.12)	1.08 (1.02, 1.15)
10th-2D	1.04 (1.01, 1.07)	1.04 (0.99, 1.09)	1.05 (1.01, 1.09)
Warm season	N=2,535	N=1,037	N=1,498
90th-days	1.02 (1.00, 1.03)	1.02 (1.00, 1.04)	1.02 (1.00, 1.03)
90th-3D	1.05 (1.00, 1.11)	1.04 (0.96, 1.12)	1.06 (0.99, 1.12)
90th-2D	1.03 (1.00, 1.07)	1.03 (0.98, 1.08)	1.03 (0.99, 1.07)
95th-days	1.02 (1.00, 1.05)	1.03 (0.99, 1.06)	1.02 (0.99, 1.05)
95th-2D	1.04 (0.99, 1.09)	1.06 (0.99, 1.14)	1.02 (0.96, 1.08)

Notes: Generalized linear mixed model was used to examine the associations. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5,}$ and O_3. PTB: preterm birth.

Table S13. Associations of extreme climate events with preterm birth among subjects without history of preterm birth in the China Labor and Delivery Survey, stratified by early and late preterm birth (N=69,970).

Extreme events	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]
1w before delivery	N=4,771	N=1,894	N=2,877
Fifth-days	1.07 (1.04, 1.10)	1.06 (1.01, 1.11)	1.08 (1.04, 1.12)
Fifth-2D	1.18 (1.04, 1.34)	1.13 (0.93, 1.39)	1.23 (1.05, 1.44)
10th-days	1.06 (1.04, 1.09)	1.05 (1.01, 1.09)	1.08 (1.04, 1.11)
10th-3D	1.10 (1.03, 1.16)	1.05 (0.95, 1.16)	1.13 (1.05, 1.22)
10th-2D	1.12 (1.06, 1.19)	1.08 (0.99, 1.19)	1.16 (1.08, 1.25)
90th-days	0.96 (0.93, 0.98)	0.95 (0.91, 0.99)	0.96 (0.93, 0.99)
90th-3D	0.91 (0.86, 0.96)	0.92 (0.84, 1.00)	0.89 (0.83, 0.97)
90th-2D	0.96 (0.90, 1.02)	0.96 (0.88, 1.05)	0.95 (0.88, 1.02)
95th-days	0.97 (0.94, 1.01)	0.97 (0.93, 1.02)	0.97 (0.93, 1.02)
95th-2D	1.09 (1.02, 1.16)	1.08 (0.98, 1.19)	1.10 (1.01, 1.19)
2w before delivery	N=4,771	N=1,894	N=2,877
Fifth-days	1.03 (1.02, 1.05)	1.03 (1.00, 1.05)	1.04 (1.02, 1.06)
Fifth-2D	1.07 (1.03, 1.11)	1.05 (0.99, 1.11)	1.09 (1.04, 1.14)
10th-days	1.03 (1.02, 1.04)	1.02 (1.00, 1.05)	1.04 (1.02, 1.06)
10th-3D	1.09 (1.04, 1.15)	1.05 (0.97, 1.13)	1.13 (1.06, 1.20)
10th-2D	1.06 (1.03, 1.09)	1.04 (0.99, 1.09)	1.08 (1.04, 1.12)
90th-days	0.99 (0.97, 1.00)	0.98 (0.95, 1.00)	0.99 (0.97, 1.01)
90th-3D	0.97 (0.93, 1.03)	0.96 (0.89, 1.04)	0.98 (0.92, 1.05)
90th-2D	0.98 (0.95, 1.01)	0.97 (0.92, 1.01)	0.98 (0.94, 1.02)
95th-days	0.99 (0.97, 1.01)	0.99 (0.96, 1.02)	0.99 (0.96, 1.02)
95th-2D	0.98 (0.93, 1.03)	1.00 (0.93, 1.07)	0.96 (0.90, 1.02)

Notes: Generalized linear mixed model was used to examine the associations. PTB: preterm birth. Early PTB: gestational week 24-34 weeks and late PTBs: 35-36 weeks. Subjects who reported any of PTB history were excluded. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3.

Table S14. Associations of extreme climate events with preterm birth among subjects without severe maternal disease in the China Labor and Delivery Survey, stratified by early and late preterm birth (N=69,883).

Extreme events	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]
1w before delivery	N=4,931	N=1,972	N=2,959
Fifth-days	1.07 (1.03, 1.10)	1.05 (1.00, 1.10)	1.08 (1.04, 1.13)
Fifth-2D	1.17 (1.04, 1.33)	1.08 (0.89, 1.32)	1.26 (1.07, 1.47)
10th-days	1.06 (1.03, 1.09)	1.04 (1.00, 1.08)	1.08 (1.05, 1.12)
10th-3D	1.09 (1.03, 1.16)	1.03 (0.94, 1.14)	1.14 (1.06, 1.23)
10th-2D	1.12 (1.06, 1.18)	1.06 (0.97, 1.16)	1.17 (1.09, 1.26)
90th-days	0.97 (0.94, 0.99)	0.96 (0.93, 1.00)	0.96 (0.93, 1.00)
90th-3D	0.92 (0.87, 0.98)	0.95 (0.87, 1.03)	0.90 (0.83, 0.97)
90th-2D	0.97 (0.92, 1.03)	0.99 (0.91, 1.08)	0.95 (0.88, 1.03)
95th-days	0.98 (0.95, 1.02)	0.99 (0.94, 1.04)	0.98 (0.93, 1.02)
95th-2D	1.08 (1.02, 1.15)	1.07 (0.97, 1.17)	1.10 (1.02, 1.19)
2w before delivery	N=4,931	N=1,972	N=2,959
Fifth-days	1.03 (1.01, 1.05)	1.02 (0.99, 1.05)	1.04 (1.02, 1.07)
Fifth-2D	1.07 (1.03, 1.11)	1.04 (0.98, 1.10)	1.10 (1.05, 1.15)
10th-days	1.03 (1.01, 1.04)	1.02 (0.99, 1.04)	1.04 (1.02, 1.06)
10th-3D	1.08 (1.03, 1.14)	1.03 (0.95, 1.11)	1.14 (1.07, 1.21)
10th-2D	1.05 (1.02, 1.08)	1.02 (0.97, 1.07)	1.08 (1.04, 1.12)
90th-days	0.99 (0.98, 1.01)	0.98 (0.96, 1.01)	0.99 (0.97, 1.01)
90th-3D	0.99 (0.94, 1.04)	0.97 (0.89, 1.05)	0.99 (0.93, 1.06)
90th-2D	0.99 (0.95, 1.02)	0.98 (0.93, 1.03)	0.99 (0.95, 1.03)
95th-days	1.00 (0.98, 1.02)	1.00 (0.97, 1.03)	0.99 (0.97, 1.02)
95th-2D	0.99 (0.94, 1.03)	1.01 (0.94, 1.08)	0.97 (0.91, 1.03)

Notes: Generalized linear mixed model was used to examine the associations. Early PTB: gestational week 24-34 weeks and late PTBs: 35-36 weeks. Subjects with the severe maternal disease, including ether of diabetes, hypertensive disorders, nephropathy, and toxemia, were excluded. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3. PTB: preterm birth.

Table S15. Associations of extreme climate events with preterm birth in the China Labor and Delivery Survey, additionally adjusting for background temperature exposure (N=70,818).

Extreme climate events	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]	Spontaneous PTB [OR (95% CI)]	PPROM [OR (95% CI)]	Iatrogenic PTB [OR (95% CI)]
1w before delivery	N=4,965	N=1,983	N=2,982	N=2,454	N=1,358	N=1,153
Fifth-days	1.07 (1.04, 1.10)	1.05 (1.00, 1.10)	1.09 (1.05, 1.13)	1.07 (1.03, 1.12)	1.10 (1.04, 1.16)	1.02 (0.95, 1.08)
Fifth-2D	1.18 (1.05, 1.34)	1.10 (0.90, 1.34)	1.26 (1.08, 1.47)	1.14 (0.95, 1.35)	1.40 (1.12, 1.75)	1.04 (0.80, 1.37)
10th-days	1.06 (1.04, 1.09)	1.04 (1.00, 1.08)	1.08 (1.05, 1.12)	1.07 (1.03, 1.10)	1.10 (1.05, 1.15)	1.02 (0.96, 1.07)
10th-3D	1.09 (1.03, 1.16)	1.04 (0.94, 1.14)	1.13 (1.05, 1.22)	1.15 (1.06, 1.24)	1.10 (0.98, 1.23)	0.94 (0.82, 1.08)
10th-2D	1.12 (1.06, 1.19)	1.07 (0.98, 1.16)	1.17 (1.09, 1.26)	1.13 (1.05, 1.22)	1.16 (1.05, 1.29)	1.05 (0.94, 1.19)
90th-days	0.97 (0.94, 0.99)	0.96 (0.93, 1.00)	0.96 (0.93, 0.99)	0.99 (0.95, 1.02)	0.92 (0.87, 0.96)	0.97 (0.92, 1.02)
90th-3D	0.92 (0.87, 0.98)	0.95 (0.87, 1.03)	0.89 (0.83, 0.96)	0.94 (0.86, 1.01)	0.86 (0.77, 0.96)	0.95 (0.85, 1.07)
90th-2D	0.97 (0.92, 1.03)	0.99 (0.91, 1.08)	0.95 (0.88, 1.02)	1.00 (0.92, 1.08)	0.90 (0.81, 1.01)	0.99 (0.88, 1.11)
95th-days	0.98 (0.95, 1.02)	0.99 (0.94, 1.04)	0.97 (0.93, 1.02)	0.99 (0.95, 1.04)	0.97 (0.91, 1.03)	0.97 (0.90, 1.04)
95th-2D	1.08 (1.02, 1.15)	1.08 (0.98, 1.18)	1.09 (1.01, 1.18)	1.16 (1.06, 1.26)	1.07 (0.95, 1.20)	0.95 (0.83, 1.08)
2w before delivery	N=4,965	N=1,983	N=2,982	N=2,454	N=1,358	N=1,153
Fifth-days	1.03 (1.01, 1.05)	1.02 (0.99, 1.05)	1.04 (1.02, 1.07)	1.04 (1.01, 1.06)	1.05 (1.02, 1.08)	1.00 (0.97, 1.04)
Fifth-2D	1.07 (1.03, 1.11)	1.04 (0.98, 1.10)	1.10 (1.05, 1.15)	1.08 (1.02, 1.13)	1.09 (1.02, 1.17)	1.02 (0.94, 1.11)
10th-days	1.03 (1.01, 1.04)	1.02 (0.99, 1.04)	1.04 (1.02, 1.06)	1.03 (1.01, 1.05)	1.05 (1.02, 1.08)	1.00 (0.97, 1.03)
10th-3D	1.08 (1.03, 1.14)	1.03 (0.95, 1.11)	1.13 (1.07, 1.20)	1.09 (1.02, 1.16)	1.17 (1.07, 1.28)	0.99 (0.89, 1.10)
10th-2D	1.05 (1.02, 1.09)	1.03 (0.98, 1.08)	1.08 (1.04, 1.12)	1.06 (1.02, 1.10)	1.09 (1.03, 1.15)	1.01 (0.95, 1.08)
90th-days	0.99 (0.97, 1.01)	0.98 (0.96, 1.01)	0.99 (0.97, 1.01)	1.00 (0.98, 1.02)	0.96 (0.93, 0.98)	1.00 (0.96, 1.03)
90th-3D	0.98 (0.94, 1.04)	0.97 (0.90, 1.05)	0.99 (0.92, 1.05)	1.02 (0.95, 1.09)	0.88 (0.80, 0.98)	1.02 (0.92, 1.13)
90th-2D	0.98 (0.95, 1.02)	0.98 (0.93, 1.03)	0.98 (0.94, 1.02)	1.00 (0.96, 1.05)	0.93 (0.87, 0.99)	0.99 (0.93, 1.06)
95th-days	1.00 (0.97, 1.02)	1.00 (0.97, 1.03)	0.99 (0.96, 1.02)	1.01 (0.98, 1.04)	0.97 (0.93, 1.01)	0.99 (0.95, 1.03)
95th-2D	0.99 (0.94, 1.03)	1.01 (0.94, 1.08)	0.96 (0.90, 1.02)	1.02 (0.96, 1.09)	0.94 (0.86, 1.03)	0.95 (0.87, 1.05)

Notes: Generalized linear mixed model was used to examine the associations. Background temperature was calculated from the averaged ambient temperature during each exposure window. PTB: preterm birth. PPROM: preterm premature rupture of the fetal membranes. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, O_3, and background temperature of each studied period.

Table S16. Associations of extreme climate events with preterm birth based on data with multiple imputation in the China Labor and Delivery Survey (N=70,818).

Extreme climate events	Overall PTB [OR (95% CI)]	Early PTB [OR (95% CI)]	Late PTB [OR (95% CI)]
1w before delivery	N=4,965	N=1,983	N=2,982
Fifth-days	1.06 (1.03, 1.10)	1.04 (1.00, 1.10)	1.08 (1.04, 1.13)
Fifth-2D	1.17 (1.04, 1.33)	1.09 (0.90, 1.33)	1.26 (1.08, 1.48)
10th-days	1.06 (1.03, 1.09)	1.04 (1.00, 1.08)	1.08 (1.05, 1.12)
10th-3D	1.09 (1.02, 1.15)	1.03 (0.94, 1.13)	1.13 (1.05, 1.22)
10th-2D	1.12 (1.06, 1.18)	1.06 (0.98, 1.16)	1.17 (1.09, 1.25)
90th-days	0.97 (0.94, 0.99)	0.96 (0.92, 1.00)	0.96 (0.93, 0.99)
90th-3D	0.92 (0.87, 0.98)	0.94 (0.86, 1.02)	0.90 (0.83, 0.97)
90th-2D	0.97 (0.91, 1.02)	0.98 (0.90, 1.07)	0.95 (0.88, 1.03)
95th-days	0.98 (0.95, 1.01)	0.98 (0.93, 1.03)	0.97 (0.93, 1.02)
95th-2D	1.08 (1.02, 1.15)	1.07 (0.97, 1.18)	1.09 (1.01, 1.18)
2w before delivery	N=4,965	N=1,983	N=2,982
Fifth-days	1.03 (1.01, 1.05)	1.02 (0.99, 1.04)	1.04 (1.02, 1.06)
Fifth-2D	1.06 (1.02, 1.10)	1.03 (0.97, 1.09)	1.09 (1.04, 1.14)
10th-days	1.03 (1.01, 1.04)	1.01 (0.99, 1.04)	1.04 (1.02, 1.06)
10th-3D	1.08 (1.03, 1.13)	1.02 (0.95, 1.10)	1.13 (1.06, 1.20)
10th-2D	1.05 (1.02, 1.08)	1.02 (0.97, 1.07)	1.08 (1.04, 1.12)
90th-days	0.99 (0.97, 1.00)	0.98 (0.96, 1.01)	0.99 (0.97, 1.01)
90th-3D	0.98 (0.93, 1.03)	0.96 (0.89, 1.04)	0.99 (0.93, 1.06)
90th-2D	0.98 (0.95, 1.01)	0.97 (0.92, 1.02)	0.98 (0.94, 1.03)
95th-days	0.99 (0.97, 1.01)	0.99 (0.96, 1.02)	0.99 (0.97, 1.02)
95th-2D	0.98 (0.94, 1.03)	1.00 (0.94, 1.07)	0.97 (0.91, 1.03)

Notes: Generalized linear mixed model was used for each dataset to examine the associations. PTB: preterm birth. All model was adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3.
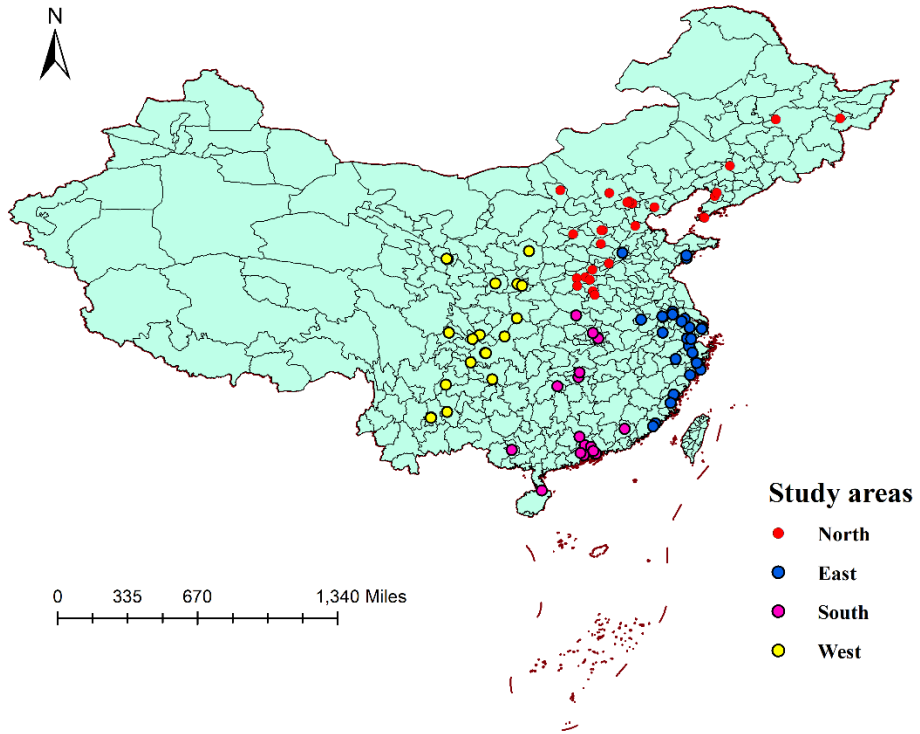
Fig S1. The geographical location of study areas in China.
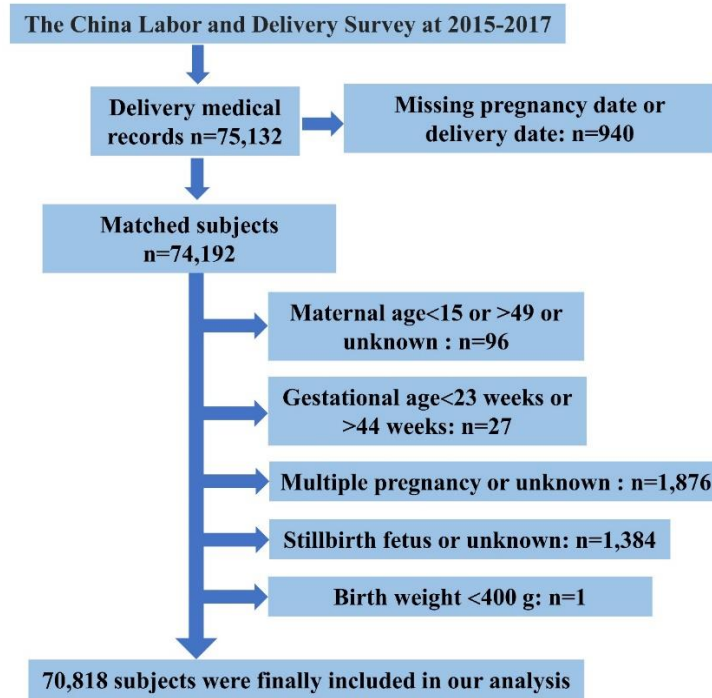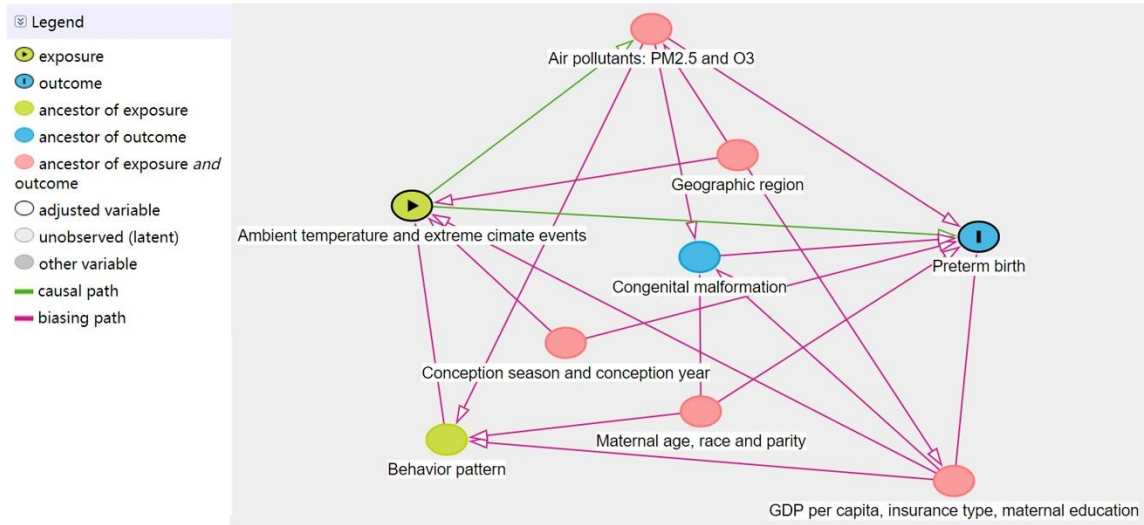
Fig S2. Flowchart for population selection.

Fig S3. Directed acyclic graph for covariate selection.

Notes: We developed the DAG according to published literature and expert knowledge. The nodes and arrows represent variables and the causal associations between them, respectively. The associations among the possible variables, exposure, and outcome derived from the literature (Basu et al. 2016; Bekkar et al. 2020; He et al. 2016; Ilango et al. 2020; Spolter et al. 2020; Sun et al. 2019; Q Wang et al. 2020; YY Wang et al. 2020). DAG was performed in DAGitty, which is available for online use, and package "dagitty" in R software (Textor et al. 2016). Child sex was not shown in DAG due to its unclear role but was considered a covariate in this study as moste previous studies did.
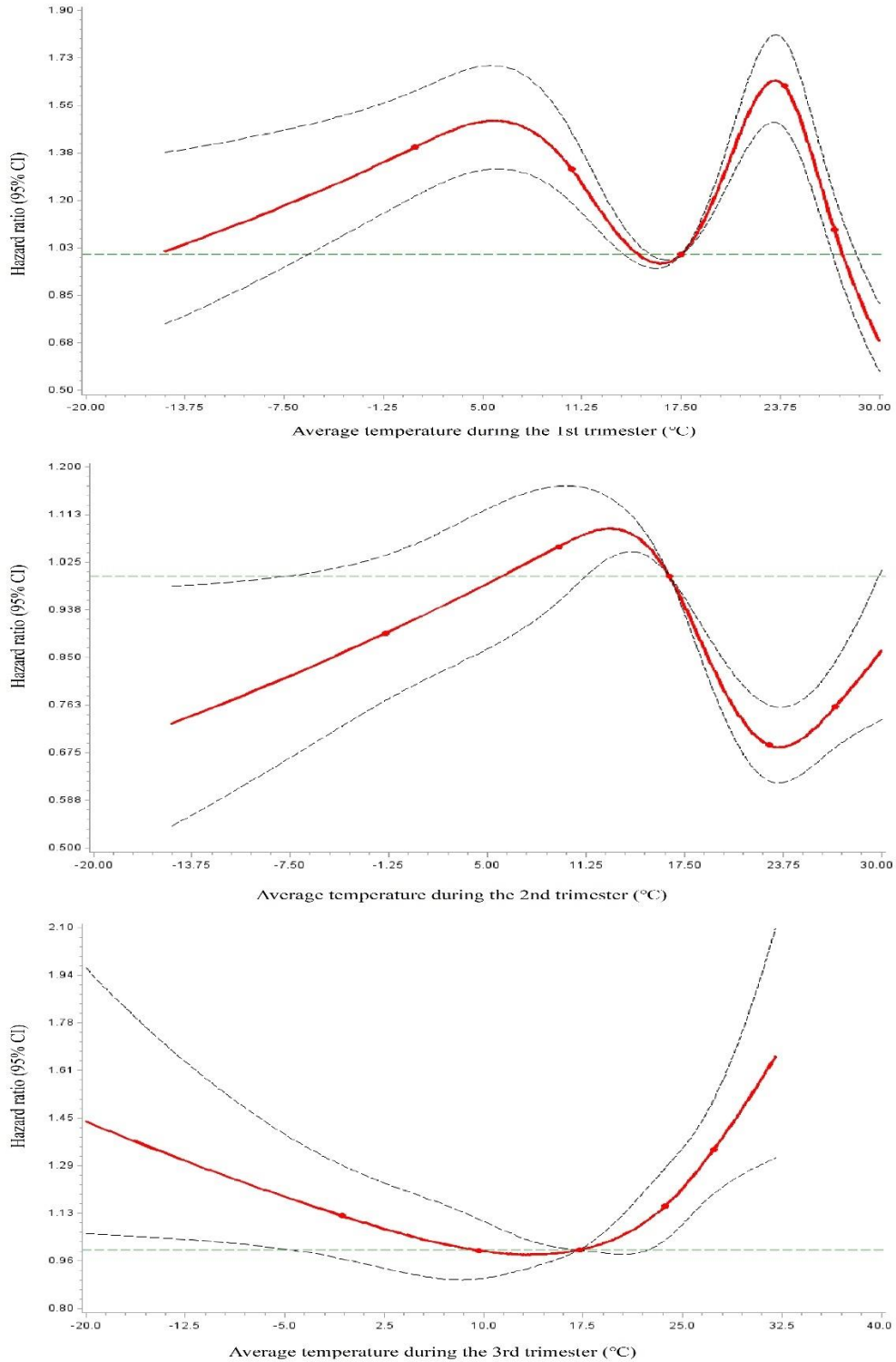
Fig S4. Relationships between the average temperature exposed during different trimesters and the preterm birth risk in the China Labor and Delivery Survey (N=70,818) (See Tables S9 for corresponding numeric data).

Notes: Cox proportional hazard regression incorporated with penalized cubic spline was used to examine exposure-response associations. All models were adjusted for maternal age, maternal ethnicity, maternal education, insurance type, child sex, parity, GDP per capita, geographic region, conception season, conception year, $PM_{2.5}$, and O_3.

References

Basu R, Sarovar V, Malig BJ. 2016. Association between high ambient temperature and risk of stillbirth in california. American journal of epidemiology 183:894-901.

Bekkar B, Pacheco S, Basu R, DeNicola N. 2020. Association of air pollution and heat exposure with preterm birth, low birth weight, and stillbirth in the us: A systematic review. JAMA network open 3:e208243.

He JR, Liu Y, Xia XY, Ma WJ, Lin HL, Kan HD, et al. 2016. Ambient temperature and the risk of preterm birth in guangzhou, china (2001-2011). Environ Health Perspect 124:1100-1106.

Ilango SD, Weaver M, Sheridan P, Schwarz L, Clemesha RES, Bruckner T, et al. 2020. Extreme heat episodes and risk of preterm birth in california, 2005-2013. Environment international 137:105541.

Sun S, Weinberger KR, Spangler KR, Eliot MN, Braun JM, Wellenius GA. 2019. Ambient temperature and preterm birth: A retrospective study of 32 million us singleton births. Environment international 126:7-13.

Wang Q, Li B, Benmarhnia T, Hajat S, Ren M, Liu T, et al. 2020. Independent and combined effects of heatwaves and pm2.5 on preterm birth in guangzhou, china: A survival analysis. Environ Health Perspect 128:17006.

Wang YY, Li Q, Guo Y, Zhou H, Wang QM, Shen HP, et al. 2020. Ambient temperature and the risk of preterm birth: A national birth cohort study in the mainland china. Environment international 142:105851.

Textor J, van der Zander B, Gilthorpe MS, Liskiewicz M, Ellison GT. 2016. Robust causal inference using directed acyclic graphs: The r package 'dagitty'. International journal of epidemiology 45:1887-1894.