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A systematic review and meta-analysis of heat exposure impacts on maternal, fetal and neonatal health

In the format provided by the authors and unedited

Supplemental table S1: Summary of findings

	Main Author (Year)	Location	Sample Size	Main Study Outcome and Effect Estimate
Maternal				
Antenatal bleeding				
1.	Bider (1991)	Tel Aviv region, Israel	N=349 hospitalisations due to vaginal bleeding	No monthly/seasonal pattern observed with antepartum haemorrhage
2.	Cil (2017)	3000 counties across USA	N=570 000	HW (temperature and relative humidity > threshold). Association between exposure ≥1 HW in a trimester (or 3 months before conception) and any clinically significant uterine bleeding. 1st trimester 0.837 additional cases/1000 births (SE=0.367; p<0.05)
3.	He (2018)	Quebec, Canada	N=17 172. N preterm=5 294. N term=11 878	Weekly Tmax ≥30°C compared to 15°C associated with term abruption OR=1.12 (95%CI=1.02, 1.24). No association with preterm abruption.
4.	Rammah (2019)	Harris county, Texas, USA	N=87 placental abruptions	OR=1.93 (95%CI=1.15, 3.23) per 10°F increase in apparent temperature at lag1d. Lag1_6d NS, but in direction of effect.
5.	Qu (2021)	New York State, USA	N= 1 934 918. N=835 465 emergency department visit for antepartum haemorrhage	EHE (>90th centile) by month in transition season and summer. Lag0d. Antepartum haemorrhage, abruption placentae and placenta previa May visit OR=1.15 (95%CI=0.99, 1.33), admission OR=1.18 (95%CI=0.98, 1.42)
Caesarean section				
6.	Molina (2017)	Andean region, Bolivia, Colombia and Peru	N=86 021	Outcome is change in absolute percent with 1 SD above historical Tmean in location for entire pregnancy. C-section increase 0.7% NS
Cardiovascular event				
7.	Ha (2017)	12 sites in USA	N=228 438. N=680 cardiovascular events	In warm season, OR=1.07 (95%CI=1.03, 1.12) of cardiovascular event per 1°C increase in Tmean during week before childbirth. Highest lag0d OR=1.11 (95%CI=1.06, 1.15) per 1°C increase in temperature
Gestational diabetes mellitus				
8.	Katsarou (2016)	Skane, Sweden	N=11 538. N=487 GDM cases	2-h glucose level increased 0.009 mmol/L per 1°C increase in monthly Tmean (p<0.001)
9.	Booth (2017)	Toronto, Canada	N=555 911. N=35 879 GDM cases	Prevalence of GDM at Tmean ≤-10°C in 30d before test=4.6% (95%CI=3.5%, 5.3%) vs prevalence at ≥24°C=7.7% (95%CI=7.2%, 8.2%). OR of positive test=1.06 (95%CI=1.05, 1.07) per 10°C increase in Tmean in past 30d.
10.	Retnakaran (2018)	Toronto, Canada	N=1464. N=318 GDM cases	Odds of GDM higher for increased temperature change in preceding 7, 14, 21 and 28d (only in Feb-July): preceding 7d OR=1.16 (95%CI=1.04, 1.29; P<0.01); preceding 14d OR=1.20 (95%CI=1.05, 1.37; P<0.01); preceding 21d OR=1.16 (95%CI=1.01, 1.33; P<0.05); preceding 28d OR=1.20 (95%CI=1.03, 1.39; P<0.05)
11.	Shen (2019)	Newcastle, Brisbane, Australia	N=2120	Monthly Tmean at time of OGTT. Lower levels at higher temperature of fasting plasma glucose r=-0.145 (95%CI=-0.187, -0.103; P<0.001) and glycated haemoglobin A1c r=-0.069 (-0.113, -0.025; P=0.002). At higher temperatures increased 1-h plasma glucose r=0.079 (95%CI=0.036, 0.120; P<0.001); 2-h plasma glucose r=0.093 (95%CI=0.051, 0.135; P<0.001). Monthly Tmean at birth. Lower levels at high temperature: umbilical cord C-peptide r=-0.153 (95%CI=-0.199, -0.107; P<0.001) and umbilical cord glucose r=-0.126 (95%CI=-0.172, -0.079; P<0.001)
12.	Molina-Vega (2020)	Malaga, Spain	N=2374. N=473 GDM cases	Higher odds of GDM with higher Tmean on day of OGTT OR=1.049 (95%CI=1.028, 1.070; P<0.05), preceding 14d OR=1.024 (95%CI=1.005, 1.044; P<0.05), preceding 28d OR=1.048 (95%CI=1.027, 1.069; P<0.05). Higher temperature change in 14 and 28d before OGTT test associated with GDM
13.	Su (2020)	Taiwan	N=371 131	Odds of GDM higher per 1°C increase in daily Tmean overall OR=1.04 (95%CI=1.04, 1.04), daily Tmean 14-27°C OR=1.03 (95%CI=1.02, 1.03), and daily Tmean 28-30°C OR=1.54 (95%CI=1.48, 1.60). Reduced odds GDM for each 1°C increase in mean within-day temperature difference OR=0.90 (95%CI=0.87, 0.92)
14.	Zhang (2021)	Guangzhou, China	N=5165. N=604 GDM cases	Odds of GDM diagnosis at 24-28 weeks. Compared with the Tmedian of Tmax (30.4°C): 99th centile (35.5°C), week 21 gestation OR=1.66 (95%CI=1.01,

				2.74), week 22 OR=1.74 (95%CI=1.06, 2.87). 95th and 97th centile similar to 99th. Per 1°C increase in diurnal temperature range: week 21 OR=1.03 (95%CI=1.002, 1.06), week 22 OR=1.04 (95%CI=1.01, 1.08), week 23 OR=1.06 (95%CI=1.02, 1.09), week 24 OR=1.07 (95%CI=1.03, 1.12)
15.	Qu (2021)	New York State, USA	N=1934 918. N admitted=835 465	EHE (>90th centile). Lag0d. Diabetes mellitus visits May OR=1.17 (95%CI=1.01, 1.36). Admissions May OR=1.22 (95%CI=1.08, 1.39)
16.	Teyton (2022)	Southern California, USA	N=395 927	At 97th percentile, bell-shaped curve for Tmax across gestational weeks; negative or null estimated for the first trimester and late second trimester and positive estimates for weeks 13-14. Shape of the 99th temperature percentile similar to 97th percentile, although more pronounced. Odds of GDM increased with Tmax at 99th percentile for week 13, OR=1.36 (95%CI=1.07, 1.75) and week 14, OR=1.36 (95%CI=1.06, 1.72). Odds of GDM increased with Tmax at 97th percentile for Tmax at week 14 OR=1.28 (95%CI=1.11, 1.61).
Hypertensive disorders in pregnancy				
17.	Dieckmann (1938)	Multiple cities, worldwide	N not reported	Significant association between Tmean and eclampsia, r=0.33 ±0.07. Poor exposure data: annual Tmean used for some cities. No significant association between temperature range and eclampsia.
18.	Griswold (1965)	Miami, Florida	22 650 deliveries (40 eclampsia	Positive association between eclampsia and weather. Eclampsia attack rate=3.1 per 1000 during Aug, Sept and Oct, 1.2 per 1000 for other months. Presence of lag60d between beginning of summer and increased attack rate
19.	Ylostalo (1972)	Oulu, Finland	N=1152	Temperature on admission (when >0°C) positively correlated with hypertension in pregnancy, preeclampsia or eclampsia, r=0.855 (p<0.001)
20.	Neutra (1974)	Cali, Colombia	N=621. N=156 eclampsia cases	Eclampsia rates decreases as Tmax increases on day of admissions and 3 days prior to admissions (chi squared test=p<0.05). Rates of eclampsia on the cooler days are 1.6 to 1.9 times greater than on moderate days. Tmin and temperature range not associated with rates of eclampsia.
21.	Agobe (1981)	Lagos, Nigeria	N=80 129. N=821 eclampsia cases	Eclampsia rate (per 1000 hospital deliveries) inversely proportional to temperature, r=-0.51; P<0.001.
22.	Bider (1991)	Tel Aviv region, Israel	N=276 hypertension and toxaemia	Increased rates of preeclampsia in winter.
23.	Neela (1993)	Hyderabad, India	N=34 cases preeclampsia	Higher Tmean for month of childbirth, lower eclampsia. Correlation coefficient=-0.77 (p<0.01), but based on very small numbers (19 vs 15) in monsoon vs dry season, with no significant difference between seasons in pre-eclampsia (941/22216 vs 331/7346) .
24.	Jamelle (1998)	Karachi, Rawalpindi, Peshawar, Quetta, Pakistan	N=18 483. N=395 eclampsia cases	Eclampsia increased with temperature (r=0.74; P<0.01) in Rawlpindi, Punjab. Other provinces NS
25.	Yackerson (2007)	Negev, Israel	N=11 979.N=109 preeclampsia	Increased preeclampsia with increased temperature difference (Tmax-Tmin about 20°C; p=0.003; lag3d)
26.	Tam (2008)	Hong Kong, China	N=15 157. N=245 preeclampsia and eclampsia cases	Significant association between season of conception and rate of preeclampsia (logistic regression Wald Chi-Square=9.2, p=0.03). Conceptions during summer had a higher risk of preeclampsia than those during autumn; OR=1.7 (95%CI=1.2, 2.5). Women who conceived in June had highest risk of developing preeclampsia OR=2.8 (95%CI=1.5-5.2) while women who conceived in October had the lowest.
27.	Imminki (2008)	Cape Town, South Africa	N=1329 N=93 HELLP syndrome. N=157 eclampsia	Decrease in preeclampsia with increase in monthly Tmin in month of childbirth (p<0.001). Baseline Tmin <8.5°C OR=1.0. Tmin 8.5-10.5°C OR=0.90 (95%CI=0.76, 1.068). Tmin 10.5-12.5°C OR=0.96 (95%CI=0.81, 1.14). Tmin 12.5-14.5°C OR=0.90 (95%CI=0.71, 1.12). Tmin 14.5-16.5°C OR=0.62 (95%CI=0.53-0.72)
28.	Metoki (2008)	Sendai City, Miyagi Prefecture, Japan	N=101	Home BP measurement week 20 gestation to 1 month postpartum. 10°C increase in daily Tmin reduced BP by 2.5 mmHg for SBP (95%CI=2.3, 2.6 mmHg) and 2.5 mmHg for DBP (95%CI=2.4, 2.7 mmHg). Similar findings with daily Tmax and Tmean. (Excludes women who developed gestational hypertension)

29.	Algert (2010)	New South Wales, Austrailia	N=424 732. N=34 828 hypertension in pregnancy cases	High temperature month 8 decreased pregnancy hypertension (r=-0.69). High temperature at conception=increased pregnancy hypertension and pre-eclampsia prevalence (data not provided)
30.	Hampel (2011)	Nancy, and Poitiers, France	N=1500	Per 10°C decrease in temperature, 0.5% increase in SBP (95%CI=0.1, 1.0%), corresponds to 0.6 mmHg increase in SBP (95%CI=0.1, 1.1 mmHg)
31.	Melo (2014)	Recide, Brazil	N=26 125. N=5051 hypertensive disorders of pregnancy	Monthly Tmean in month of childbirth negatively correlated with percent of patients with hypertension; r=-0.26; P=0.046
32.	Nasiri (2014)	Mashhad, Khorasan, Razavi province, Iran	N=20 520. N=262 preeclampsia	Monthly Tmean positively associated with preeclampsia prevalence in conception month (p<0.001).
33.	Tran (2015)	Charlottesville, USA	N=63 633. N=526 severe preeclampsia.	Daily Tmax: 1st trimester per 1 SD OR=1.02 (95%CI=1.00, 1.03). Month 1 per 1 SD OR=1.12 (95%CI=1.03, 1.22). Month 1 per 1°C OR=1.03 (95%CI=1.01, 1.04). Month 1 Tmin 1st quartile (≤2.3°C) vs 4th quartile Tmin ≥9.7°C OR=1.04 (95%CI=1.02, 1.07)
34.	Cho (2017)	South Korea	N=2 495 383. N=48 275 preeclamsia cases	No association between monthly temperature and preeclampsia r=0.49 (SE=0.39, p=0.22) [moderate positive association]
35.	Auger (2017)	Quebec, Canada	N=1 890 711. N 65 273 preeclampsia cases	Preeclampsia prevalence highest with Tmean in week 1-4 of pregnancy ≥15.0°C; (95th centile)=3.69% (95%CI=3.63, 3.74); 5.0-14.9°C(95th-50th)=3.58% (95%CI=3.53-3.64); -5-4.9°C (50th-5th)=3.42% (95%CI=3.36-3.48); <-5°C(5th)=3.36% (95%CI=3.31-3.42). Last 4w pregnancy, lower prevalence in 95th centile: ≥15.0°C=3.25% (95%CI=3.21-3.30); 5.0-14.9°C=3.53% (95%CI=3.48-3.58); -5–5°C=3.64% (95%CI=3.58-3.70); <5°C=3.61% (95%CI=3.55-3.67). Maximum OR of 0.98(95% CI=0.88,1.08), when adjusted for season for exposure in first four weeks of pregnancy and pre-eclampsia(visual estimate from graph)
36.	Cil (2017)	3000 counties across USA	N=570 000	HW (temperature and relative humidity>threshold). Exposure ≥1 HW in trimester (or 3m before conception) and additional cases per 1,000 births. Pregnancy-associated hypertension in 2nd trimester increased by 1.04 cases per 1000 births (SE=0.625; p<0.1). 3rd trimester increased 1.47 (SE=0.615; p<0.05). Eclampsia 2nd trimester increased 0.417 (SE=0.212; p<0.05). 3rd trimester increased 0.30 (SE=0.171; p<0.1).
37.	Shashar (2020)	Beersheba, Israel	N=88 476	Positive association between averaged trimester temperature and preeclampsia during warm pregnancies (>50% gestation during spring-summer). RR=2.38 (95%CI=1.50, 3.80) eclampsia with 1 IQR elevation in 1st trimester, RR=2.91 (95%CI=1.98, 4.28) in 2nd trimester and RR=2.91 (95%CI=1.98, 4.28) in 3rd trimester. No association in cold pregnancies.
38.	Xiong (2020)	Chengdu, China	N=2043 182. N=69 263 hypertensive disorder of pregnancy cases	During first 20w pregnancy, moderately hot and very hot temperatures associated with increased odds of preeclampsia OR=1.13 (95%CI=1.07, 1.19) or eclampsia OR=1.16 (95%CI=1.10, 1.22). Gestational hypertension similar trends
39.	Dastoorpoor (2021)	Ahvaz, Khuzestan province, Iran	N=150 766	Temperature 99th vs 75th centile. Preeclampsia at lag0_6d RR=1.15 (95%CI=0.82, 1.62); lag0_21d RR=1.67 (95%CI=0.90, 3.08). Gestational hypertension lag0_6d RR=0.84 (95%CI=0.58, 1.22); lag0_21d RR=0.87 (95%CI=0.45, 1.69)
40.	Bogan (2019)	Gaziant Turkey	N=6410 admissions. N=357 toxaemia cases	No significant association between Tmax increase and toxemia for outpatients OR=1.01 (95%CI=0.99, 1.02) and in-patients OR=0.99 (95%CI=0.97, 1.01)
41.	Qu (2021)	New York State, USA	N=1 934 918. N admitted=835 465	EHE (>90th centile) by month in transition season and summer. Lag0d. Hypertension complication visits Sept OR=1.13 (95%CI=1.02, 1.25)
42.	Kim (2021)	Arizona, New York and Washington, USA	N=2 240 000 mothers	When exposed to temperatures above 3SD, increase in hospitalisations is driven by hypertension (r=0.013, SE0.006, p<0.05).
43.	Khodadi (2022)	Ahvaz, Iran	N=150 766 women. N=4 357 pre-eclampsia cases. N=4030 gestational hypertension cases	Hot thermal stress (UTCI) not associated with cumulative relative risk of preeclampsia and gestational hypertension at lag0d, 0_2d, 0_6d, 0_13d and 0_21d. Preecamplsia at lag0d and lag 0_21d, cumulative relative risk=1.09 (95%CI=0.76, 1.56) and

				1.52 (95%CI=0.76, 3.08). Gestational hypertension at lag0d. cumulative relative risk=0.98 (95%CI=0.66, 1.46) [Highest effect estimate: Pre-eclampsia, high-low analysis, Lag0_13, CRR= 1.385 (0.529–3.629), Gestational Hypertension, high-low analysis, lag0_6, CRR= 1.544 (0.775–3.079)]
44.	Part (2022)	Johannesburg, South Africa	N=7986. N=844 hypertensive disorder of pregnancy	Weekly Tmean exposure of 23°C versus 18°C during weeks 3-5 of pregnancy associated with increased risk of preeclampsia, eclampsia, severe preeclampsia, imminent eclampsia, or HELLP syndrome: week 3 HR=1.76 (95%CI=1.12, 2.78) and week 4 HR=1.79 (95% CI=1.19, 2.71). Women with PEH more likely to deliver at later gestational age if exposed to heatwave (heatwave95: p=0.002 and heatwave99: p <0.001)
Infections				
45.	Busowski (1995)	Tampa, Florida	N births=26 880. N pyelonephritis cases=499	NS correlation between daily Tmean, Tmin or Tmax in month of admission and pyelonephritis rate
46.	Dadvand (2011)	Barcelona, Spain	N=7976. N positive GBS culture=1359.	Temperature in last 4w of pregnancy increased risk of GBS colonisation per degree above Tmean OR=1.014 (95%CI=1.003, 1.025). Increase in GBS colonisation from >15.4°C. Stepwise increase in quartile 3 and 4 temperature vs quartile 1 (<12.0°C). Quartile 3 (15.4-21.8°C), OR=1.18 (95%CI=0.99-1.40; p=0.068). Quartile 4 (>21.8°C) OR=1.21 (95%CI=1.02-1.45, p=0.031)
47.	Minisha (2019)	Doha, Qatar	N=1588. N bacteriuria cases=270 N=143 significant bacteriuria	Bacteriuria versus average monthly temperature r=0.677 (p=0.003). Percentage of samples with bacteriuria in months with temperatures ≥35°C=11.3%(179 cases/1408 non-cases) vs. 3.6%(57 cases/1531 non-cases) when <25°C (p< 0.001). Same patterns with Group B Streptococcus and E. Coli
48.	Qu (2021)	New York State, USA	N=1 934 918. N admitted=835 465.	EHE (>90th centile) by month in transition season and summer. Lagd0. Infectious and parasitic diseases visits May OR=1.29 (95%CI=1.05, 1.58)
Maternal admissions				
49.	Davis (2018)	Charlottesville, USA	N admissions=14 400	HW >35°C for 3d. Admissions for complications of pregnancy, childbirth and the puerperium. Lag0d. Mean difference higher during HW periods 0.4 (95%CI=0.0, 0.8; p=0.034)
50.	Zhao (2019)	1814 cities across Brazil	N=58 400 682 total admissions. N maternal admissions not reported	Maternal admissions (ICD-10 O00-O99) 1-3% higher during HW for all 12 HW definitions. Maximum effect estimate at 97.5th percentile at lag4d lag, approximately 3%(95%Cis=2, 4)
51.	Zhao (2019)[1]	1814 cities across Brazil	N=49 145 997 admissions. N maternal admissions not reported	Percent increase in maternal admissions (ICD-10 O00-O99) at lagd07 per 5°C increase in daily Tmean=2.5% (95%CI=2.4, 2.6). Increase in hospitalisations for early hot season=2.7% (95%CI=2.3, 3.1; P<0.001) and late hot season=2.1% (95%CI=1.6, 2.6; P<0.001). Larger effect on perinatal conditions 8.3% (CI=6.7, 9.9; p< .001) and late hot season 7.7% (CI=6.0,9.4; p<0.001)
52.	Qu (2021)	New York State, USA	N=1 934 918. N admitted=835 465. N maternal admissions not reported.	EHE (>90th centile) by month in transition season and summer. Emergency department visits: lag0d: May OR=1.02 (95%CI=1.00, 1.04). Summer (June-Aug) OR=1.02 (95%CI=1.00, 1.03). Sept OR=1.03 (95%CI=1.00, 1.05). Summer lag significant to day 5. Lag0_3d OR=1.04 (95%CI=1.02, 1.05). Admissions during pregnancy: May lag0d OR=1.06 (95%CI=1.02, 1.09). June-Aug NS (all lags around 1.0). Sept lag0d OR=1.02 (95%CI=0.99, 1.05). HW emergency visits. Duration of HW lag4d >90th centile. Summer OR=1.10 (95%CI=1.05, 1.16). OR size increases with HW duration
53.	Kim (2021)	Arizona, New York and Washington, USA	N=2 240 000 mothers	Additional day between 1 and 2 SD temperature associated with reduction in prenatal hospitalisation r=-0.006 (SE0.002, p<0.05) and for emergency/urgent hospitalisation r=-0.009 (SE0.002, p<0.01). Additional day between 2 and 3SD of temperature, increase in hospitalisation r=0.014 (SE0.005, p<0.05). Exposure to additional day of temperature above 3SD, any prenatal hospitalisation increased r=0.010 (SE0.033, p<0.01) and emergency/urgent hospitalisations increased 0.071 (SE0.024, p<0.01). Exposed to temperatures above 3SD, increase in hospitalisations is driven by hypertension (r=0.013, SE0.006, p<0.05),

				excessive vomiting (r=0.007, SE0.004, p<0.05), and other less common conditions (r=0.042, SE0.013, p<0.10, and r=0.043, SE0.020, p<0.05). Secondary diagnosis of other diseases of urinary system (r=0.027, SE0.013, p<0.05), other diseases of the digestive system (r=0.007, SE0.003, p<0.01) and thrombocytopaenia increased (r=0.004, SE0.002, p<0.10) when exposed to temperature >3SD. In historically cooler counties, hepatisations for emergency/urgent cases increased by 0.111 (SE0.044, p<0.05) in association with one additional day of exposure to above 90°F.
Mental health				
54.	Lin (2017)	Shanghai, China	N=1931	Emotional stress (symptom checklist-90 revised scale, Global Severity Index). U-shape base 20-25°C. Compared to daily mean 20-25°C, ≥95th (31.2-34.1°C) high maternal GSI (highest tercile) at lag1d OR=2.9 (95%CI=1.9, 4.6; P<0.001), and at lag2d OR=2.9 (95%CI=2.1, 4.2; P<0.001). Daily diurnal temperature range also associated. Maternal life event stress during pregnancy (life event scale for pregnant women) NS (figures not reported)
55.	Qu (2021)	New York State, USA	N=1 934 918. N admitted=835 465 for many adverse maternal outcomes	EHE (>90th centile) by month in transition season and summer. Lag0d. Mental illness admission Sept OR=1.29 (95%CI=0.99, 1.67)
Prelabour rupture of membranes				
56.	Yackerson (2008)	Negev desert, Israel	N=11 979. N PPROM=862	Change in temperature (Tmax-Tmin) increased PPROM r=0.9 (SE=0.3; P=0.003). Lag1d
57.	Ha (2018)	12 cities across USA	N=228 438 singletons ≥23 weeks gestation. N PROM=15 381. N PPROM=5032. N term PROM=10 349	In warm season, 5% increase in PPROM per 1°C temperature increase in lag0_7d (95%CI=1.03, 1.06). Associations larger closer to childbirth than day 7. OR in hottest months with lag0d OR=1.08(95% CI=1.07, 1.09). Term PROM similar results
58.	Song (2019)	Xinxiang, North Henan, China	N=29 608. N PPROM=3 255	Threshold of association between PPROM and temperature at >29°C (91th centile),with risk relative to median (17°C) RR= 1.61 (95%CI= 1.01, 2.57). At 99th centile (32°C) vs median (17°C), RR=2.03 (95%CI=1.20, 3.43) lag0_1d. RR=2.16 (95%CI=1.24, 3.76) lag0_2d. RR=2.00 (95%CI=1.12, 3.57) lag0_3d. Effect estimates smaller, and non-significant for longer lags to 0_7d
59.	Gat (2021)	Nege, Southern Israel	N=84 476. N PPROM=986	Increase in Tmean. Jewish NS. Bedouin-Arabs lag0d RR=1.19 (95%CI=1.03, 1.37). Lag1d and lag2d also significant. Lag0_7d per quartile increase RR=1.15 (95%CI=0.10, 1.34; P=0.059). Quartile 3 vs Quartile 1 RR=1.488 (p<0.05). Quartile 4 vs Quartile 1 RR=1.11 (NS). Some CIs not available in article
60.	Yang (2021)	Shanghai, China	N PROM=11 873. N PPROM=3347. N term PROM=8526	Baseline comparison: median temperature. 97.5th Tmean PROM (term PROM + PPROM) at lag6d RR=1.08 (95%CI=1.01, 1.16) to lag8d RR=1.050 (95%CI=1.000, 1.102). 97.5th Tmean term PROM lag5d RR=1.08 (95%CI=1.01, 1.16) to lag7d RR=1.09 (95%CI=1.02, 1.18). 90th Tmean also correlated with term PROM at lag6_7d. RR=1.23 of term PROM for diurnal temperature variation of 17°C (95%CI=1.03, 1.47) at lag0d. PPROM with 12°C diurnal temperature variation RR=1.11 (95%CI=1.03, 1.47)
Foetal and Perinatal				
Composite outcome				
61.	Asamoah (2018)	10 administrative regions of Ghana	N=1136 (N stillbirths=34, N miscarriages=110)	Insignificant increase in odds of stillbirth or miscarriage with each additional increase in mean yearly WBGT across all administrative regions. OR=1.12 (95%CI=0.90, 1.39). Monthly WBGT exposure was not associated with stillbirths or miscarriages OR=1.03 (95%CI=0.84, 1.27). When analysing four selected regions (based on time-homogenous heat exposure), increase in odds of miscarriage or stillbirth with 1°C increase in yearly mean WBGT OR=1.27 (95%CI=0.89, 1.81).
Congenital anomalies				
62.	Tikkanen (1991)	Finland	N cases=573. N controls=1 200	No association between self-reported exposure to workplace temperatures during the first trimester of pregnancy ≥20 °C and risk of cardiac malformation (p >0.05)

63.	Davies (2000)	Mexico City, Mexico	N cases=38. N controls=335	Tmean exposure at week 5. OR=2.0 (95%CI=0.96, 4,15; p=0.04) of a perinatal death with a lethal malformation at a Tmean>18°C versus <18°C
64.	Judge (2004)	New York state, USA	N cases= 502, N controls=1 066	Self-reported exposure to >100 °F (~38 °C) in early pregnancy (2.7% of women). OR of any cardiovascular anomaly=1.13 (95%CI=0.59, 2.19) for >10 hours/week versus never OR=1.27 (95% CI=0.52, 3.13)
65.	Gu (2007)	Japan 11 sites	N=1 586	Highest incidence at Tmean of 5.4℃. Temperature negatively correlated with incidence (-0.89; p< 0.001).
66.	Aminzadeh (2010)	Ahvaz, southwest Iran	N cases abnormal TSH=1 131. N cases=142. N controls=45 802	4% reduction per 1℃ increase in Tmean at childbirth OR=0.96 (95%CI=0.94, 0.98; p<0.001). Lowest incidence in hottest month, highest in coldest. Linear relationship between congenital hypothyroidism and temperature (r=0.87, p<0.001)
67.	Van Zutphen (2012)	New York State, excluding New York City, USA	N cases congenital cataracts= 75. N cases anophthalmia or microphthalmia=34. N controls=59 328	A 5°F (2.8 °C) increase in the daily mean minimum universal apparent temperature (UAT) associated with an increase in congenital cataracts OR=1.51 (95%C =1.14, 1.99). Congenital cataracts also associated with heat waves OR=1.97 (95% CI=1.17, 3.32), number of heat waves OR=1.45 (95%CI=1.04, 2.02), and number of days above 90th centile OR=1.09 (95%CI=1.02, 1.17). Associations between heat and congenital cataracts were positive for weeks 4–7, but not from week 10 onwards. Higher mean minimum UAT associated with reduced anophthalmia or microphthalmia OR=0.71 (95% CI=0.54, 0.94), as was daily mean UAT OR = 0.70 (95% CI=0.53, 0.93) and daily maximum OR=0.70 (95%CI = 0.52, 0.93). No association detected between mean and maximum universal apparent temperature, heat waves, and days >90th centile and nervous system defects. Spina bifida without anencephalous OR=1.12 with daily minimum apparent temperature (95% CI=0.92, 1.35), OR=1.30 with heat wave exposure, (95%CI=0.82, 2.05). Microcephalus and heat waves exposure OR=1.10 (95%CI=0.77, 1.58). No associations detected between mean and maximum universal apparent temperature, heat waves and days >90th centile, cardiovascular defects, musculoskeletal defects, and craniofacial defects. Most point estimates around 1.00. A 5 °F (2.8 °C) increase in mean daily minimum universal apparent temperature (UAT) associated with renal agenesis/hypoplasia OR=1.17 (95% CI=1.00, 1.37). Odds of gastroschisis significantly decreased with heat wave events OR=0.48 (95% CI=0.28, 0.81) and number of heat waves OR=0.63 (95% CI=0.43, 0.92)
68.	Agay-Shay (2013)	Israel, Tel Aviv	N cases=1630 (607 cases with multiple CHDs, 542 with isolated ASDs and 481 with isolated VSDs). N controls=130 402	Whole year period. OR=1.03 (95%CI=1.01; 1.05) for multiple congenital health disorders (CHDs) for exposure to Tmax (per 1 °C increase). Isolated ASD OR=1.02 (95%CI=1.00, 1.04) per 1 °C increase in Tmean. Quartile 3 temperature versus Q1 OR=1.34 (95% CI=1.06, 1.70), Q4 OR=1.27 (95% CI=1.00, 1.61). In the cold season exposure to the Tmean and Tmax (per 1 °C increase) increased risk for multiple CHDs OR=1.05 (95%CI=1.00, 1.10) and OR=1.03 (95%CI=1.01, 1.05). Comparing the highest to lowest quartiles of Tmean, risk for multiple CHDs increased OR=1.41 (95%CI=1.03, 1.94). 1-day increase in the extreme heat events showed increased risk for multiple CHDs OR=1.13 (95% CI=1.06, 1.21) and also for isolated ASDs OR=1.10 (95% CI=1.02, 1.19). A 1-day increase in the extreme heat events based on the previous 90 days increased risk for multiple CHDs OR=1.02 (95%CI=1.00, 1.04). VSD point estimates around 1.0, except per 1 °C increase in daily Tmean OR=1.08 (95% CI=1.00, 1.16)
69.	Kilinc (2016)	Ankara and Istanbul, Turkey	N cases=1709. N controls=4946	More cases occurred in warmer than colder months. Tmax monthly in cases=36.4 ±10.8 vs controls 26.0 ±9.6 (P=0.01) and monthly Tmean, 22.5 ±13.9 in cases vs 18.7 ±11.3 in controls (p= 0.01). Mean monthly ambient temperatures in summer OR=1.32 (95%CI=1.08, 1.52) and maximum monthly ambient temperatures in summer OR=1.22 (95%CI=0.99, 1.54)
70.	Soim (2017)	USA 10 states	N cases=326. N controls=1781	Heat event (2 consecutive days daily apparent temperature max 95th (HE95) or 3 consecutive days at

				90th centile (HE90). No associations between NTDs and HE95 or HE90. HE90 (98°F) versus no HE90 in California OR=0.51 (95%CI=0.28–0.93). Overall population HE90 of 3 days duration versus 0 days OR=0.66 (95% CI=0.45–0.98) and OR=0.33 (95%CI=0.12–0.94) in California.
71.	Auger (2017)	Quebec, Canada	N cases=6482 (N=539 with critical heart defects and N= 5943 noncritical heart defects). N controls=704 209	10 days ≥30 °C higher prevalence versus 0 days, of transposition of great vessels (29.2 vs. 19.2 per 100,000), truncus arteriosus (12.2 vs. 5.5 per 100,000), coarctation of aorta (21.9 vs. 16.5 per 100,000), ASD (413.2 vs. 289.0 per 100,000), defects of the aorta (19.4 vs. 11.9 per 100,000), heterotaxy (14.6 vs. 8.2 per 100,000), and other defects (255.2 vs. 223.0 per 100,000). Single and multiple defects also higher. Higher differences with longer exposure, especially with ASD, 15 days ≥30 °C (PR = 1.37, 95% CI = 1.10, 1.70). ASD associations highest in weeks 2 and 8. PR highest week 7, e.g., 32 °C associated with 1.13 times (95% CI: 1.01, 1.26) risk relative to 20°C. Maximum temperatures of 32 °C associated with multiple defects week 8 (PR = 1.31, 95% CI = 1.04, 1.65) compared with 20 °C.
72.	Auger (2017)	Quebec, Canada	N cases=297. N controls= 887 710	Overall neural tube defects no pattern with weekly Tmax during week 3 or 4 post-conception. Prevalence of spina bifida higher for weekly Tmax ≥30°C during week, 4 29.5 per 100,000 (95%CI=21.3, 37.8) vs 25.0 per 100,000 at 20-24.9°C (95%CI=18.2-31.7); CIs wide. No pattern with anencephalus or encephalocoele. Compared to 20°C, daily Tmax 30°C, OR=1.56 of any neural tube defect on day 5 (95%CI=1.04, 2.35) and OR=1.49 on day 6 (95%CI=1.00, 2.21) of week 4. Spina bifida and anencephalus or encephalocoele weak associations at end of critical exposure window. Associations with neural tube defects with higher temperatures towards end of week 4
73.	Soim (2018)	USA 8 states	N cases=907. N controls=2206	HE95: ≥2 consecutive days with apparent Tmax >95th centile. HE90: ≥3 consecutive days apparent Tmax >90th centile. For Southern regions, no association between heat wave exposure OR=0.87 (95%CI=0.58, 1.29), frequency OR=0.92 (95%CI=0.61, 1.39) and duration of exposure OR=1.02 (95%CI=0.52, 1.98) for EHE90 or EHE95. For Southeast region, significant association for EHE95 for 3 day versus 0 days OR=1.89 (95%CI=1.11, 3.23) and 4 days versus 0 days for EHE 90 OR=1.70 (95%CI=1.02, 2.81). For Northeast, no significant association for heatwave OR=1.52 (95%CI=0.73, 3.20), frequency and duration. For Southwest no significant association for heatwave, frequency or duration, highest effect estimate OR=0.67 (95%CI=0.17, 2.61). For West, no significant associations found for heatwave exposure, frequency and duration, OR=1.53 (95%CI=0.69, 3.40) for EHE 90 for 3 days vs 0 days. For Upper Midwest, significant protective effect for 2 EHEs vs 0 OR=0.49 (95%CI=0.28, 0.86) and EHE90 3 days vs 0 OR=0.42 (95%CI=0.22, 0.82). For all regions, overall, no significant associations were found, point estimates range from estimates ranged from 0.78 to 1.11
74.	Lin (2018)	USA 8 states	N cases=5848 congenital heart defects. N controls=5742.	Study examines ≥2d with daily Tmax>95th centile (EHE95). ≥3d with Tmax >90th centile (EHE90). Duration of EHE90 or EHE95, total days and consecutive days. Most associations null with overall defects. All point estimates >1.0. VSD and ASD defects NS. Almost all estimates >1.0, higher in summer. VSD summer EHE95 OR=1.18 (95%CI=0.81, 1.72). VSD spring EHE95 OR=1.06 (95%CI=0.41, 2.74). ASD summer EHE95 OR=1.32 (95%CI=0.88, 1.99). ASD spring EHE95 OR=1.15 (95%CI=0.33, 4.04). VSD EHE 90 3-5d OR 2.17-2.57. All p<0.05 in summer. OR point estimates generally increased with additional duration of exposure. Higher effect sizes in some regions, e.g. OR=2.28 for EHE95 in spring in New York for VSD and 1.87 (95%CI=1.11, 3.16) for ASD and EHE95. EHE95 total days and left ventricular outflow tract obstruction in Utah OR=1.53 (95%CI=1.00, 2.35) and septal defects in Iowa OR=1.71 (95%CI=1.09, 2.69). EHE5 duration

				and conotruncal defects in Utah OR=1.34 (95%CI=1.00, 1.81), septal defects in New York OR=1.30 (95%CI=1.05, 1.62). Association between temperature and VSD increased with magnitude and duration of high temperature exposure
75.	Xu (2023)	11 Cities in Eastern China (Huzhou, Hangzhou, Jiaxing, Shaoxing, Ningbo, Taizhou, Wenzhou, Jinhua, Quzhou, Lishui, Zhoushan)	N= 983 523 births. N= 5904 infants with CHD	Increased risk of congenital heart defect with increasing temperature exposure during gestational periods 8-14 weeks and 20-26 weeks, with graph additionally showing significance at approx. 28-32 weeks. Maximum OR per 1°C increase at 24th week, of 1.85 (95% CI=1.335, 2.840). No other RR reported for other lag periods. CRR maximum at highest temperature of 3.78 (95%CI=1.46, 10.72)
76.	Zhang (2023)	United States (National)	N total=2 352 529. N anomalies=29 188 (incidence of 12.4 per 1000 births)	Moderate heat (85th percentile) and extreme heat (95th percentile) associated with increased risk of congenital anomalies, further strengthened when adjusted for PM2.5 in some instances. Total anomalies: Moderate heat- OR=1.06 (95% CI=1.02, 1.11) adjusted OR 1.25, 95% CI: 1.18, 1.32) Extreme heat- only significant with adjusted OR=1.05 (95% CI: 1.00, 1.11), to calculate, adjusted-OR=1.29 (95% CI=1.21, 1.38)
Non-reassuring foetal status				
77.	Bonell (2022)	West Kiang, The Gambia	N=40. N=17 adverse pregnancy outcomes	Foetal heart rate linear association with heat stress; 10.7 increase (95%CI=7.5, 13.8) beats/min for each 10°C UTCI increase and 13.4 (95%CI=9.5, 17.2) beats/min for each 10°C WBGT increase. Change in umbilical artery resistance index (RI) from cool baseline to working conditions reduced with increasing heat stress exposure up to 32°C UTCI/30°C WBGT, then increases with increased heat stress. U-shaped association with WBGT, base at 30°C. No statistical difference between RI and heat stress in those with and without adverse pregnancy outcomes
78.	Bonell (2022)	West Kiang, The Gambia	N=92	Increased fetal heart rate associated with UTCI OR=1.45 (95%CI=1.26, 1.64; p<0.0001) and WBGT OR=2.07 (95%CI=1.69, 2.46; p<0.0001). Each 1°C increase in UTCI associated with fetal strain OR=1.17 (95%CI 1.09, 1.29; p<0.0001) and adjusted OR of 1.12 (1.03, 1.21, p=0.010). For each 1°C increase in WBGT, increased fetal strain OR 1.21 (95%CI=1.12, 1.32, p<0.0001), adjusted OR=1.08 (95%CI=0.97, 1.21, p=0.137).
79.	Yuzen (2023)	Hamburg, Germany	N=386	Peripheral resistance of uterine artery decreased in pregnancies exposed to 4 consecutive days of exposure exceeding the 90th percentile, p=0.038.
80.	Shankar (2023)	Thatta, Pakistan	N=459	Association between Tmax in first trimester and reduced gestational age appropriate z-score for length β=-0.04 (95%CI=-0.06, -0.01; p<0.001) and head circumference β=-0.03 (95%CI=-0.05, -0.01; p<0.05). For each 5°C increase in Tmax in first trimester, length and height gestational age appropriate z-score decreased by 0.19 and 0.14 respectively. Association between Tmax in third trimester and gestation age appropriate length β=0.03 (95%CI=0.01, 0.05; p<0.05). Heat index exposure in first and second trimester negatively associated with adjusted length and height β=-0.02 (95%CI=-0.04, -0.01; p=0.001), β=-0.02 (95%CI= -0.03, -0.01; p=0.008) for length and β=-0.02 (95%CI= -0.04, -0.01; p=0.007) and β=-0.02 (95%CI= -0.03, -0.00; p=0.018) for head circumference. Severe heat exposure (>20 days when temperature >39°C) in first trimester associated with decreased gestational age adjusted length and head circumference.
81.	Leung (2023)	Boston, USA	N=9446	5°C increase cumulative temperature exposure associated with head circumference, difference in mean z score at 16-32 weeks gestation -0.17 (95%CI=-0.27, -0.08) and 24-31 weeks gestation -0.31 (95%CI=-0.50, -0.12). Mean z score for biparietal diameter decreased for every 5°C increase cumulative temperature exposure during 16-23 weeks -0.23 (95%CI=-0.33, -0.13) and 24-31 weeks -0.21 (95%CI=-0.40, -0.03). Femur length associated with temperature during weeks 16-23, reduction in z score -0.16 (95%CI=-0.27, -0.06). Abdominal circumference reduction in z-score with 5°C increase cumulative

				temperature exposure during 16-23 weeks -0.14 (95%CI=-0.25, -0.030), 24-31 weeks -0.26 (95% CI=-0.44, -0.07) and weeks 32-40 -0.26 (95%CI=-0.48, -0.040)
Oligohydramnios				
82.	Sciscione (1997)	Baltimore, USA	N=42	Negative correlation between Tmean and amniotic fluid index (measured using ultrasound). At lag2d **r=0.25 (p=0.003),** lag3d r=0.28 (p=0.002) and lag4d r=0.31, p=0.001.
83.	Luton (2004)	Paris, France	N total=131. N cases=11	Proportion of cases with oligohydramnios higher in 2003 than 2002 7/40 (17.5%) vs. 4/91 (4.4%) p=0.03
Perinatal death				
84.	Basagana (2011)	Catalonia region, Spain	N deaths=1480	Lag0d. Perinatal deaths >95th centile vs ≤95th RR=1.53 (95%CI=1.16, 2.02). Female greater risks than males
85.	Schumann (2019)	Northern Sweden	N=28 239. N Sami population=14 045. N non-Sami=14,194. N perinatal mortality Sami=645. N perinatal mortality non-Sami=601.	Summer, non-Sami >90th centile in month of birth vs <10th centile. Odds of perinatal mortality OR=0.20 (95%CI=0.05, 0.81). No significant effects in summer-born Sami, however, odds ratio was increased, in positive direction of effect. NS in other seasons. Temperatures median <0°C in several months, July median 14.8°C. For high temperatures with lag 1 month before birth: OR=1.61 (95%CI=0.90, 2.89)
Placental outcome				
86.	Wang (2020)	Guangzhou, China	N=4051	Reference 20°C. 95th centile (29°C) temperature exposure during late third trimester associated with -6.03g (95%CI=-11.28; -0.78g) change in placental weight and -16.15cm3 (95%CI=-26.24; -6.07) change in placental volume. No significant associations found during other periods of pregnancy. Positive association between temperature and placental weight/birth ratio (PFR) β=0.26 (95%CI= 0.07; 0.45) at 29°C. Association found between high temperatures and PFR during 25-36 weeks gestation.
Spontaneous abortion				
87.	Bianchi-Demichelo (2001)	Lugano, Switzerland	N=56 emergency clinic visits for threatened abortion. N=54 spontaneous abortion	Tmin increase associated with emergency room visit for threatened abortion. At 1°C Tmin OR=1.08 (95%CI=1.03, 1.14). At 15°C Tmin, OR=3.3 (95%CI=1.6, 6.7). No association found for increased emergency room visit for spontaneous abortion.
88.	Sun (2020)	Guangdong, China	N=2044 miscarriages. N=2275 controls	Inverse U-shaped association between Tmean and miscarriage. Peak effects 1-2 months prior to hospitalisation and entire pregnancy. 50th centile (22-23°C) compared to 15°C. For month 1 prior to hospitalisation OR = 1.20 (95%CI: 1.04–1.37). Month 2 prior to hospitalisation OR=1.24 (95%CI=1.09–1.41). Entire pregnancy OR=1.39 (95%CI=1.19–1.63). No significant associations at 75th and 95th centiles for first, second and third months prior to pregnancy and for the entire pregnancy, but OR all above 1.
89.	Dastoorpoor (2021)	Ahvaz, Khuzestan province, Iran	N=150 766 women. N=5063 spontaneous abortion	Intensified thermal stress of PET index (type of heat index). Spontaneous abortion lag0d OR=1.10 (95%CI=0.89, 1.36)
90.	Bogan (2019)	Gaziantep, Turkey	N=6410 admissions. N=6053 cases of abortion	Increases in Tmax not associated with spontaneous abortion OR=0.99 (95%CI=0.99-0.99)
91.	Qu (2021)	New York State, USA	N=1 934 918. N admitted=835 465 emergency department visit for threatened or spontaneous abortion	EHE (>90th centile) by month in transition season and summer. Lag0d. Threatened/spontaneous abortion visits May OR=1.03 (95%CI=0.99, 1.09). Summer OR=1.02 (95%CI=0.99, 1.05). Sept OR=1.05 (95%CI=1.00–1.11)
92.	Khodadi (2022)	Ahvaz, Iran	N=150 766 women. N=5063 spontaneous abortion	Hot thermal stress (UTCI) not associated with cumulative relative risk of spontaneous abortion at lag0d, lag0_2d, lag0_6d, lag0_13d and lag0_21d. For lag0d CRR=1.23 (95%CI=0.86, 1.77)
93.	Zhao (2022)	Nanjing, China	N=1002 cases. N=2004 controls	75th, 95th and Tmax compared to Tmean (17°C). At lag1d at 75th percentile OR=1.48 (95%CI=1.22, 1.80), 95th percentile OR=1.84 (95%CI=1.34, 2.51), Tmax OR=2.07 (95%CI=1.36, 3.16). At lagd2, 7th percentile OR=1.37 (95%CI=1.22, 1.54), 95th percentile OR=1.57 (95%CI=1.32, 1.88) and Tmax OR=1.68 (95%CI=1.33, 2.13). At lag4d, 7th percentile OR=1.18 (95%CI=1.08, 1.30) and 95th percentile OR=1.19 (95%CI=1.03, 1.38).
Stillbirth				
94.	Strand (2012)	Brisbane, Australia	N=101 870. N SB=653	Temperature in lag0_28d. Increasing Tmean increased risk of SB up to 21°C (reference group), e.g. HR of

				stillbirth at 12°C about 0.3 vs 21°C. Significant at 20-36w gestation, but not at ≥37w. Above 21°C plateau reduces risk (U shape), NS difference in HR at high temperature. Patterns with lag0_7d similar, except larger point estimate HR reduction at higher temperatures, e.g. 25°C vs 21°C RR=0.82 (95%CI=0.64, 1.02). At 15°C expect 353 stillbirths per 100,000 pregnancies, at 23°C 610 per 100,000 pregnancies
95.	Arroyo (2016)	Madrid, Spain	N=298705	Risk of late foetal death increased at lag1d by 1.2% RR=1.01 (1.01, 1.01; p<0.001) with exposure to Tmax in 2nd trimester. Risk of late foetal death increased with exposure to Tmin in 3rd trimester RR=1.04 (1.04, 1.04; p<0.001)
96.	Basu (2016)	California, USA	N SBs=8510	Lags associated lag2d, 3, 4, 5, 6, 23, 24, 25, 26. All results cumulative average of lag2_6d and percent increase per 10°F in apparent temperature: 10.4% (95%CI=4.4, 16.8) (ES 3x10°F=1.34; SE=0.10). Associations in week 20-25 and 31-33, but not 34-36 and 37-44 (near 0 point estimate). Cold season NS
97.	Ha (2017)	12 clinical centres across USA	N=223 375. N SBs=992	Compared to 10–90th centile temperatures during whole pregnancy. >90th centile OR of stillbirth=3.71 (95%CI=3.07, 4.47). Pre-conception OR=1.02 (95%CI=0.80, 1.30). 1st trimester OR=0.83 (95%CI=0.63-1.08). 2nd trimester OR=1.03 (95%CI=0.78-1.34). 3rd trimester not assessed as small. Warm season (May-Sept) lag0_6d OR=1.06 (95%CI=1.03, 1.09) per 1°C increase in temperature. Cold season (Oct-April) OR=1.00 (95%CI=0.98, 1.02)
98.	Auger (2017)	Quebec, Canada	N SBs=5047. N term SB=1693	Daily Tmax. All SBs. Lag2d ≥28°C vs 11.5-19.9°C OR=1.10 (95%CI=0.97, 1.25). Lag3d OR=1.08 (95%CI=0.95, 1.22) 28°C vs 15.5-19°C. Lag4d, lag5d similar. Lag6d OR=1.14 (95%CI=1.00, 1.29) ≥28°C vs 15-19.9°C. NS for preterm SBs. Term SB (all compared to 20°C) >28°C lag3d OR=1.16 (95%CI=1.02, 1.33). >30°C OR=1.22 (95%CI=1.02,1.46), 32°C OR=1.28 (95%CI=1.03, 1.60). Lag6d, compared to 15-19.9°C ≥28°C OR=1.32 for term SB (95%CI=1.06, 1.65). NS lag7d, lag8d
99.	Li (2018)	Brisbane, Australia	N=289 351. N SBs=1783	PTB prevalence with comparison daily Tmean and Tmin at different centiles. 75th centile 1st trimester HR=1.13 (95%CI=0.90, 1.42), 2nd trimester HR=1.11 (95%CI=1.04, 1.19), 3rd trimester HR=1.91 (95%CI=0.91, 4.02). 95th centile 1st trimester HR=1.05 (95%CI=0.96, 1.16), 2nd trimester HR=1.47 (95%CI=1.24, 1.74), 3rd trimester HR=2.23 (95%CI=1.02, 5.33)
100.	Weng (2018)	Taiwan, China	N=2 123 751. N SBs=20 475	Temperature at birth 21.5-23.4°C (reference group, lowest level). Temperature 23.5-25.4°C RR=1.08 (95%CI=1.01, 1.14). Temperature 25.5-27.4°C RR=1.09 (95%CI=1.03, 1.15). Temperature 27.5-29.4°C RR=1.16 (95%CI=1.10, 1.22). Temperature 29.5-30.8°C RR=1.17 (95%CI=1.09, 1.26)
101.	Rammah (2019)	Harris county, Texas, USA	N SBs=709. N SBs with placental abruption=87	OR with 10°F increase in apparent temperature (ambient and dew point temperature). OR=1.25-1.37. Significant for lag1_6d (highest lag1d OR=1.37 (95%CI=1.16, 1.61). With moving averages (means of lag days) highest with lag0_6d: OR=1.45 (95%CI=1.18, 1.77). Analysis restricted to hottest months (June, July, Aug). Lag0_6d OR=2.57 (95%CI=1.72, 2.84)
102.	Wang (2019)	Brisbane, Australia	N=277 133. N SBs=705	Exposure in each gestation month binary variable, 6 HW definitions: 90th centile (2, 3, 4d duration); 95th centile (2, 3, 4d duration). All OR point estimates month 1-9 of pregnancy >1. Month 10 OR<1. For most HW definitions, point estimate OR higher in month 1-6 than in month 7, 9. HW definition 90th centile 2d, month 1-6 ranged from HR=1.54 (95%CI=1.27, 1.87) to HR=1.75 (95%CI=1.44, 2.12), but HR=0.97 (95%CI=0.74, 1.27) month 7, HR=1.46 in month 8 (95%CI=1.09, 1.96), lowered in month 9, 10. 95th centile for 4d highest risk in month 8 HR=1.52 (95%CI=1.11, 2.09)
103.	Ranjbaran (2020)	Tehran, Iran	N=516 570. N SBs=3460	Increasing temperature was associated with an increased relative risk of stillbirth of 1.25 (95%CI 0.95,

				1.65) comparing the 99th percentile of mean temperature to the median.
104.	Davenport (2020)	Malawi, Mali, Nigeria, Zimbabwe, Madagascar, Senegal, Kenya, Uganda, Lesotho, Burkina Faso, Guinea, Rwanda, Zambia, Siera Leone, Liberia	N=65 327. N SBs=5 319	Likelihood of second or third trimester stillbirth or spontaneous/induced abortion increases with 10% increase in proportion of days >104°F to 1.9% (p-value<0.01). As proportion of days between 100-104°F increases by 10%, likelihood of a second or third term stillbirth increases by 1.4%. For observations with at least 2 months of potential exposure, there is an increase of 0.11 in the probability of stillbirth for extreme heat exposure in the pre-pregnancy months, and an increase of 0.1 in the probability of still birth for exposure to extreme heat in the first trimester (p<0.05). For observations with at least 7 months exposure, this is only statistically significant for exposure in the third trimester (increase of 0.4 in probability of stillbirth)
105.	Kanner (2020)	Utah, USA	N=112 005. N SBs=500	Average ambient temperature across whole pregnancy from LMP to delivery ang stillbirth risk. >90th percentile OR=5.06 (95% CI=3.34, 7.68) compared to moderate temperatures using generalised estimating equations. For case control models, exposure to extreme hot temperatures associated with stillbirth OR= 6.79 (95% CI=4.61, 9.99). Acute analysis: temperature during the last week of pregnancy, average over whole week and per day. Using case-crossover models, 1.07 increased odds [95%CI= 1.04, 1.10] associated with each 1°C. When restricting to mean AT > 20°C, this increased to 1.32 (95%CI=1.20, 1.49] per 1°C increase.
106.	Savitz (2021)	California, USA	N=1876	Stillbirth all lag1_7d. >90th centile in June-Sept per 1°C OR=1.05 (95%CI=1.00, 1.10). Quartile 4 >26°C vs quartile 1 OR=1.5 (95%CI=1.0, 2.1). April, May, Oct per 1°C OR=1.05 (95%CI=1.00, 1.10). Quartile 2 OR=2.1 (95%CI=1.5, 2.9). Quartile 3 OR=1.8 (95%CI=1.3, 2.7). Quartile 4 OR=1.6 (95%CI=1.1, 2.5) vs Quartile 1
107.	Khodadi (2022)	Ahvaz, Iran	N=150 766. N SBs=1965	Hot thermal stress (UTCI) increased the cumulative relative risk of stillbirth for lag 0-13d, RR=2.05 (95%CI=1.01, 4.15)
108.	Yang (2022)	Taiwan	N SBs=22 796	Relative risk of stillbirth compared to 20-22°C. 1.10 (95%CI=1.04, 1.17; p<0.01) with mild heat 22-25°C, 1.15 (95%CI=1.09, 1.22; p<0.01) for moderate heat 25-29°C and 1.18 (95%CI=1.11, 1.25; p<0.01) when exposed to extreme heat (>29°C). The percentage of stillbirths that are attributable to mild heat, moderate heat and extreme heat are 9.18% (95%CI=0.04, 0.14), 13,69% (95%CI=0.05, 0.22) and 15.06% (95%CI=0.10, 0.20). The greatest cumulative effect of extreme heat temperature was found in the 97.5th percentile of temperature (29.8 °C) relative to the optimal temperature (21 °C) at lag 0–3 months, with a cumulative relative risk (CRR) of 2.49 (95% CI=1.24, 5.03).
109.	Nyadanu (2022)	Western Australia	N=474 835. N SBs=2835	Relative to no thermal stress (median UTCI 13.9°C), risk of stillbirth for exposure to heat stress 95th and 99th percentile were sginficant for lag days 0, 0-1, 0-3, 0-6, 0-13 and 0-21. For lago day 0, RR=1.01 (95%CI=1.00, 1.01) and RR=1.01 (95%CI=1.01, 1.02)
110.	Richards (2022)	California, Floria, Georgia, Kansas, New Jersey and Oregon, USA	N controls=553 928 and N SBs=140 428	For every 1°C increase in 7d average over threshold, odds of stillbirth increased OR 1.10 (95%CI=1.04, 1.17). When more than 4 consecutive hot days in previous week, risk of stillbirth increased 1.03 (95%CI=1.01, 1.06). NS compared to 20°C, average temperature of 35°C during exposure window increased risk of stillbirth 1.03 (95%CI=1.00, 1.06)
111.	McElroy (2022)	14 LMICs (Angola, Benin, Burundi, Ethiopia, Haiti, Malawi, Nepal, Nigeria, Philippines, South Africa, Tajikistan, Timor-Leste, Uganda, and Zimbabwe)	N=103 535. N SBs=1210	Stillbirth Tmax 20-30°C significant increased RR vs 20°C lag0_7d. Lag3_6d significant increased 39°C. Diurnal range significant increased RR for diurnal <16°C vs 16°C Tmax. Women with ≥1d diurnal range RR=2.1 (95%CI=1.01, 4.02) of stillbirth
112.	Nyadanu (2023)	Ghana	N=5 961 328. N=90 532 stillbirths	Odds of stillbirth increased with increasing UTCI exposure up to 90th percentile, with a reduction in odds, and a protective effect noted at 99th percentile

				for cumulative lag. Maximum OR =1.18 (95%CI=1.02, 1.36) for cumulative lag of 0-9 months at 90th percentile UTCI vs median. Maximum OR=1.03 (95%CI=1.01,1.05) at lag 1,2,3 months (non-cumulative) at 90th percentile UTCI vs median
Neonatal				
Low birth weight				
113.	Murray (2000)	Northern Ireland, United Kingdom	N=5 418 817	Estimates only provided for sub-group analyses: Females, with an increase of 1°C in mean daily Tmax in 2nd trimester mean birth weight rose 3.5gm (SE=0.88; p<0.001). Males 1.02gm (SE=0.88; P=0.25)
114.	Wells (2002)	140 populations worldwide, including: Africa (40 countries); Asia (30 countries); Central/South America (25 countries); and Europe, North America, Australia, New Zealand (35 countries)	Median sample size=5558. Mean sample size=97 237	Annual heat index (0-4), drawn from monthly discomfort ratings using temperature and humidity data. Simple linear regression weight (grams) and heat index r=-0.59 (p<0.001). Analysis with 108 populations with full data: 1 unit rise in heat index birth weight decreases 2.7% (p=0.002). Linear relationship
115.	Tustin (2004)	Dunedin, New Zealand	N=7 039	Average birth weight did not differ as a function of ambient temperature (peak versus trough for trimesters 1 and 2) F(1 953) = .31, p<0.05 in full term infants
116.	Elter (2004)	Istanbul, Turkey	N=3333	Mean birth weight for each trimester of daily Tmean. Temperature in 2nd trimester associated with reduced BW (β=0.001; p=0.018). NS in other trimesters (data not provided)
117.	Lawlor (2005)	Aberdeen, Scotland, United Kingdom	N=12 150	Temperature around conception -2.4gm per 1°C (95%CI=-4.6, -0.2). Tmean in middle of 1st trimester and birth weight (hotter temperature associated with lower BW). Stepwise change -5.4gm/1°C (95%CI=-7.9, -2.9; p test for trend <0.001). Temp in mid-2nd trimester NS association. 3rd trimester step-wise increase in weight per quartile increase in temp (p test for trend=0.002). Gains 1.3gm /1°C (95%CI=0.5, 2.1). Temperature around childbirth similar finding
118.	Chodick (2007)	Israel (whole country)	N=225 545. N LBW=12 724	Monthly Tmin. Month 1 of pregnancy regression coefficient for birth weight per 1°C=0.77 (95%CI=0.11, 1.42; p=0.02). Month 4 of pregnancy regression coefficient per 1°C=1.45 (95%CI=0.78, 2.13; p<0.01)
119.	Madsen (2010)	Oslo, Norway	N=25 229. N LBW=303	NS birth weight and temperature (mean difference in birth weight per temperature quartile)
120.	Wolf (2012)	Saxony and Brandenburg, Germany	Saxony: N=162 913, N LBW=8034. Brandenburg: N=128 604, N LBW=6242.	Comparisons of Tmean in quintile (baseline, coldest to hottest), term LBW. Brandenburg. 2nd trimester: 2nd quintile OR=0.85 (95%CI=0.70, 1.02), 3rd OR=0.68 (95%CI=0.51, 0.91) 4th OR=0.70 (95%CI=0.48, 1.00) 5th OR=0.81 (95%CI=0.53, 1.25) p=0.05. Saxony 1st trimester: 2nd quartile OR=0.99 (95%CI=0.86, 1.14), 3rd OR=0.91 (95%CI=0.73, 1.14) 4th OR=0.97 (95%CI=0.72, 1.31) 5th OR=0.74 (95%CI=0.51, 1.06) p=0.06. Alternative analysis methods found associations between rise in temperature and higher LBW risk. Inconsistent findings.
121.	Jensen (2013)	68 countries and territories worldwide (all continents)	Data not provided	1°C increase in Tmax reduces birth weight by 23gm (0.75% change), 2°C=45gm (1.46%), 3°C=68gm (2.21% change). All significant. Reduction in birth weight by 1.05% per 1°C in range 20-25°C. LBW increases with Tmax (p<0.001) and Tmin (p<0.001)
122.	Bruckner (2014)	Uppsala, Sweden	N=13 657	Birth weight NS finding, coefficient=-0.24 (95%CI=-0.66, 0.18)
123.	Dadvand (2014)	Barcelona, Spain	N=6438. N LBW=190	LBW and Tmean over whole pregnancy. LBW OR=1.21 (95%CI=0.98, 1.49) per quartile increase in temperature [ES Q4 vs Q1=1.77; SE=0.47). IQR= 2.4°C
124.	Grace (2015)	Burkina Faso, Central African Republic, Ethiopia, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia, Zimbabwe (19 countries)	N=61 075. N LBW=6694	Change in weight (gm) per day >100°F. 3 months pre-conception -0.45 (p<0.1), 1st trimester -0.71 (p<0.01), 2nd trimester -0.85 (p<0.001), 3rd trimester -0.24 (NS). Larger estimates with temperature threshold >105°F. LBW rises with temperature. Regression coefficient for LBW with n days >100°F 3 months pre-conception -0.17 (NS), 1st trimester -0.20 (p<0.1), 2nd trimester -0.33 (p<0.01), 3rd trimester -0.17 (NS). Also significant findings with days above 105°F
125.	Kloog (2015)	Massachusetts, USA	N=462 400. N LBW not provided	Birth weight. In predicted and weather station measures, at lag0_7d, lag0_14d, lag30d, 3rd trimester

				and all pregnancy, weight decreased with increased IQR temperature. With predicted temperature, 3rd trimester impacts larger than entire pregnancy impacts or the impacts in lag0_7d. Term birth weight was -5.0gm per IQR over all pregnancy (95%CI=–7.8, –2.3), -8.9gm (95%CI=–16.2, –1.5) at lag0_7d, but -16.6gm (95%CI=–27.4, –5.9) in lag30d and -16.7gm (95%CI=–29.7, –3.7) in 3rd trimester [ES=33.4; SE=13.3]. NS weather station temperature birth weight associations. LBW. OR for LBW with IQR rise in predictive temperature over entire pregnancy=1.04 (95%CI=0.96, 1.13). [ES=1.08; SE=0.087], and with weather station measures OR=1.02 (95%CI=0.45, 2.30)
126.	Yitshak-Sade (2016)	southern Israel	959	Temperature elevation (per 1°C) and birth weight (grams). Entire pregnancy 0.002g (95%CI -0.003, -0.0005; p<0.05),third trimester 0.02g (95% CI -0.04g, -0.008g; p<0.05) and last month of pregnancy -0.005g (95%CI -0.009, -0.002; p<0.05). Temperature IQR elevaion in the third trimester was associate with 0.002g (95%CI -0.004, -0.001g) decrease in birth weight.
127.	Ngo (2016)	Manhattan, New York, USA	N=514 104	Birth weight inverted U-shape. Compared to 45-65°F. Each extra day of >85 °F in 1st trimester BW -1.12gm (p<0.1). 2nd trimester -1.15gm (p<0.05). Cumulative impact during whole of pregnancy birth weight -1.7gm (p<0.10). LBW Each extra day of >85°F probability of LBW in 2nd trimester increases 0.00046 (p<0.10). Other comparisons NS and small.
128.	Diaz (2016)	Madrid, Spain	N=298 705. LBW=3290	LBW. NS association between a ‘heat wave' week (mean Tmax in week >34) and term LBW (data not provided)
129.	Andalon (2016)	Colombia	N=1 250 000. N LBW=22,500	Birth weight. ‘Heat shock' (temperature in ≥1 month anytime during pregnancy that is >0.7 z-scores from long-term mean (1901–1997): birth weight -3.6gm (p<0.05, SE: 1.62). LBW -0.1% NS
130.	Poeran (2016)	Netherlands (whole country)	n=1 460 401	Results are change in birth weight (gm) per 1°C increase in mean Tmin. 2nd trimester 0.4 (95%CI=0.0, 0.8; p<0.05). 3rd trimester 1.5 (95%CI=1.2, 1.7; p<0.001). T max. reduction in weight per 1°C increase: conception day +/- 3d) -0.4 (95%CI=-0.8, -0.1; p<0.001). 1st trimester -2.1 (95%CI=-2.4, -1.7; p<0.001). 2nd trimester -2.4 (95%CI=-2.8, -2.0; p<0.01). 3rd trimester -2.1 (95%CI=-2.5, -1.8; p<0.001). Lag0d -0.4 (95%CI=-0.6, -0.1; p<0.01).
131.	Rashid (2017)	Matlab, Bangladesh	N=3267. N LBW=997	Daily Tmean orrelated with outcome. Weight rises 5.97gm per 1°C temperature in week 12 (p=0.052), 4.7gm in week 19 (p=0.028). Reduction in birth weight at lag6weeks in some analyses.
132.	MacVicar (2017)	Kanungu District, Uganda	N=3691. N LBW=237	Per 1°C increase in Tmean, birth weight increased 41.8gm in 3rd trimester (95%CI=0.64, 82.92). Other trimesters NS, low point estimates. Entire pregnancy change per 1°C temperature=26.03 (95%CI=35.33, 87.40). Driest season (June-Aug), 1°C increase in mean temperature in 3rd trimester=123.06gm rise (95%CI=18.95, 227.18; p<0.05). Rainy season (Sept.-Nov) 98.37gm rise per 1°C (95%CI=23.04, 173.7; p<0.05). Other seasons NS. LBW NS association (data not provided).
133.	Ha (2017)	12 sites across USA	N=220 572. N LBW=4 322	>95th percentile for temperature vs <95th. LBW preconception RR=1.01 (95%CI=0.88, 1.17); 1st trimester RR=1.02 (95%CI=0.88, 1.17); 2nd trimester RR=1.06 (95%CI=0.92, 1.22); 3rd trimester RR=1.31 (95%CI=1.15, 1.50); all pregnancy RR=2.49 (95%CI=2.20, 2.83)
134.	Molina (2017)	Bolivia, Colombia, and Peru (Andean region)	N=86 021	Birth weight 19.7gm lower with 1SD above historical Tmean (p<0.01) in whole pregnancy period [ES=39.4; SE=7.64]. 1st trimester 1SD above mean lower birth weight by 16.4gm (p<0.05). 2nd and 3rd trimester NS. LBW 0.7% increase in absolute % of LBW with each SD > historical Tmean (p<0.05 [ES=1.014 (2sd); SE=0.007])
135.	Sienkiewicz (2018)	Podlaskie Province, Poland	N=205 cases, 205 controls	LBW. NS association between Tmean and LBW (data not provided)
136.	Li (2018a)	Brisbane, Australia	N=237 585	Birth weight. Tmax >30°C (reference group) vs 25–30 °C, 20–25°C, ≤20°C. Mean birth weight 1st week and 1st 4 weeks NS. lag7d >30°C vs 25-30°C 0.006kg

				(95%CI=0.000, 0.013;pP=0.066); 20–25°C 0.011kg (95%CI=0.008, 0.018; p=0.041), ≤20°C 0.018kg (95%CI=0.010, 0.031; p=0.024). lag028 >30°C vs 25-30°C 0.003kg (95%CI=-0.004, 0.011; p=0.349), 20–25°C 0.013kg (95%CI=0.002, 0.024; p=0.021) ≤20°C 0.008kg (95%CI=-0.016, 0.033; p=0.527). 'almost linear' relationship (stepwise)
137.	Kloog (2018)	Southern Israel	N=56 141. N LBW=1716	LBW U shape (base +/- 20°C). Quartile 25-75 is reference group. Entire pregnancy Tmean exposure >75th OR=1.17 (95%CI=0.99, 1.38) 1st trimester Tmean >75th centile OR=1.03 (95%CI=0.82, 1.31); 2nd trimester OR=1.14 (95%CI=0.92, 1.41), 3rd trimester OR=1.02 (95%CI=0.92, 1.12). No lags significant.
138.	Weng (2018)	Taiwan, China	N=2 045 748. N LBW data not provided	LBW. Temperature at birth. Temperature 21.5-23.4°C (reference group). Temperature 23.5-25.4°C RR=1.05 (95%CI=1.02, 1.07). Temperature 25.5-27.4°C RR=1.07 (95%CI=1.04, 1.09). Temperature 27.5-29.4°C RR=1.09 (95%CI=1.07, 1.12). Temperature 29.5-30.8°C RR=1.07 (95%CI=1.04, 1.10)
139.	Basu (2018)	California, USA	N=2 076 230. N LBW=43 629	LBW. U-shaped in 1st, 3rd trimester and overall (base 12.8°C to 18.3°C). Linear in 2nd trimester. Reference value temperature above which OR rises. Apparent temperature (temperature and relative humidity). All outcomes are % change in OR of LBW per 10°F increase in temperature. Whole of pregnancy 13.0% (95%CI=4.1, 22.7) [ES 3X 10°F above base=1.09; SE=0.03). 1st trimester −7.4% (95%CI=−12.5, −2.0). 2nd trimester 1.7% (95%CI=0.3, 3.2). 3rd trimester 15.8% (95%CI=5.0, 27.6). Lag0_28d NS, Lag0_14d 2.6% (95%CI=0.2, 5.0).
140.	Son (2019)	Seoul, South Korea	N=813 820. N term LBW=12 298	LBW. Heat Index (air temperature and relative humidity). HR for a quartile increase in heat index. Term LBW NS: whole pregnancy HR=1.01 (95%CI=0.96, 1.05) [ES Q4 vs Q1=1.018; SE=0.07); lag028 HR=1.01 (95%CI=0.99. 1.02)
141.	Sun (2019)	403 counties across USA	N=29 597 735	Birth weight. Daily Tmean. Reference temperature 40-50th centiles. Entire pregnancy temperatures. Birth weight (difference in gm compared to reference group) >90th difference=−15gm (95%CI=−17, −13). 80–90th difference=−11gm (95%CI=−12,−9). Impacts in 2nd, 3rd trimesters were similar to temperature impacts in all pregnancy. Temperature 1st trimester NS, point estimates around 1.0. Largest impacts were in marine and cold/very cold climate zones. Inverse U-shape
142.	Lawrence (2020)	New York State, United States	N LBW=22 615. N controls=129 168	One EHE90 exposure associated with LBW during first trimester, compared with no exposure OR=1.09 (95%CI=1.02, 1.16). One exposure occurrence to EHE97 during entire pregnancy and during trimester one, was associated with LBW; OR=1.05 (95%CI=1.01, 1.09) and OR=1.11 (95%CI=1.06, 1.16) respectively. Two day long EHE97 was associated with increase in LBW overall pregnancy OR=1.05 (95%CI=1.02, 1.09) and the first trimester OR=1.10 (95%CI=1.05, 1.15) with the strongest association for ≥3 d in the first trimester OR 1.13 (95%CI=1.03, 1.24). Occurrence of one EHE in the first trimester was associated with a decrease in mean birthweight for EHE90 -20.95g (95%CI=-33.57,-8.19) and EHE97 -11.89g (95%CI=-20.84, -2.94). EHE90 duration for 3 days was associated with overall -10.57g (95%CI=-19.77, -1.37) and the first trimester -22.34 g (95% CI=-37.75, -6.92) decrease in mean birthweight. The strongest association was observed for EHE97 for duration ≥3 d during the first trimester -34.19 g (95%CI=-52.96, -15.43).
143.	Ilango (2020)	California, US	N=1 967 300. N preterm births=127 039	May-September. Increasing associations with increasing duration of HW. HR size increases from 75th, to 90th, 95th, 98th used as a threshold for HW definition. HR ranged from 1.01 (95%CI: 1.00, 1.02) for HW 2 days >75th centile to 1.13 (95%CI=1.05, 1.21) with 4 days >98th centile
144.	Davenport (2020)	Malawi, Mali, Nigeria, Zimbabwe, Madagascar, Senegal, Kenya, Uganda, Lesotho, Burkina Faso,	N births=53 592. N LBW=5 277	Linear Probability Models. No statistically significant result in relationship between low birth weight and temperature. As proportion of days between 95°F and 99°F increases by 10%, the likelihood of a low birth weight baby decreases by 0.09% (p=0.069). As the

		Guinea, Rwanda, Zambia, Siera Leone, Liberia		proportion of days between 100 - 104°F increases by 10%, the likelihood of a low weight baby increases by 0.04% (p=0.898). As the proportion of days > 104°F increases by 10%, the likelihood of a low birth weight baby increases by 0.4% (p=0.188). In this model, there is some impact of heat. for every 10% increase in the proportion of days within 95-99°F, there is a 1.04% increase in the likelihood of low birth weight (p < 0.01)
145.	Jakpor (2020)	Poitiers, Nancy, and Brittany, France	N=4589 mother-child pairs	No statistically significant association between Tmean and term birthweight. The association trended downwards. Association between SD of temperature and term birthweight between weeks 6 to 20; cumulative change in term birthweight was -124,5g (95%CI= -228.0; -20.9).
146.	Cho (2020)	162 cities, South Korea	N=2 300 000. N LBW not provided	No significant association between LBW and daily temperature >32°C, or 30-32°C, 0-12 months after weather event, relative to 28-30°C. At month 0 after weather event, r=-0.12 (SE 0.025) for exposure to daily Tmax >32°C relative to 28-30°C. At month 3 r=0.006 (SE 0.021) for exposure to daily Tmax >32°C relative to 28-30°C
147.	Chen (2020)	145 counties in 31 provinces, China	N=637 033 live singleton births	Additional day during gestation with temperature above 28°C relative to a day in 0-4°C range, leads to reduction in birth weight by 0.050% (1.66g, SE0.022, p<0.01). Exposure to an additional hot day above 28°C during gestation increases the probability of LBW by 0.035% (SE0.017, p<0.05). Effects of an additional day above 28°C relative to 0-4°C had significant effects in trimester 1 and trimester 3 (T1 log birth weight -0.031 (SE0.012, p<0.05) an T3 log birth weight -0.035 (SE 0.014, p<0.05, T3 LBW 0.037 (SE0.016, p<0.05). An additional day at 24-28°C relative to 0-4°C day, increased probability of LBW by 0.021% (SE0.010, p<0.05)
148.	Grace (2021)	Mali	N=9542 children	Higher number of exposure to days over 100°F associated linearly with lower predicted birthweight in trimester 1,2 and 3 (r=0.94 for all trimesters)
149.	Du (2021)	Jinan City, Shandong Province, China	N 6202. N=78(1.26%)	High vs median temperature on whole of pregnancy an unadjusted OR=2.86 (95%CI=1.31, 5.53). No other results are statistically significant, but in same direction of effect, notably after approx. week 31 in dlnm model. U-shape non-linear relationship noted.
150.	Basagana (2021)	Israel	N=624 940 singleton term births	U-shaped association between odds of term birth weight according to climate zone specific centiles of average daily Tmean relative to the 41-50th centile. Whole pregnancy. Mean decrease of -10g (95%CI=-16, -3) at 71-80th percentile , -20g (95%CI=-17, -14) at 81-90th percentile and -65g (95%CI=-72, -58) above the 90th centile compared with the reference range. Positive association between term LBW for the pregnancy as a whole for 81-90th OR=1.24 (95%CI=1.12, 1.36) and OR=1.58 (95%CI 1.43, 1.74) >90th percentile. The biggest effects were observed in the third trimester for heat exposure >90th percentile compared to the reference range: -51g (95%CI=-59, -43) and OR=1.65 (95%CI=1.47, 1.86). In the DLNM models, associations between term birth weight and GA-week specific exposures to temperature above the 90th percentile were inverse during the GA weeks 3-9, 19-35, with the strongest associations estimated for hot temperature during GA week 3 -3.8g (95%CI=-7.1g, -0.4g) and during GA weeks 26-27 (-2.6g (95%CI=-4.6, -0.5). Associations between term LBW and GA-week specific temperature above the 90th percentile were close to the null through entire pregnancy.
151.	Tapia (2021)	Lima, Peru	N term births=123 034. N=2074(1.78%)	Comparing IQR of Tmax with Q1 as reference, Q4 Tmax in third trimester showed reduction in weight: -30.6g (95%CI=-37.67, -23.59) and decreased Z-score= -0.07 (95%CI=-0.097,-0.061). Protective effect noted in first trimester. When stratified to include only term births, effect was greater. For Q4 Tmax -33.0g (95%CI=-40.14, -25.86). LBW. Tmax in 3rd trimester OR=1.13 (95%CI=1.02,1.27) when stratified by PM2.5
152.	Zhang (2021)	Henan, China	N births=1 539 117. N LBW=5790	LBW associated with each SD unit increment in Tmean during entire pregnancy OR=1.05 (95%CI=1.02,1.09) and during second trimester OR=1.09

				(95%CI=1.05,1.133. Exposure to extreme heat in the entire pregnancy and during second trimester increased the risk of LBW OR=1.25 (95%CI=1.14, 1.37), OR for trimester 2=1.19 (95%CI=1.08-1.31)
153.	Yitshak-Sade (2021)	Massachusetts, USA	N term births=712 438	Positive non significant difference in birth weight with higher temperatures. A 1°C rise in temperature from 23 to 24°C=-7.9g (95%CI =11.2; -4.6g). Cumulative exposure to a weekly temperature of 30°C=-133.4g (95%CI=-191.1; -80.12) and 22°C=-75.7g (95%CI -109.0; -35.7). Exposure to temperature at 95th (23°C) percentile relative to the 5th percentile (-4°C) associated with a reduction in birthweight in weeks 0-16 and 29-37 of gestation.
154.	Khodadi (2022)	Ahvaz, Iran	N women=150 766. N LBW=863	Hot thermal stress (UTCI) not associated with cumulative relative risk of LBW at lag 0d, 0_2d, 0_6d, 0_13d and 0_21d. For lag0d cumulative RR=0.89 (95%CI=0.38, 2.12) and for lag0_6d, cumulative RR=1.37 (95%CI=0.54, 3.49)
155.	Requia (2022)	Brazil(entire country, split by region)	N=1 047 330. N LBW=51245 (4.89%)	Results stratified by region. North region positive and statistically significant results, other regions similar effects in some sub-analyses(e.g. temp 26-30°C). Maximum effect noted in second trimester with % increase in OR of LBW of 5.16%(95%CI=3.60, 6.74). South region with statistically significant protective effects of heat exposure on LBW.
156.	Bakhtisityarava (2022)	Brazil, Mexico and Chile	N births in Brazil=8 079 872. N births Mexico=6 405 777. N births Chile=890 156	Brazil. Tmean during entire gestation of 22.3°C and 37.4°C (50th and 95th percentiles) associated with a -10.41g (95%CI=-16.28; -4.54) and -36.99g (95%CI=-45.50; -28.49) decrease in birthweight as compared to 19°C. Mexico, a gestation average temperature of 28° C (95th percentile) associated with -8.55g (95%CI=-16.43; -0.68) decrease in birthweight as compared to 19°C. Chile. No statistical significance at increased temperatures. 23°C vs 19°C associated increased weight: 18 g (95%CI= -40, 50]. Significant decrease in birthweight associated with 5°C higher temperature in months 2,3,6, 7-9 of gestation in Brazil and 7, 8 and 9 months of gestation in Mexico relative to 19°C gestation average (month 9 in Brazil: -6.64g (95%CI=-9,0; -3,8) and month 9 in Mexico: -5.7g (95%CI=-7.8; -3.3))
157.	Carlson (2022)	Boston, United States	N=4442 mother-child dyads	Weeks 10–29. 1°C increase in SD HI was associated with -16.3 g (95%CI=-5.4, -27.4) change in birth weight. The cumulative change in birthweight for this period was -287.4 g (95%CI=-474.1 g, -100.8 g). Effect of a 1°C increase in SD HI for each week in the second trimester was associated with a -201 change in term birth weight (95%CI=-334 g, -69 g), which was larger than the effect size for SD temperature (1°C increase in SD temperature=-151 g (95%CI=-283 g, -18 g).
158.	Conte Keivabu (2022)	50 provincial capital cities, Spain	N=4 314 381. N PTB=259 383	Percent increase in outcome per additional day at >32°C versus days at 5-25°C. LBW: 0.016 per day, p>0.05. VLBW 0.006, p>0.05.
159.	Cil (2022)	United States	N virths=34 700 000 births. N LBW = 2 197 793 (Converted from rate per 1000).	For each additional day between 80-90°F, LBW increases by 0.026 per 1,000 (0.1% of mean; p<0.01), and VLBW by 0.008 per 1,000 (0.1% of mean; p<0.5). The same above-2 SD heat day appears to decrease the probability of LBW when pregnancies had greater exposure to winter months (i.e. low-exposure group); -0.023 (p<0.05) for VLBW
160.	Leung (2023)	Boston, Massachusetts, USA	N term births=8641	Reduction in mean z-score of birthweight associated with a 5°C higher cumulative temperature exposure over entire pregnancy, -0.32 (95%CI=-0.51, -0.12) for term deliveries.
Neonatal admissions				
161.	Kakkad (2014)	Ahmedabad, India	N births=2025. N admission=554. N heat related admissions=36	Per 1°C increase in daily Tmax ≥42°C, 43% increase in neonatal heat-related admissions (95%CI=9.2, 88%). Non-heat-related admissions 1% increase per 1°C when temperature≥40°C (P=0.83). Moving to lower floor (reportedly hot top floor to reportedly cooler lower floor) 64% reduced heat-related admissions at 42°C (95%CI=3, 89%). 14% reduced non-heat-related admission when moving to a lower level at 42°C (P=0.13)

162.	Zhao (2019)	1814 cities, Brazil	N=49 145 997. N admissions not reported	Percentage increase in hospitalisation related to perinatal conditions lag07d per 5°C increase in daily Tmean=7.4% (95%CI=6.0, 8.5). Early hot season=8.3% (95%CI=6.7, 9.9; p<0.001). Late hot season=7.7% (95%CI=6.0, 9.4, P<0.001).
163.	Zhao (2019)	1814 cities, Brazil	N total admissions=58 400 682. N perinatal admissions not reported	Risk of hospitalization for perinatal conditions higher during heatwaves for all 12 definitions of heatwaves. Perinatal admissions increase 5-33%. HW >97.5th centile for 4 days 33% increase. HW >95th centile 3 days=10% increase (95%CI=8, 12%)
164.	Cil (2022)	USA	N births=34 700 000 births. N NICU admissions=2 573 872	Additional day with Tmean above 90°F leads to additional 0.153 per 1000 NICU admissions (0.2% of mean; p<0.10). In births with greater exposure to summer months during gestation (i.e. high exposure group), an additional hot day with temperatures 2-3SD above the mean leads to an additional 0.295 NICU admissions per 1000 births (0.4% of the mean; p<0.01).
Neonatal morbidity				
165.	Scrafford (2013)	Sarlahi District, southern Nepal	N=18 985. N referred for jaundice=556	Increase per 1°C increase in Tmin RR=1.04. (RR 95%CI=1.03, 1.06). Neonatal jaundice diagnosed by visual assessment
166.	Andalon (2016)	Columbia	N=1 477 011 births	During HW (various definitions) Apgar 0.2 to 0.6% lower probability of being normal (p<0.05). Largest impacts with 2nd and 3rd trimester exposure. Maximum OR during 2nd trimester for HW 1.5-2.0 SD above historical mean 1.01 (SE=0.001)
167.	Cil (2017)	3000 counties, USA	N=570 000	HW (temperature and relative humidity >threshold). Exposure ≥1 HW in a trimester (or 3 months before conception). Additional cases/1000 births. HW 3rd trimester increased foetal distress 2.07 (SE=0.95; p<0.05). Other trimesters same direction, but NS. Assisted breathing of newborn on ventilator for >30 minutes NS. Meconium aspiration syndrome (inhalation of meconium by foetus/newborn affecting respiratory system) 2nd trimester increased 0.37 (SE=0.21, p<0.1) and 3rd trimester 0.41 (se=0.23, p<0.1). Any of the 3 outcomes. 3rd trimester increased 2.95 (SE=1.22; p<0.05). 1st increased by 2.23 (SE=1.20 p<0.1) and 2nd trimester 2.20 (SE=1.13, p<0.1).
168.	Tang (2021)	Ningxia Hui Autonomous Region, China	N=182 322 deliveries N=1575 low Apgar scores	Compared to moderate temperature exposure, prenatal exposure to extreme heat (>90th centile) associated with 13.9-47.9% increased risk of low Apgar scores in prenatal exposure windows. At lag1d, odds of lower Apgar score OR=1.31 (95%CI=1.07, 1.60). At lag0_7, odds of lower Apgar score OR=1.26 (95%CI=1.03, 1.55). At lag0_30d, odds of lower Apgar score OR=1.24 (95%CI=1.02, 1.53) with exposure to extreme heat
169.	Iijima (2021)	Hamatsu, Japan	N=3 344	Tmean lagd0 correlated with total serum bilirubin (p=0.04) (higher temperatures, lower bilirubin). Higher in summer than winter.
170.	Chen (2022)	Guangzhou, China	N=64 270 neonatal observations	For each unit increase in extreme temperature, corresponding 0.265 decrease in sum of Apgar scores. Apgar score will decrease by 0.008 (0.029%) when duration of extreme temperature (>95th or <5th percentile) increases by a day.
Neonatal death				
171.	Weng (2018)	Taiwan	N=2 045 748. N neonate deaths not reported.	Temperature at birth: Baseline: 21.5-23.4°C. 25.5-27.4°C RR=1.28 (95%CI=0.94, 1.73); 27.5-29.4°C RR=1.20 (95%CI=0.92, 1.57); 29.5-30.8°C RR=1.08 (95%CI=0.74, 1.57)
Preterm birth				
172.	Lajinian (1997)	Brooklyn, New York, USA	N not provided	Heat-humidity index (humidity, dry bulb temperature), calculated for 4 periods, each 7 days: coldest and hottest weeks in winter and summer. N PTB in that week/total pregnancies 20-36 weeks in that week. Coldest winter week 1.23% (12/972; HI=25.0); hottest winter week 1.25% (12/961; HI=42.7); coldest summer week 2.00% (21/1031; HI=63.3); hottest summer week 3.00% (30/1008; HI=79.5). Linear trend of % PTB over the 4 weeks P<0.002
173.	Porter (1999)	Chicago, USA	N=11 792. N PTB not provided	Maximum apparent temperatures categorised as <90°F, 90°F to 99°F, 100°F to 109°F, ≥110°F. NS for any comparisons of mean gestation. Lag0d: <90°F= 38.6w. 90-99°F=38.7w. 100-110°F=38.7w. ≥110°F=38.9w.

				Lag1d <90°F=38.7w. 90-99°F=38.7w. 100-110°F=38.8w. ≥110°F=38.7w. Lag2d <90°F=38.6w. 90-99°F=38.7w. 100-110°F=38.8w. ≥110°F=38.8w. All comparisons NS
174.	Tustin (2004)	Dunedin, New Zealand	N=7 039. N PTB not provided	In each year, the 3 months with highest Tmean (peaks) compared with 3 months when Tmean were lowest (trough). All comparisons P>0.05. 1st trimester mean gestation weeks in peak months=36.7 (SD=0.05) vs mean gestation weeks in trough months=39.6 (SD=0.05). 2nd trimester mean gestation weeks in peak months=39.6 vs mean gestation weeks in trough months=39.7. 3rd trimester mean gestation weeks in peak months=39.6 (SD=0.05) vs mean gestation weeks in trough months=39.7 (SD=0.05)
175.	Yackerson (2008)	Negev, Israel	N=11 979. N PTB=992	PTB and Tmax regression coefficient=-0.09 (SE=0.03, p=0.008). Significant increase in PTB with change in temp (Tmax-Tmin regression) lag3d coefficient p=0.01.
176.	Lee (2008)	North West Thames region, London, United Kingdom	N=482 765. N PTB=29 716	Lag1d, 2d, 3d, 4d, 5d, 6d OR around 1.0, NS. lag0d daily Tmax OR=1.00 (95%CI=0.99, 1.00) daily Tmin OR=1.00 (95%CI=1.00, 1.00)
177.	Basu (2010)	12 counties of California, USA	N PTB=58 681	8.6% increase (95%CI=6.0, 11.3) in PTB with a 10°F increase in mean apparent temperature in lag0_6d [ES 3X10°F=1.047; SE=0.007]. All lags day 0, 1, 2, 3, 4, 5, 6 were associated. Association strongest for PTB at weeks 34-35
178.	Dadvand (2011)	Barcelona, Spain	N=7585. N PTB not provided	Temperature baseline (1983-2006). Regression coefficient is change in gestational days and exposure to HI90, HI95 and HI99 heat indexes. 90th centile: lag1d coefficient=-0.9 (95%CI=-2.1, 0.4; p=0.17). lag2d coefficient=–1.0 (95%CI=–2.1, 0.0; p=0.06. HI95 lag0d coefficient=–0.2 (95%CI=–0.4, –0.1; P<0.01). lag1d coefficient=–1.6 (95%CI=–3.5, 0.2; p=0.08). HI99 centile Lag1d coefficient=–5.3 (95%CI=–10.1, –0.5; p=0.03). lag1d estimates increase from 90th to 95th to 99th centile (dose response pattern)
179.	Wolf (2012)	Saxony and Brandenburg, Germany	Saxony: N=162 913, N PTB=10 277. Brandenburg: N=128 604, N PTB =8717.	Comparisons of Tmean in quintile (baseline, coldest to hottest). Brandenburg. PTB 1st trimester 2nd quintile OR=1.00 (95%CI=0.92, 1.09), 3rd quintile OR=0.91 (95%CI=0.79, 1.04), 4th quintile OR=1.01 (95%CI=0.85, 1.20), 5th quintile OR=0.91 (95%CI=0.75, 1.10; p=0.06). All other comparisons NS. Saxony PTB 1st trimester: 2nd quintile OR=0.93 (95%CI=0.87, 1.01), 3rd quintile R=0.99 (95%CI=0.88, 1.11), 4th quintile OR=1.02 (95%CI=0.87, 1.19), 5th quintile OR=1.13 (95%CI=0.92, 1.37; p=0.09). Inconsistent findings
180.	Strand (2012)	Brisbane, Australia	N=101 870. N PTB not provided	Temperature in lag0_28d. Increasing temperature increased HR at gestation 28-36 weeks (significant), but NS at <28 weeks gestation. HR for PTB 28-36 weeks similar at lag0 _7d to lag0 -28d. HR PTB lag0 _28d 28–36 weeks gestation=1.20 at 27°C vs 21°C (95%CI=1.0, 1.40)
181.	Wang (2013)	Brisbane, Australia	N=50 848. N PTB=3347	9 definitions of heat waves (90th centile, 95th, 98th, duration 2-4d). HR for exposure to ≥1 HW day in lag0_7d. All 9 definitions significant HR from 1.13 (95%CI=1.03, 1.24) to 2.00 (95%CI=1.37, 2.91). Highest HR with HW defined as >98th centile, 4 days duration.
182.	Schifano (2013)	Rome, Italy	N=132 691. N PTB 22-32 weeks=847. N PTB 33-36 weeks=6412	Apparent temperature (includes air and dew-point temperature). Only lag0_2d significant in warm season (April-Dec). Percent change of 1.87% (95%CI=0.86, 2.87) per 1°C increase in temperature. 20.93% increase per IQR increase (95%CI=9.37, 33.72). Analysis by gestation, impact only significant for 33-36 weeks gestation: 1.93% change (95%CI=0.88, 2.98) vs 22-32 weeks: −1.02% change (95%CI not provided). Percent change in daily n PTB=19.21% for HW days compared with non-HW days (95%CI=7.91, 31.69). HW defined as >2 days with Tmax >monthly 90th centile or daily Tmin >monthly 90th centile, and Tmax >median monthly value over time. NS impact in cold season. PTB–temperature association linear in warm season, also in cold season, but less steep slope
183.	Auger (2014)	Montreal, Quebec, Canada	N=206 929. N PTB=12 390	Tmax in week before childbirth and risk of delivery. Preterm: 3 consecutive days ≥32°C HR=0.92

				(95%CI=0.7, 1.14). N days ≥32°C, HR compared to 0 days. 1d HR=0.98 (95%CI=0.91, 1.06); 2d HR=1.03 (95%CI=0.90, 1.18); 3d HR=0.91 (95%CI=0.72, 1.15); 4-7d HR=0.82 (95%CI=0.55, 1.21). Early term (37-39w): HR compared to 0 days ≥32°C. 1d HR=1.02 (95%CI=0.98, 1.06); 2d HR=0.96 (95%CI=0.89, 1.04); 3d HR=1.08 (95%CI=0.97, 1.21); 4-7d HR=1.27 (95%CI=1.07, 1.52); 3 consecutive days ≥32°C HR=1.17 (95%CI=1.06, 1.29); 10% greater hazard of delivery at 35°C relative to 20°C (p<0.05)
184.	Bruckner (2014)	Uppsala, Sweden	N=13 657. N PTB not provided	Compared to 50th centile, logHR of PTB rose with temperature. >75th centile PTB increased HR=1.52 (95%CI=1.22, 1.90) per 1°C increase in temperature vs 50th centile. J-shape (inflection at 7.5°C)
185.	Kent (2014)	Alabama, USA	N=543 980. N PTB=60 466	Positive associations between heat wave indices and PTB for 9/15 heat wave definitions. Heat index of daily Tmean >95th centile for ≥2 consecutive days: Lag6d. 11.6% (95%CI=0.9, 23.4%) higher % PTB on heat wave versus non–heat wave days. Heat Index of daily Tmean >98th centile for ≥2 days: 32.4% (95%CI=3.7, 69.1%). Heat indices using mean daily temperatures increased from 90th centile (1.5% higher PTB; 95%CI=–3.5 , 6.9%) to 95th and 98th centiles (higher point estimates with increased cut-off value). NS for PTB and apparent temperature HIs. In 10/15 heat indices, the longer the duration of heat waves the larger the point estimate of associations (unknown if significant). Associations between heat wave days and the outcomes similar between 1st heat wave of the season and later ones, and between early and late-season heat waves
186.	Vicedo-Cabrera (2014)	Valencia, Spain	N=20 148. N PTB=1067	Apparent temperature measures. Tmax >50th centile vs <50th. Lag2d RR=1.17 (95%CI=0.99, 1.38). Lag3d RR=1.12 (95%CI=1.01, 1.24). Lag 8, 10, 11, 14days also significant (RR=1.02, 1.06). Tmax >90th centile vs <50th. Lag2d RR=1.23 (95%CI=1.00, 1.52). Lag day 9, 10, 11, 12 also significant RR 1.06-1.07.Tmin. >50th centile vs <50th Lag days 4, 5 significant RR=1.04-1.05. 90th centile lag day 3, 4, 5, 6 significant RR=1.05 to 1.07
187.	Carmichael (2014)	468 counties, across the country, USA	N black=2 607 150. N black PTB=422 358. N white= 6 986 984. N white PTB=656 777	No overall population measures, only subpopulations (black and white women). Fit a multiple linear regression with socioeconomic and demographic features, environmental variables, and health-related variables form birth certificates. Report R(squared) and p value of individual variables. Warmer climate was associated with higher PTB in black and white women. Regression coefficient for warmer climate in black women 0.020 (NS) and 0.114 (p<0.001) for deliveries in weeks 20-31 and 32-36. For white women, regression coefficient is 0.010 (p<0.001) and 0.060 (p<0.001) for deliveries in weeks 20-31 and 32-36 weeks.
188.	Vicedo-Cabrera (2015)	Stockholm, Sweden	N=36 577. N PTB=1204	Moderate heat: RR increase in daily Tmean from annual median value to 75th centile of warm season. Lag0_21d NS RR=1.02-1.03. Lag22d RR=1.04 (95%CI=1.00, 1.08). Lag0_23d RR=1.04 (95%CI=1.00, 1.08). Lag0_24d RR=1.04 (95%CI=1.00, 1.09). Lag0_25d RR=1.05 (95%CI=1.00, 1.09). Lag0_26d RR=1.05 (95%CI=1.00, 1.10). Lag0_27d RR=1.05 (95%CI=1.00, 1.11). Lag0_28d RR=1.05 (95%CI=1.00, 1.11). Slope of maximum cumulative temperature RR=2.50 (95%CI=1.02, 6.15) at 75th centile. Extreme heat >99th vs 75th centile of warm NS and point estimates around 1.0
189.	Kloog (2015)	Whole state of Massachusetts, USA	N=462 400. N PTB=11 993	Temperatures both from predictive modelling and weather stations. PTB with predicted temperature per IQR change in mean temperature in whole pregnancy OR=1.02 (95%CI=1.00, 1.05); OR=1.07 (95%CI=0.87, 1.27) [ES for 2 IQR change=1.05; SE=0.007] with temperature from weather stations. Some models using predictive temperatures showed increases gestation at higher temperatures, while weather station data showed gestation decrease

190.	Muresan (2016)	Cluj-Napoca, Transylvania, Romania	N PTB=138	Weekly Tmean and SD of mean, correlated with PTBs in that week (52w in total, lag7d). Weekly Tmean r=0.31 (P=0.027). SD in each week r=0.307 (P=0.007)
191.	Liang (2016)	Shenzhen, China	N=1 040 638. N PTB=58 411	Reference group is median of daily Tmean. Cumulative effects of high temperature 95th centiles RR=0.69 (95%CI=0.60, 0.80) and 99th centile RR=0.62 (95%CI=0.52, 0.74). Negative associations with 95th centile (all p<0.05): lag10d RR=0.99 (95%CI=0.97, 1.00); lag15d RR=0.99 (95%CI=0.98, 1.00); lag20d RR=0.99 (95%CI=0.98, 1.00); lag25d RR=0.99 (95%CI=0.98, 1.00); lag30d RR=0.99 (95%CI=0.97, 1.00). 99th centile (all p<0.05): lag10d RR=0.98 (95%CI=0.97, 1.00); lag15d RR=0.98 (95%CI=0.97, 0.99); lag20d RR=0.98 (95%CI=0.97, 0.99); lag25d RR=0.98 (95%CI=0.97, 0.99); lag30d RR=0.98 (95%CI=0.96, 1.00)
192.	He (2016)	Guangzhou, China	N=838 146. N PTB=47 209	All estimates compared to Tmean in area (24.4°C). Moderate heat (95th centile, >30.7°C): lag07d HR=1.02 (95%CI=0.98, 1.06); last 4 weeks of pregnancy HR=1.08 (95%CI=1.02, 1.13); from week 20 onwards HR=1.07 (95%CI=1.02, 1.13); cumulative exposure over pregnancy HR=1.07 (95%CI=1.02, 1.14). Extreme heat (99th centile, >31.9°C): lag07d HR=1.03 (95%CI=0.98, 1.07); last 4 weeks of pregnancy HR=1.10 (95%CI=1.03, 1.18); from week 20 onwards; 1.010 (95%CI=1.02, 1.18); cumulative exposure over pregnancy HR=1.10 (95%CI=1.02, 1.18). Extreme heat in gestation windows: weeks 20–31 HR=1.45 (95%CI=1.15, 1.83), week 32–34 HR=1.29 (95%CI=1.08, 1.54) and weeks 35–36 was 1.08 (95%CI=0.97, 1.21). At moderate and extreme heat lag07d NS and stepwise HR with periods closer to birth. U shape (base at 25°C)
193.	Walfisch (2016)	Negev, Israel	N=263 709. N PTB=20 825	RR increase in PTB per 1 heat stress unit (mean wet and dry temperature)=1.06 (95%CI=1.04, 1.08). Spontaneous PTB IRR=1.07 (95%CI=1.05, 1.10). Induced PTB IRR=0.99, (95%CI=0.97, 1.01). [lag period uncertain]. Increase in 1 heat stress unit increases PTB by 3.7% for PTD <34 weeks (higher than PTB 34-36 weeks). Linear association
194.	Schifano (2016) Rome	Rome, Italy and Barcelona, Spain	Rome: N=78 633, N PTB 22-32 weeks=484, N 33-36 weeks=3830. Barcelona: N=27 255. N 22-32 weeks=173, N 33-36 weeks=1071.	Maximum apparent temperature (includes air and dew-point temperature). Lag2d used as strongest in Rome, no clear difference in lags in Barcelona. Barcelona: HR per 1°C increase=1.00 (95%CI=0.10, 1.01); HR rise with quartile increase=1.03 (95%CI=0.98, 1.07) [ES Q4 vs Q1=1.08; SE=0.065). Highest HR per 1°C Tmax increase in 22–26 week gestation HR=1.07 (95%CI=1.04 to 1.11), decreased stepwise by gestation period (5 periods in total) to 36th week HR=1.03 (95%CI=1.02, 1.05). Significant at all gestations. Rome: HR per 1°C increase=1.01 (95%CI=1.01, 1.02). HR per quartile increase=1.13 (95%CI=1.10, 1.17) [ES Q4 vs Q1=1.45; SE=0.056]. As in Barcelona, highest HR per 1°C increase in 22–26 week of gestation HR=1.07 (95%CI=1.05, 1.09) and decreased stepwise to 1.03 (95%CI=1.03 , 1.04) at 36 weeks. Significant at all gestations
195.	Ngo (2016)	Manhattan, New York, USA	N=510 781. N PTB not provided	Compared to 45-65°F. Each extra day >85°F gestation -0.0039 weeks (46 min). Other comparisons NS and small.
196.	Arroyo (2016)	Madrid, Spain	N=298 705. PTB=24 620	Results for an IQR increase in Tmax >34°C. lag 1d RR=1.06 (95%CI=1.02 to 1.09) [ES IQR 1 vs IQR2=1.11; SE=0.038]. IQR not noted.
197.	Andalon (2016)	Colombia (whole country)	N=1 250 000. N PTB=193 750	'Heat shock' (temperature in ≥1 month anytime during pregnancy that is >0.7 z-scores of SD from long-term mean (1901–1997)). -0.3% point reduction in probability of full-term pregnancy (95%CI=0.0, 0.6%; p<0.05). No step-wise impacts with increase in sd (0.7–1.0 to 1.0–1.5; to 1.5–2.0 to ≥2.0). NS pattern of heat exposure and trimesters, but impacts on PTB estimates highest in 2nd and 3rd trimester
198.	Cox (2016)	Flanders, Belgium	N=807 835. N PTB=27 076	Temperature centiles over whole study period, compared to median. Tmin lag1d 95th centile RR=1.09 (95%CI=1.02, 1.15). 99th centile RR=1.16 (95%CI=1.05, 1.28). Lag3d 95th centile RR=1.10 (95%CI=1.03, 1.18). Lag6d 95th centile RR=1.09

				(95%CI=1.01 ,1.18). Tmax lag1d 95th centile RR=1.10(95%CI=1.01 to 1.19). 99th centile RR=1.15 (95%CI=1.01 to 1.31). NS, but <32 weeks estimates higher than 32-36
199.	Mathew (2017)	Alice springs, Northern Territory, Australia	N=16 870. N PTB total=1 401. N Indigenous= 7996. N PTB=951. N Non-indigenous=8873 N PTB=450	Compared to 50th centile temperature for whole period (30°C). RR>1 for temperature 41-45°C (Tmax). Increase in RR about 2%. Exponential increase in RR (2-3w before delivery) about 4.5% with ≥41°C. Only significant at lag15_20 at ≥45°C. Cumulative effects of exposure to Tmax 40°C for 21d increases PTB risk 8.3% (95%CI=1.03, 1.15)
200.	Ha (2017)	12 sites across USA	N=223 375. N early PTB =3855.	RR >90th centile vs 10-90th, reference temperatures are 3 months preconception. Early PTB: weeks 1-7 gestation RR=1.11 (95%CI=1.01, 1.21); weeks 8-14 RR=1.06 (95%CI=0.96, 1.17); weeks 15-21 RR=1.18 (95%CI=1.07, 1.29); weeks 22-28 RR=1.08 (95%CI=0.98, 1.19) [data on weeks 29-36 not provided]. Late PTB: weeks 1-7 RR=1.05 (95%CI=0.99, 1.11); weeks 8-14 RR=1.01 (95%CI=0.94, 1.08); weeks 15-21 RR=1.18 (95%CI=1.11, 1.27); weeks 22-28 RR=1.00 (95%CI=0.93, 1.07). Cumulative exposure (total pregnancy exposure) to hot temp was associated with PTB in pregnancies from weeks0_34 and weeks0_36. Case-crossover analysis: Increase in odds of early PTB per 5°F increase in temperature in lag6d: OR=1.16 (95%CI=1.12, 1.19); late PTB OR=1.12 (95%CI=1.10, 1.15)
201.	Basu (2017)* (Excluded from analysis because duplicate of Avalos (2017))	N. California, USA	N PTB=14,466	Mean daily apparent temperature lag0_6 before birth vs exposures for same mother at 7 and 28d before or after that week. Results are percent change per 10°F (5.6°C) increase in apparent temperature. Warm season 11.63% (95%CI=4.08, 19.72) (ES 3x10°F=1.06; 0.022). Cold season 6.18% (95%CI=-2.96, 16.18)
202.	Avalos (2017)	Northern California, USA	N PTB=14 466	All measures are % change in PTB with 10°F (5.6°C) increase in mean apparent temperature (temperature and dew-point temperature). Warm season mean apparent temperature lag0_6d, lag4, 5, 6d significant. Lag0_6d 11.6% (95%CI=4.1%, 19.7%). Cold season lag0_6d 6.2% (95%CI=-3.0%, 16.2%)
203.	Cil (2017)	3000 counties across USA	N=570 000. N PTB not provided	HW is heat index (temperature and relative humidity) above 'established thresholds'. Exposure ≥1 HW in each trimester (or 3 months before conception). HW in 2nd trimester lower gestational age at birth (coefficient=-0.019; P<0.05; other trimesters NS)
204.	Giorgis-Allemand (2017)	Denmark, France, Greece, Hungary, Italy, Lithuania, Norway, Spain, Sweden, The Netherlands, United Kingdom	N=71 493. N PTB=3533	1st trimester exposure had stronger association than 2nd trimester, 1 or 4 weeks before childbirth and whole-pregnancy. Tmean. 1st trimester temperatures, compared to PTB<5°C, OR =1.13 (95%CI=1.00, 1.27) with 5°C–9.9°C; OR=1.14 (95%CI=0.99, 1.33) with 10°C–14.9°C, OR=1.20 (95%CI=0.99, 1.45) with ≥15°C (p for test for trend=0.08).
205.	Yu (2018)	Mayagüez, Ponce and San Juan, Puerto Rico	Mayagüez: N=71 390. N PTB=11 708. Ponce: N=118 820. N PTB=18 298. San Juan: N=213 729. N PTB=34 836	Lag0_28d. San Juan (capital city), Mayagüez small temperature impacts, even reduced PTB at high temperatures. Ponce PTB rises with temperature (warmest of the 3 regions). 90th centile similar patterns. Ponce Mayagüez lag0_28d smaller impacts than lag0d. San Juan lag0_28d and lag0d similar. 29.4°C vs 26.2°C in Mayagüez, cumulative RR=0.78 (95%CI=0.68, 0.90). 28.8°C vs 26.7°C in Ponce, cumulative RR is 1.1 (95% CI: 1.03, 1.2)
206.	Li (2018)	Brisbane, Australia	N=237 585. N PTB=15 047	1st week of pregnancy; 1st 4 weeks; lag0_6d, lag0_28d. Tmax >30°C (reference group) vs 25-30°C, 20-25°C, ≤20°C categories based on distribution of temperature, effect of temperature on outcomes. Mean duration of gestation similar in temperature groups for all 4 lags (38.92-38.98w). NS. Multivariate NS
207.	Li (2018)	Brisbane, Australia	N=289 351. N PTB=22 822	Similar findings for Tmax and Tmin daily temperatures. Comparison daily Tmean 75th centile and temperature at minimum PTB prevalence. 1st trimester HR=1.04 (95%CI=0.98, 1.09). 2nd trimester HR=1.03 (95%CI=0.99, 1.07). 3rd trimester HR=1.11 (95%CI=1.08, 1.15). 95th centile vs temperature at minimum PTB prevalence 1st trimester HR=1.07 (95%CI=1.00, 1.14). 2nd trimester HR=1.03

				(95%CI=0.99, 1.08). 3rd trimester HR=1.21 (95%CI=1.16, 1.26). U shape in 3rd trimester (base 19.5°C)
208.	Zhong (2018)	Changsha, Hunan Province, China	N=3509. N PTB=141	Whole pregnancy OR=1.34 (95%CI=1.11-1.62) per 1°C increase in Tmean. OR per increase of 1°C in 1st trimester whole period NS and all seasons aside from summer OR=1.93 (95%CI=1.32-2.82). 2nd trimester whole period OR=1.03 (95%CI=1.00, 1.06), spring OR=1.51 (95%CI=1.32, 1.74), summer OR=1.77 (95%CI=1.32, 2.37). 3rd trimester whole period NS, spring OR=1.44 (95%CI=1.17, 1.76). Whole pregnancy: spring OR=1.57 (95%CI=1.24, 1.97), summer OR=1.78 (95%CI=1.06, 2.98). Winter, autumn NS, point estimate around 1.0. OR for 1d increase in extreme heat exposure (>30°C). 1st trimester OR=1.00 (95%CI=0.99, 1.02). 2nd trimester OR=1.01 (95%CI=1.00, 1.02). 3rd trimester OR=0.98 (95%CI=0.96, 0.99). Whole pregnancy OR=0.99 (95%CI=0.97, 1.00)
209.	Zheng (2018)	Changsha, Hunan Province, China	N=3604. N PTB=145.	OR is per 0.5°C increase. High temperatures (above median in each period). Conception month: OR=1.14 (95%CI=1.04-1.24). 1st trimester high temperature OR=1.23 (95%CI=1.12-1.35). 2nd trimester OR=0.86 (95%CI=0.80-0.93; P<0.001. 3rd trimester high temperature OR=1.22 (95%CI=1.10, 1.35). Birth month high temperature (>19.9^{0}C) OR=1.00 (95%CI=0.91, 1.09). Whole pregnancy high temperature (>18.2^{0}C) OR=2.57 (95%CI=1.98, 3.33). Extreme heat day (>90th centile). Odds of PTB per 2d/m increase in extreme heat days. Conception month OR=1.15 (95%CI=1.04, 1.26). 1st trimester OR=1.10 (95%CI=0.99, 1.23). 2nd trimester OR=0.59 (95%CI=0.49, 0.70). 3rd trimester OR=1.14 (95%CI=1.04, 1.25). Birth month OR=1.10 (95%CI=1.01, 1.19). Entire pregnancy OR=1.51 (95%CI=1.05, 2.18). U shape (base 18°C)
210.	Weng (2018)	Taiwan, China	N=2 045 748. N PTB not provided	Temperature at birth. 21.5-23.4°C (reference group, lowest risk). Temperature 23.5-25.4°C RR=1.00 (95%CI=0.97, 1.02). Temperature 25.5-27.4°C RR=1.04 (95%CI=1.02, 1.07). Temperature 27.5-29.4°C RR=1.11 (95%CI=1.08, 1.13).Temperature 29.5-30.8°C RR=1.05 (95%CI=1.02, 1.08). U shape (base 23.5-25.4°C)
211.	Guo (2018)	132 cities in 30 provinces in China	N=1 020 471. N PTB=73 240. Cold area PTB n=12 433. Medium temperature area PTB n=29 266. Hot area PTB n=25 665	>95% centile of local Tmean, compared to 5-95% centile. For cold areas, NS findings, but all in direction of effect. Medium areas NS preconception, weeks 1-7 gestation, weeks 8-14, weeks 15-21, all direction of protective effect; 4 weeks before birth OR=1.16 (95%CI=1.10 to 1.22); NS 1 week before birth, direction of effect. Hot areas preconception OR=1.23 (95%CI=1.17, 1.30); weeks 1-7 OR=1.11 (95%CI=1.05, 1.17); weeks 8-14 OR=1.15 (95%CI=1.09, 1.21); weeks 15-21 OR=1.11 (95%CI=1.05 to 1.17); 4 weeks before birth OR=1.06 (95%CI=0.10 to 1.12; p=0.060); 1 week before birth OR=1.07 (95%CI=1.01 to 1.13)
212.	Wang (2019)	Brisbane, Australia	N=277 133. N PTB=17 368	Exposure in each gestation month binary variable, 6 HWs: 90th centile (2, 3, 4d duration); 95th centile (2, 3, 4d duration). All definitions and 9 month gestation HRs were significant. For most definitions, HR point estimates were highest in months 1-6. In most months, the longer the duration of HW the higher the OR. OR similar in 90th and 95th centiles, 95th lower than 90th in some comparisons. In 42 of 72 measures HR>1.20, 16 measures>1.4. HR at 90th centile 2d duration highest in month 2=1.42 (95%CI=1.29, 1.56) and lowest in month 7 HR=1.09 (95%CI=0.99, 1.20), median in month 3 HR=1.29 (95%CI=1.17, 1.42)
213.	Wu (2019)	Wuhan city, Hubei province, China	N=11 056. N PTB=618	Diurnal temperature range=Tmax minus the Tmin on the same day. Mean range during each period. Range PTB significant in lag0_14d 5.4% increase PTB risk per 1°C increase in range (95%CI=0.6 , 10.4). Tertiles of range lag0_14d: Low reference group. Medium OR=1.349 (95%CI=1.076, 1.692). High OR=1.420 (95%CI=1.078, 1.870; p test for trend=0.021)
214.	Asta (2019)	Rome, Palermo, Venice, Trieste, Bologna, and Turin, Italy	N=121797. N PTB=6135.	Tmax (temperature and dew point). 90th vs 75th centile in each city. lag2d Palermo RR=1.02 (95%CI=0.95, 1.09). lag1d Bologna RR=1.09 (95%CI=0.90, 1.32).

				lag3d Venice RR=1.94 (95%CI=1.32, 2.85). lag2d Rome RR=1.06 (95%CI=1.03, 1.10). lag3_6d Turin RR=1.03 (95%CI=0.97, 1.07). lag14_20d Trieste RR=1.06 (95%CI=0.95, 1.20). U shape in Venice (base 22.5°C)
215.	Mohammadi (2019)	Sabzevar, north eastern Iran	N PTB=3140	Lag0d highest impact, lag1, 2, 3, 4, 5, 6, 7, 8d also significant. NS findings at larger lags. PTB in heat wave days (daily Tmean >90th percentile ≥2 consecutive days) compared to non-HW days RR 1.21 (95%CI=1.08, 1.37). Compared to median value, lag0d. Mean temperature RR 75th centile=1.25 (95%CI=1.12, 1.4) RR 99th centile=1.6 (95%CI=1.37, 1.87). Tmax RR 75th centile=1.18 (95%CI=1.07 to 1.3) RR 99th centile=1.53 (95%CI=1.33, 1.76). Apparent temperature (dry bulb temperature, vapour pressure, air velocity) RR 75th centile=1.26 (95%CI=1.16, 1.37), RR 99th centile=1.55 (95%CI=1.36, 1.77)
216.	Son (2019)	Seoul, South Korea	N=813 820. N PTB=32 908	Heat Index (air temperature and relative humidity). HR are for a quartile increase in heat index. PTB whole pregnancy HR=1.03 (95%CI=1.01 to 1.06) [ES Q4 vs Q1=1.10; SE=0.044], lag028 HR=1.01 (95%CI=1.01 to 1.02) [ES Q4 vs Q1=1.04; SE=0.013], lag07 HR=1.01 (95%CI=1.00 to 1.02).
217.	Ward (2019)	Coast , Mountain and Piedmont, North Carolina, USA	Coast : N=79 994, PTB = 9723. Mountain: N=29 923, N PTB=3392. Piedmont: N=147 049, PTB = 9723.	Lag0d. Tmin. Reference group temperature when OR became >1. Mountain region, 82-83 centile (reference group): 84–86 centile OR=1.01 (95%CI=1.01, 1.02), 86–88 OR=1.04 (95%CI=1.03, 1.04) 88–90 OR=1.06 (95%CI=1.05, 1.07), 90–92 OR=1.08 (95%CI=1.05, 1.11) 92–94 OR=1.10 (95%CI=1.05, 1.14), 94–96 OR=1.11 (95%CI=1.04, 1.17), 96–98 OR=1.12 (95%CI=1.04, 1.19). Piedmont Region 84-85 centile (reference group): 86–88 centile OR=1.01 (95%CI=1.00, 1.01), 88–90 OR=1.01 (95%CI=1.01, 1.02), 90–92 OR=1.02 (95%CI=1.00, 1.05), 92–94 OR=1.03 (95%CI=0.98, 1.07), 94–96 OR=1.03 (95%CI=0.97, 1.09), 96–98 OR=1.04 (95%CI=0.97, 1.11), 98–100 OR=1.04 (95%CI=0.97, 1.11). Coastal Plains Region 82-82 centile (reference group): 84–86 OR=1.01 (95%CI=1.01, 1.01), OR=86–88 1.02 (95%CI=1.02, 1.02), 88–90 OR=1.03 (95%CI=1.03, 1.03), 90–92 OR=1.04 (95%CI=1.03, 1.05), 92–94 OR=1.05 (95%CI=1.02, 1.08), 94–96 OR=1.06 (95%CI=1.01, 1.10), 96–98 OR=1.06 (95%CI=1.01, 1.12), 98–100 OR=1.07 (95%CI=1.00, 1.13) Clear dose-dependent rises in OR with temperature. Lag3d similar findings
218.	Sun (2019)	403 counties, USA	N=31 921 046. N PTB=2 973 909	95th centile vs median lag4d RR=1.03 (95%CI=1.02, 1.04), lag1d significant. Lag0d, lag2d lag3d NS. Linear shape
219.	Smith (2020)	Minnesota, United States	N=154 157. N PTB=14 542	HW lagd7 mean daily heat index >37°C [99th centile] (temperature and humidity) RR=1.13 (95%CI=0.99, 1.28) versus non-HW
220.	Wang (2020)	Guangzhou, China	N = 215 059. N PTB = 11 109	Except for 33°C-D2 and 33°C-D3, other 10 HW definitions associated with higher risk of PTB. The HRs of PTB ranged from 1.10 (95%CI=1.01, 1.20) to 1.92 (1.39, 2.64). In general, risk of PTB increased with HW intensity. When stratified by gestational age, all HW more intense than 75th-D2 were associated with higher risk of PTB at 35-36w, with HR ranging from 1.13 (95%CI=1.03, 1.25) to 1.72 (95%CI=1.26, 2.35). For PTB at 28-34w, very intense HW associated with PTB: 95th-D3 HR 1.56 (95%CI=1.07, 2.28) and 98th-D2 2.04 (95%CI=1.37, 3.03)
221.	Liu (2020)	Guangzhou, China	N = 4101. N PTB=234	Increased HR for PTB with increasing temperatures. Maximum significant periods of exposure for 95th percentile at weeks 4-8:Max HR = 1.79(95% CI=1.26, 2.54) and 22-27weeks HR=1.83 (95%CI=1.27, 2.62). Dose-response effect noted.
222.	Spolter (2020)	Southern district of Israel	N=62547.N late PTB= 5336	Exposure to weekly Tmean over whole period, e.g. week 31-36 for late preterm vs middle quintile. Late preterm HR=1.31 (95%CI=1.11, 1.56). 5th quintile HR=1.13 (95%CI=0.98, 1.29). Early term highest quintile HR=1.24 (95%CI=1.13, 1.36). 4th quintile HR=1.16 (95%CI=1.07, 1.25). Quintile 5 >25.6°C. Quintile 4 22.2-25.4°C

223.	Gronlund (2020)	Detroit, Michigan, United States	N PTB=9052	Hot season May - September. Total effects 10.6% [95% CI=3.8%, 17.2%] of PTBs attributable to apparent temperature (AT) exposure of 24.9°C versus 18.6°C. Direct effect, taking into account mediation by PM10, ozone and NO2= 10.4% [95%CI=2.2%, 17.5%].
224.	Cho (2020)	162 cities, South Korea	N=2 300 000. N PTB not provided	No significant association between PTB and daily temperature >32°C, or 30-32°C, 0-12m after weather event, relative to 28-30°C. At month 0 after weather event, r=-0.018 (SE 0.030) for exposure to daily Tmax >32°C relative to 28-30°C. At month 3, r=0.004 (SE 0.025) for exposure to daily Tmax >32°C relative to 28-30°C
225.	Barreca (2020)	Unites States	N= 56 030 127	Extreme heat associated with increase in deliveries on the day of exposure and on following day, and that additional births were accelerated by up to two weeks. 25 000 infants per year born earlier as a result of heat exposure, with a total loss of more than 150 000 gestational days annually. Absent adaptation, climate projections suggest additional losses of 250 000 days of gestation per year by the end of the century. Birth rates increase by 0.97 births per 100 000 women aged 15-44 years old on days with a maximum temperature ≥ 32.2 °C (90°F) compared to days with a maximum temperature of 15.6-21.1°C (60-70°F) - increase of 5% relative to average daily county birth rate. 0.66 increase on next day. Two days after exposure, birth rates decrease by 0.57, suggesting most births most affected births shift forward by one or two days.
226.	Wang (2020)	China	N = 1 282 859. N PTB=104 493	Whole of pregnancy: 95th percentile vs minimum risk HR=1.55 (95% CI=1.48, 1.61; p<0.05). First trimester 95th percentile vs minimum risk HR=1.96 (95%CI=1.85, 2.08; p<0.05), Second trimester 75th percentile vs minimum risk HR=1.41 (95%CI=1.34, 1.47; p<0.05), Third trimester 95th percentile vs minimum risk HR=1.04 (95%CI=1.02, 1.06; p<0.05).
227.	Li (2021)	Shenzhen, China	N=1 388 994. N PTB=78 920	Diurnal temperature range (Tmax-Tmin). HR 2nd trimester per 1°C increase=1.06 (95%CI=1.03, 1.08). 4 weeks preceding birth HR=0.96 (95%CI=0.95, 0.97). 1 week preceding birth HR=0.99 (95%CI=0.98, 0.10). For May to Oct HR 2nd trimester=1.10 (95%CI=1.06, 1.14). Tmean on a day - Tmean on previous day. HR 1st trimester per 1°C increase=1.08 (95%CI=1.05, 1.12), 2nd trimester HR=1.24 (95%CI=1.20, 1.28). 4 weeks before birth HR=1.02 (95%CI=1.00, 1.04). May to Oct HR 2nd trimester=1.44 (95%CI=1.37, 1.51)
228.	Cushing (2021)	Harris County, Texas	N=198 013. N PTB=20 462	Risk of PTB 15% higher following extremely hot days HR=1.15 (95%CI=1.01, 1.30) for Tmax ≥40°C vs. <20°C; HR=1.15 (95% CI=1.02, 1.28) for Tmax and Tmin >99th centile. Censoring at earlier gestational ages suggested stronger associations earlier in pregnancy.
229.	Gat (2021)	Nege, Southern Israel	N=84 476. N PTB=8076	Increase in Tmean. Jewish NS. Bedouin-Arabs lag0d RR=1.19 (95%CI=1.03, 1.37). Also lag1d and lag2d significant. Lag0_7d per quartile increase RR=1.15 (95%CI=0.10, 1.34; p=0.059). Quartile 3 vs Quartile 1 RR=1.49 (p=0.001). Quartile 4 vs Quartile 1 RR=1.10 (NS)
230.	Tapia (2021)	Lima, Peru	N= 123 034. N PTB=8897	Comparing IQR of Tmax with Q1 as reference, Q4 Tmax in first trimester HR=1.06 (95% CI: 1.01, 1.14). Harmful effects noted for entire pregnancy and second trimester, but NS in third trimester. Minimum p-value for interaction 0.001.
231.	Cheng (2021)	Xuzhou, China	N=103 876 births. N=4 623 PTB	No effect for heat (99th percentile relative to median temperature_ RR 1.01 (95% CI=0.75-1.37) for lag0d. All other lags have RR point estimate < 1 for 99th and 75th percentile.
232.	Gong (2021)	Rural areas of Henan province, China	N=5394. N PTB=186	For each 1°C increase in daily Tmean during entire pregnancy, PTB inceased OR=1.21 (95%CI=1.10, 1.32) and gestational age decreased by -0.44d (95%CI=-0.61, -0.27). Gestational age decreased with each additional 1°C in daily Tmean in 1st trimester -0.06d (95%CI=0.01, 0.11). Odds of PTB increased with each 1°C increase in daily Tmean in last week of pregnancy OR=1.03 (95%CI=1.00, 1.06), last 2 weeks pregnancy OR=1.03 (95%CI=1.01, 1.06), last 3 weeks pregnancy

				OR=1.04 (95%CI=1.01, 1.07) and last 4 weeks pregnancy OR=1.04 (95%CI=1.01, 1.07). Gestational age decreased with each 1°C increase in daily Tmean for the last week of pregnancy: -0.08d (95%CI=-0.14, -0.03), last 2 weeks pregnancy -0.10 (95%CI=-0.15, -0.04), last 3 weeks pregnancy -0.11 (95%CI=-0.16, -0.05) and last 4 weeks pregnancy -0.11(95%CI=-0.17, -0.05). In cold season, PTB odds increased and gestational age decreased with ambient temperature fluctuations in last 1-4w pregnancy, but not in the warm season: Last 4w OR=1.05 (95%CI=1.02, 1.09)
233.	Kwag (2021)	South Korea	N = 1 329 991. NPTB=61 182	Increased OR for preterm birth with heat wave exposure hours >202.5 (90th percentile) compared to 0 hours of exposure in first trimester of 1.05 (95% CI: 1.01; 1.09, P-value = 0.009). Increased OR for preterm birth with heat wave exposure hours >315.0 (88th percentile) compared to 0 hours of exposure in second trimester of 1.17 (95% CI: 1.13; 1.22, P-value < 0.001). Increased OR for preterm birth with heat wave exposure hours >315.0 (88th percentile) compared to 0 hours of exposure in first trimester with PM2.5 of 51-75percentile of 1.37 (95% CI: 1.25; 1.52, P-value <0.001)
234.	Jegasothy (2021)	New South Wales, Australia	N=916 678 N PTB=29 421	Exposure 95th centile of daily Tmean (25°C). Increased risk of PTB RR=1.14 (95%CI=1.07, 1.21) compared with median daily Tmean (17°C). Similar effect sizes seen for 95th centile of daily Tmin and Tmax vs median. Cumulative effect of daily Tmean difference from 17°C to 25°C peaked at lag7d RR=1.16 (95%CI=1.08, 1.25). Cumulative effect of Tmax difference from median (23°C) to 95th centile (33°C) also highest at lag7d with RR=1.12 (95%CI=1.05, 1.20)
235.	Khodadi (2022)	Ahvaz, Iran	N=150 766 women. N PTB=5776	Hot thermal stress (UTCI) not associated with cumulative RR of PTB at lag 0d, 0_2d, 0_6d, 0_13d and 0_21d. For lag0d cumulative RR=0.90 (95%CI 0.67, 1.21) and for lag0_21d, cumulative relative risk for PTB was 1.38 (95%CI 0.71, 2.67)
236.	Nyadanu (2022)	Western Australia	N PTB=15 576	Exposure 75th (18.9°C) centile relative to median UCTI (13.8°C). At lag0d and lag0_6d RR=1.01 (95% CI=1.01, 1.01), lag0_13d RR=1.01 (95%CI=1.01, 1.02) and lag0_21d RR=1.04 (95%CI=1.03, 1.04). For the 95th (26.4°C) centile relative to median UCTI (13.8°C), lag0d and lag0_6d RR=1.01 (95%CI=1.01, 1.01), lag0_13d RR=1.03 (95%CI=1.03, 1.04) and lag0_21d RR=1.04 (95%CI 1.03, 1.05). For the 99th (31.2°C) centile relative to median UCTI (13.8°C), lag0d and lag0_6d RR=1.01 (95%CI=1.01, 1.02) and lag0_13d RR=1.05 (95%CI=1.04, 1.06). Excess of 11 (95%CI=9, 13) per 10,000 liveborn due to immediate (lag0d) and 36 (95%CI=29, 43) due to cumulative (lag0_6d) heat stress (99th centile). Transition season had higher risk at 95th and 99th centiles compared to winter and summer at lag0d, and at 99th percentile for lag0d, lag0_6d, lag0_13d and lag0_21d. At lag 0d at 99th percentile, RR=1.04 (95%CI=1.03, 1.04) in transition season compared to RR=0.99 (95%CI=0.99, 1.00) in winter and RR=1.02 (95%CI=1.00, 1.01) in summer
237.	Hough (2022)	Poitiers, Nancy, Brittany and Grenoble, France	N=5347	Mean Tmin (95th vs 50th; 15.7C vs 7.4C) during weeks 1–5 RR=2.00 (95%CI=1.05, 3.84) and 20-26 weeks RR=2.87 (95% CI=1.21, 6.79). Mean Tmin 95th centile 15.7°C in individual weeks 1–5 or 21–26 all p<0.05, mean RR of 1.16 for all these weeks (95%CI=1.02–1.34). 90th smaller but significant effect in these windows. 99th percentile larger effect in weeks 21-26 RR=3.81 (95%CI=1.18, 12.32). 95th significant in last 5 days of gestation.
238.	Keivabu (2022)	50 provincial capital cities, Spain	N=4 314 381. N PTB=259 383	Unit is percent increase in outcome per additional day at >32°C vs days at 5-25°C. PTB: -0.026% reduced per day (p>0.05).
239.	McElroy (2022)	14 LMICs (Angola, Benin, Burundi, Ethiopia, Haiti, Malawi, Nepal, Nigeria, Philippines, South Africa, Tajikistan, Timor-Leste,	N=103 535. N PTB=5882	Diurnal range <16°C (p<0.05) only lagd0 14°C RR=1.76 (95%CI=1.23-2.54). NS, but strong trend for increased risk of PTB at >20°C Tmax lag0_7d

		Uganda, and Zimbabwe)		
240.	Cil (2022)	United States	N=34 700 000. N PTB = 3 425 098	An additional day during pregnancy with average temperature 90°F leads to additional 0.013 very preterm births per 1 000 (0.1% of mean; p <0.10), an additional 0.014 extremely preterm births per 1 000 births (0.23% of mean; p<0.01). In births with greater exposure to summer months during gestation (i.e. high exposure group), an additional hot day with temperatures 2-3 SD above the mean leads to an additional 0.104 preterm births per 1 000 (0.1% of the mean; p<0.05)
241.	Bont (2022)	Sweden	N=560 615. N PTB=28 221	When comparing 95th and 50th centile, OR=1.21 (95%CI=0.82, 1.78) in case-crossover design, reduction of -0.65 (95%CI=-9.67, 8.36) days in gestational age at birth in quantile regression, and HR=1.25 (95%CI=0.92, 1.70) in time-to-event analysis. NS
242.	Zhang (2022)	China	No population numbers provided. National and provincial prevalence of PTB, and heat-wave-PTB association in China were obtained from other studies.	HW associated PTBs in observed climate amounted to annual average of 13 262 (95%CI= 6 962, 18 802) cases. HW related PTBs induced by anthropogenic climate change gave an average of 4609 (95%CI=711, 6110) cases annually amounting to 25.8% (95%CI=17.1%, 34.5%). The total economic costs of human capital losses caused by annual by anthropogenic climate change are expected to exceed $1billion annually
243.	Yuzen (2023)	Hamburg, Germany	N=25 624. N PTB=2181	RR of PTB after exposure to heat event (Tmax significant at the 98th percentile for minimum 3 consecutive days) RR=1.59 (95%CI 1.01, 2.43). PTB associated with apparent temperature at 90th percentile for 5 days RR=1.20 (95%CI=1.02, 1.40) and 99th percentile for 2 days exposure RR=1.45 (95%CI=1.04, 2.00). Late PTB (34-37 weeks) highest risk at 98th percentile for 3 day Tmax exposure RR=2.00 (95%CI=1.21, 3.21) and by apparent temperature at 99th percentile RR=1.67 (95%CI=1.14, 2.43)
244.	Wang (2023)	16 selected counties in 8 cities in China	N=21652. N=10 826 sibling pairs. N PTB=804	Exposure to heat in trimester 3 and entire pregnancy associated with increased odds of PTB. In trimester 3, moderate heat (Tmin >85th percentile) OR=2.98 (95%CI=2.09, 4.26), severe heat (>90th percentile) OR=2.48 (95%CI=1.73, 3.55) and extreme heat (>95th percentile) OR=3.22 (95%CI=2.10, 4.92). Similarly for entire pregnancy, exposure to moderate heat OR=2.15 (95%CI=1.56, 2.98), severe heat OR=3.12 (95%CI=2.18, 4.46) and extreme heat OR=5.09 (95%CI=3.27, 7.92).
Small for gestational age				
245.	Ha (2017)	15 hospitals, USA	N=220 572. N=22 239 SGA	Temperature from conception to childbirth higher among SGA than non-SGA. Temperature >95th centile in whole pregnancy RR=1.05 (95%CI=0.97, 1.13)
246.	Molina (2017)	Andean region, across Bolivia, Colombia, and Peru	N=86 021	Outcome is change in absolute % with 1 SD above historical Tmean in location. SGA increase 0.9% (P<0.05)
247.	Kloog (2018)	Southern Israel	N=56 141. N=8634 SGA cases	Quartile 25-75 is reference. Whole pregnancy Tmean exposure >75th percentile reduced SGA OR=0.91 (95%CI=0.84, 0.99). 1st trimester mean temp >75th centile OR=0.82 (95%CI=0.73, 0.92); 2nd trimester OR=0.94 (95%CI=0.85, 1.04), 3rd trimester OR=0.95 (95%CI=0.85, 1.05)
248.	Carlson (2022)	Boston, USA	N=4442 mother-child dyads	Association between 1SD change in heat index and SGA significant between gestational week 9 and 26, a 1°C increase in weekly SD heat index associated with 10% (95%CI=2%, 18%) increase in SGA. Cumulative risk for SGA weeks 9-26 was OR=4.7 (95%CI=1.6, 14.1). Cumulative effect in the 2nd trimester (week 14–26) OR=3.2 (95%CI=1.4, 7.4)
249.	Li (2023)	Hubei Province, China	N=1 436 480 singleton newborns. N=108 825 cases of SGA	In Eastern region, significant association between SGA and heat exposure in the second trimesters OR=1.04 (95%CI=1.01, 1.08) and third trimester OR=1.17 (95%CI=1.13, 1.22). In middle region, SGA associated with heat exposure in third trimester OR=1.29 (95%CI=1.21, 1.37), but protective in second trimester OR=0.90 (95%CI=0.84, 0.98). In the Western region

				(highest altitude), no significant association between SGA and heat exposure.
250.	Sun (2019)	403 counties, USA	N=29 597 735 term births. N=3 018 969 SGA cases	Reference 40th-50th centile of daily Tmean for entire pregnancy and term SGA. >90th centile OR=1.04 (95%CI=1.03, 1.05). 80-90th centile OR=1.03 (95%CI=1.02, 1.04). Results similar if preterm births included. Linear association from 50th-100th centile. Impacts in 2nd and 3rd trimester similar to impacts in all pregnancy. Temperature 1st trimester NS, point estimates around 1.0. Largest impacts in marine and cold/very cold climate zones

Supplementary note 1: Study References

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Supplementary note 2: Funnel plots for meta-analyses

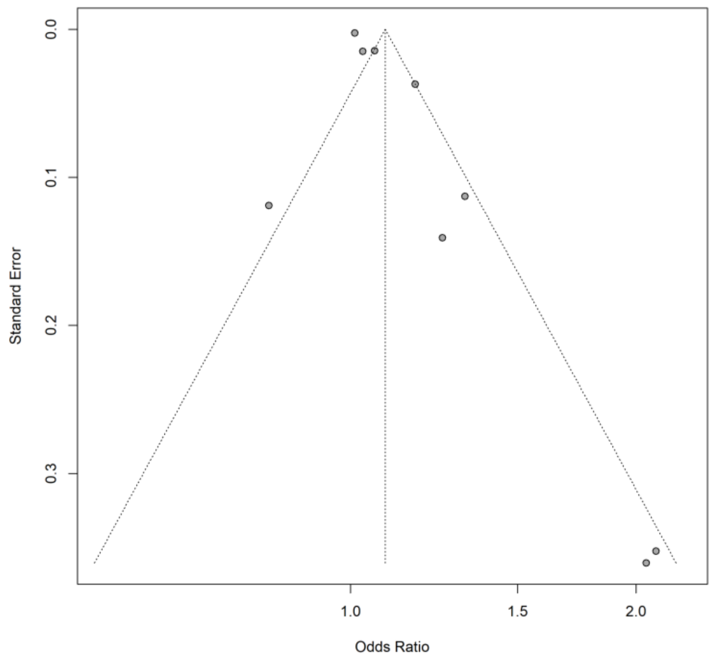

Figure S3.1: Funnel plot of odds of stillbirth. Asymmetrical funnel plot for studies that assessed the odds of stillbirth during high versus low temperatures with exposure period < 4 weeks illustrating evidence of inflated effects in smaller studies. Each shaded grey circle represents a study's effect estimate and standard error.

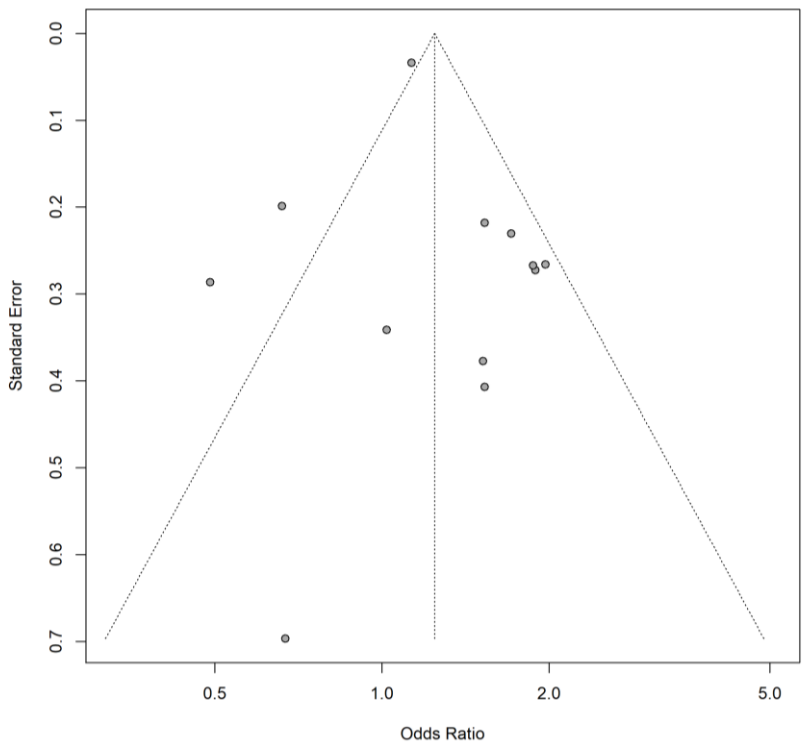

Figure S3.2: Funnel plot for odds of congenital anomalies. Studies that assessed the odds of congenital anomalies during a heat wave on a funnel plot, suggestive of publication bias. Each shaded grey circle represents a study's effect estimate and standard error.

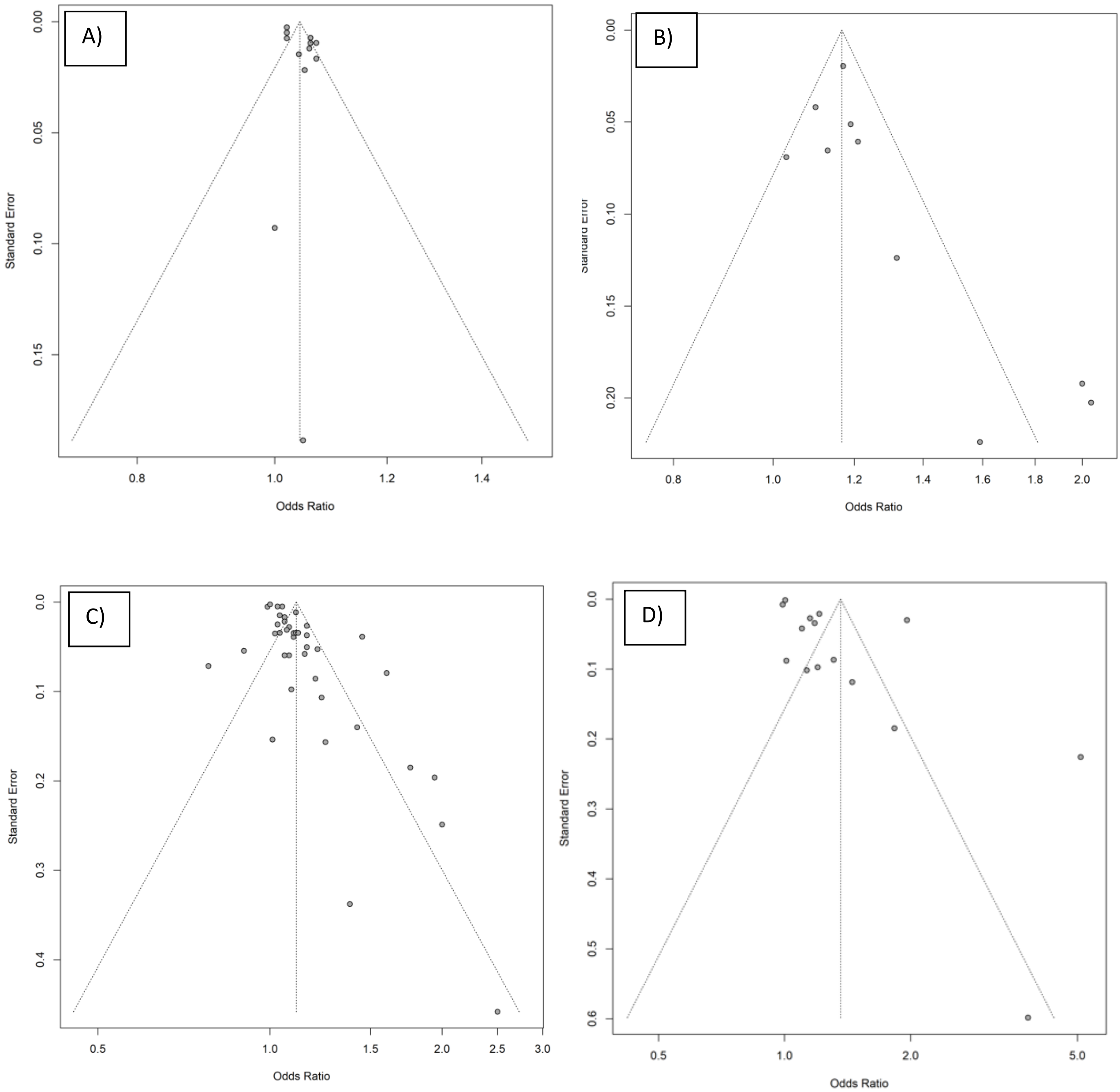

Figure S3.3 Funnel plots for the odds of preterm birth. A) per 1°C temperature increase with short exposure lag <4 weeks with evidence of symmetry B) during a heat wave with exposure period <4 weeks with asymmetry suggestive of inflated effects estimates in smaller studies C) during high versus low temperatures with exposure <4 weeks with evidence of publication bias with smaller studies reporting higher effect estimates D) during high versus low temperatures with long term exposure >4 weeks with evidence of asymmetry potentially indicating publication bias with smaller studies reporting higher effect estimates. Each shaded grey circle represents a study's effect estimate and standard error.

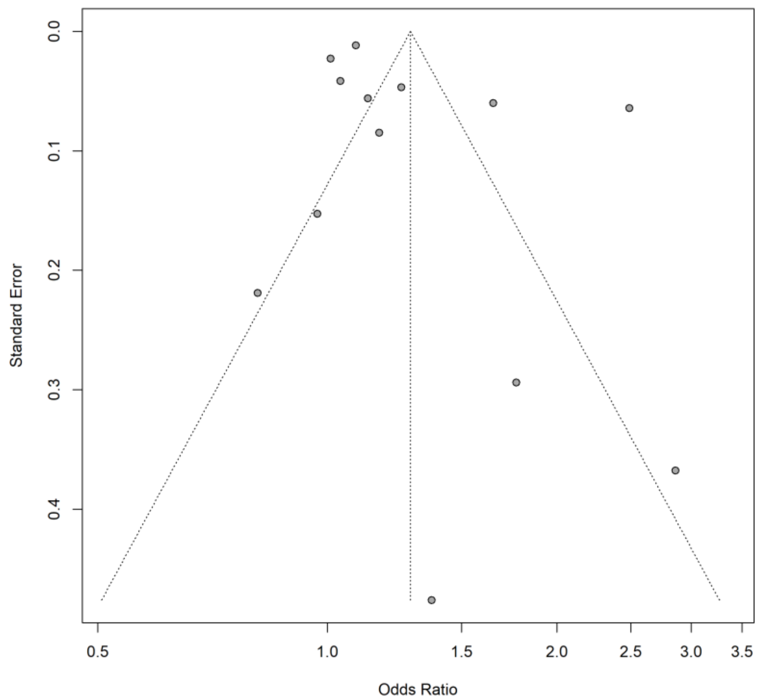

Figure S3.4 Funnel plot for the odds of low birth weight. Asymmetrical funnel plot representing studies that assessed low birth weight during high versus low temperatures, with risk of publication bias die to higher effect estimates reported in smaller studies.

Supplementary note 3: Search on MEDLINE (PubMed) and Web of Science

MEDLINE search:

Search covers terms for:

1. The population (those affected by heat: no 1 below) AND
2. Intervention (No. 2a: climate change OR 2b Media OR 2c cooling OR 2d Health promotion)
3. NOT 3 (genetics)

1. Search for the Population (those with heat-related conditions)

(((“ambient temperature”[title/abstract] OR “heat strain”[title/abstract] OR “heat exposure”[title/abstract] OR “heat stress”[title/abstract] OR Heating[mesh] OR “Heat Stress Disorders”[MESH] OR “hot temperature*”[title/abstract] OR “extreme heat”[MESH] OR “Heat stroke”[MESH] OR “heatstroke”[title/abstract] OR “heat index”[title/abstract] OR “heat episode”[title/abstract] OR “Heat Stress Disorders”[MESH] OR “heat event”[title/abstract] OR “Body temperature”[Mesh:noexp] OR “extreme temperature*”[title/abstract] OR “summer temperature*”[title/abstract] OR “Heat Exhaustion”[mesh] OR “summer weather”[title/abstract] OR “summer temperature*”[title/abstract] OR “heat wave”[title/abstract] OR “heatwave”[title/abstract] OR “indoor temperature”[title/abstract] OR “global temperature*”[title/abstract]))) NOT ((("Animals"[Mesh] NOT ("Animals"[Mesh] AND "Humans"[Mesh])))) NOT (“Chemicals and Drugs Category”[MeSH]) NOT ((("Plants"[Mesh] NOT ("Plants"[Mesh] AND "Humans"[Mesh]))))

AND

2. Search strategy for interventions

a. locating Climate change articles in PubMed

((“global warming”[Title/Abstract] OR “global warming”[MESH] OR climatic*[Title/Abstract] OR “climate change"[Title/Abstract] OR “climate change”[MESH] OR “Desert Climate”[mesh] OR “El Nino-Southern Oscillation”[Mesh] OR Microclimate[mesh] OR “Tropical Climate”[mesh]))

b. Search for media (a validated search for social media)

media[title/abstract] OR communication*[title/abstract] OR audiovisual[title/abstract] OR helpline*[title/abstract] OR hotline*[title/abstract] OR telecommunication*[title/abstract] OR educat*[title/abstract] OR radio[title/abstract] OR television[title/abstract] OR TV[title/abstract] OR internet[title/abstract] OR campaign*[title/abstract] OR advert*[title/abstract] OR print*[title/abstract] OR “information campaign”[title/abstract] OR telemedicine[title/abstract] OR telehealth[title/abstract] OR telepharmac* OR e-health[title/abstract] OR ehealth[title/abstract] OR e-pharmac*[title/abstract] OR “social media”[mesh] OR “social media”[title/abstract] OR “social network*”[title/abstract] OR Twitter[title/abstract] OR Facebook[title/abstract] OR Linkedin[title/abstract] OR Pinterest[title/abstract] OR YouTube[title/abstract] OR "daily motion"[title/abstract] OR Yelp[title/abstract] OR Foursquare[title/abstract] OR "Google Circles"[title/abstract] OR Qype[title/abstract] OR Ello[title/abstract] OR Instagram[title/abstract] OR "Pip.io"[title/abstract] OR "Google Buzz"[title/abstract] OR Orkut[title/abstract] OR Tumblr[title/abstract] OR onesocialweb[title/abstract] OR asmallworld[title/abstract] OR bebo[title/abstract] OR myspace[title/abstract] OR folkdirect[title/abstract] OR virb[title/abstract] OR Friendster[title/abstract] OR storyofmylife[title/abstract]

c. **Search for cooling**

cooling[title/abstract] OR “Air condition*”[title/abstract] OR “Air-condition*”[title/abstract] OR climatization[title/abstract] OR climatisation[title/abstract] OR ventilation[title/abstract] OR Fan[title/abstract] OR fans[title/abstract]

d. **Search for health promotion and risk**

adaptation[title/abstract] OR adapting[title/abstract] OR response[title/abstract] OR alert[title/abstract] OR implement*[title/abstract] OR awareness[title/abstract] OR strategy*[title/abstract] OR strategies[title/abstract] OR ”risk management”[title/abstract] OR ”risk management”[mesh] OR “emergency management”[title/abstract] OR “preparedness”[title/abstract] OR “disaster management”[title/abstract] OR warning*[title/abstract] OR “health promotion”[MeSH] OR “Health education”[MeSH] OR “communication campaign*”[Title/abstract] OR guideline*[Title/Abstract] OR recommendation*[Title/Abstract] OR “Health Services for the Aged”[mesh] OR “health facility planning”[MESH] OR “Public health surveillance”[MeSH] OR “home intervention”[title/abstract] OR “home care”[title/abstract] OR homecare[title/abstract] OR “home care services”[MESH] OR “patient care planning”[MESH] OR “Comprehensive Health Care”[mesh] OR outreach[title/abstract] OR “Patient care team”[MESH] OR multidisciplinary[title/abstract] OR “home visit”[title/abstract] OR “home assessment”[title/abstract] OR “patient management”[title/abstract] OR “social support”[MESH] OR shelter[title/abstract]

3. **Not genetics**

NOT (Genetic Phenomena[MeSH] OR DNA[title/abstract] OR RNA[title/abstract])

Full search:

(((((((adaptation[title/abstract] OR adapting[title/abstract] OR response[title/abstract] OR alert[title/abstract] OR implement*[title/abstract] OR awareness[title/abstract] OR strategy*[title/abstract] OR strategies[title/abstract] OR ”risk management”[title/abstract] OR ”risk management”[mesh] OR “emergency management”[title/abstract] OR “preparedness”[title/abstract] OR “disaster management”[title/abstract] OR warning*[title/abstract] OR “health promotion”[MeSH] OR “Health education”[MeSH] OR “communication campaign*”[Title/abstract] OR guideline*[Title/Abstract] OR recommendation*[Title/Abstract] OR “Health Services for the Aged”[mesh] OR “health facility planning”[MESH] OR “Public health surveillance”[MeSH] OR “home intervention”[title/abstract] OR “home care”[title/abstract] OR homecare[title/abstract] OR “home care services”[MESH] OR “patient care planning”[MESH] OR “Comprehensive Health Care”[mesh] OR outreach[title/abstract] OR “Patient care team”[MESH] OR multidisciplinary[title/abstract] OR “home visit”[title/abstract] OR “home assessment”[title/abstract] OR “patient management”[title/abstract] OR “social support”[MESH] OR shelter[title/abstract])) OR (cooling[title/abstract] OR “Air condition*”[title/abstract] OR “Air-condition*”[title/abstract] OR climatization[title/abstract] OR climatisation[title/abstract] OR ventilation[title/abstract] OR Fan[title/abstract] OR fans[title/abstract])) OR (media[title/abstract] OR communication*[title/abstract] OR audiovisual[title/abstract] OR helpline*[title/abstract] OR hotline*[title/abstract] OR telecommunication*[title/abstract] OR educat*[title/abstract] OR radio[title/abstract] OR television[title/abstract] OR TV[title/abstract] OR internet[title/abstract] OR campaign*[title/abstract] OR advert*[title/abstract] OR print*[title/abstract] OR “information campaign”[title/abstract] OR telemedicine[title/abstract] OR telehealth[title/abstract] OR telepharmac* OR e-health[title/abstract] OR ehealth[title/abstract] OR e-pharmac*[title/abstract] OR “social media”[mesh] OR “social media”[title/abstract] OR “social network*”[title/abstract] OR Twitter[title/abstract] OR Facebook[title/abstract] OR Linkedin[title/abstract] OR Pinterest[title/abstract] OR YouTube[title/abstract] OR "daily motion"[title/abstract] OR Yelp[title/abstract] OR Foursquare[title/abstract] OR "Google Circles"[title/abstract] OR Qype[title/abstract] OR Ello[title/abstract] OR Instagram[title/abstract] OR "Pip.io"[title/abstract] OR "Google Buzz"[title/abstract] OR Orkut[title/abstract] OR Tumblr[title/abstract] OR onesocialweb[title/abstract] OR asmallworld[title/abstract] OR bebo[title/abstract] OR myspace[title/abstract] OR folkdirect[title/abstract] OR virb[title/abstract] OR Friendster[title/abstract] OR storyofmylife[title/abstract])) OR (((“global warming”[Title/Abstract] OR “global warming”[MESH] OR climatic*[Title/Abstract] OR “climate change"[Title/Abstract] OR “climate change”[MESH] OR “Desert Climate”[mesh] OR “El Nino-Southern Oscillation”[Mesh] OR Microclimate[mesh] OR “Tropical Climate”[mesh]))))) NOT ((Genetic Phenomena[MeSH] OR DNA[title/abstract] OR RNA[title/abstract])))) AND ((((“ambient temperature”[title/abstract] OR “heat strain”[title/abstract] OR “heat exposure”[title/abstract] OR “heat stress”[title/abstract] OR Heating[mesh] OR “Heat Stress Disorders”[MESH] OR “hot temperature*”[title/abstract] OR “extreme heat”[MESH] OR “Heat stroke”[MESH] OR “heatstroke”[title/abstract] OR “heat index”[title/abstract] OR “heat episode”[title/abstract] OR “Heat Stress Disorders”[MESH] OR “heat event”[title/abstract] OR “Body temperature”[Mesh:noexp] OR “extreme temperature*”[title/abstract] OR “summer temperature*”[title/abstract] OR “Heat Exhaustion”[mesh] OR “summer weather”[title/abstract] OR “summer temperature*”[title/abstract] OR “heat wave”[title/abstract] OR “heatwave”[title/abstract] OR “indoor temperature”[title/abstract] OR “global temperature*”[title/abstract]))) NOT ((("Animals"[Mesh] NOT ("Animals"[Mesh] AND "Humans"[Mesh])))) NOT (“Chemicals and Drugs Category”[MeSH]) NOT ((("Plants"[Mesh] NOT ("Plants"[Mesh] AND "Humans"[Mesh])))))

Web of Science search:
Terms for heat and interventions:

(TS=(ambient temperature OR heat strain OR heat exposure OR heat stress OR extreme heat OR Heat stroke OR heatstroke OR heat index OR heat episode OR heat event OR extreme temperature OR heat exhaustion OR heat wave OR heatwave OR hot temperature OR global temperature OR summer temperature OR summer weather OR outdoor temperature OR “Air conditioner*” OR “air conditioning”)) **OR**

(TI=(ambient temperature OR heat strain OR heat exposure OR heat stress OR extreme heat OR Heat stroke OR heatstroke OR heat index OR heat episode OR heat event OR extreme temperature OR heat exhaustion OR heat wave OR heatwave OR hot temperature OR global temperature OR summer temperature OR summer weather OR outdoor temperature OR “air conditioner*” OR “air conditioning”))

AND LANGUAGE: (English OR Chinese OR German) **AND DOCUMENT TYPES:** (Article)

WC/SU

(WC=(Medicine, Research & Experimental OR Public, Environmental & Occupational Health OR Health Care Sciences & Services OR Primary Health Care OR Film, Radio, Television OR urban studies OR Behavioral Sciences OR communication OR Infectious Diseases OR Planning & Development)) OR

(SU=(Communication OR Biomedical Social Sciences OR Health Policy & Services OR Public, Environmental & Occupational Health OR Urban Studies OR Research & Experimental Medicine OR Infectious Diseases OR Health Care Sciences & Services OR Behavioral OR Film, Radio & Television))

NOT

NOT TS=(wildlife OR animal OR fish OR flora OR conservation OR soil OR “heat shock protein” OR ”heat shock proteins” OR genetic OR “DNA” OR “RNA”)

Indexes:

Science Citation Index Expanded (SCI-EXPANDED) --1945-present

Social Sciences Citation Index (SSCI) --1945-present

Arts & Humanities Citation Index (A&HCI) --1975-present

Supplementary note 4: HIGH Horizons Study Group

HIGH Horizons Study Group

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