

## Supplementary Material

### Early delivery following chronic and acute ambient temperature exposure: a comprehensive survival approach

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## Part A: Calculation of Excess Heat Factor (EHF)

We calculated EHF as:

$$EHF = \max(0, EHI_{sig}) \times \max(1, EHI_{accl}) \quad (1)$$

$$EHI_{sig} = \frac{\sum_{j=1}^3 T_{-j}}{3} - P_{95} \quad (2)$$

$$EHI_{accl} = \frac{\sum_{j=1}^3 T_{-j}}{3} - \frac{\sum_{j=1}^{30} T_{-j}}{30} \quad (3)$$

where  $EHI_{sig}$  is a significance index that reflects how the previous three days were relative to the location's typical temperature,  $EHI_{accl}$  is an acclimation index that reflects how hot the previous three days were relative to the current season,  $T_{-j}$  is the mean temperature on the  $j^{\text{th}}$  day before day  $T$ , and  $P_{95}$  is the 95<sup>th</sup> percentile of historical daily mean temperature. We calculated  $P_{95}$  over the five years preceding the first conception for each cohort area (Nancy and Poitiers for EDEN; Côtes-d'Armor, Finistère, and Ille-et-Vilaine for PELAGIE; Grenoble for SEPAGES) using daily mean temperature from Météo France meteorological stations, excluding stations missing >35 observations or at >900 m elevation and weighting each station by the number of participants within 20 km. Supplementary Table S2 lists  $P_{95}$  of each cohort area.

## Part B: Supplementary tables

Supplementary Table S1. Quantiles for each indicator by time window. Pregnancy starts on the day of conception and ends on the day of delivery.

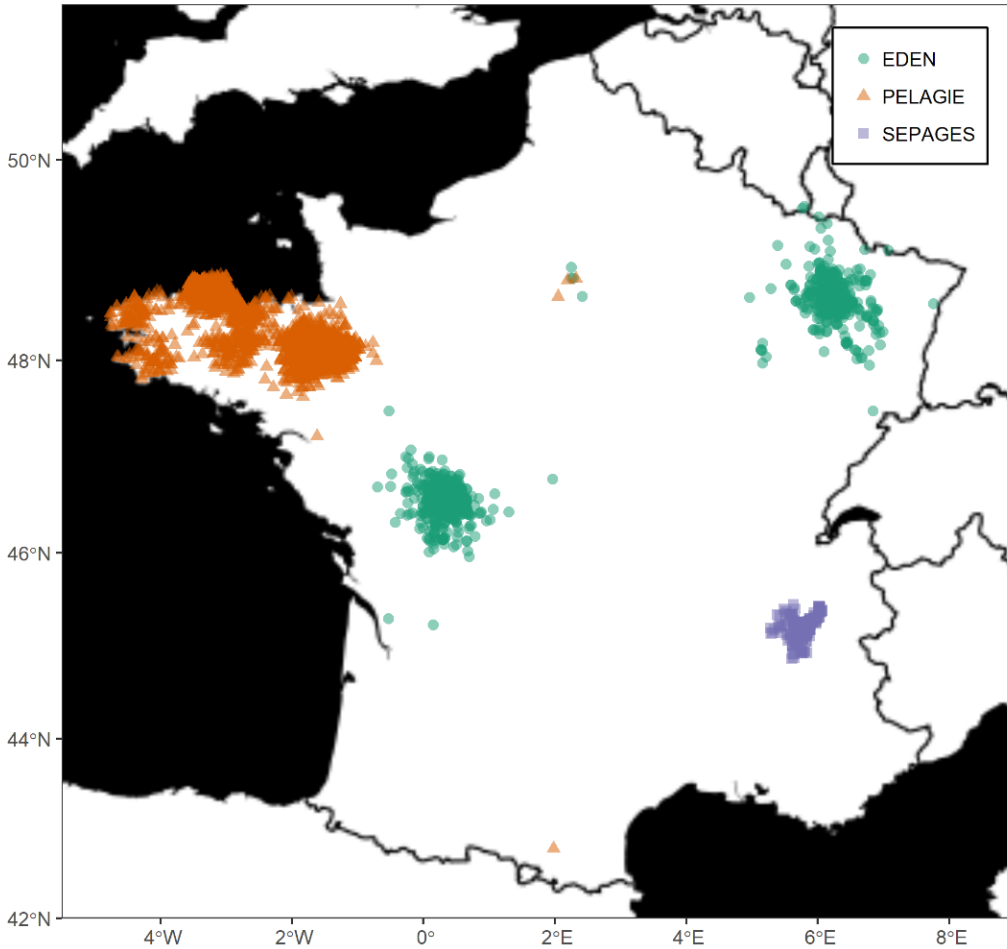
Period	Indicator	1 <sup>st</sup>	5 <sup>th</sup>	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>	95 <sup>th</sup>	99 <sup>th</sup>
First 26 weeks of pregnancy	Tmean (°C)	-0.8	2.0	4.0	6.9	11.6	16.7	19.9	21.7	25.3
	Tmin (°C)	-4.2	-1.1	0.6	3.5	7.4	11.6	14.4	15.7	18.3
	Tmax (°C)	2.7	5.7	7.6	10.9	16.8	23.0	27.2	29.3	33.5
	T <sub>SD</sub> <sup>a</sup> (°C)	0.5	0.8	1.0	1.3	1.8	2.5	3.3	3.8	4.8
	EHF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	19.4
Last 30 days of pregnancy	Tmean (°C)	-1.6	1.2	3.2	7.2	12.1	17.0	20.5	22.6	26.0
	Tmin (°C)	-5.4	-2.3	-0.4	1.7	7.9	12.1	15.2	16.6	19.0
	Tmax (°C)	1.6	5.0	7.1	11.3	17.2	23.3	28.1	30.6	35.0
	T <sub>SD</sub> <sup>a</sup> (°C)	0.5	0.8	1.0	1.3	1.9	2.5	3.3	3.8	4.6
	EHF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	18.1

<sup>a</sup> Weekly standard deviation of daily mean temperature

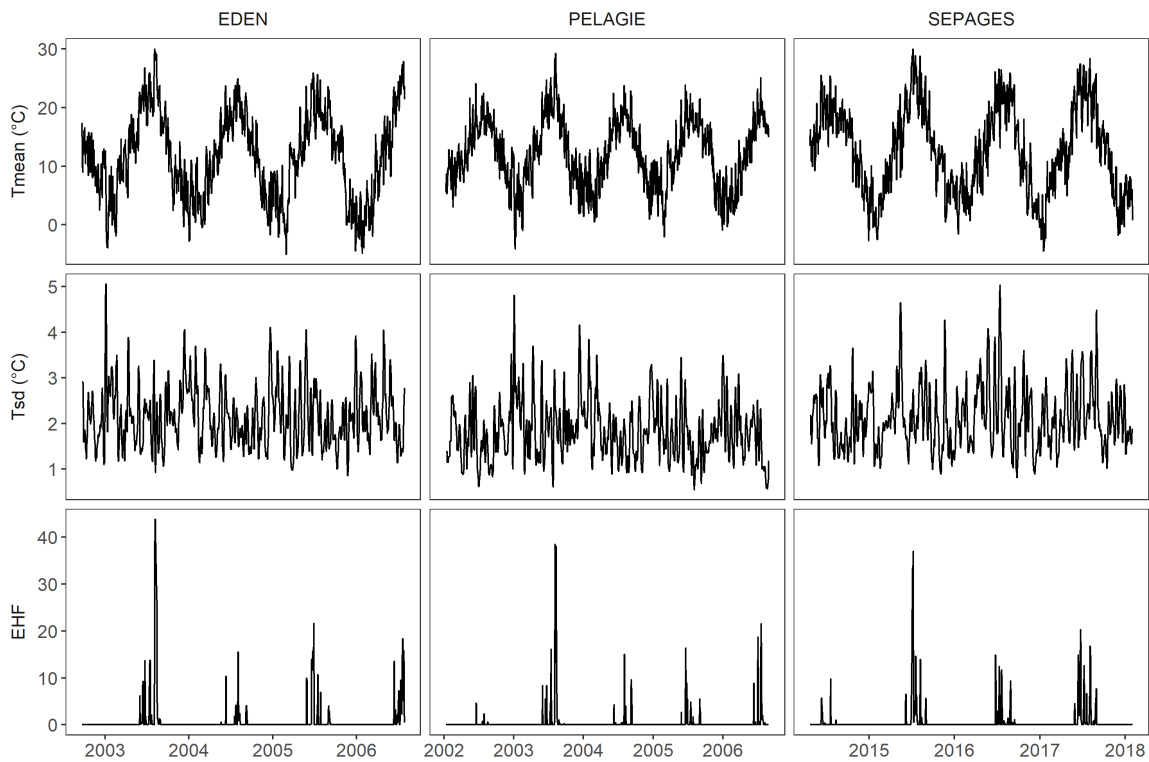
Supplementary Table S2.  $P_{95}$ : 95<sup>th</sup> percentile of daily mean temperature over the 5 years preceding the first conception in each cohort area.

Cohort	Area	$P_{95}$
EDEN	Nancy	21.2
	Poitiers	21.5
PELAGIE	Côtes-d'Armor	18.4
	Finistère	17.8
	Ille-et-Vilaine	20.6
SEPAGES	Grenoble	23.1

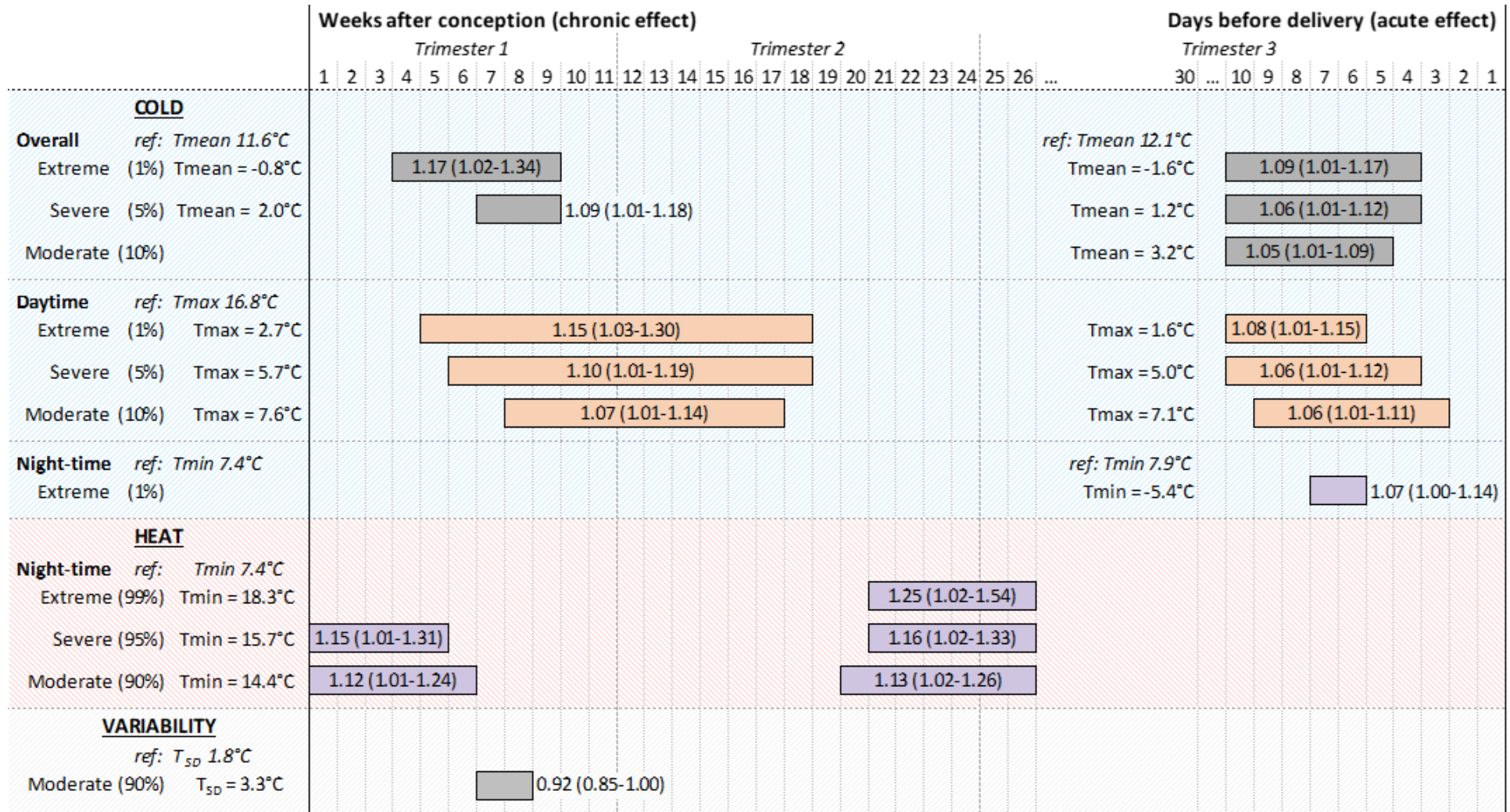
**Part C: Supplementary figures**



Supplementary Figure S1. Locations of the cohort participants.

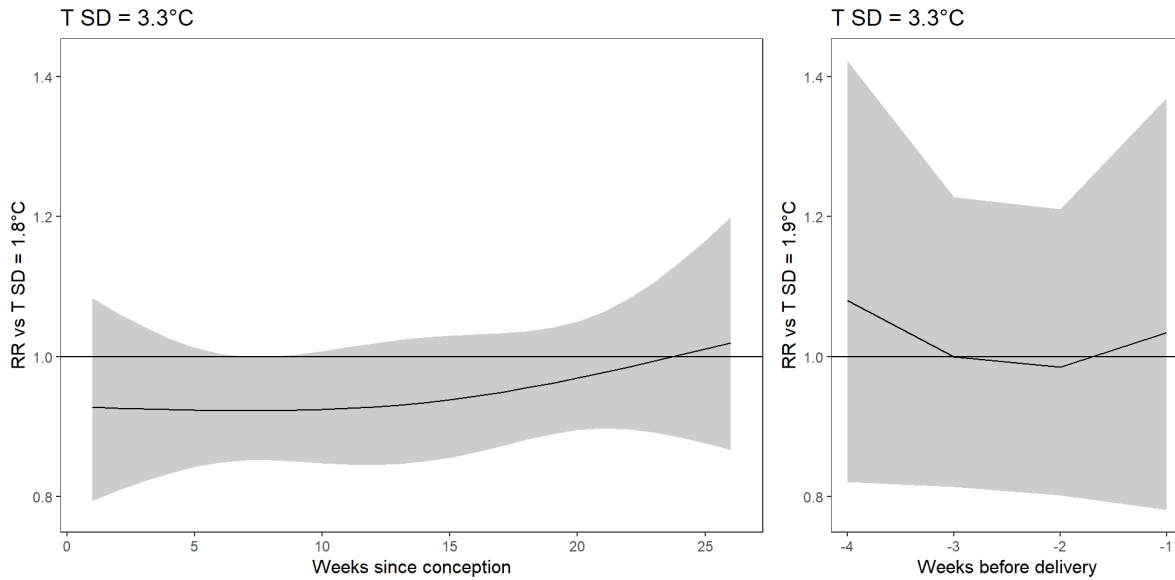


Supplementary Figure S2. Daily mean temperature, temperature variability, and EHF at the home address of study participants from the first date of conception to the last date of delivery by cohort.



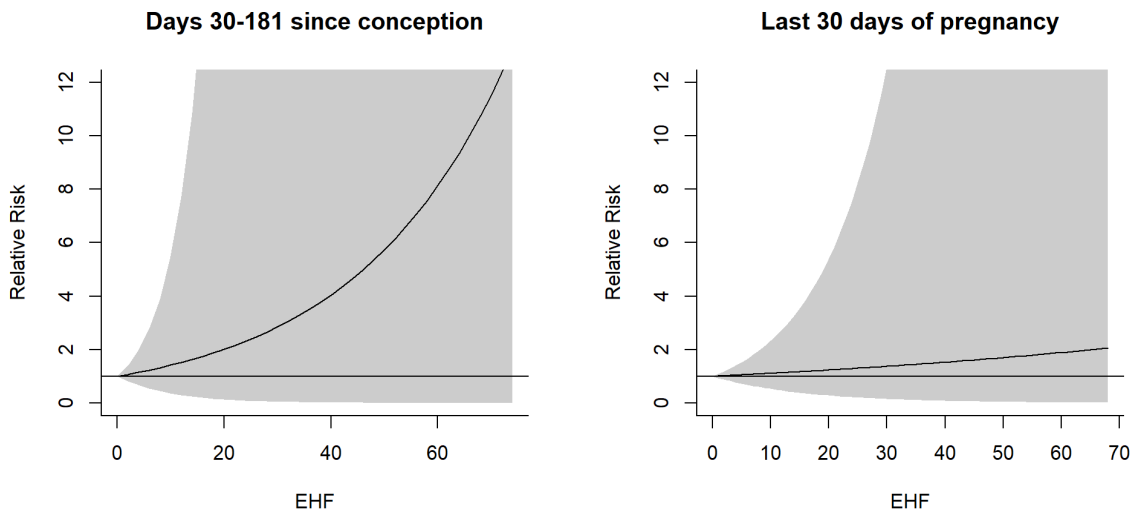
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2 Supplementary Figure S3. Adjusted relative risk for preterm birth associated with ambient temperature exposure for one week or one day during a  
 3 critical window. Bars show timing of critical windows; bar labels show adjusted RR (95% confidence interval). Models included exposure throughout  
 4 pregnancy, area, season of conception, urbanicity, NDVI, child sex, and maternal characteristics (age at conception, height, pre-pregnancy BMI, parity,  
 5 education, smoking during pregnancy).



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 7 Supplementary Figure S4. Adjusted relative risk for preterm birth associated with moderate  
 8 temperature variability (90<sup>th</sup> percentile of T<sub>SD</sub>) during each of the 26 weeks following conception  
 9 (left) and the 30 days ending at delivery (right). Shaded area shows 95% confidence interval.

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 12 Supplementary Figure S5. Cumulative adjusted relative risk for preterm birth associated with  
 13 different levels of EHF exposure throughout the 30-181 days after conception (left) or the 30 days  
 14 ending at delivery (right). Shaded area shows 95% confidence interval.