Supplementary Materials for

Temperature, climate change, and birth weight: Evidence from Hungary

Population and Environment

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Additional details regarding the data

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Additional details regarding the data

Estimation of the conception dates

We estimate the date of conception of each live birth using the information on the birth date and pregnancy length. First, because pregnancy length is the difference between the birth date and the beginning of the last menses, and it is reported in completed weeks, we estimate the first day of the menstrual cycle as follows:

$$\mathrm{M} = \mathrm{B} - (\mathrm{G} \times 7 + 3),$$

where M is the beginning of the last menses, B is the date of birth, and G is the gestation length. It is important to note that the actual gestational age is 0–6 days longer than the reported one, as G is recorded in completed weeks. Therefore, M is calculated by adding 3 days to the reported pregnancy length (G).

Next, we estimate the conception date (C) based on M. As conception (fertilization) takes place generally between the 11th and 19th day of the menstrual cycle (Cole et al. 2009; Fehring et al. 2006; Lenton et al. 1984; Stirnemann et al. 2013), we assume that conceptions occur on the 15th day of the cycle:

$$\mathrm{C} = \mathrm{M} + 14.$$

Weather data

The E-OBS 19.0e dataset of the European Climate Assessment & Dataset project provides daily weather measures for Europe with a spacing of 0.1° × 0.1° in regular latitude/longitude coordinates from 1950. The E-OBS dataset contains information on temperatures (mean, maximum, and minimum) and precipitation. To describe the daily weather conditions at the grid points within Hungary, we create eight binary variables based on the mean temperature (below −5°C, −5–0°C, 0–5°C, 5–10°C, 10–15°C, 15–20°C, 20–25°C, over 25°C) and four variables indicating the amount of daily precipitation (0 mm, 0–1 mm, 1–5 mm, over 5 mm).

To preserve the variation in temperature, we average the new temperature and precipitation variables for each day over grid points within the twenty counties of Hungary (including Budapest). Finally, the weekly level measures are constructed from the daily data by summing the variables over the weeks for each county. Accordingly, eight temperature variables show the number of days in a given year-week and given county when the daily mean temperature falls in a certain temperature bin, and four precipitation variables show the number of days when the amount of daily precipitation falls in a certain precipitation bin. Formally, the weakly level temperature variables are calculated as follows:

$$T^{j}_{cyw} = \sum_{d}\sum_{g}\frac{T^{j}_{cgywd}}{N_{c}}$$

where *c* denotes the county, *g* the grid points, *y* the year, *w* the calendar week, and *d* represents the day of the week. T is an indicator variable that shows whether the mean temperature in a given year-week-day and given county-grid point falls into temperature category *j* (below −5°C, −5–0°C, 0–5°C, 5–10°C, 10–15°C, 15–20°C, 20–25°C, or above 25°C). N is the number of grid points located within the counties.

Climate change projections

The NASA NEX–GDDP data contain projections of 21 climate models: ACCESS1-0, BCC-CSM1-1, BNU-ESM, CanESM2, CCSM4, CESM1-BGC, CNRM-CM5, CSIRO-MK3-6-0, GFDL-CM3, GFDL-ESM2G, GFDL-ESM2M, INMCM4, IPSL-CM5A-LR, IPSL-CM5A-MR, MIROC-ESM, MIROC-ESM-CHEM, MIROC5, MPI-ESM-LR, MPI-ESM-MR, MRI-CGCM3, and NorESM1-M. They were developed for the Fifth Assessment Report of the IPCC. Each climate projection is downscaled to a spatial resolution of 0.25° × 0.25°.

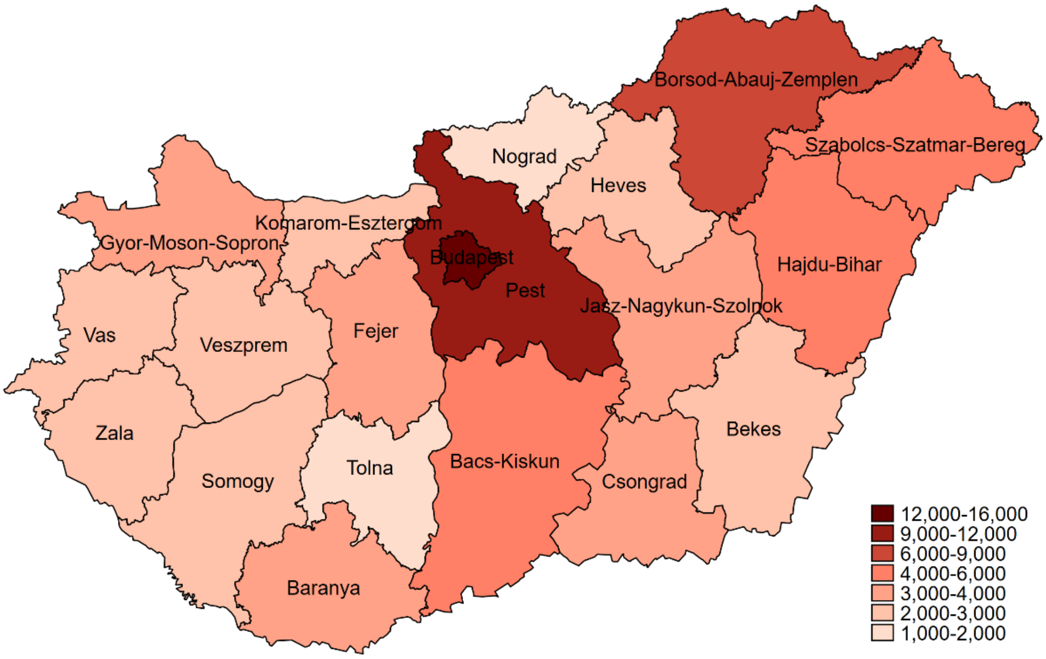
As the NEX–GDDP dataset provides only maximum and minimum temperatures, the mean temperature is calculated as the average of the maximum and minimum temperatures. We create eight temperature indicators that describe the daily mean temperature at the grid points located within the borders of Hungary (mean temperature is below −5°C, −5–0°C, 0–5°C, 5–10°C, 10–15°C, 15–20°C, 20–25°C, over 25°C). The projected temperature on a specific day in a given county is obtained by averaging the temperature variables over the grid points located within that county. Using these daily level estimations, we calculate the distribution of the mean temperature in the periods of 1986–2005 and 2040–2059 for the 21 climate models by county and calendar week. The within-model temperature changes are calculated as the difference between the periods of 2040–2059 and 1986–2005. Finally, to make a projection for the whole country, we average the county-level temperature changes. For this aggregation, we use the counties' average number of births conceived between 2000 and 2016 as weights (scaled to mean 1). Specifically, the within-model temperature changes are calculated as follows:

$$\Delta T_{mw}^{j} = \sum_{c} f_c \left(\sum_{y}\sum_{d}\sum_{g} \frac{1}{20} \times \frac{T_{mcgywd}^{j,2040-2059}}{N_c} - \sum_{y}\sum_{d}\sum_{g} \frac{1}{20} \times \frac{T_{mcgywd}^{j,1986-2005}}{N_c} \right)$$

where *m* denotes the climate model, *c* the county, *g* the grid points, *y* the year, *w* the calendar week, and *d* represents the day of the week. T is an indicator variable that shows whether the projected mean temperature in a given year-week-day and given county-grid point falls into temperature category *j* (below −5°C, −5–0°C, 0–5°C, 5–10°C, 10–15°C, 15–20°C, 20–25°C, or above 25°C). N is the number of grid points located within the counties, whereas f is a weight variable (scaled to mean 1) based on the counties' average number of births in our sample.

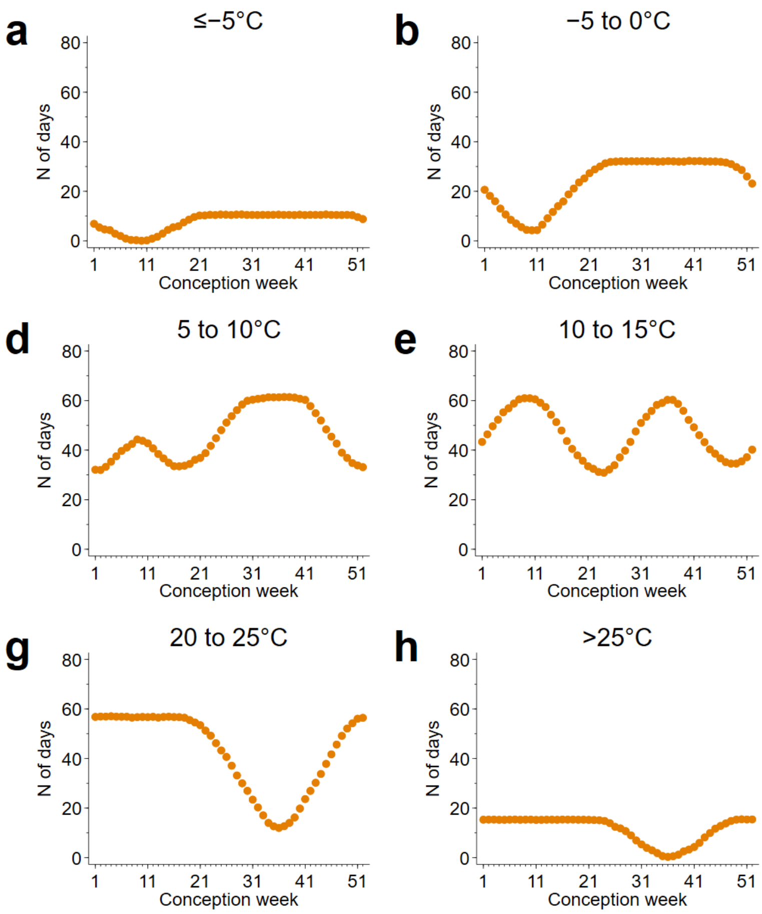
Figures

Fig. A1 Number of singleton births per year by county



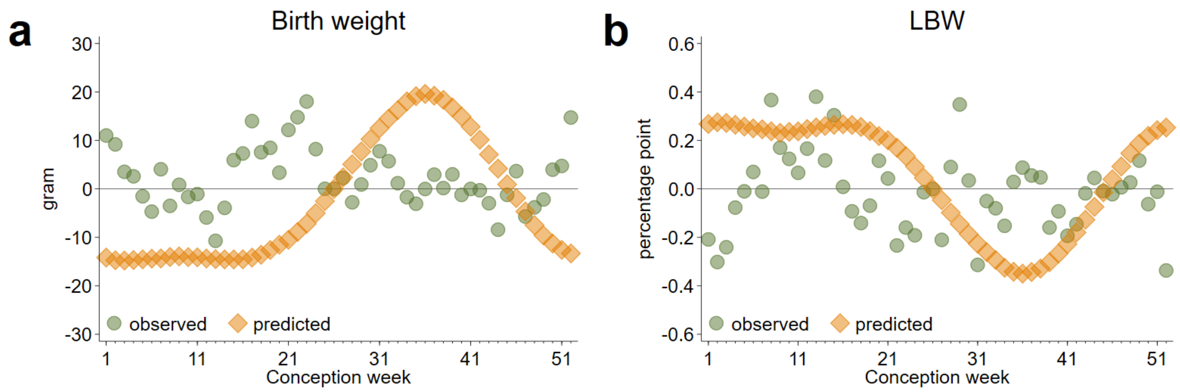
Based on singleton live births conceived in 2000-2016.

Fig. A2 Temperature exposure during pregnancy by conception week



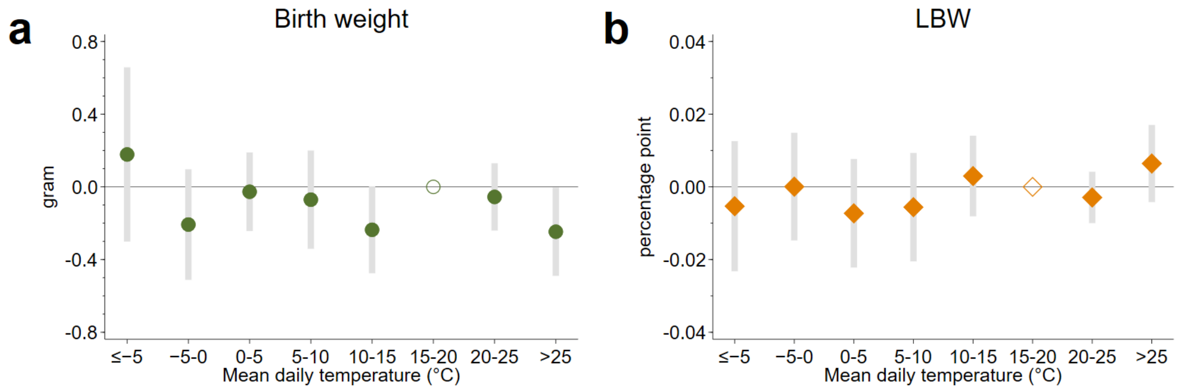
Based on singleton live births conceived in 2000-2016. Assuming 39-week-long gestation periods.

Fig. A3 Seasonality of birth weight and LBW



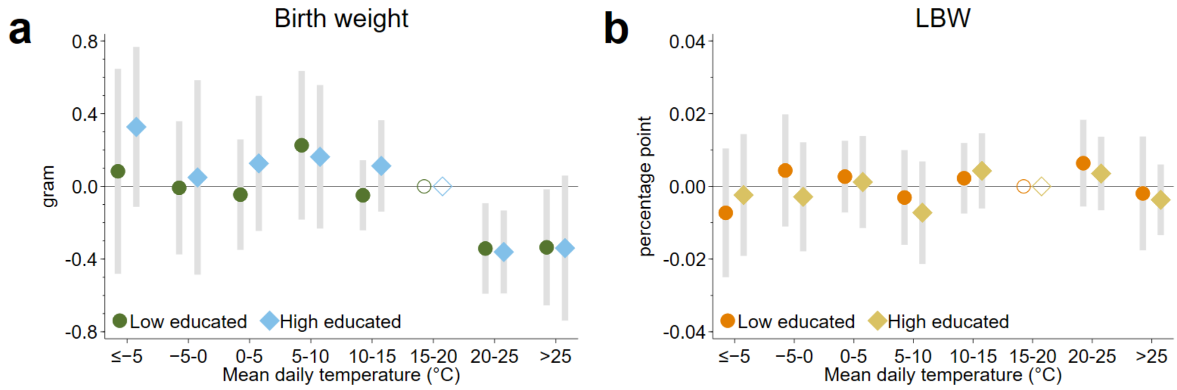
Calendar week 26 serves as the reference week. The observed values are the average birth weight and LBW rate values in each conception week in the period of 2000-2016. The predicted values are based on the temperature estimates from Eq. 1 (ignoring precipitation and the other control variables).

Fig. A4 Placebo regressions with weather 1 year later of the actual exposure period



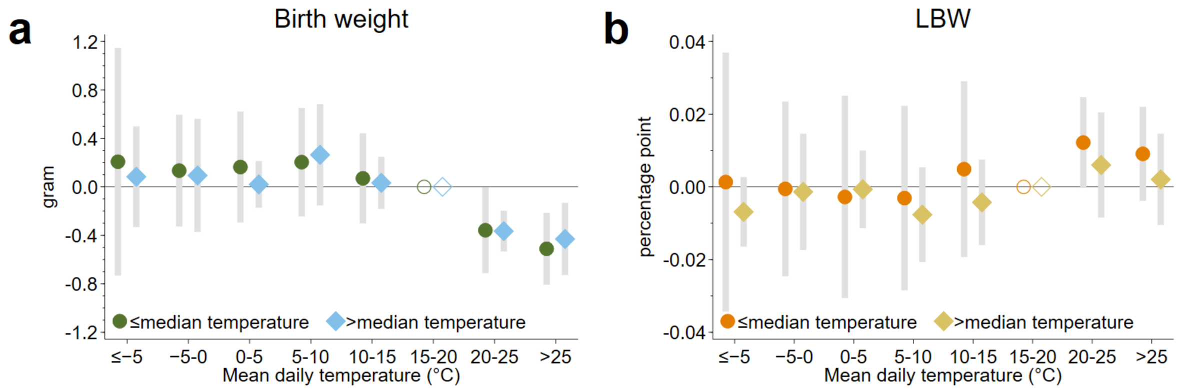
The effect of in utero exposure to one additional day with different mean temperatures on birth weight (**a**) and LBW (**b**) relative to a day with a mean temperature of 15–20°C. We use weather variables measured exactly 1 year later of the actual exposure period. The circles/diamonds are the point estimates, and the error bars represent 95% confidence intervals. The estimations are based on Eq. 1. The model has county-by-year fixed effects and county-by-calendar-week fixed effects. Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for. The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Standard errors are clustered by county and time (conception year×conception week).

Fig. A5 Estimated impacts by education of the mothers



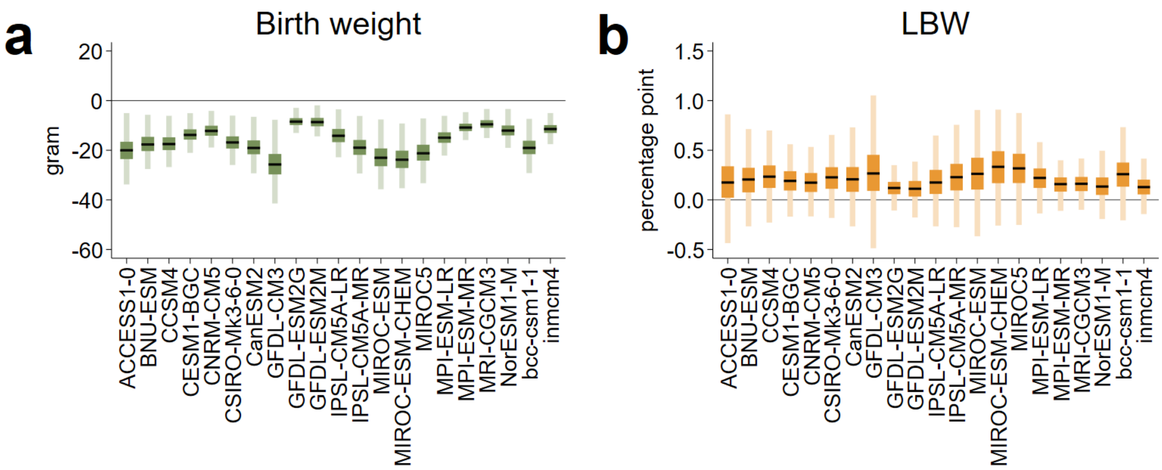
The effect of in utero exposure to one additional day with different mean temperatures on birth weight (**a**) and LBW (**b**) relative to a day with a mean temperature of 15–20°C. The circles/diamonds are the point estimates, and the error bars represent 95% confidence intervals. The model has county-by-year fixed effects and county-by-calendar-week fixed effects. Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for. The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Standard errors are clustered by county and time (conception year×conception week). Low education = secondary school or less; high education = university/college graduates. The estimations include mothers aged 24 or more. The estimations are based on Eq. 1 but interaction terms between the temperature variables and the indicator variables for low/high educated mothers are included (and, accordingly, the temperature main effects are excluded).

Fig. A6 Estimated impacts for counties below and above the median yearly average temperature



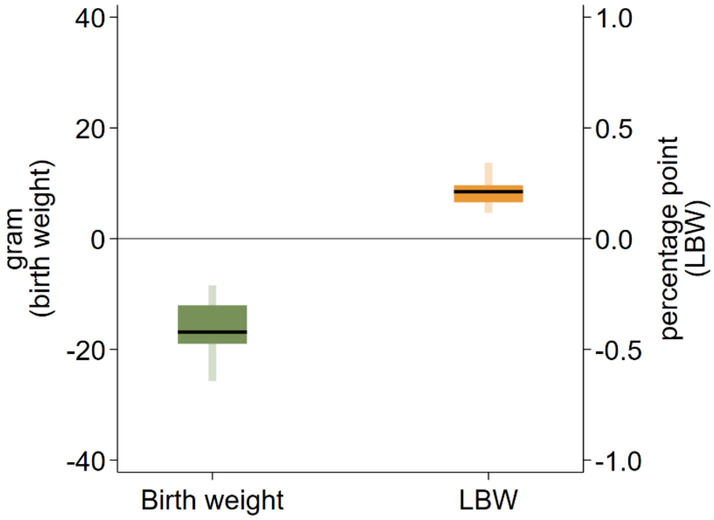
The effect of in utero exposure to one additional day with different mean temperatures on birth weight (**a**) and LBW (**b**) relative to a day with a mean temperature of 15–20°C. The circles/diamonds are the point estimates, and the error bars represent 95% confidence intervals. The model has county-by-year fixed effects and county-by-calendar-week fixed effects. Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for. The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Standard errors are clustered by county and time (conception year×conception week). The estimations are based on Eq. 1 but interaction terms between the temperature variables and the indicator variables for the two county groups are included (and, accordingly, the temperature main effects are excluded).

Fig. A7 Projected impacts of climate change across climate models



Impacts of climate change by 2040–2059 on birth weight (**a**) and prevalence of low birth weight (**b**) across climate models. The impacts are calculated using (i) the projected within-model differences in the temperature distribution between the periods of 1986–2005 and 2040–2059 under RCP 8.5 and (ii) the historical relationship between in utero temperature exposure and birth weight/LBW from Eq. 1 (estimated by 1,000 bootstrap samples). The black lines show the median projections. The dark shaded areas show the interquartile range of the projections. The hollow shaded bars represent the range containing 99% of the projections.

Fig. A8 Projected impacts of climate change by accounting only for climate uncertainty



Impacts of climate change by 2040–2059 on birth weight and prevalence of low birth weight. The impacts are calculated using (i) the projected of within-model differences in the temperature distribution between the periods of 1986–2005 and 2040–2059 by 21 climate models under RCP 8.5 and (ii) the historical relationship between in utero temperature exposure and birth weight/LBW from Eq. 1. The black lines show the median projections. The dark shaded areas show the interquartile range of the projections. The hollow shaded bars represent the range containing 99% of the projections. The projected impacts for birth weight are shown on the left horizontal axis. The projected impacts for LBW are shown on the right horizontal axis. Regression uncertainty is ignored by using the main coefficients estimations depicted in Fig. 1.

Tables

Table A1 Annual distribution of daily mean temperature by county

County	N of days with daily mean temperature							
	≤−5°C	−5 to 0°C	0 to 5°C	5 to 10°C	10 to 15°C	15 to 20°C	20 to 25°C	>25°C
Budapest	7.1	29.2	54.6	61.5	61.2	71.2	60.0	20.5
Baranya	7.8	31.2	52.3	63.9	63.5	72.4	56.8	17.5
Bacs-Kiskun	9.2	29.9	53.4	62.0	61.1	70.4	60.5	18.8
Bekes	11.1	32.2	54.2	59.8	61.6	68.9	60.6	16.9
Borsod-Abauj-Zemplen	14.5	38.6	59.7	57.8	61.9	73.3	50.6	9.0
Csongrad	10.4	31.4	53.5	60.6	62.0	68.1	60.6	18.8
Fejer	7.6	30.7	55.3	62.5	60.7	72.8	58.3	17.4
Gyor-Moson-Sopron	7.3	30.8	58.0	64.2	61.6	74.4	54.7	14.1
Hajdu-Bihar	12.5	34.8	56.4	58.0	60.7	71.4	58.1	13.3
Heves	13.8	37.8	57.5	59.4	61.4	72.6	51.5	11.3
Komarom-Esztergom	8.7	33.2	58.1	61.8	61.9	73.3	54.1	14.2
Nograd	14.4	37.9	59.1	59.1	62.3	73.8	48.9	9.8
Pest	9.4	31.8	55.6	61.0	61.1	71.6	57.8	16.9
Somogy	6.8	30.5	54.0	64.0	63.6	74.4	56.9	15.1
Szabolcs-Szatmar-Bereg	13.5	34.0	58.4	57.8	62.1	73.7	55.7	10.0
Jasz-Nagykun-Szolnok	10.6	32.9	54.3	59.6	60.3	70.1	60.7	16.8
Tolna	8.0	29.7	53.3	63.3	61.0	72.6	59.2	18.1
Vas	7.2	32.4	59.7	63.9	66.3	74.7	51.0	10.1
Veszprem	8.9	33.9	59.0	62.0	64.3	74.2	51.4	11.6
Zala	6.2	32.1	56.4	64.7	66.9	75.3	52.7	10.9

Notes: The averages of years 2000-2016.

Table A2 Descriptive statistics, control variables

Variable	Mean	SD	Min	Max	N
Precipitation during pregnancy (in days)					
0 mm	207.6	11.8	156.7	239.2	1,532,661
0 to 1 mm	2.3	1.5	0.0	11.1	1,532,661
1 to 5 mm	36.1	6.8	17.3	69.4	1,532,661
above 5 mm	28.1	8.6	6.3	64.2	1,532,661
Female	0.485	0.500	0	1	1,532,661
Mother's education					
less than primary	0.028	0.166	0	1	1,532,661
primary	0.196	0.397	0	1	1,532,661
vocational	0.171	0.377	0	1	1,532,661
secondary	0.322	0.467	0	1	1,532,661
tertiary	0.276	0.447	0	1	1,532,661
missing	0.007	0.082	0	1	1,532,661
Father's education					
less than primary	0.008	0.091	0	1	1,532,661
primary	0.127	0.333	0	1	1,532,661
vocational	0.266	0.442	0	1	1,532,661
secondary	0.257	0.437	0	1	1,532,661
tertiary	0.214	0.410	0	1	1,532,661
missing	0.128	0.334	0	1	1,532,661
Mother's marital status					
single	0.351	0.477	0	1	1,532,661
married	0.601	0.490	0	1	1,532,661
widowed/divorced	0.048	0.214	0	1	1,532,661
Mother's employment status					
employed	0.642	0.479	0	1	1,532,661
unemployed	0.065	0.246	0	1	1,532,661
maternity leave	0.156	0.362	0	1	1,532,661
student	0.022	0.146	0	1	1,532,661
retired	0.004	0.061	0	1	1,532,661
full time mother	0.080	0.272	0	1	1,532,661
other inactive	0.023	0.150	0	1	1,532,661
missing	0.009	0.095	0	1	1,532,661
Father's employment status					
employed	0.781	0.413	0	1	1,532,661
unemployed	0.067	0.249	0	1	1,532,661
student	0.004	0.060	0	1	1,532,661
retired	0.007	0.084	0	1	1,532,661
other inactive	0.010	0.098	0	1	1,532,661
missing	0.132	0.338	0	1	1,532,661
Mother's age					
-17	0.025	0.156	0	1	1,532,661
18-19	0.041	0.199	0	1	1,532,661
20-23	0.127	0.333	0	1	1,532,661
24-27	0.219	0.413	0	1	1,532,661

28-31	0.274	0.446	0	1	1,532,661
32-35	0.198	0.398	0	1	1,532,661
36-39	0.091	0.288	0	1	1,532,661
40-	0.025	0.157	0	1	1,532,661
Father's age					
-19	0.011	0.103	0	1	1,532,661
20-23	0.049	0.216	0	1	1,532,661
24-27	0.129	0.335	0	1	1,532,661
28-31	0.229	0.420	0	1	1,532,661
32-35	0.223	0.416	0	1	1,532,661
36-39	0.138	0.345	0	1	1,532,661
40-43	0.063	0.243	0	1	1,532,661
44-	0.041	0.199	0	1	1,532,661
missing	0.117	0.321	0	1	1,532,661
N of previous live births					
0	0.467	0.499	0	1	1,532,661
1	0.322	0.467	0	1	1,532,661
2	0.131	0.337	0	1	1,532,661
3	0.043	0.203	0	1	1,532,661
4	0.018	0.133	0	1	1,532,661
5 or more	0.019	0.136	0	1	1,532,661
N of spontaneous fetal losses					
0	0.850	0.357	0	1	1,532,661
1	0.116	0.320	0	1	1,532,661
2 or more	0.034	0.182	0	1	1,532,661
N of induced abortions					
0	0.836	0.371	0	1	1,532,661
1	0.118	0.322	0	1	1,532,661
2	0.032	0.177	0	1	1,532,661
3 or more	0.014	0.119	0	1	1,532,661

The in utero exposure period is defined as a 39-week-long period starting with the week of conception.

Table A3 Sensitivity of the estimates of in utero temperature exposure (birth weight)

Daily mean temperature (°C)	(1) Baseline	(2) Excl. births with <26 weeks of gestation	(3) Incl. time trends	(4) County, year, and week FE	(5) Excl. control variables	(6) Incl. gestation length	(7) Including municipality of residence FE	(8) Dep. var.: log birth weight
below –5	0.129	0.217	–0.007	–0.078	0.027	0.380*	0.147	0.0028
	(0.219)	(0.210)	(0.221)	(0.228)	(0.254)	(0.136)	(0.215)	(0.0088)
–5 to 0	0.104	0.123	0.077	0.119	0.063	0.068	0.106	0.0022
	(0.159)	(0.159)	(0.160)	(0.176)	(0.161)	(0.140)	(0.162)	(0.0055)
0 to 5	0.071	0.134	0.046	0.105	0.024	0.275*	0.076	0.0007
	(0.106)	(0.107)	(0.112)	(0.130)	(0.130)	(0.107)	(0.105)	(0.0041)
5 to 10	0.235	0.281+	0.120	0.160	0.177	0.357*	0.232	0.0065
	(0.146)	(0.148)	(0.145)	(0.149)	(0.167)	(0.132)	(0.144)	(0.0053)
10 to 15	0.048	0.097	0.022	0.068	–0.030	0.114+	0.042	–0.0005
	(0.077)	(0.076)	(0.094)	(0.102)	(0.090)	(0.057)	(0.075)	(0.0038)
15 to 20	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.
20 to 25	–0.355**	–0.341**	–0.297**	–0.329**	–0.285**	–0.331**	–0.353**	–0.0116**
	(0.088)	(0.085)	(0.101)	(0.070)	(0.095)	(0.082)	(0.085)	(0.0039)
over 25	–0.458**	–0.458**	–0.371**	–0.484**	–0.457**	–0.474**	–0.455**	–0.0137**
	(0.119)	(0.116)	(0.122)	(0.119)	(0.117)	(0.065)	(0.119)	(0.0044)
FE 1.	county×year	county×year	county×year	county	county×year	county×year	county×year	county×year
FE 2.	county×week	county×week	county×week	year	county×week	county×week	county×week	county×week
FE 3.	–	–	–	week	–	–	municipality of residence	–
Time trends	–	–	county×week-spec. quadratic	–	–	–	–	–
Control variables	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Gestation length	No	No	No	No	No	Yes	No	No

The effect of in utero exposure to one additional day with a given mean temperature on birth weight, relative to a day with a mean temperature of 15–20°C. The estimations based on Eq. 1. The model has county-by-year fixed effects and county-by-calendar-week fixed effects (except column 4 where county, conception year, and conception week FE are included). Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for (except column 5 where only precipitation is controlled for). Column 6 also includes average gestational age. Column 7 includes municipality of residence fixed effects (based on the mother place of residence at the time of the delivery). Column 8 shows the percentage effects on birth weight. The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Standard errors are shown in parenthesis, clustered by county and time (conception year×conception week). $^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$

Table A4 Sensitivity of the estimates of in utero temperature exposure (LBW)

Daily mean temperature (°C)	(1) Baseline	(2) Excl. births with <26 weeks of gestation	(3) Incl. time trends	(4) County, year, and week FE	(5) Excl. control variables	(6) Incl. gestation length	(7) Including municipality of residence FE
below –5	–0.0029	–0.0061	0.0001	–0.0038	–0.0021	–0.0132*	–0.0029
	(0.0073)	(0.0070)	(0.0071)	(0.0073)	(0.0084)	(0.0062)	(0.0072)
–5 to 0	–0.0003	–0.0010	–0.0042	–0.0007	0.0004	0.0012	0.0001
	(0.0057)	(0.0058)	(0.0065)	(0.0058)	(0.0055)	(0.0046)	(0.0059)
0 to 5	–0.0010	–0.0033	–0.0016	–0.0045	–0.0010	–0.0093+	–0.0007
	(0.0048)	(0.0051)	(0.0057)	(0.0055)	(0.0059)	(0.0047)	(0.0048)
5 to 10	–0.0051	–0.0069	–0.0040	–0.0049	–0.0045	–0.0102*	–0.0047
	(0.0060)	(0.0060)	(0.0067)	(0.0061)	(0.0066)	(0.0048)	(0.0060)
10 to 15	–0.0005	–0.0022	–0.0035	–0.0060	0.0007	–0.0032	0.0001
	(0.0047)	(0.0044)	(0.0054)	(0.0048)	(0.0052)	(0.0039)	(0.0046)
15 to 20	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.	ref. cat.
20 to 25	0.0080	0.0075	0.0047	0.0098*	0.0058	0.0070	0.0082
	(0.0052)	(0.0051)	(0.0057)	(0.0038)	(0.0050)	(0.0043)	(0.0051)
over 25	0.0042	0.0041	0.0006	0.0087+	0.0050	0.0048	0.0041
	(0.0044)	(0.0044)	(0.0047)	(0.0042)	(0.0043)	(0.0042)	(0.0043)
FE 1.	county×year	county×year	county×year	county	county×year	county×year	county×year
FE 2.	county×week	county×week	county×week	year	county×week	county×week	county×week
FE 3.	–	–	–	week	–	–	municipality of residence
Time trends	–	–	county×week-spec. quadratic	–	–	–	–
Control variables	Yes	Yes	Yes	Yes	No	Yes	Yes
Gestation length	No	No	No	No	No	Yes	No

The effect of in utero exposure to one additional day with a given mean temperature on LBW, relative to a day with a mean temperature of 15–20°C. The estimations based on Eq. 1. The model has county-by-year fixed effects and county-by-calendar-week fixed effects (except column 4 where county, conception year, and conception week FE are included). Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for (except column 5 where only precipitation is controlled for). Column 6 also includes average gestational age. Column 7 includes municipality of residence fixed effects (based on the mother place of residence at the time of the delivery). The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Standard errors are shown in parenthesis, clustered by county and time (conception year×conception week). $^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$

Table A5 Estimates of in utero temperature exposure applying different ways of clustering the standard errors (birth weight)

Daily mean temperature (°C)	(1)	(2)	(3)	(4)
below –5	0.129 (0.219)	0.129 (0.222)	0.129 (0.192)	0.129 (0.234)
–5 to 0	0.104 (0.159)	0.104 (0.162)	0.104 (0.139)	0.104 (0.198)
0 to 5	0.071 (0.106)	0.071 (0.109)	0.071 (0.129)	0.071 (0.118)
5 to 10	0.235 (0.146)	0.235 (0.148)	0.235^{+} (0.135)	0.235 (0.174)
10 to 15	0.048 (0.077)	0.048 (0.082)	0.048 (0.105)	0.048 (0.094)
15 to 20	ref. cat.	ref. cat.	ref. cat.	ref. cat.
20 to 25	$–0.355^{**}$ (0.088)	$–0.355^{**}$ (0.089)	$–0.355^{**}$ (0.082)	$–0.355^{**}$ (0.117)
over 25	$–0.458^{**}$ (0.119)	$–0.458^{**}$ (0.115)	$–0.458^{**}$ (0.104)	$–0.458^{*}$ (0.172)
Clustering	County + Conception year × conception week	County	Conception year × conception week	County + Conception year

The effect of in utero exposure to one additional day with a given mean temperature on birth weight, relative to a day with a mean temperature of 15–20°C. The estimations come from Eq. 1. The model has county-by-year fixed effects and county-by-calendar-week fixed effects. Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for. The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Columns show estimates applying different clustering schemes as indicated in the bottom row. Standard errors are shown in parenthesis. $^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$

Table A6 Estimates of in utero temperature exposure applying different ways of clustering the standard errors (LBW)

Daily mean temperature (°C)	(1)	(2)	(3)	(4)
below –5	–0.0029 (0.0073)	–0.0029 (0.0077)	–0.0029 (0.0087)	–0.0029 (0.0083)
–5 to 0	–0.0003 (0.0057)	–0.0003 (0.0061)	–0.0003 (0.0063)	–0.0003 (0.0074)
0 to 5	–0.0010 (0.0048)	–0.0010 (0.0054)	–0.0010 (0.0060)	–0.0010 (0.0066)
5 to 10	–0.0051 (0.0060)	–0.0051 (0.0062)	–0.0051 (0.0062)	–0.0051 (0.0083)
10 to 15	–0.0005 (0.0047)	–0.0005 (0.0048)	–0.0005 (0.0050)	–0.0005 (0.0058)
15 to 20	ref. cat.	ref. cat.	ref. cat.	ref. cat.
20 to 25	0.0080 (0.0052)	0.0080 (0.0052)	0.0080^{*} (0.0038)	0.0080 (0.0051)
over 25	0.0042 (0.0044)	0.0042 (0.0042)	0.0042 (0.0045)	0.0042 (0.0053)
Clustering	County + Conception year × conception week	County	Conception year × conception week	County + Conception year

The effect of in utero exposure to one additional day with a given mean temperature on LBW, relative to a day with a mean temperature of 15–20°C. The estimations come from Eq. 1. The model has county-by-year fixed effects and county-by-calendar-week fixed effects. Precipitation, sex of the newborns, and the characteristics of the parents (age, education, employment, marital status of the mother, pregnancy history of the mother) are controlled for. The in utero exposure period is defined as a 39-week-long period starting with the week of conception. Columns show estimates applying different clustering schemes as indicated in the bottom row. Standard errors are shown in parenthesis. $^{+}p<0.10$, $^{*}p<0.05$, $^{**}p<0.01$