

Climate change increasing pregnancy risks around the world due to extreme heat

A Climate Central analysis of the past five years (2020-2024)

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KEY FACTS

- Extreme heat presents dangerous risks to global maternal health and birth outcomes, and it's becoming more frequent and intense due to climate change.
- Climate Central analyzed daily temperatures during the past five years (2020 to 2024) in 247 countries, territories, and dependencies and 940 global cities to count the number of **pregnancy heat-risk days**. Pregnancy heat-risk days have maximum temperatures warmer than 95% of temperatures observed at a given location — a threshold associated with an increased risk of preterm birth.
- During 2020 to 2024, nearly one-third of analyzed countries (78 out of 247) experienced at least one additional month's worth of pregnancy heat-risk days on average annually due to climate change.
- In most countries (222), climate change at least doubled the average annual number of pregnancy heat-risk days experienced during the past five years, compared to a world without climate change.
- The greatest increases in pregnancy heat-risk days due to climate change over the past five years occurred primarily in developing regions with limited access to healthcare — most notably in the Caribbean, and parts of Central and South America, the Pacific Islands, Southeast Asia, and sub-Saharan Africa.

DATA

- [Download data](#) for 247 countries, territories, and dependencies and 940 cities around the world.
- [Explore interactive maps](#) for countries and cities across all continents.

INTRODUCTION

Extreme heat poses dangerous risks to [global maternal health](#) and birth outcomes. During pregnancy, heat exposure has been linked to higher risks of [complications](#) like hypertension, gestational diabetes, [maternal hospitalizations](#), and [severe maternal morbidity](#). It's also associated with an increased risk of adverse outcomes such as [stillbirth](#) and [preterm birth](#) (before 37 weeks), the latter of which can have [lasting health effects](#) on the baby. According to the U.S. Centers for Disease Control and Prevention, [even a single day of extreme heat](#) exposure during pregnancy can increase the risk of complications.

Human-caused climate change has raised [global average temperatures](#) and made dangerous extreme heat events a more common risk around the world.

*Climate change is increasing risks during pregnancy around the world in many ways. See **“Climate change impacts on maternal health and birth outcomes”** for more information.*

ABOUT THIS ANALYSIS

This analysis quantifies how climate change is influencing the frequency of extreme heat associated with increased risks of preterm birth and examines where pregnant people are most at risk.

Climate Central analyzed daily temperatures during the past five years (2020 to 2024) in 247 countries, territories, and dependencies (referred to as “countries” in the rest of the report for simplicity) and 940 global cities, using two primary mechanisms:

1. **Pregnancy heat-risk days:** We counted the number of days with temperatures warmer than 95% of temperatures observed at a given location (also referred to as temperatures above the 95th percentile). Research¹ shows that this threshold can increase the risk of [preterm birth](#). We define these extremely hot days as “pregnancy heat-risk days.”
2. **The [Climate Shift Index \(CSI\)](#) system:** We calculated the number of pregnancy heat-risk days that would have occurred in a world without human-caused climate change (i.e., a counterfactual scenario) and compared that to the total number observed each year. This allowed us to count how many pregnancy heat-risk days were added by climate change annually.

¹ We chose this percentile based on peer-reviewed research from [Kuehn et al. \(2017\)](#), [Wang et al. \(2013\)](#), [Wang et al. \(2024\)](#), and [McElroy et al. \(2022\)](#).

RESULTS

→ Every country analyzed experienced an increase of pregnancy heat-risk days due to climate change.

- All 247 countries analyzed experienced, on average, at least five additional pregnancy heat-risk days annually — days where maximum temperatures were hotter than 95% of local temperatures — during the past five years (2020-2024) due to climate change. Many experienced significantly more (Figure 1).
- In nearly one-third of the countries (78 out of 247), and 18% of global cities analyzed (169 of 950), climate change added at least one additional month's worth of pregnancy heat-risk days on average each year.

Explore the [full dataset](#) or [interactive maps](#) for details on specific countries.

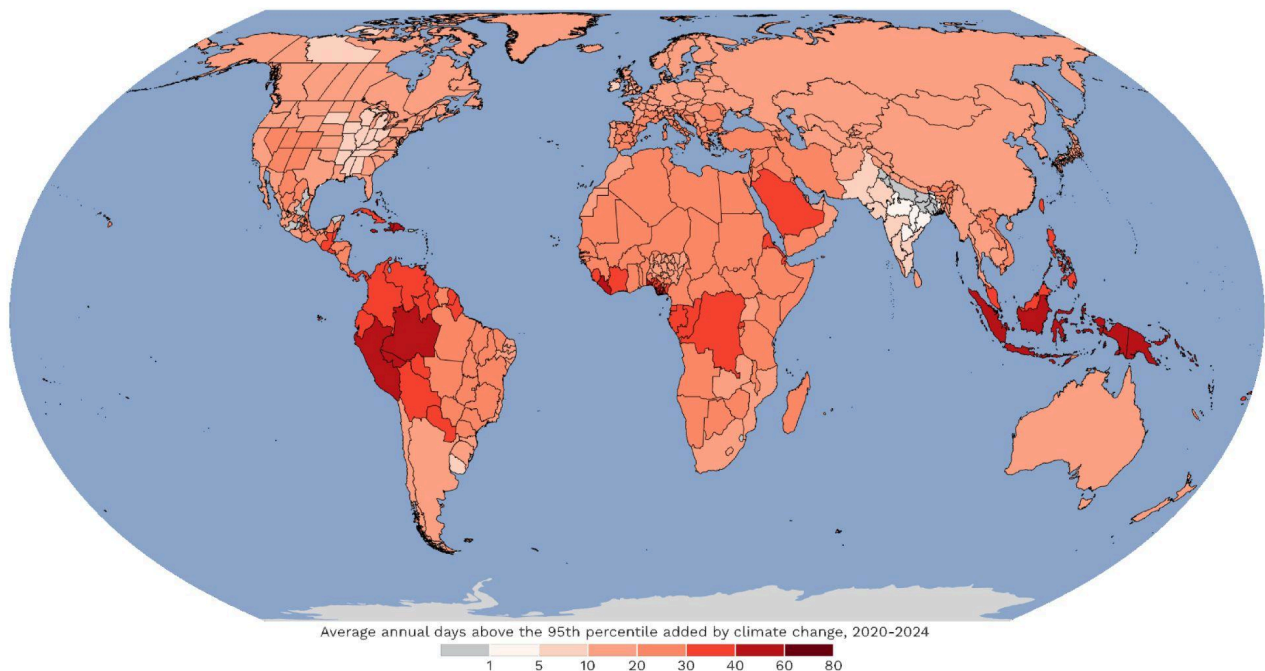


Figure 1. Average number of annual pregnancy heat-risk days added by climate change during the past five years (2020-2024). Analysis based on ECMWF ERA5 data and the Climate Shift Index (CSI) system. Produced April 29, 2025.

→ **In most countries, climate change more than doubled the number of pregnancy heat-risk days experienced.**

- During the past five years (2020-2024), climate change at least doubled the average annual number of pregnancy-heat risk days for 90% of countries (222 out of 247) and 63% of cities (593 out of 940) across all continents, compared to a world without climate change
- For some countries and cities, all or nearly all of the pregnancy heat-risk days they experienced during 2020 to 2024 were caused by climate change (Tables 1 and 2). In other words, in a world without climate change, these places would not have seen temperatures at or above the 95th temperature percentile during the past five years.

Country	Average annual pregnancy heat-risk days	Average annual pregnancy heat-risk days added by climate change
Palau	77	76
Micronesia (Federated States of)	59	58
Guam	55	55
Tuvalu	52	52
Northern Mariana Islands	50	50
Singapore	47	46
Seychelles	46	45
British Indian Ocean Territory	37	37
Nauru	36	36
French Polynesia	26	26
Niue	25	25
Ilemi Triangle	20	20

Table 1. Countries where all or nearly all of the pregnancy heat-risk days (days when maximum temperatures are hotter than 95% of local temperatures) experienced during the past five years (2020-2024) were caused by climate change.

City	Country	Average annual pregnancy heat-risk days	Average annual pregnancy heat-risk days added by climate change
Weno	Micronesia, Federated States of	63	63
Capitol Hill	Northern Mariana Islands	51	51
Victoria	Seychelles	45	45
Riyadh	Saudi Arabia	37	37

Meneng Terrace	Nauru	36	36
Yaren	Nauru	36	36
Alofi	Niue	23	23
Papeete	French Polynesia	22	22
Honolulu	United States	22	22
Mogadishu	Somalia	21	21
Maracaibo	Venezuela	20	20
Juba	South Sudan	14	14
Teresina	Brazil	13	13
San Cristobal	Venezuela	13	13
Bogota	Colombia	7	7

Table 2. Cities where all of the pregnancy heat-risk days (days when maximum temperatures are hotter than 95% of local temperatures) experienced during the past five years (2020-2024) were caused by climate change.

→ **Places where climate change added the most pregnancy heat-risk days are among the most likely to experience barriers to adequate maternal healthcare.**

- During the past five years, countries where climate change added the most pregnancy heat-risk days were mainly located in **the Caribbean; Central America and South America; the Pacific Islands and Southeast Asia; and sub-Saharan Africa.**
- Many of the most affected countries are [small island nations and developing countries](#), whose residents are among the [most vulnerable](#) to the consequences of climate change despite contributing the least to greenhouse gas emissions. These countries also have some of the largest populations [lacking access to efficient cooling](#), which, if available, can mitigate health impacts from extreme heat. People living in these regions are [more likely to face barriers to healthcare access and higher rates of maternal mortality](#).
- Fifteen countries (Table 3) — **nearly all located in the Caribbean** — experienced an average of at least 60 additional pregnancy heat-risk days annually due to climate change. That accounts for at least one-fifth of the duration of an average pregnancy (280 days).
- Ten cities saw at least 70 additional pregnancy heat-risk days each year (Table 4), the majority of which were located in the **Caribbean**.

Explore the [full dataset](#) or [interactive maps](#) for details on specific countries.

Country	Average annual pregnancy heat-risk days	Average annual pregnancy heat-risk days added by climate change
Palau	77	76
British Virgin Islands	76	72
United States Virgin Islands	76	72
Saint Kitts and Nevis	74	70
Anguilla	74	70
Saint Vincent and the Grenadines	73	69
Dominica	72	69
Montserrat	71	68
Grenada	70	66
Antigua & Barbuda	71	66
Barbados	69	66
Guadeloupe	67	64
Aruba	65	62
Netherlands Antilles (formerly) ²	65	62
Martinique	63	60

Table 3. Countries that experienced the most additional pregnancy heat-risk days (days when maximum temperatures are hotter than 95% of local temperatures) annually due to climate change. Nearly all are located in the Caribbean.

City	Country	Average annual pregnancy heat risk days	Average annual pregnancy heat risk days added by climate change
Monrovia	Liberia	89	76
Ngerulmud	Palau	77	76
Freetown	Sierra Leone	78	74
Koror	Palau	75	74
Road Town	British Virgin Islands	76	72
Lower Prince's Quarter	Sint Maarten	77	72
Marigot	Saint Martin	77	72
Philipsburg	Sint Maarten	77	72
Basseterre	Saint Kitts and Nevis	74	71
Roseau	Dominica	75	71

Table 4. Cities that experienced the most additional pregnancy heat-risk days (days when maximum temperatures are hotter than 95% of local temperatures) annually due to climate change.

² Netherlands Antilles officially dissolved in 2010, however countries that comprised this entity remain part of the Kingdom of the Netherlands. Naming is based on the [U.N. World Food Programme](#).

Climate change impacts on maternal health and birth outcomes

In addition to more frequent extreme heat, planet-warming carbon pollution contributes to other weather extremes that increase risks for pregnant people.

- **Certain types of air pollution have both immediate and long-term effects on maternal health.** Particulate matter 2.5 (PM2.5), a type of fine particle pollution, has been associated with [elevated mental stress](#), prevalence of [hypertensive disorders of pregnancy](#) (including preeclampsia and gestational hypertension), and [increased gestational blood pressure](#) in pregnant people. Sources of PM2.5 include vehicle exhaust, [wildfire smoke](#), and burning fossil fuels (coal, oil, and methane gas) for energy. Extreme heat can also [exacerbate existing air quality problems](#).
- **Flooding events — and their aftermath — pose severe risks to pregnant people.** Exposure to flooding during pregnancy has been associated with [pregnancy loss, low birth weight, and gestational hypertension](#). Floods and their aftermath can also [expose pregnant people](#) to hazardous material, pathogens, contaminated drinking water, and dangerous objects submerged in flood waters.
- **Climate disasters can damage infrastructure critical to protecting pregnant people.** Damaged or destroyed infrastructure from wildfires, hurricanes, and floods can disrupt access to healthcare services and [limit access to hospitals](#) for delivery and postnatal care. Housing instability has been linked to [adverse pregnancy outcomes](#), including preterm birth and low birth weights for newborns.
- **Extreme weather events can pose risks to maternal mental health.** Extreme weather events can [threaten](#) mental health during or after pregnancy, especially in communities already dealing with housing, food, or financial insecurity. Prenatal stress can [affect](#) maternal health and pregnancy outcomes, including low birth weight and preterm births.
- **Climate change threatens to stall or reverse progress made to improve maternal health and birth outcomes in many countries.** According to global health leaders, significant progress has been made toward [reducing maternal mortality](#) in recent decades; however, progress has slowed since 2016, and climate change is a factor. Additional research indicates that rising climate-related risks to pregnant people [threaten](#) to reverse progress made in maternal and reproductive health.

Learn more about [how climate change impacts pregnant, breastfeeding, and postpartum people](#) from the U.S. Environmental Protection Agency.

Pregnancy heat risks in a period of unprecedented warming

This analysis provides a five-year snapshot of daily extreme heat impacts that reflect a long-term global warming trend that is [driven by human activities](#). This period of analysis (2020–2024) includes [the two hottest years on record](#) (2023 and 2024), whose record-shattering global temperature anomalies are still [not fully understood](#). Recent analysis indicates, however, that human activities accounted for [1.3°C \(92%\)](#) of the total observed global temperature anomaly in 2023 (1.43°C).

EXPANDED FINDINGS

While this report highlights days above the 95th temperature percentile over the past five years, the full analysis also includes data for the 90th and 99th temperature percentiles. Research indicates there is no single threshold for elevated preterm birth risk — it varies based on socio-economic factors such as national wealth, healthcare access, and race.³

Although this analysis examined the frequency of temperatures associated with increased risks of preterm birth, other adverse [pregnancy complications](#) and birth outcomes have been linked with these temperature percentiles. Extreme heat exposure is also strongly associated with [low birth weight](#), which has significant implications for the immediate and long-term health of the baby.

To examine data that could be relevant for local populations with higher or lower vulnerability based on socio-economic factors, [download the full dataset](#) or [explore interactive maps](#) for more details on specific countries.

METHODOLOGY

Calculating Pregnancy Heat-Risk Days

We analyzed observed global temperatures using ERA5 reanalysis temperature data, which is available at a resolution of 0.25° (31 km). The analysis also used counterfactual temperatures — the temperatures that would have occurred in a world without human-caused climate change. These are estimated using Climate Central’s [Climate Shift Index \(CSI\) system](#), which is based on peer-reviewed attribution science. See the [methodology](#) for more information.

This analysis looked at days when maximum temperatures were hotter than 90%, 95%, and 99% of local temperatures from 1991–2020. These percentiles are used as rough estimates of heat levels linked to a higher risk of preterm birth (before 37 weeks) based on several

³ More information can be found in the following studies: [Wheeler et al. \(2022\)](#), [Bekkar et al. \(2020\)](#), and [León-Depass and Sakala et al. \(2021\)](#).

peer-reviewed studies.⁴ There isn't one universal temperature threshold for increased risk of preterm birth — heat sensitivity varies around the world due to factors like wealth, healthcare access, and race. To reflect this, we included all three percentiles in the analysis. This report focuses on days above the 95th percentile, which are used as a conservative estimate of global risk for preterm birth, called “pregnancy heat-risk days.”

We counted the number of days in each year when the daily maximum temperature exceeded the 90th, 95th, and 99th temperature percentile thresholds of the ERA5 (observed) and counterfactual temperatures from 2020-2024 and calculated the difference to assess how climate change has impacted temperatures.

We calculated country-level averages for each of the 247 countries and territories, excluding countries smaller than a single grid cell (0.25°). For larger countries like the U.S. and Canada, we also averaged data by state or province. We repeated the analysis for 940 cities to estimate city-specific counts of pregnancy heat-risk days linked to climate change.

For clarity, figures are rounded to the nearest significant digit. While the analysis used high-precision data, fewer decimals are shown, which may lead to minor arithmetic discrepancies but does not affect overall accuracy. A “month” is defined as 30 or more days.

Country names/boundaries are based on shapefiles from the [U.N. World Food Programme](#).

Selecting Cities to Analyze

We analyzed 940 cities from around the world, drawn from [simplemaps](#). These include cities with populations exceeding one million people and various U.S. cities.

REPORT CONTRIBUTIONS

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⁴ Based on peer-reviewed research from [Kuehn et al. \(2017\)](#), [Wang et al. \(2013\)](#), [Wang et al. \(2024\)](#), [McElroy et al. \(2022\)](#), with additional research from [Ha et al. \(2016\)](#), [Zhang et al. \(2022\)](#), [Cushing et al. \(2022\)](#), [He et al. \(2015\)](#), and [Yüzen et al. \(2023\)](#)