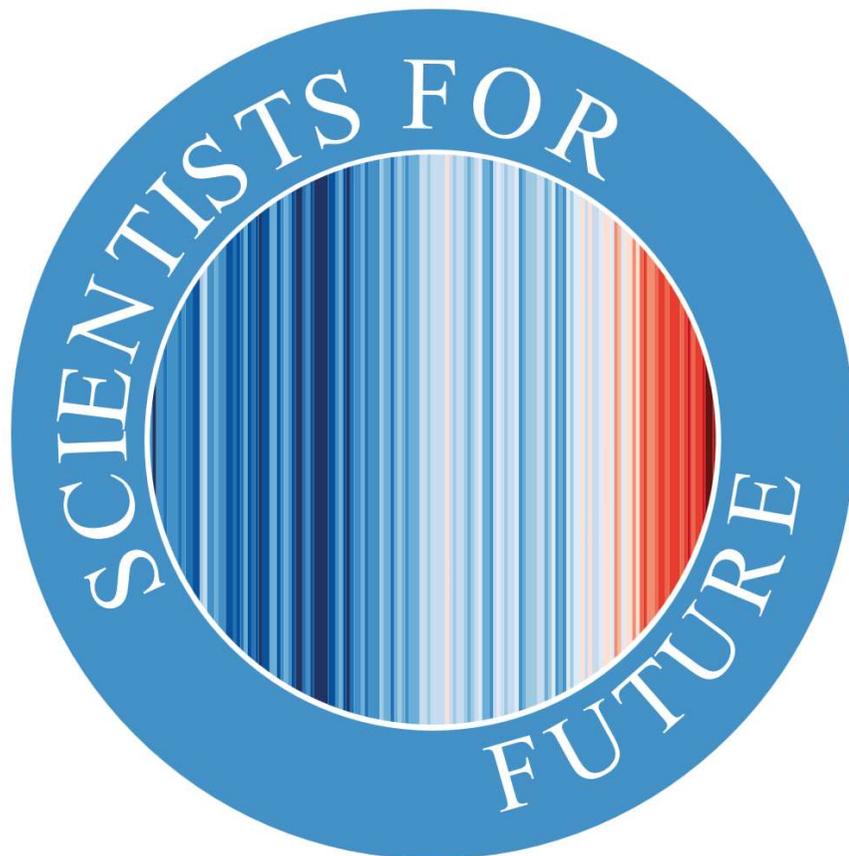


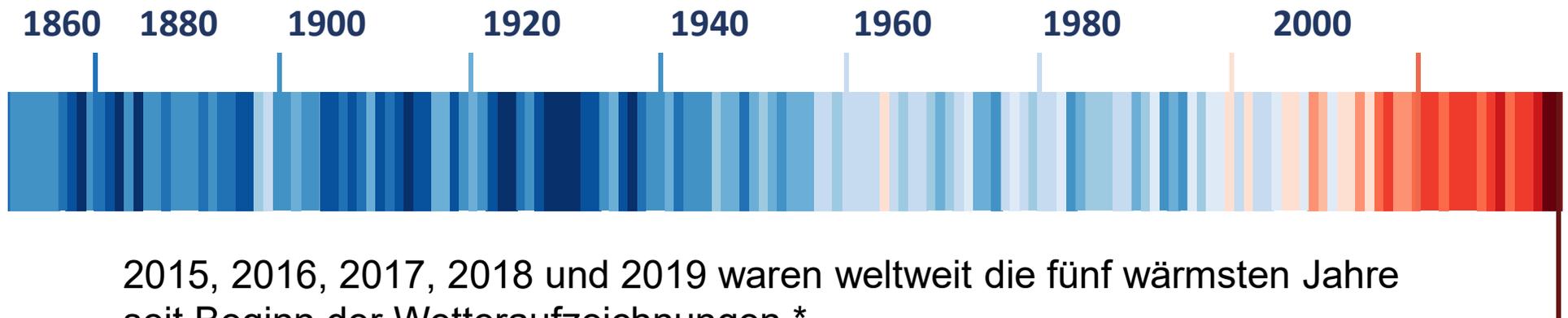
# Schwangerschaftsrisiken in der globalen Erwärmung



**Ekkehard Schleußner**  
**Klinik für Geburtsmedizin**  
**Universitätsklinikum Jena**

# Schwangerschaftsrisiken in der globalen Erwärmung

**Ekkehard Schleußner**  
**Klinik für Geburtsmedizin**  
**Universitätsklinikum Jena**



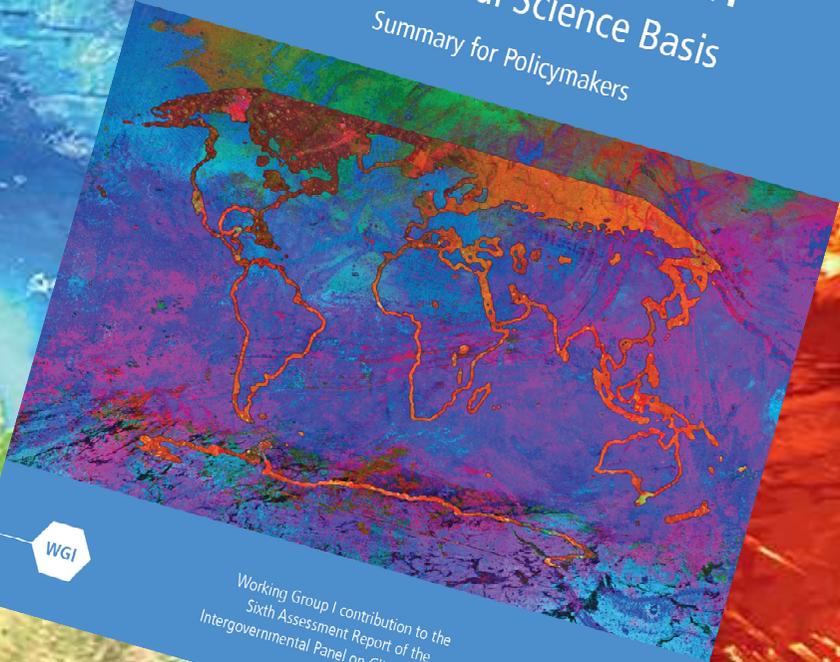


ipcc  
INTERGOVERNMENTAL PANEL ON climate change

# Climate Change 2021

## The Physical Science Basis

Summary for Policymakers



WGI

Working Group I contribution to the  
Sixth Assessment Report of the  
Intergovernmental Panel on Climate Change



Access provided by Friedrich Schiller University Jena

COMMENT | VOLUME 398, ISSUE 10304, P939-941, SEPTEMBER 11, 2021

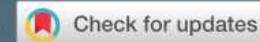
PDF

## Call for emergency action to limit global temperature increases, restore biodiversity, and protect health

Lukoye Atwoli • Abdullah H Baqui • Thomas Benfield • Raffaella Bosurgi • Fiona Godlee • Stephen Hancocks • et al.

[Show all authors](#)

Published: September 04, 2021 • DOI: [https://doi.org/10.1016/S0140-6736\(21\)01915-2](https://doi.org/10.1016/S0140-6736(21)01915-2)



Indeed, no temperature rise is “safe”.

In the past 20 years, heat-related mortality among people older than 65 years has increased by more than 50%.

Higher temperatures have brought increased dehydration and renal function loss, dermatological malignancies, tropical infections, adverse mental health outcomes, pregnancy complications, allergies, and cardiovascular and pulmonary morbidity and mortality.

Die Chefredakteurinnen und -redakteur von 19 medizinischen Fachzeitschriften aus aller Welt haben die Vereinten Nationen dazu aufgerufen, den Ausstoß von Treibhausgasen stärker zu reduzieren, um so die Gesundheit der



REVIEW | VOLUME 398, ISSUE 10311, P1619-1662, OCTOBER 30, 2021

## The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future

Marina Romanello, PhD • Alice McGushin, MSc • Claudia Di Napoli, PhD • Paul Drummond, MSc • Nick Hughes, PhD

Louis Jamart, MSc • et al. [Show all authors](#)

Published: October 20, 2021 • DOI: [https://doi.org/10.1016/S0140-6736\(21\)01787-6](https://doi.org/10.1016/S0140-6736(21)01787-6) • 

*Lancet* 2021; 398: 1619–62

Published Online  
October 20, 2021  
[https://doi.org/10.1016/S0140-6736\(21\)01787-6](https://doi.org/10.1016/S0140-6736(21)01787-6)

For the German translation of the Executive Summary see Online for appendix 3

### Climate change impacts, exposures, and vulnerability

- 1.1: health and heat
  - 1.1.1: vulnerability to extremes of heat
  - 1.1.2: health and exposure to warming
  - 1.1.3: exposure of vulnerable populations to heatwaves
  - 1.1.4: change in labour capacity
- 1.2: health and extreme weather events
  - 1.2.1: wildfires
  - 1.2.2: flood and drought
  - 1.2.3: lethality of weather-related disasters
- 1.3: global health trends in climate-sensitive diseases
- 1.4: climate-sensitive infectious diseases
  - 1.4.1: climate suitability for infectious disease transmissic
  - 1.4.2: vulnerability to mosquito-borne diseases
- 1.5: food security and undernutrition
  - 1.5.1: terrestrial food security and undernutrition
  - 1.5.2: marine food security and undernutrition

### Adaptation, planning, and resilience for health

- 2.1: adaptation planning and assessment
  - 2.1.1: national adaptation plans for health
  - 2.1.2: national assessments of climate change impacts, vulnerability, and adaptation for health
  - 2.1.3: city-level climate change risk assessments
- 2.2: climate information services for health
- 2.3: adaptation delivery and implementation
  - 2.3.1: detection, preparedness, and response to health emergencies
  - 2.3.2: air conditioning—benefits and harms
- 2.4: spending on adaptation for health and health-related activities
- 3.3: air pollution, energy, and transport
  - 3.3.1: exposure to air pollution in cities
  - 3.3.2: premature mortality from ambient air pollution by sector



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The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future

Marina Romanello, PhD • Alice McGushin, MSc • Claudia Di Napoli, PhD • Paul Drummond, MSc

Louis Jamart, PhD

Published: October 2021

Indicator 1.1.2: exposure of vulnerable populations to heatwaves—headline finding: children younger than 1 year were affected by 626 million more person-days of heatwave exposure and adults older than 65 years were affected by 3.1 billion more person-days of heatwave exposure in 2020 than in the 1986–2005 average

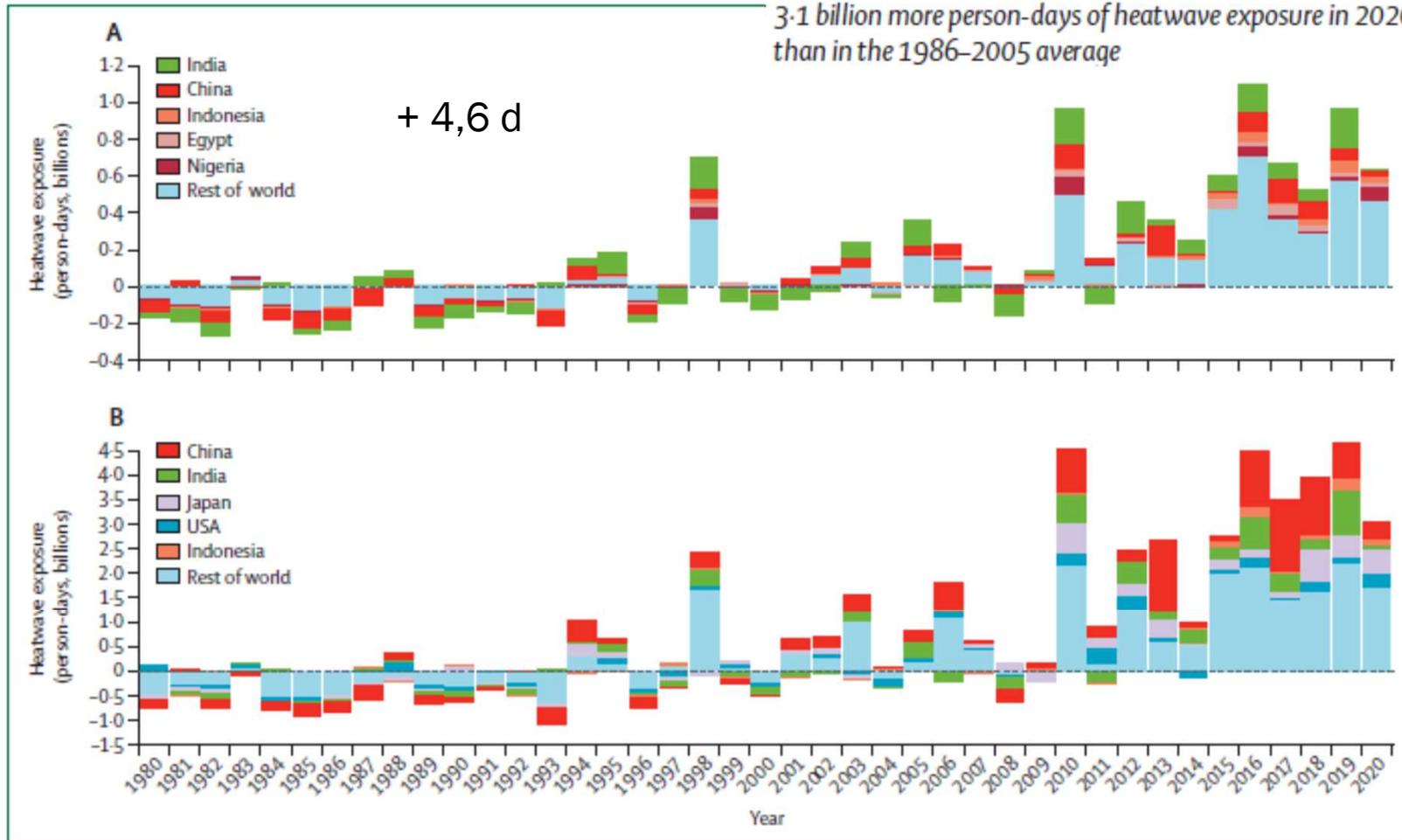


Figure 1: Change in person-days of heatwave exposure relative to the 1986–2005 baseline (A) People younger than 1 year. (B) People older than 65 years. The dotted line at 0 represents the baseline.

REVIEW | VOLUME 398, ISSUE 10311, P1619-1662, OCTOBER 30, 2021



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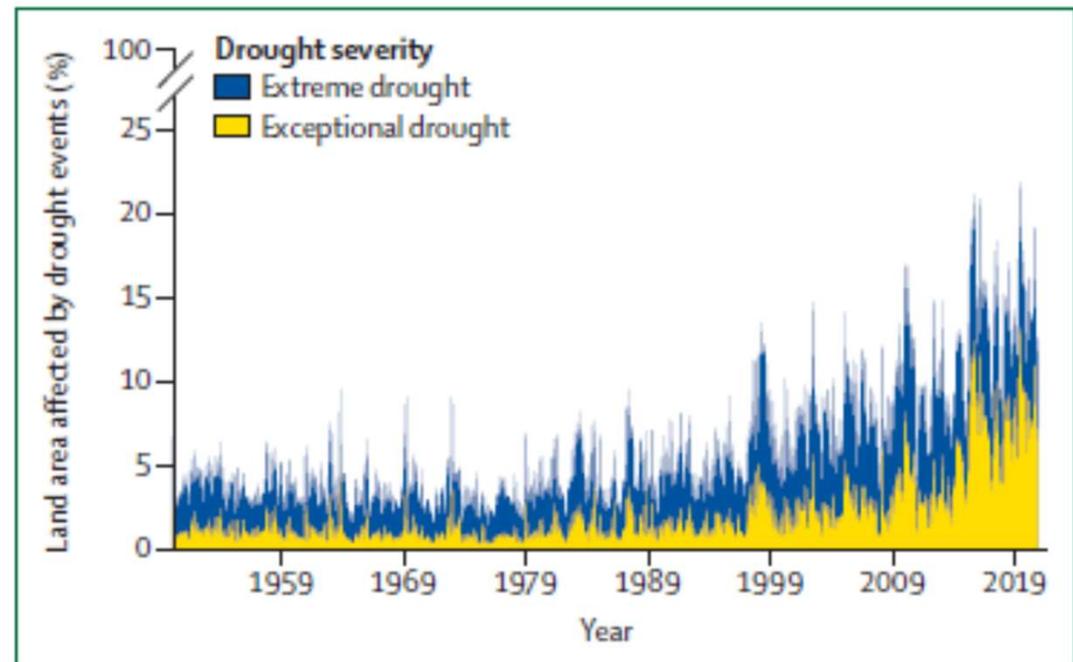
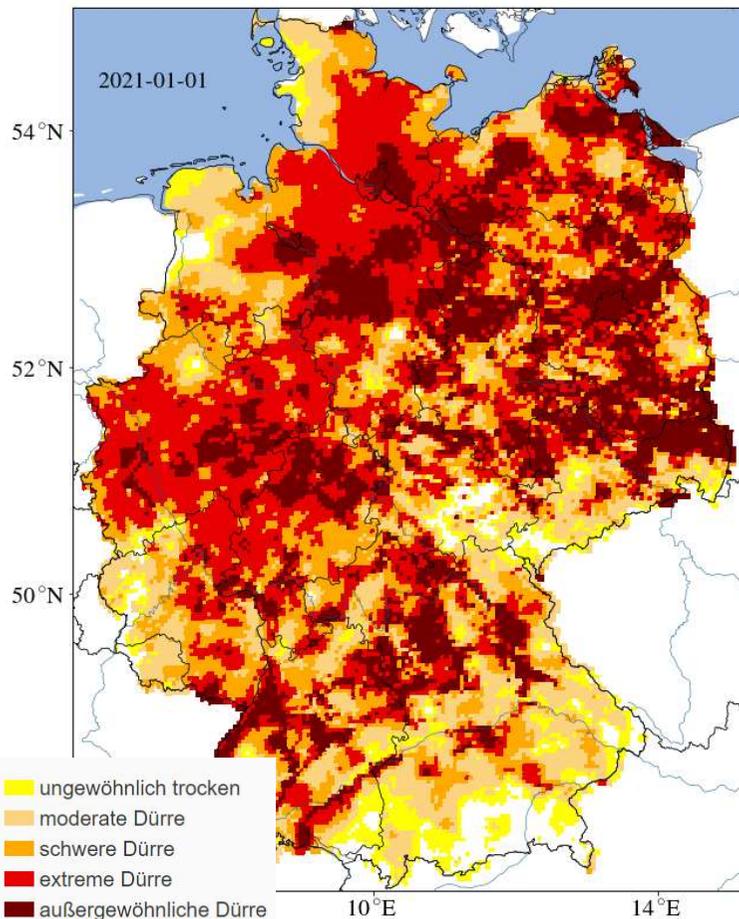
## The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future

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Published: October 20, 2021 • DOI: [https://doi.org/10.1016/S0140-6736\(21\)01787-6](https://doi.org/10.1016/S0140-6736(21)01787-6)

Indicator 1.2.3: lethality of extreme weather events—  
headline finding: the past 30 years have seen statistically significant increases in the number of extreme weather



**Figure 7: Global land area affected by drought events per month**  
Extreme drought is defined by a SPEI of  $\leq -1.6$  and exceptional drought is defined by a SPEI of  $\leq -2$ . SPEI=standardised precipitation-evapotranspiration index.



## **How Does Climate Change and Air Pollution Affect Pregnancy and Human Development?**

### **Climate change puts pregnant women and children at risk**

The impacts of climate change are already taking place: more frequent natural disasters, extreme weather and temperatures, rising sea levels, and displacement. Mainly because of combustion of fossil fuels, CO<sub>2</sub> is causing warming, and these changes affect food and housing security, vector-borne illness, and access to clean air and water, all of which influence human health, especially that of pregnant women and children. Research shows evidence linking climate change with poor pregnancy outcomes that can have lasting effects on children and the health of subsequent generations [1].

<https://www.env-health.org/wp-content/uploads/2020/04/FINAL-Climate-Change-and-Pregnancy-Fact-Sheet.pdf>

Original Investigation | Environmental Health

# Association of Air Pollution and Heat Exposure With Preterm Birth, Low Birth Weight, and Stillbirth in the US

## A Systematic Review

Bruce Bekkar, MD; Susan Pacheco, MD; Rupa Basu, PhD; Nathaniel DeNicola, MD, MSHP

Exposure and outcome	Studies finding an association, No./total No.	Births/study, mean (SD)	Total births in millions	Increased risk, median (range), % <sup>a</sup>	Studies finding racial disparity, No./total No.	Notable findings <sup>b</sup>
<b>Air pollution</b>						
Preterm birth	19/24	318 960 (393 272)	7.3	11.5 (2.0-19.0) <sup>c</sup>	10/19	Preterm birth risk increased 52% for asthmatic mothers
Low birth weight	25/29	661 205 (878 074)	18.5	10.8 (2.0-36.0) <sup>c</sup>	13/25	Low birth weight risk increased 3% for each 5-km proximity to a solid waste plant
Stillbirth	4/5	1 020 975 (1 176 174)	5.1	14.5 (6.0-23.0) <sup>c</sup>	1/4	Stillbirth risk increased 42% with high third-trimester exposure
<b>Heat</b>						
Preterm birth	4/5	192 625 (207 995)	0.8	15.8 (9.0-22.0) <sup>d</sup>	2/4	Preterm birth risk increased 11.6% per 5.6 °C increase
Low birth weight	3/3	902 277 (985 803)	2.7	31.0 (13.0-49.0) <sup>d</sup>	1/3	Term birth weight decreased 16 g per IQR temperature increase
Stillbirth	2/2	115 943 (115 933)	0.2	NA <sup>e</sup>	2/2	Stillbirth risk increased 6% per 1 °C increase the week before delivery during the warm season



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Environment International

journal homepage: [www.elsevier.com/locate/envint](http://www.elsevier.com/locate/envint)

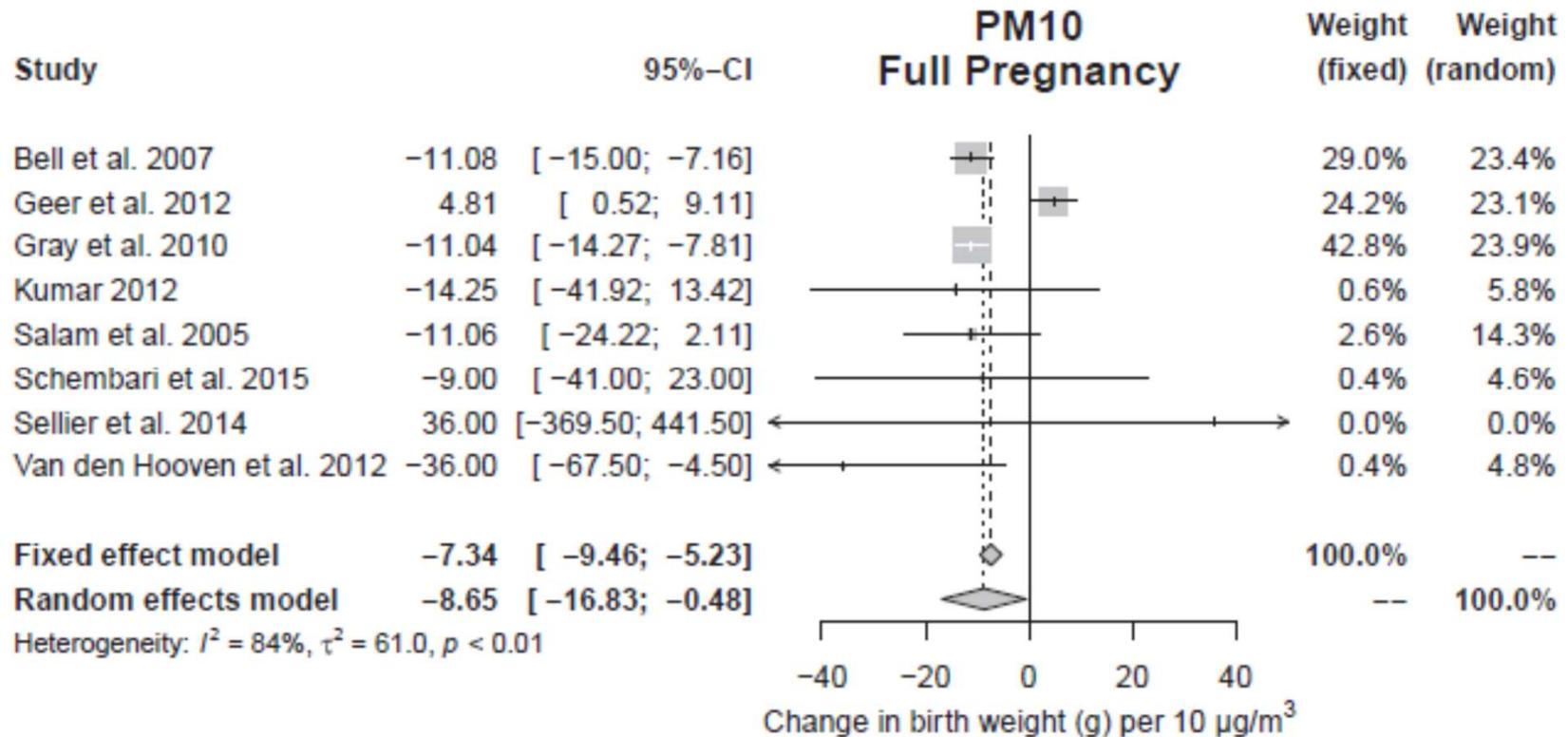


Review article

# Application of the navigation guide systematic review methodology to evaluate prenatal exposure to particulate matter air pollution and infant birth weight



Inyang Uwak<sup>a</sup>, Natalie Olson<sup>b</sup>, Angelica Fuentes<sup>b</sup>, Megan Moriarty<sup>a</sup>, Jairus Pulczynski<sup>c</sup>,  
Julien Lam<sup>d</sup>, Xiaohui Xu<sup>e</sup>, Brandie D. Taylor<sup>f</sup>, Samuel Taiwo<sup>a</sup>, Kirsten Koehler<sup>c</sup>





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## Air pollution exposure and risk of adverse obstetric and neonatal outcomes among women with type 1 diabetes

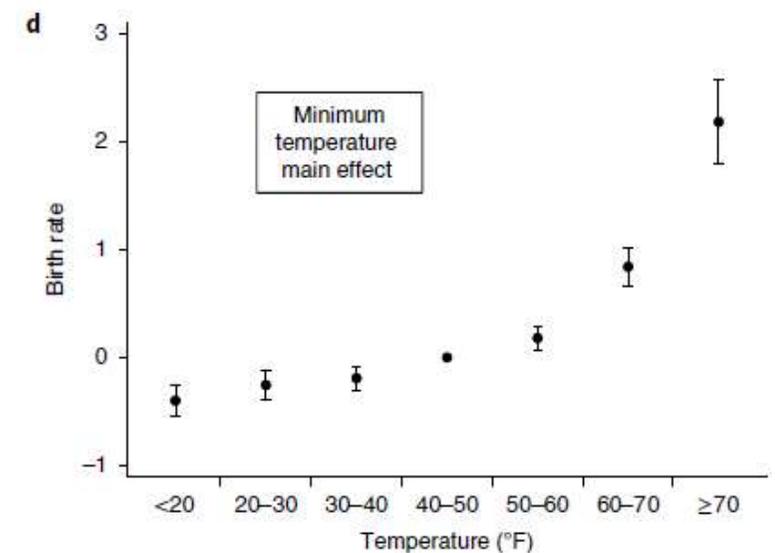
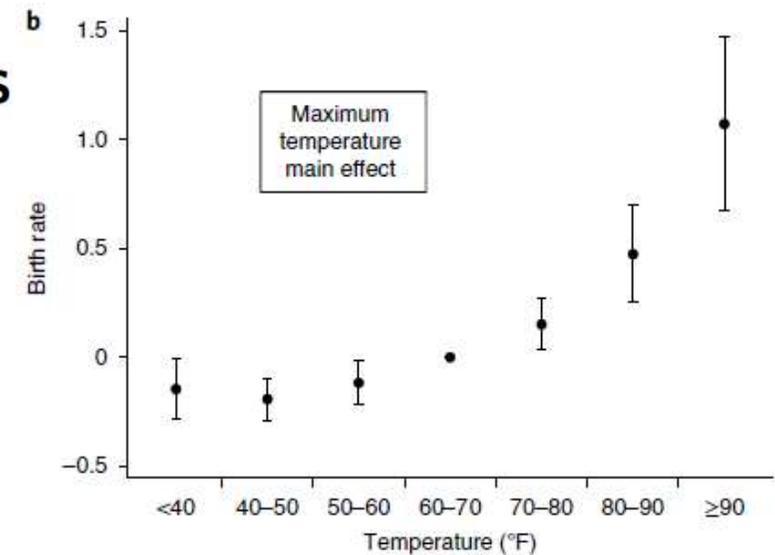
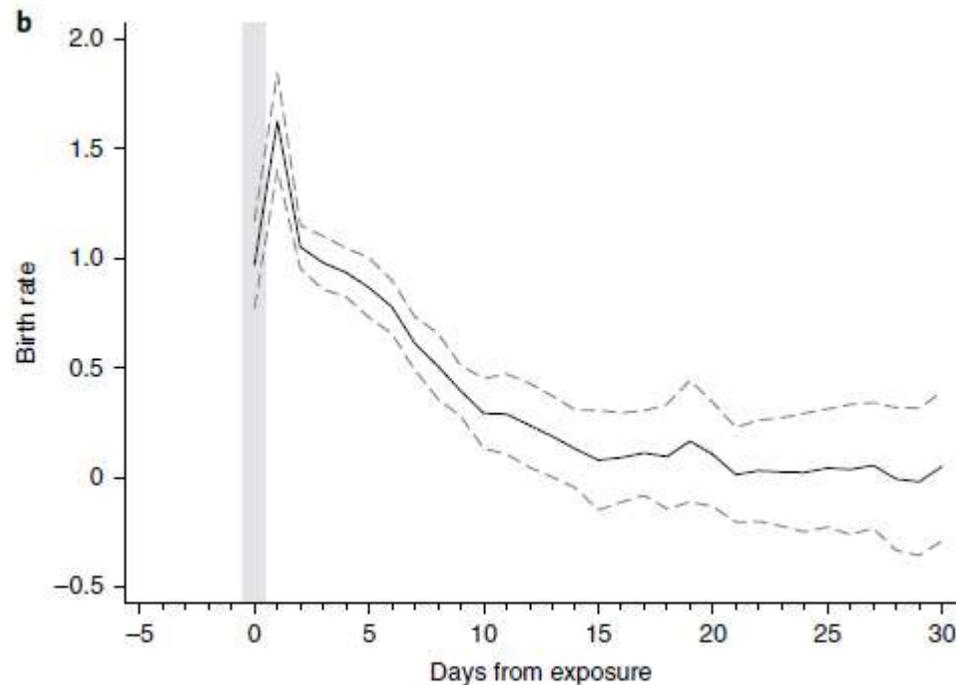
Andrew D. Williams<sup>a,\*</sup>, Jenna Kanner  
Shanshan Sheehy<sup>d</sup>, Seth Sherman<sup>e</sup>, G.

Rate per 1000<sup>a</sup> (and frequency) of obstetric and neonatal outcomes for singleton pregnancies from the Consortium of Safe Labor 2002–2008 (n = 204951).

	Women without autoimmune disease (n = 204,384)	Type I Diabetes (n = 507)	p- value <sup>b</sup>
Cesarean Delivery	278.5 (56,926)	670.6 (340)	<.05
<i>Prelabor cesarean</i>	113.6 (23,218)	270.2 (137)	<.05
<i>After spontaneous labor</i>	93.0 (19,016)	195.3 (99)	<.05
<i>After induced labor</i>	71.9 (14,692)	205.1 (104)	<.05
Preterm Birth	111.0 (22,701)	426.0 (216)	<.05
<i>Spontaneous</i>	78.4 (16,038)	248.5 (126)	<.05
<i>Indicated</i>	17.8 (3650)	145.9 (74)	<.05
Preeclampsia	46.4 (9498)	159.7 (81)	<.05
NICU Admission	115.4 (23,593)	408.2 (207)	<.05
Neonatal Respiratory Distress Syndrome	31.1 (6357)	130.1 (66)	<.05
Small for Gestational Age	109.3 (22,350)	65.0 (33)	<.05
Perinatal Mortality	5.9 (1214)	13.8 (7)	<.05

# The impact of high ambient temperatures on delivery timing and gestational lengths

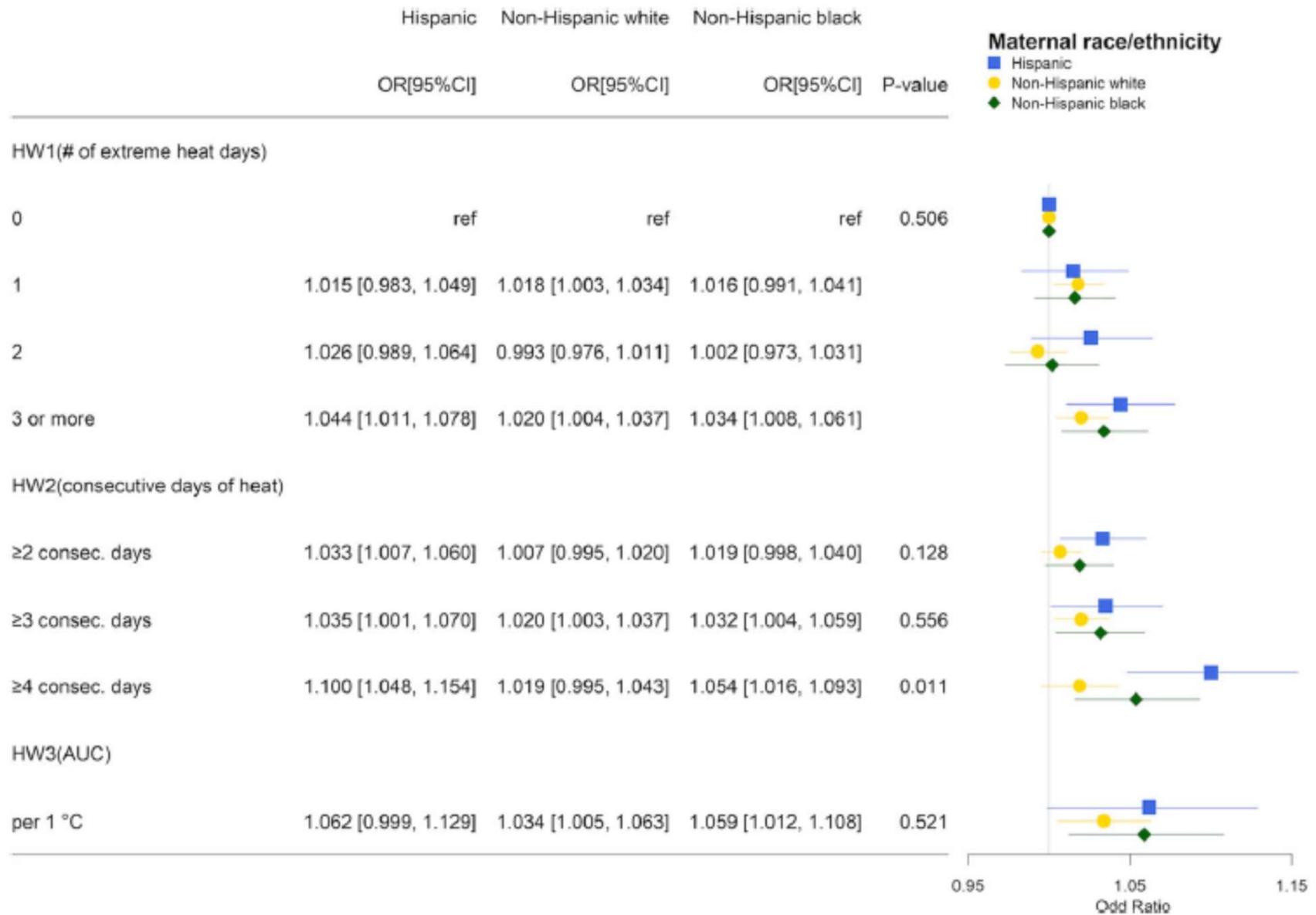
Alan Barreca<sup>1,2,3\*</sup> and Jessamyn Schaller<sup>3,4</sup>

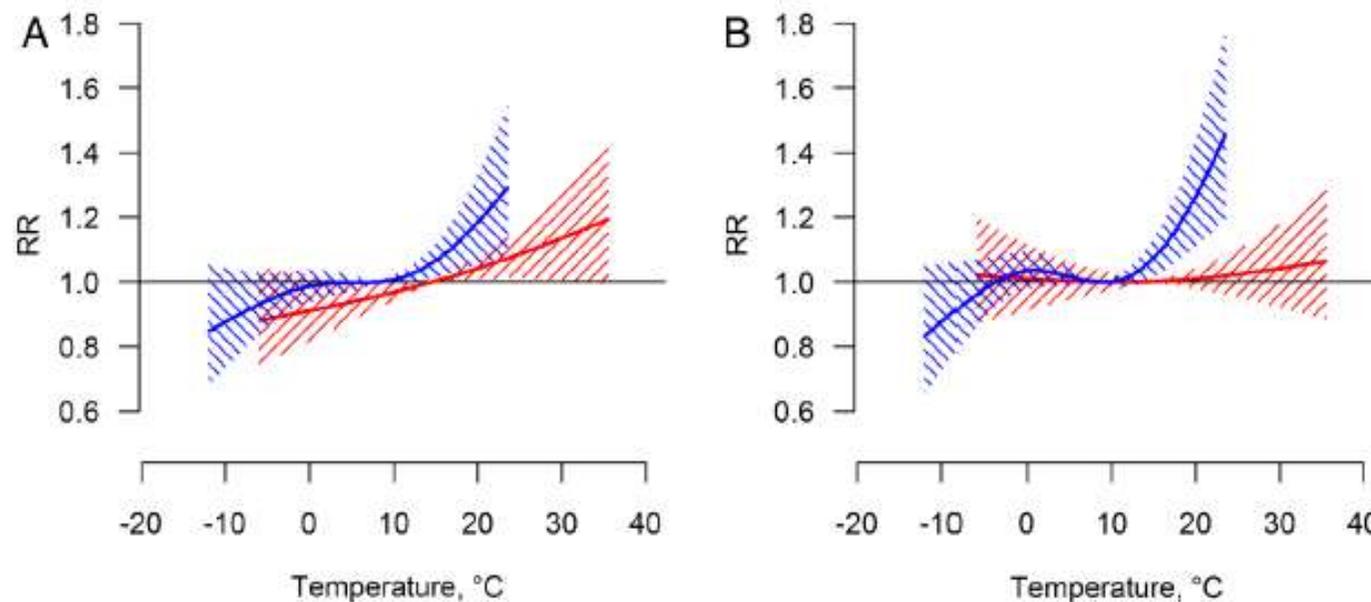


weeks. We estimate that an average of 25,000 infants per year were born earlier as a result of heat exposure, with a total loss of more than 150,000 gestational days annually. Absent adaptation, climate projections suggest additional losses of 250,000 days of gestation per year by the end of the century.

RESEARCH

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A) lag 0–1 days; and (B): lag 0–3days — Tmin — Tmax

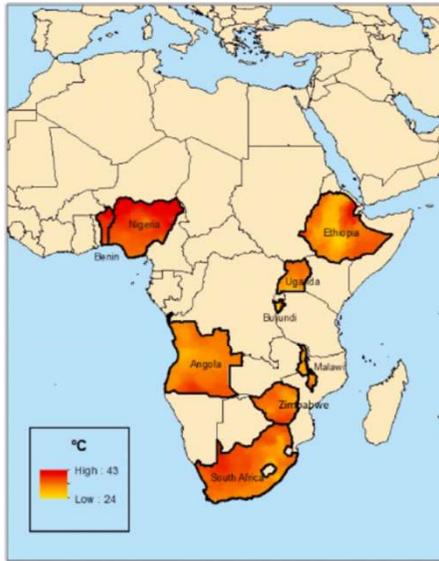
Methods: association between temperature and the risk of preterm birth in Flanders(Belgium) we used data on 807 835 singleton deliveries ( January 1998–July 2011).

## Environmental health

### Ambient temperature as a trigger of preterm delivery in a temperate climate

Bianca Cox,<sup>1</sup> Ana M Vicedo-Cabrera,<sup>2</sup> Antonio Gasparrini,<sup>3,4</sup> Harry A Roels,<sup>1,5</sup> Evelyne Martens,<sup>6</sup> Jaco Vangronsveld,<sup>1</sup> Bertil Forsberg,<sup>2</sup> Tim S Nawrot<sup>1,7</sup>

J Epidemiol  
Community Health  
2016;70:1191–1199

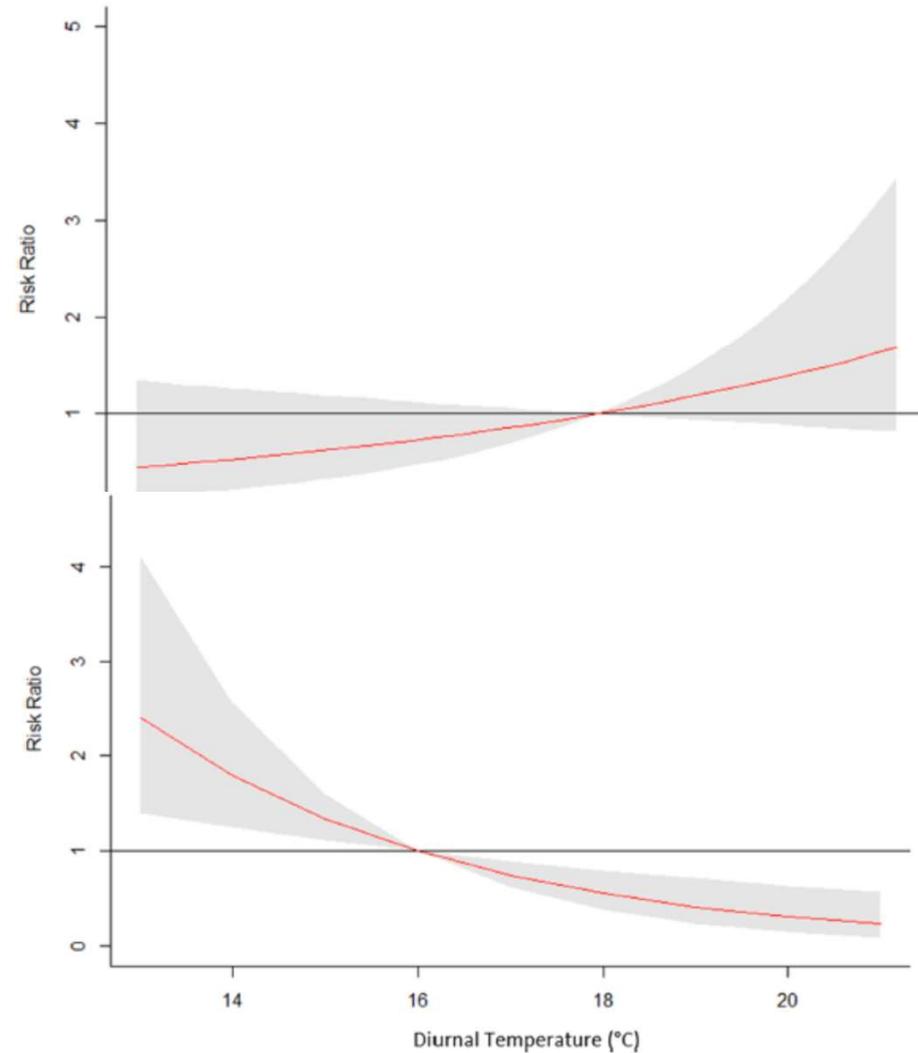


# Extreme heat, preterm birth, and stillbirth: A global analysis across 14 lower-middle income countries

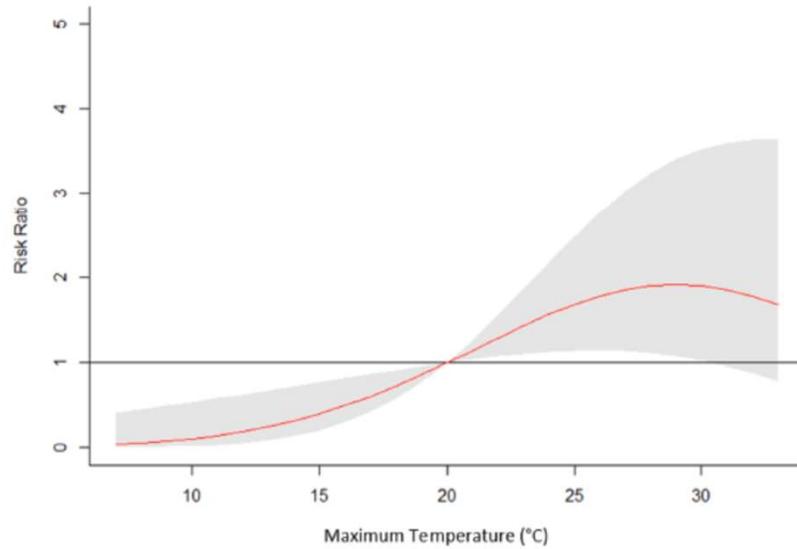
Sara McElroy<sup>a,b,c,\*</sup>, Sindana Ilango<sup>a,b,c,d</sup>, Anna Dimitrova<sup>a,b,c</sup>, Alexander Gershunov<sup>a,b,c</sup>, Tarik Benmarhnia<sup>a,b,c</sup>

Environment International 158 (2022) 106902

Overall Effect of Extreme Heat and Preterm Birth



Overall Effect of Extreme Heat and Stillbirth



# Mid German Climate Preterm Birth study

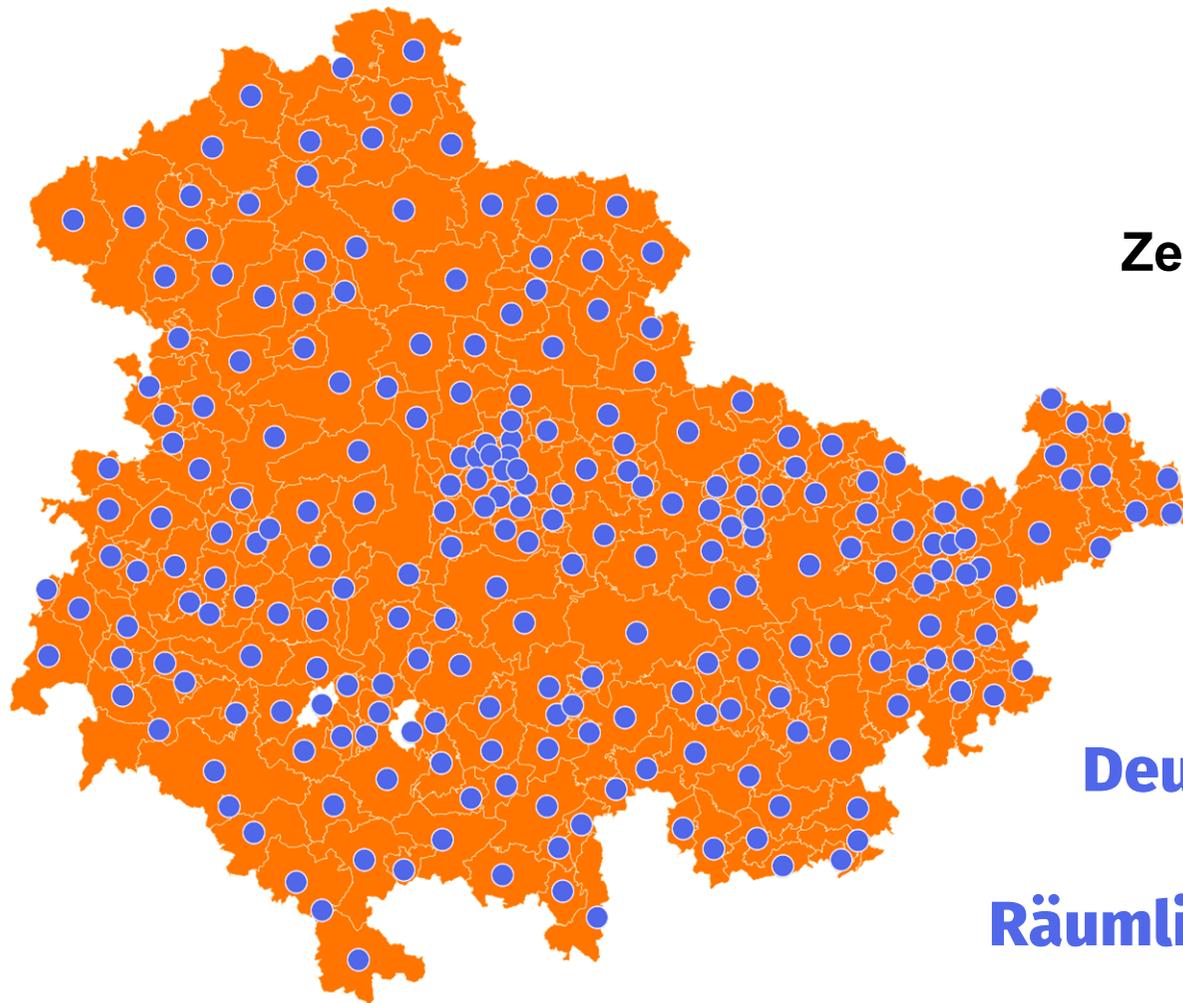
**Perinatalerhebung Thüringen**

**2014 – 2019      74.893 Geburten**

**6.663 Frühgeburten**

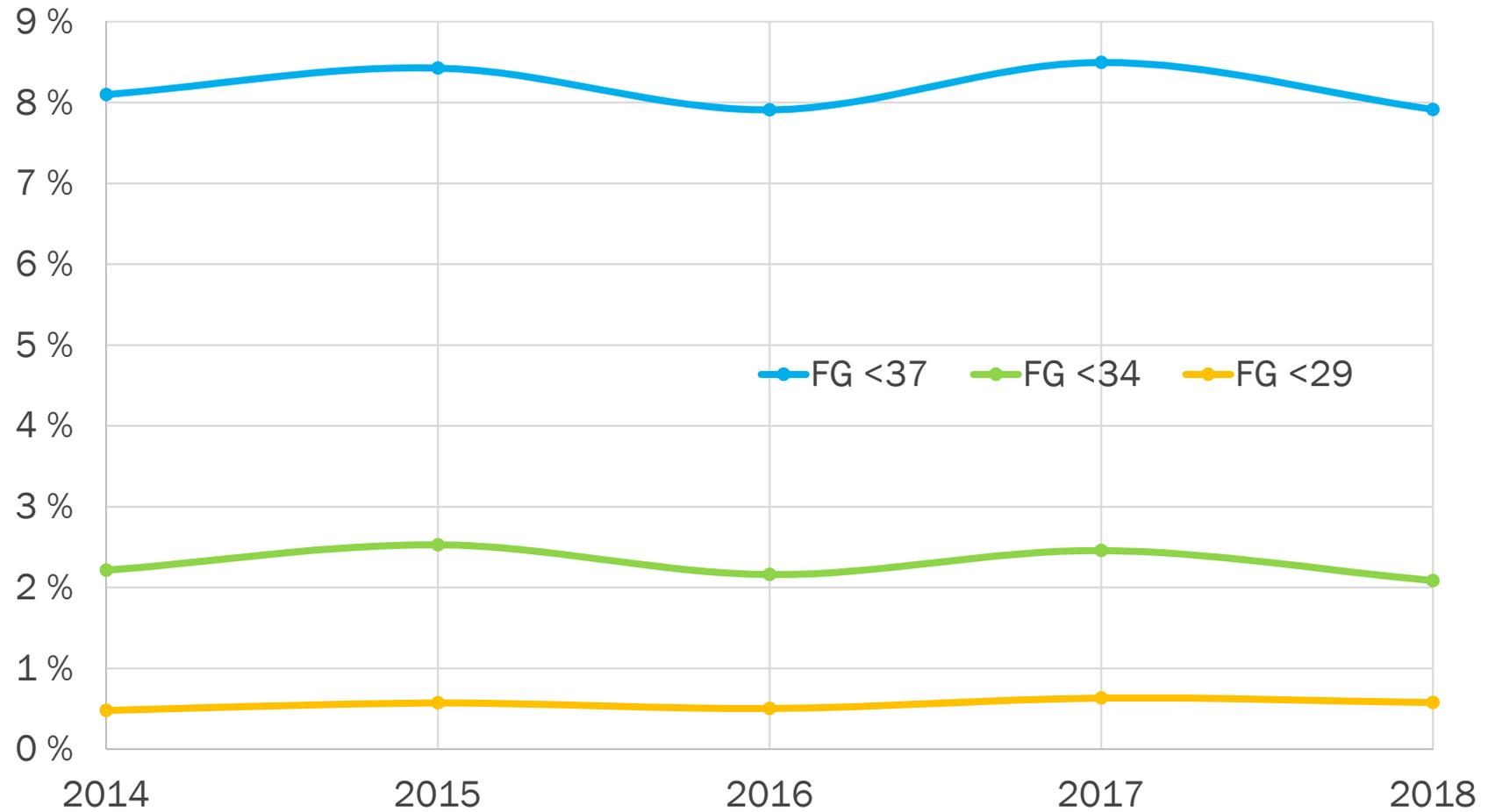
**Zeitliche Auflösung pro Tag**

**~ 40 Mill. Datenpunkte**

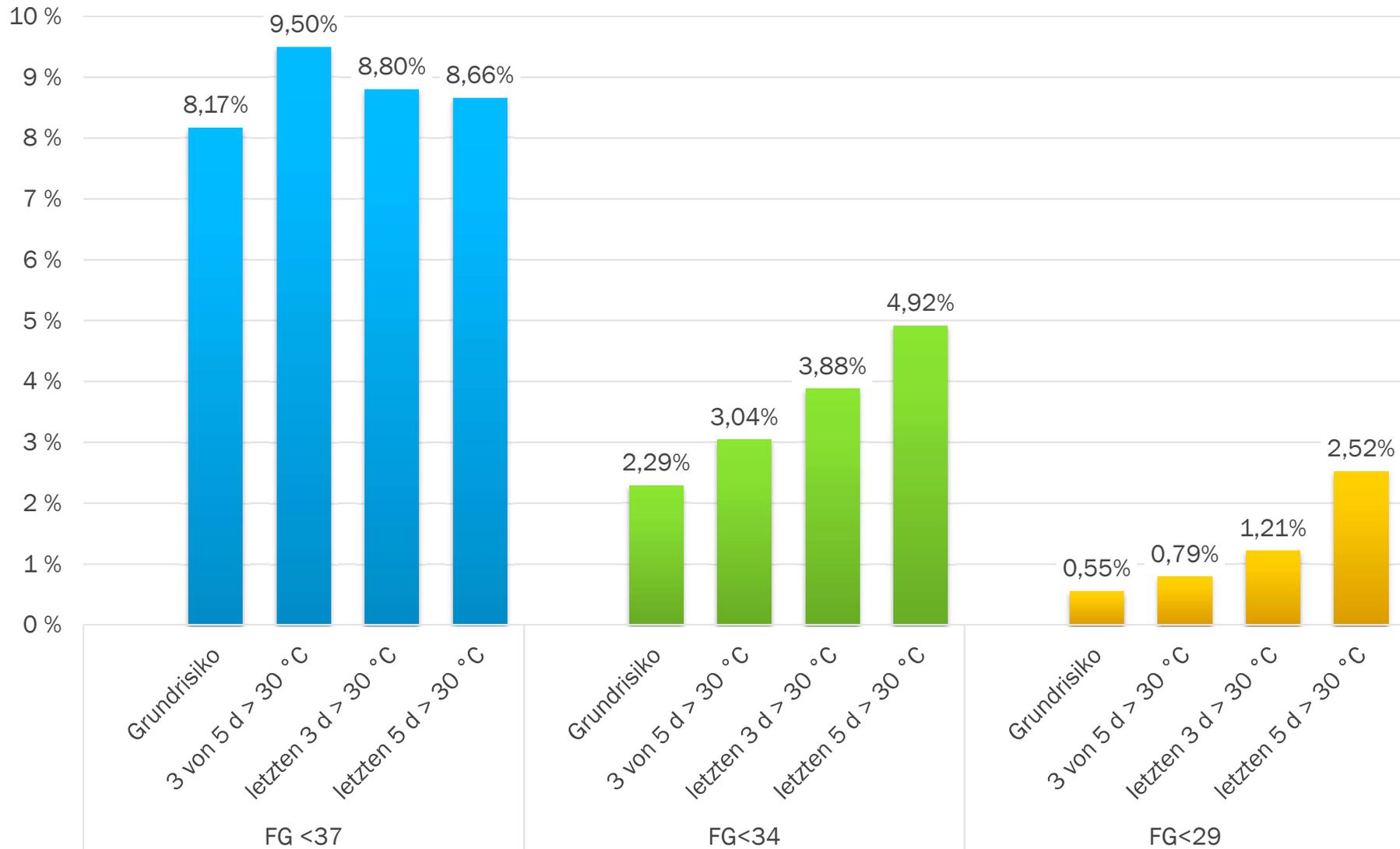


**Deutscher Wetterdienst  
Messnetz-Daten  
Räumliche Auflösung nach PLZ**

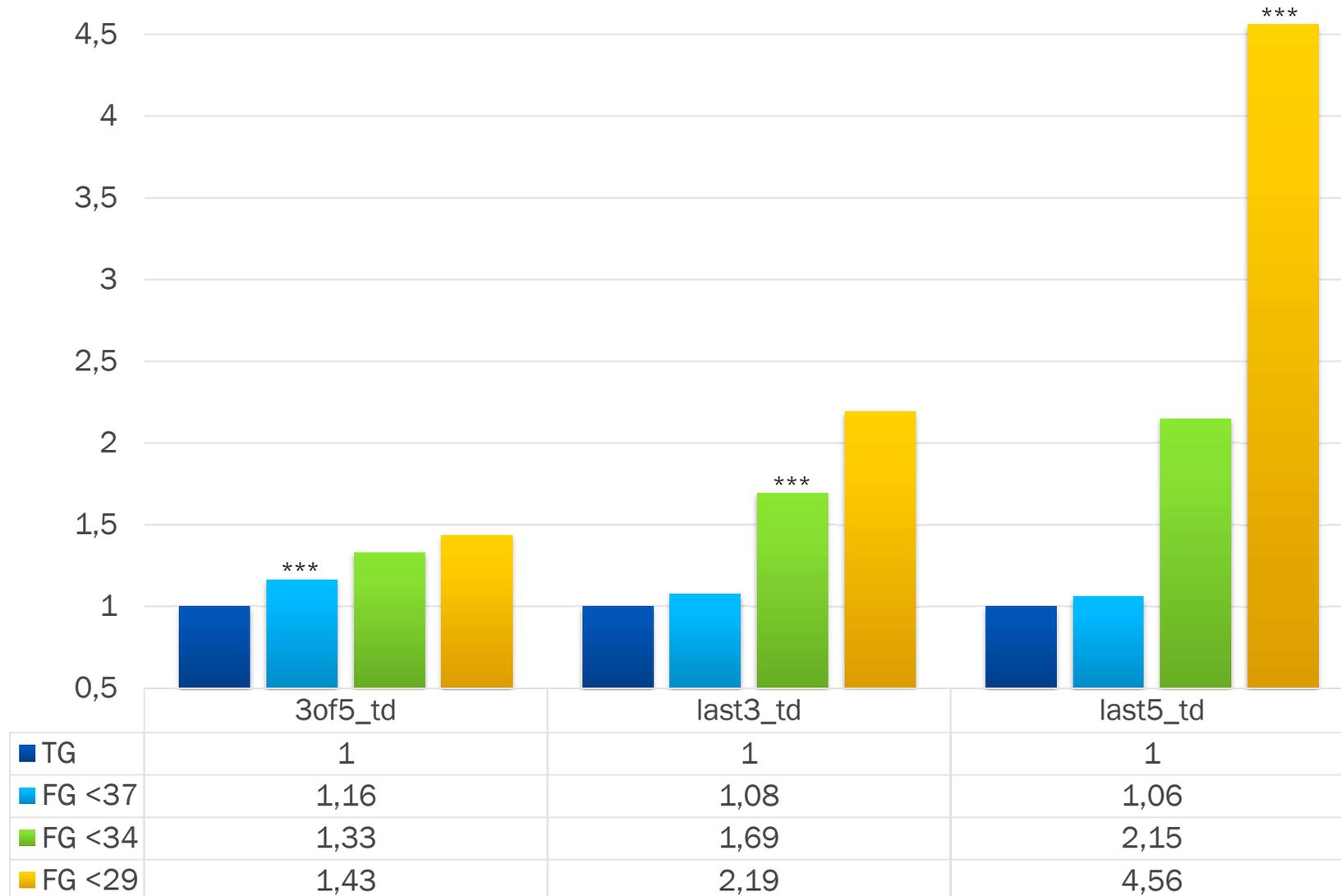
## Frühgeburtenrate 2014–2018



Risikosteigerung für Frühgeburten nach tropischen Tagen



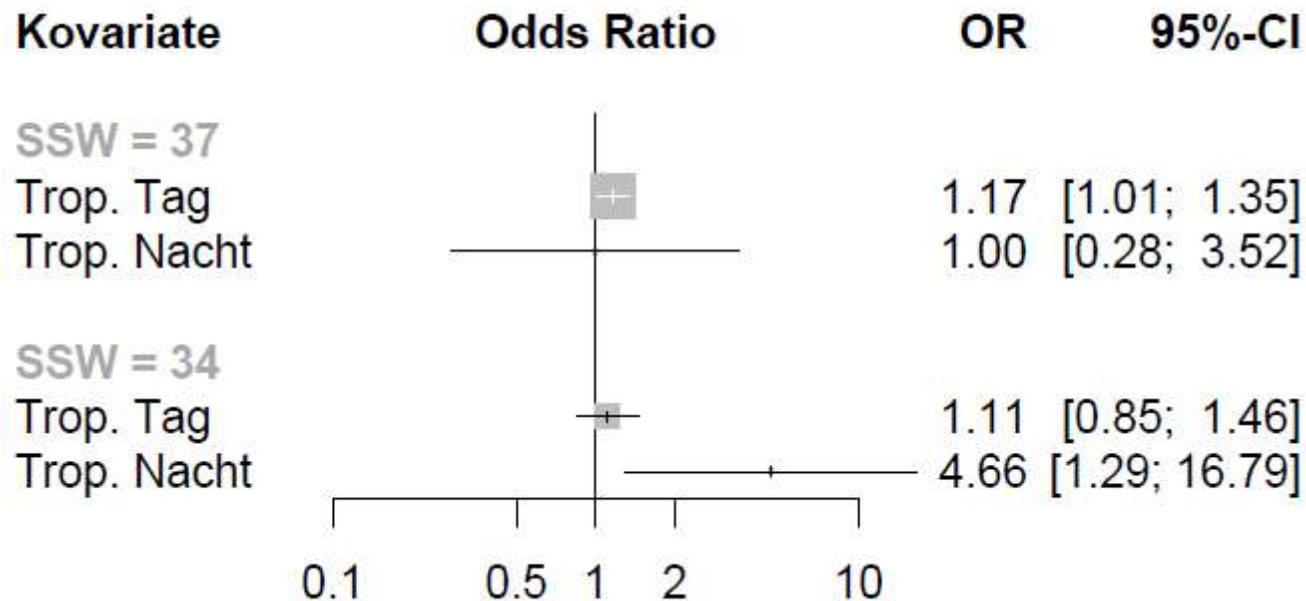
### Relatives Risiko FG nach tropischen Tagen



## Case-crossover Analyse

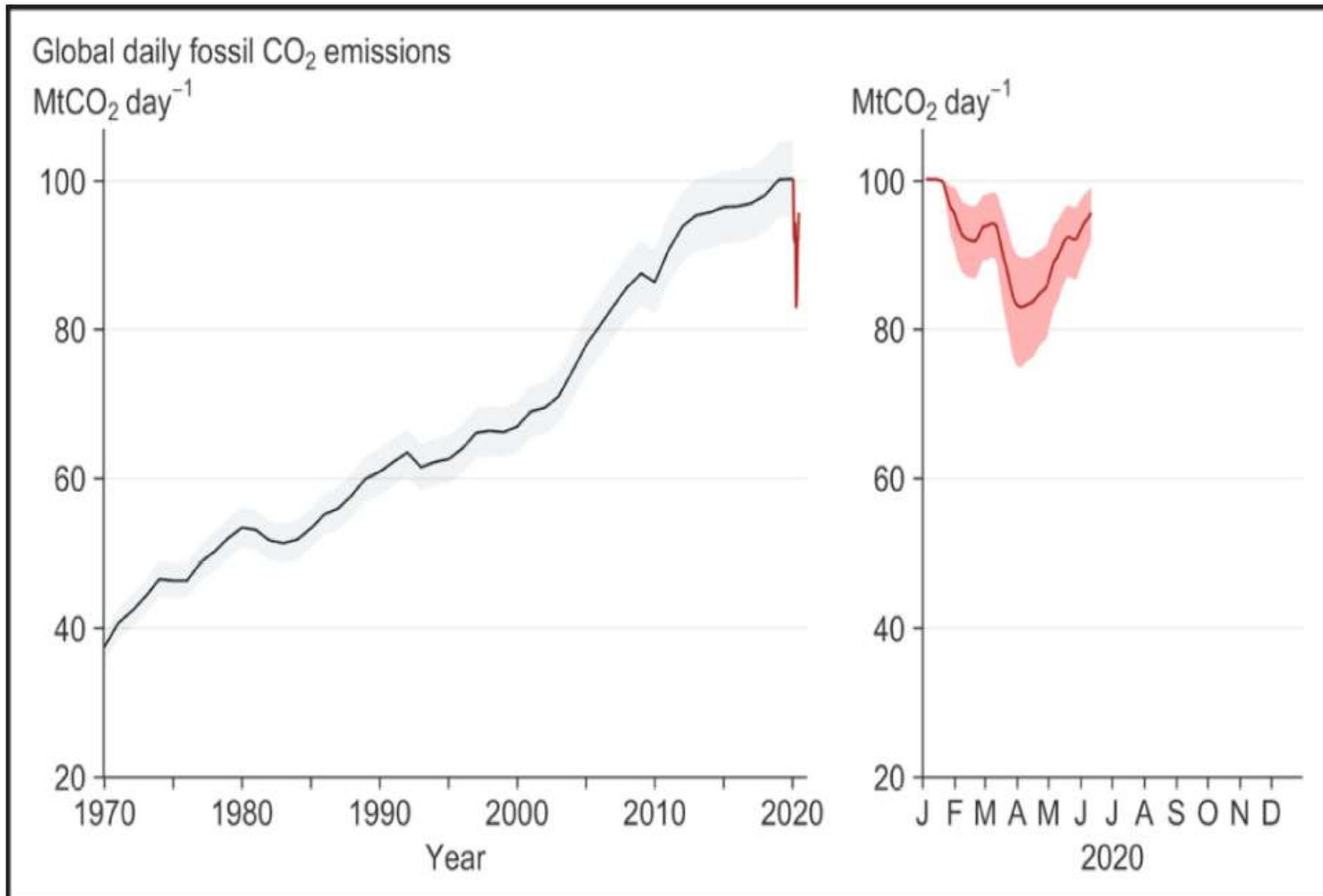
Proposed by Maclure (1991) to study transient effects on the risk of acute health events (Am J Epidemiol. 1991;133(2):144-153)

Generalised linear mixed models (logistic regression with random effects)



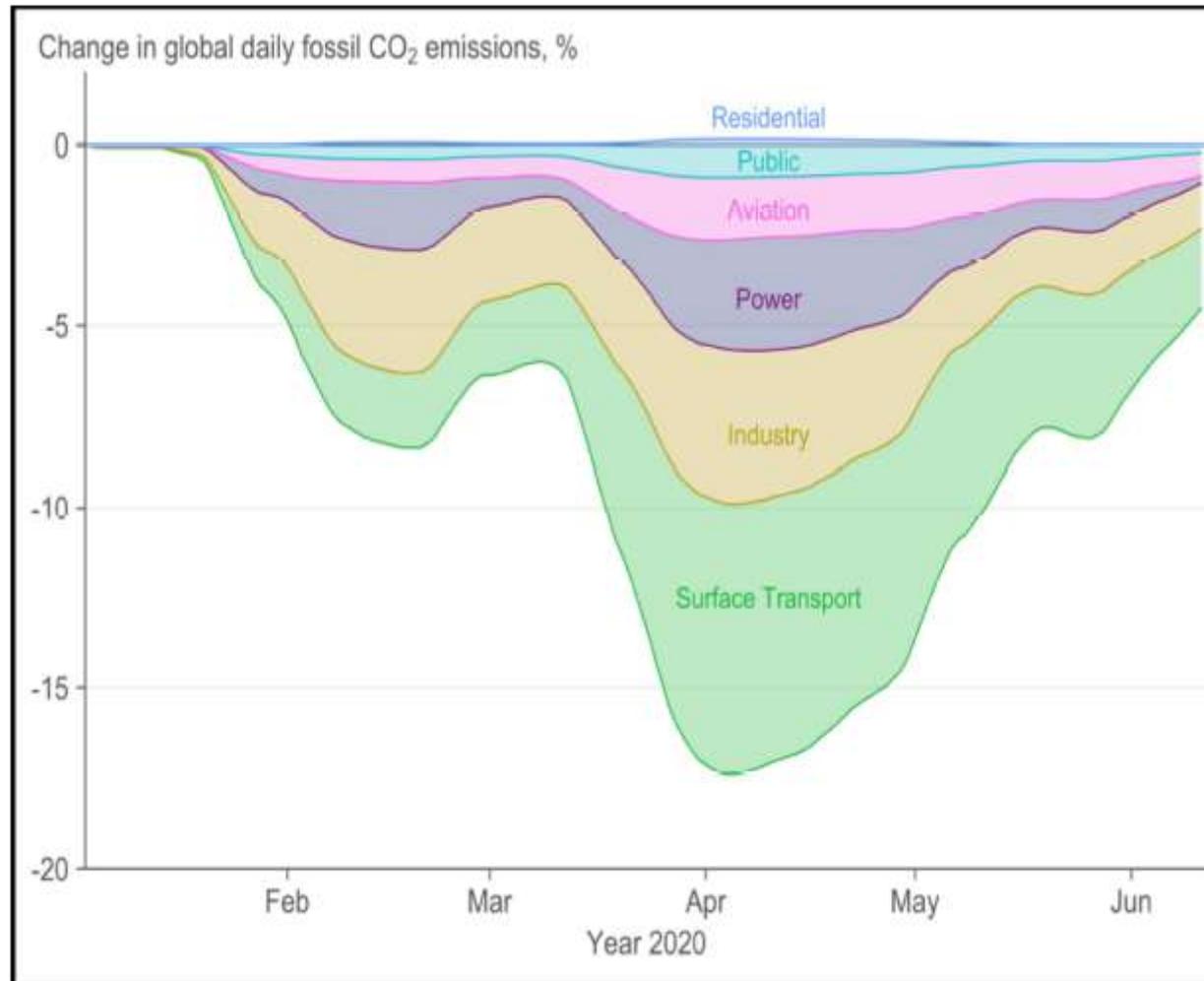
## Vorläufige Ergebnisse

- Auf Basis einer zeitlich und räumlich hoch aufgelösten Hitzeexpositionsanalyse läßt sich auch in Deutschland eine Erhöhung des Frögeburtsrisikos nachweisen
- Hitzestress ist stärker mit früher und extremer Frühgeburtlichkeit assoziiert
- Limitation ist die zu geringe Datenbasis
  - eine Analyse auf Basis der deutschlandweiten Perinatalerhebung ist in Vorbereitung



Le Ouéré et al., Nature Climate Change (2020):

<<https://creativecommons.org/licenses/by/2.0/legalcode>>



Le Ouéré et al., Nature Climate Change (2020):

<https://creativecommons.org/licenses/by/2.0/legalcode>

# SCHWANGERSCHAFT und KLIMAWANDEL

## Das PROBLEM

Der Klimawandel verschlimmert Luftverschmutzung und extreme Wetterbedingungen, die während und nach der Schwangerschaft schwere Auswirkungen auf die Gesundheit haben können:



FRÜHGEBURT



NIEDRIGES GEBURTSGEWICHT



TOTGEBURT

AUSWIRKUNGEN AUF  
GEHIRNENTWICKLUNG

## Was wir TUN KÖNNEN

Fürsprecher für öffentliche Politik, die zu einer solchen führt:



Globale Reduzierung der Luftverschmutzung



Kontinuierlicher Ausstieg aus fossilen Brennstoffen

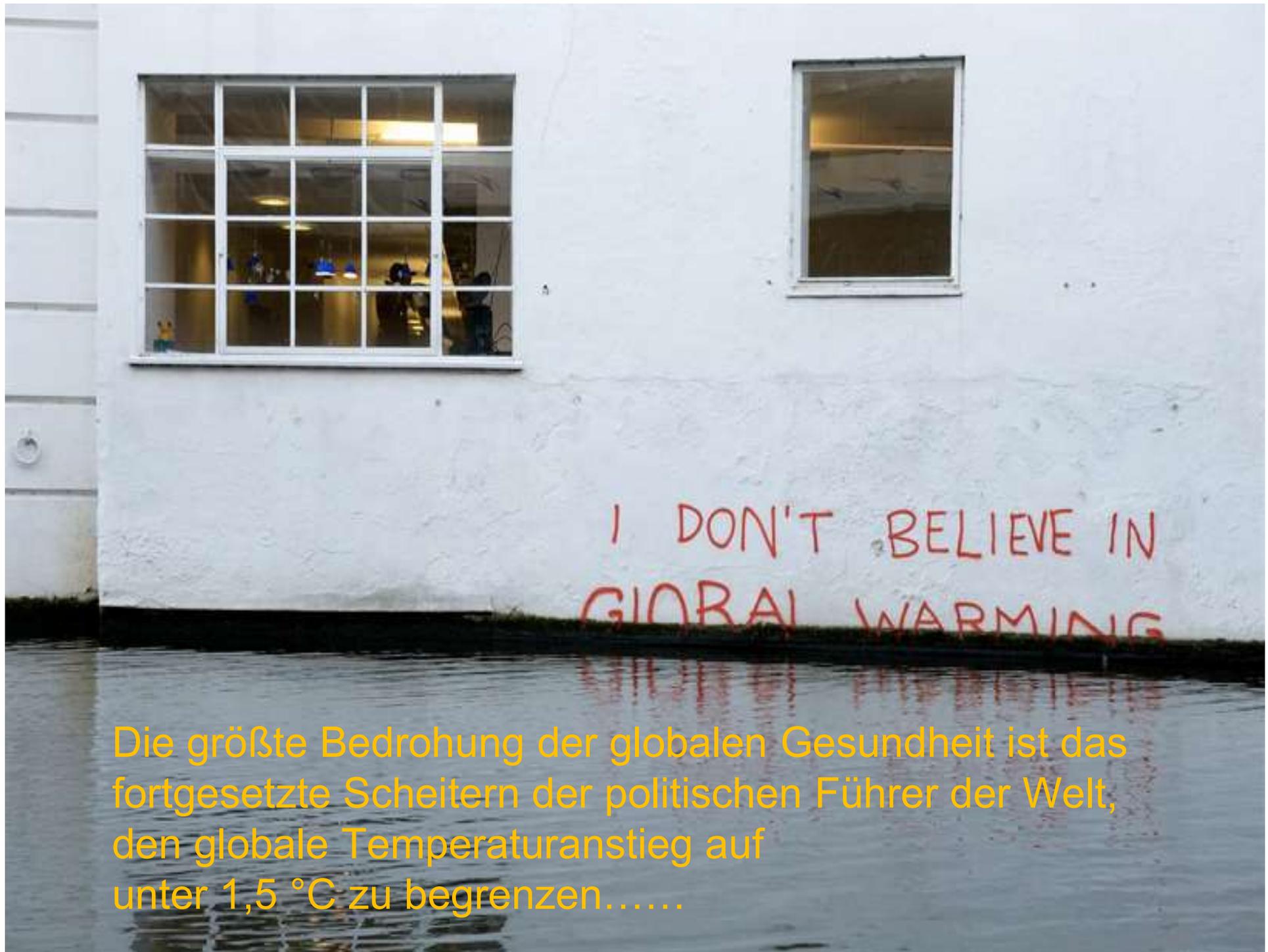


Reduzierung der toxischen Exposition

*“Die gesundheitlichen Auswirkungen der globalen Klimakrise auf die Gesundheit von Müttern und Kindern können nicht länger ignoriert werden.”*

*International Federation of Gynecology and Obstetrics (FIGO)*

**Danke für  
Ihre  
Aufmerksamkeit**



Die größte Bedrohung der globalen Gesundheit ist das fortgesetzte Scheitern der politischen Führer der Welt, den globale Temperaturanstieg auf unter 1,5 °C zu begrenzen.....