

# Climate Change Indicators

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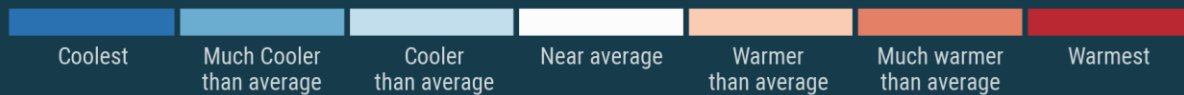
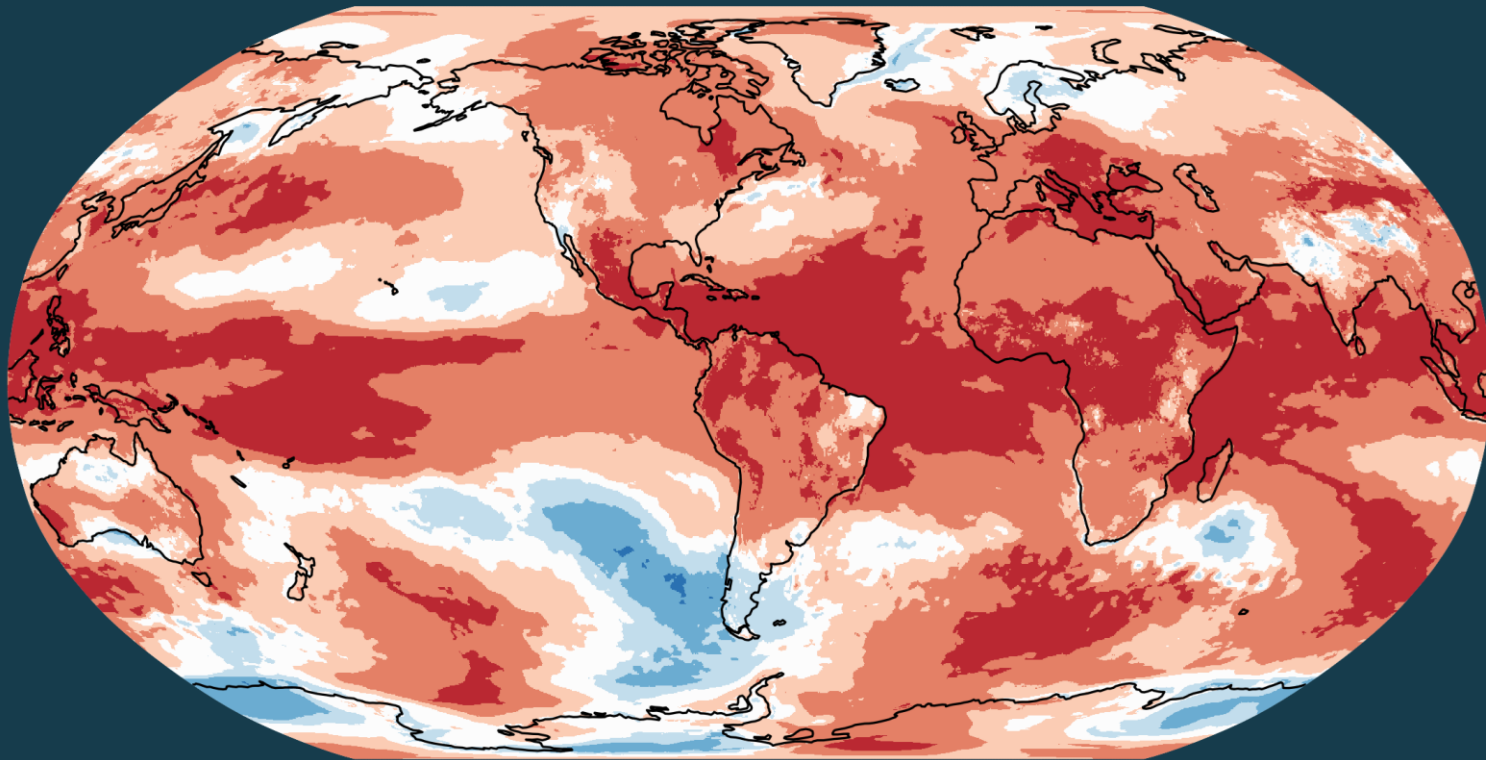
WITS RHI

30 YEARS

EXCELLENCE THROUGH  
SCIENCE & INNOVATION

## Anomalies and extremes in surface air temperature for June 2023 – May 2024

Data: ERA5 1979-2024 • Reference period: 1991-2020 • Credit: C3S/ECMWF



PROGRAMME OF THE  
EUROPEAN UNION



IMPLEMENTED BY  
ECMWF



- The frequency of extreme weather events driven by climate change, has increased markedly
- Africa, notably through increasing and prolonged extreme heat occurrences
- 12 straight months of record-breaking temperatures
- The vulnerability of pregnant women and infants exposes them to an elevated risk of adverse health outcomes during extreme heat events
- Questions remain about the optimum set of indicators needed for tracking heat exposure in MNCH

Anomalies and extremes in surface air temperature for the 12-month period from June 2023 to May 2024. Colour categories refer to the percentiles of the temperature distributions for the 1991–2020 reference period. The extreme (“Coolest” and “Warmest”) categories are based on rankings for the period 1979–2024. Percentiles and rankings are relative to all 12-month averages between January 1979 and May 2024. Data source: ERA5. Credit: Copernicus Climate Change Service/ECMWF.

# Population-Level indicators

## Objective 1:

**Identify and select suitable indicators** for quantifying and monitoring the global, EU and national-level health impacts of extreme heat among pregnant and postpartum women, newborns and infants in Europe and sub-Saharan Africa

## Approach:

- Analyses of heat impacts using health outcome data from:
  - Sweden, Italy, Greece
  - Health facilities in Kenya and South Africa
- Analysis of physiologic measures for pregnant women & infants
- **Country consultations – what do countries want/need**
- **WHO expert panel** to select indicators based on data and country consultations
- **WHO/UNICEF/UNFPA/WMO Guidance** on indicators for monitoring heat impacts on MNCH with country examples

# Short- and long-term plan of action for heat health guidelines implementation in South Africa



	Action	Expected results	Responsible and participating institutions
Short-term actions	Assessment of heatwave definition and then finalise a set of messages about heat and health	Consistent messaging	DOH Research institutions SAWS
	Assessment of health system preparedness for heat-health impacts	Identify strengths and weaknesses and plan of action	DOH Research institutions
	Activate heat health warnings with heat wave warnings	Heat health warning messages to the public Evidence-based health messaging developed	DOH SAWS SAMRC
	Heat health material into school curricula Develop curriculum material based on South African evidence	Children know about heat and health	DOH DBE
	Develop and implement heat-health (climate change) indicators	Increased surveillance of heat health impacts	DOH SAWS Research institutions
Medium-term actions	Set a temperature threshold above which sports events, school sports etc. will not be permitted to occur. Such events would need to be postponed and re-scheduled during cooler weather	Safer conditions for schoolchildren, athletes, marathon runners etc. during hot weather	Sports DOH DBE
	Assess state of adequate and ease of access to drinking water, hygiene and sanitation in schools especially during extreme heat and heatwave (overcrowding in classrooms exacerbates heat-health impacts)	Hydration of schoolchildren for health and productivity	DOH Research Institutions
	Review school classroom thermal comfort	Regulations for thermal comfort in classrooms	DOH DBE Buildings
	Review healthcare facilities thermal comfort	Regulations for thermal comfort in healthcare facilities	DOH Buildings /Settlement
	Implement climate change indicators Surveillance activity met	Monitor and evaluation from baseline and assess interventions	
Long-term actions	Review school uniforms for heat health implications	Cooler schoolchildren who can work comfortably and safely	
	Review regulations around personal protective equipment for outdoor occupational workers	Cooler outdoor workers who can work comfortably and safely	
	Urban planning to provide heat interventions	Cooler city spaces, access to water and shade	

Preterm birth

Intra- and peripartum outcomes

Foetal health - foetal distress, SGA, placental function abortion, oligohydramnios

Congenital orofacial cleft or craniofacial, musculoskeletal, genitourinary, eye and lethal congenital anomalies.

Maternal health - Caesarian section, antepartum haemorrhage, cardiovascular events and renal disease

Maternal admissions

Prelabour rupture of membranes

Preterm birth

Low birth weight

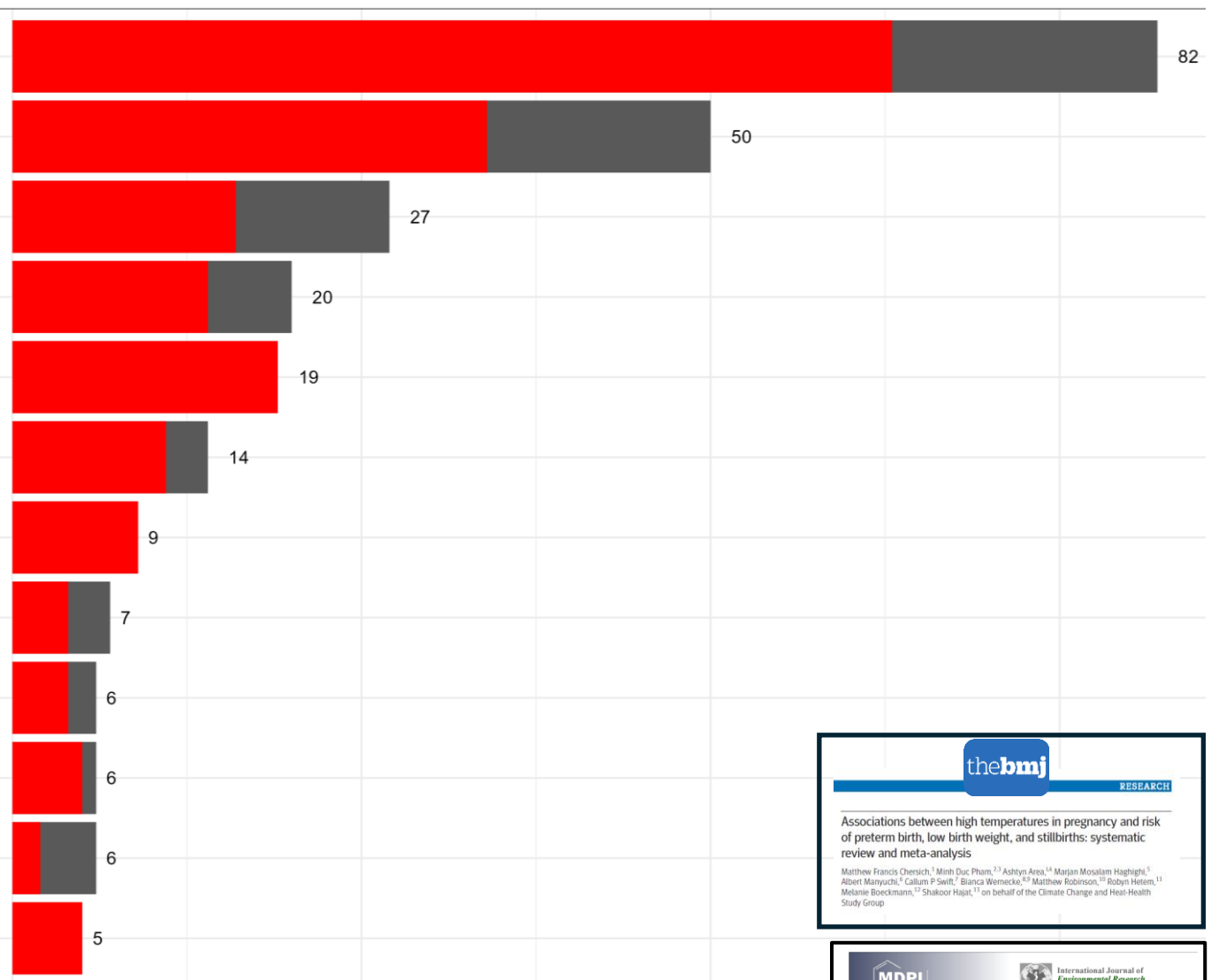
Hypertension in pregnancy

Stillbirths

Perinatal health

Gestational diabetes

Congenital heart abnormalities



thebmj

RESEARCH

Associations between high temperatures in pregnancy and risk of preterm birth, low birth weight, and stillbirths: systematic review and meta-analysis

Matthew Francis Chersich,<sup>1</sup> Minh Duc Pham,<sup>2,3</sup> Ashryn Aro,<sup>4,5</sup> Marjan Mosalam Haghighi,<sup>1</sup> Albert Manyuchi,<sup>6</sup> Callum P Swift,<sup>7</sup> Bianca Wernicke,<sup>8,9</sup> Matthew Robinson,<sup>10</sup> Robyn Hestem,<sup>11</sup> Melanie Boeckmann,<sup>12</sup> Shaikoor Hajat,<sup>13</sup> on behalf of the Climate Change and Heat-Health Study Group

MDPI

International Journal of Environmental Research and Public Health

Impacts of High Environmental Temperatures on Congenital Anomalies: A Systematic Review

Marjan Mosalman Haghighi, Caradee Yael Wright, [...], and Climate Change and Heat-Health Study Group



"Systematic review and meta-analysis of heat exposure impacts on maternal, fetal, and neonatal health," we found that for every 1°C increase in heat exposure, there was a 4% increase in odds of preterm birth across all the studies. During a heatwave, the odds of preterm birth increased by 26%.

# Indicator selection process: workshop objectives

Explore the current MNCH and climate and health monitoring processes in South Africa and Zimbabwe;

Examine options for incorporating the monitoring of the effects of heat-related effects on MNCH;

Detail the procedure for selecting and integrating new indicators;

Prioritize and select heat-health indicators for optimal tracking.



# Indicator selection process

- Heat health action guidelines
  - National climate change committee
  - Indicators set 5 years ago
    - **Food insecurity, hunger and malnutrition and MCH**
    - **Communicable diseases and/or Notifiable medical conditions**
    - **Health care system and emergency response readiness assessment**
- NIDS be reviewed every 2 years
  - NIDS 2020 approved for implementation from 01 April to 31 March
- Focus - absolute priority set of indicators aligned with international declarations and reporting requirements. NIDS not to be unduly expanded



# Methodology

- Zimbabwe and South Africa organized workshops with stakeholders across sectors to prioritize potential heat-health indicators
- Purposefully selected multidisciplinary, cross-sectoral, and inter-departmental stakeholders for the workshops
- Workshops were divided into two sessions - **"Setting the Scene" "Heat-Health Indicator & Prioritization and Selection"**
- Four group: **Maternal Health, Newborn Health, Child Health, and Heat Exposure.**
- Participants allocation to specific groups was based on their respective organisational mandates
- Each group reviewed indicators as per those available in their DHIS and some global indicators
- Each group prioritized indicators according to the criteria set during the WHO Expert Group meeting in April 2023 (feasibility, relevance, and importance)
- A total of 3 priority indicators was selected by each group





# Results- Neonatal group

## Zimbabwe

- Live birth at hospital <2500g
- Neonatal hospitalization
- Low birth weight includes preterm babies

## South Africa

- Live birth < 2500g in facility rate related to extreme heat
- Early neonatal death in facility rate related to extreme heat
- Stillbirth in facility rate related to extreme heat

# Results- Maternal group

## Zimbabwe

- Hypertensive disorders
- Maternal death and causes
- ANC contacts (8 focused visits)
- Malaria cases

## South Africa

- Hypertensive disorders
- Maternal mortality in facility ratio
- **Preterm births composite with a maternal condition**
- Malaria in pregnant women

# Results- Child Health group

## Zimbabwe

- Diarrhoea and dehydration
- Vector-borne diseases
- Mental disorder

## South Africa

- Diarrhoea with dehydration in <5
- Moderate acute malnutrition <5
- All cause hospitalisation in <5
- Daily School Attendance (5-19)years
- School learner referred for underweight (5-19)years
- School learning referred for mental health or psychosocial support (5-19)years

# Results- Heat exposure group

## Zimbabwe

- Maximum, minimum & average temperature
- Wet Bulb Globe Temperature
- Health heatwave specific definition

## South Africa

- Access to care (care seeking)
- Hospitalization matched to temperature trends
- **Preterm birth**

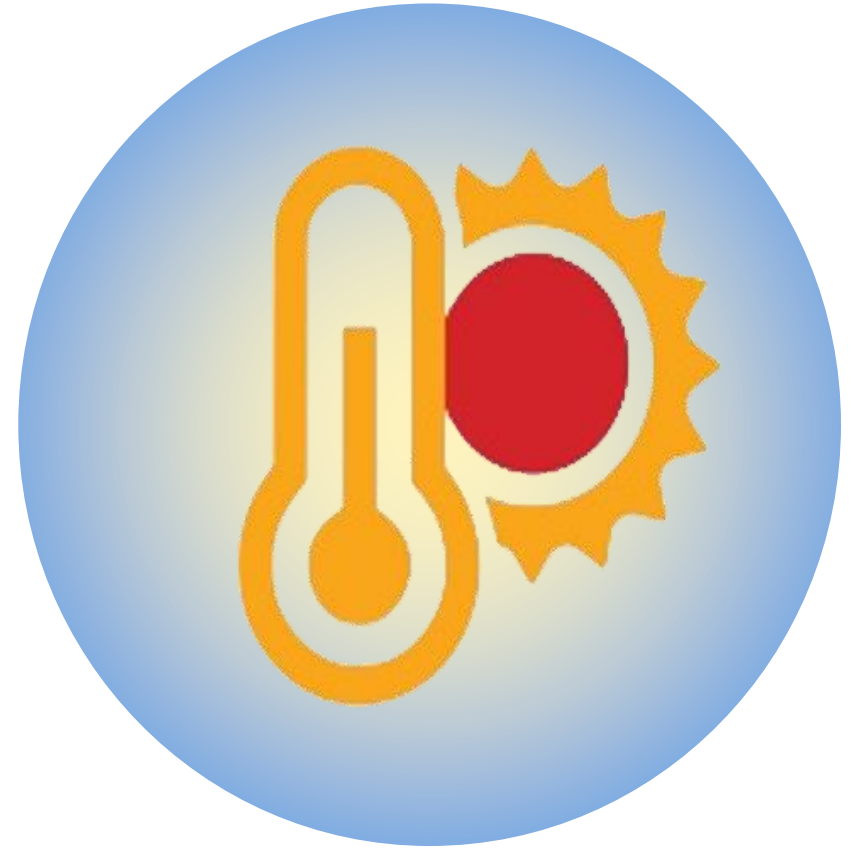


- The process underscored the importance of country ownership from the outset
- While similar indicators were identified in South Africa and Zimbabwe, there is need for customized approaches
- Stakeholder engagement, expertise utilization, and resource optimization showcase a comprehensive monitoring approach for heat-related health impacts
- Continued collaboration, progress monitoring, and indicator integration into existing systems are crucial for enhancing public health preparedness



# Next steps

- Routine data is collected, however aggregated
- Identify pilot sites to extract daily data and overlay with temperature data
- Other sources i.e. social & traditional media should be considered
- Indicator sub-committee to expand to other extreme events



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