



Heat exposure and adverse pregnancy outcomes in Abidjan, Côte d'Ivoire



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Background

- West Africa is warming faster than the global average, with more frequent and intense heatwaves projected through mid-century (Trisos et al., 2023).
- Maternal heat exposure has been associated with preterm birth, stillbirth and miscarriage, but most evidence comes from high-income settings (Chersich et al., 2020).
- Evidence from Côte d'Ivoire remains scarce, despite rising urban heat in Abidjan and a high burden of adverse pregnancy outcomes.
- Aim:** To describe temperature trends and the occurrence of miscarriage and preterm birth at two urban facilities in Abidjan, 2014–2024, as a basis for future causal analyses.

1. Registers

2. Climate

3. Aggregation

4. Analysis

Methods

- Design:** Retrospective, exploratory ecological time-series, Jan 2014 – Dec 2024.
- Sites:** Two urban health facilities in Yopougon, Abidjan — Wassakara and Toit-Rouge.
- Outcomes:** Miscarriage (<22 weeks) and preterm birth (<37 weeks), extracted from facility delivery registers.
- Exposure:** Monthly mean of daily maximum temperature (SODEXAM, Abidjan station).
- Analysis:** Descriptive trends and unadjusted Pearson correlation (95% CI) between monthly temperature and event counts; no confounder or lag adjustment. R 4.6.1.
- Ethics:** Approved by the CNESVS, Côte d'Ivoire (Ref. 216-23/MSHPCMU/CNESVS-km); facility access authorized by DGS (N° 0140/MSHPCMU/DGS/ke, 2 May 2024). See Ethics box.

Results — Site descriptives

Wassakara (2014–2024)

- 36,376 deliveries recorded
- Miscarriages: **251 (0.69%)**
- Preterm births: **329 (0.90%)**

Toit-Rouge (2014–2024)

- 22,294 deliveries recorded
- Miscarriages: **382 (1.71%)**
- Preterm births: **264 (1.18%)**

Wassakara — temperature vs. outcomes

- Preterm birth: $r = 0.088$ (95% CI –0.10 to 0.27); not significant
- Miscarriage: $r = 0.005$ (95% CI –0.18 to 0.19); not significant

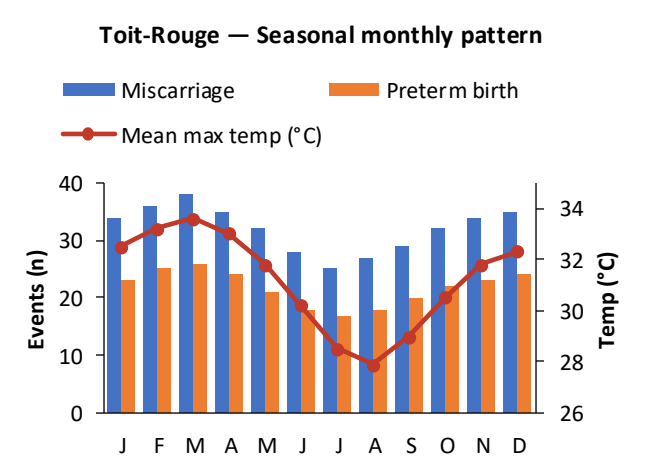
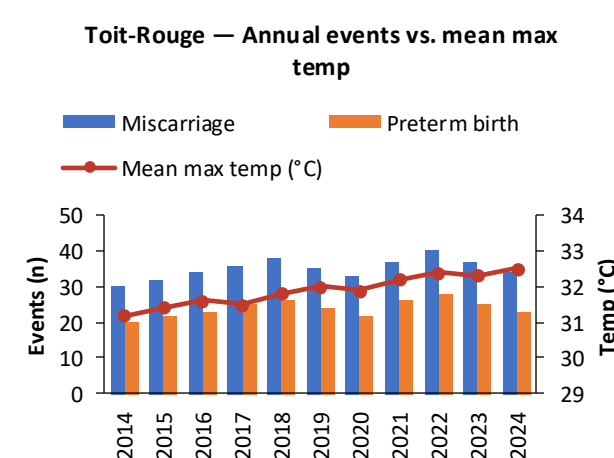
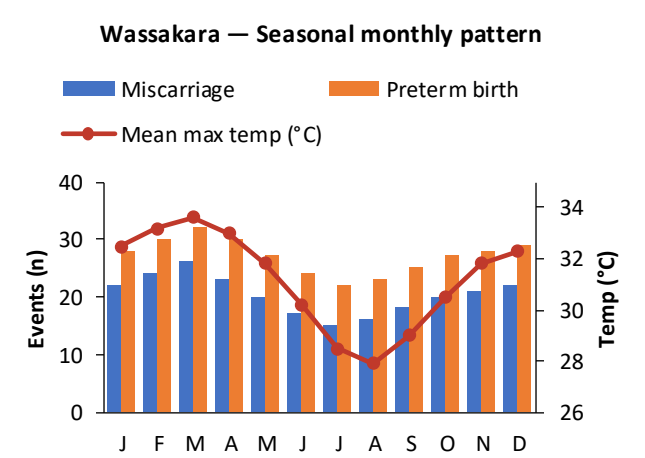
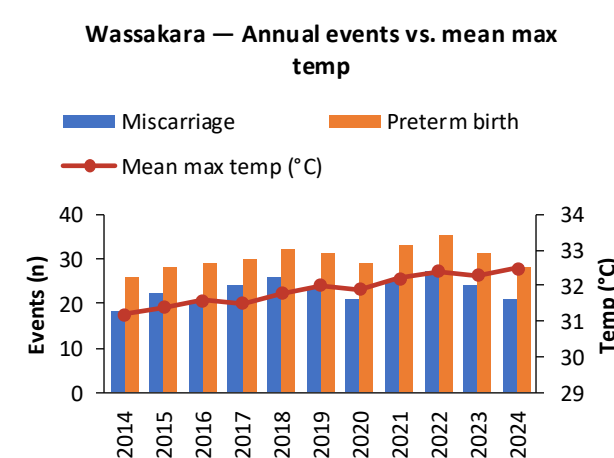
Toit-Rouge — temperature vs. outcomes

- Preterm birth: $r = -0.058$ (95% CI –0.24 to 0.13); not significant
- Miscarriage: $r = 0.006$ (95% CI –0.18 to 0.19); not significant

Conclusion

- Monthly mean daily maximum temperature in Abidjan trended upward across 2014–2024 at both facilities.
- Recorded miscarriage and preterm-birth proportions were higher at Toit-Rouge than Wassakara; differences may reflect catchment, case-mix, or recording practices and should not be interpreted as facility quality.
- Unadjusted monthly correlations between temperature and outcome counts were **weak ($|r| \leq 0.09$) with 95% CIs crossing zero**; this does not rule out an effect, as the design has limited power to detect short-window or lagged associations.
- Limitations:** ecological design with risk of aggregation bias; single weather station; no adjustment for gestational age, parity, season, or air pollution; no distributed-lag structure.
- Next steps:** individual-level analysis with gestational dating, distributed-lag non-linear models, gridded exposure data, and expanded site coverage.

Results — Temperature trends



Ethics

- Ethical approval granted by the **Comité National d'Éthique des Sciences de la Vie et de la Santé (CNESVS)**, Côte d'Ivoire — Ref. 216-23/MSHPCMU/CNESVS-km.
- Access to facility registers authorized by the Ministry of Health, Public Hygiene and Universal Health Coverage of Côte d'Ivoire, Direction Générale de la Santé (Ref. N° 0140/MSHPCMU/DGS/ke, 2 May 2024); coordinated through DRS Abidjan 1 & 2.
- Retrospective, de-identified facility records; no personally identifiable information is presented.

References & Acknowledgements

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