How climate change degrades child health: A systematic review and meta-analysis

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Abstract

Background: Children are more vulnerable than adults to climate-related health threats,[1,2] but reviews examining how climate change affects human health have been mainly descriptive and lack an assessment of the magnitude of health effects children face.[3,4] This is the first systematic review and meta-analysis that identifies which climate-health relationships pose the greatest threat the children.

Aims: We reviewed epidemiologic studies to analyse various child-health outcomes due to climate change and identify the relationships with the largest effect size. We identify population-specific risks and provide recommendations for future research.

Methods: We searched four large online databases for observational studies published up to 5 January 2023 following PRISMA (systematic review) guidelines. We evaluated each included study individually and aggregated relevant quantitative data. We used quantitative data in our meta-analysis, where we standardised effect sizes and compared them among different groupings of climate variables and health outcomes.

Results: Of 1301 articles we identified, 163 studies were eligible for analysis. We identified many relationships between climate change and child health, the strongest of which was increasing risk (60% on average) of preterm birth from exposure to temperature extremes. Respiratory disease, mortality, and morbidity, among others, were also influenced by climate changes. The effects of different air pollutants on health outcomes were considerably smaller compared to temperature effects, but with most (16/20 = 80%) pollutant studies indicating at least a weak effect. Most studies occurred in high-income regions, but we found no geographical clustering according to health outcome, climate variable, or magnitude of risk. Low-income nations were underrepresented in the studies analysed. The following factors were protective of climate-related child-health threats: (*i*) economic stability and strength, (*ii*) access to quality healthcare, (*iii*) adequate infrastructure, and (*iv*) food security. Threats to these services vary by local geographical, climate, and socio-economic conditions.

Conclusions: Children will have increased prevalence of disease due to anthropogenic climate change, and our quantification of the impact of various aspects of climate change on child health can contribute to the planning of mitigation that will improve the health of current and future generations.

Key words: temperature extremes, air pollution, particulate matter, heatwave, preterm birth, mortality, morbidity, asthma, respiratory disease, stunting, birth weight, pregnancy

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