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Editorial

Extreme Heat and Emergency Health: Preparing Health Systems for a Warming World

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Extreme heat is no longer an occasional environmental hazard; it is becoming an increasingly important public health emergency. The year 2023 provided a clear warning, with exceptional temperatures recorded across multiple regions and the global annual mean temperature reaching approximately 1.45°C above the pre-industrial level, approaching the 1.5°C threshold established by the Paris Agreement. As temperatures continue to rise, the definition of "normal" climate is changing, while heatwaves are becoming more frequent, intense, and persistent. These changes demand a shift from reactive management of heat-related illness toward proactive, climate-resilient health systems.[1]

The health consequences of extreme heat extend well beyond heat exhaustion and heatstroke. Recent evidence from the United States demonstrates a measurable relationship between extreme temperatures, heat index, and emergency department visits for heat-related illnesses. Importantly, increases in emergency visits may occur before environmental conditions reach their peak, highlighting the importance of early warning systems and real-time preparedness. Although the magnitude of the association varies geographically, heat index appears to provide a relatively consistent indicator of health risk, reinforcing the need for regionally adapted heat-health strategies.[2] For health systems already operating under resource constraints, sudden increases in heat-related demand can further challenge emergency departments, primary care services, ambulance systems, and hospital capacity.

The burden of extreme heat is also unevenly distributed. Socioeconomic disadvantage, inadequate housing, limited access to cooling, poor-quality infrastructure, and urban heat exposure can substantially increase vulnerability. Communities with fewer resources may have less capacity to protect themselves from prolonged heat, while healthcare and social support services may be less accessible in underserved areas.[1] Thus, heat-related health emergencies should not be viewed solely as consequences of temperature exposure; they are also manifestations of social and infrastructural inequalities.

Several vulnerable groups require greater attention. Pregnancy is one particularly overlooked area. Physiological changes during gestation can reduce the ability to tolerate heat and increase susceptibility to dehydration and heat-related illness. Evidence has linked high-temperature exposure during pregnancy with adverse outcomes including preterm birth, low birth weight, stillbirth, congenital anomalies, gestational diabetes, and hypertensive complications.[3] Nevertheless, maternal, newborn, and child health remain insufficiently represented in many heat-health action plans. Heat exposure may also affect perinatal mental health,

potentially compounding the effects of climate-related displacement, food insecurity, and other stressors in low-resource settings.[4]

Children represent another important but frequently underestimated population. Schools may operate during periods of peak summer heat despite inadequate cooling infrastructure, potentially contributing to heat-related illness, reduced physical activity, impaired cognitive performance, and disruption of educational activities. Earlier school-year start dates may unintentionally increase exposure to extreme heat unless calendars, buildings, transportation, and operational policies are adapted to local climate conditions.[5] Similarly, extreme heat can indirectly affect health through food systems. Heat, humidity, drought, flooding, and elevated carbon dioxide can interact to increase microbial and mycotoxin risks while reducing the nutritional quality of some staple crops, creating compound threats to food safety and nutrition.[6]

These converging risks indicate that extreme heat should be incorporated into emergency preparedness, maternal and child health programs, food-safety surveillance, school health policies, and urban planning rather than addressed as an isolated environmental issue. Heat-health warning systems should be linked to clear clinical and community actions, including targeted communication, access to cooling spaces, hydration support, occupational protection, and preparedness of emergency services. Predictive analytics using meteorological, health, and satellite data may further strengthen early identification of emerging risks.[6] Most importantly, adaptation strategies must prioritize populations with the greatest vulnerability. A warming world requires health systems capable not only of responding to heat emergencies, but of anticipating them. Extreme heat is already testing the boundaries of health-system resilience; the effectiveness of our response will depend on how quickly prevention, equity, and preparedness become central to climate-health policy.

Competing Interests

The authors declare no conflict of interest.

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