

More than warming: Climate change as an emerging health crisis

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Climate change is already reshaping the environmental and social systems that sustain health. The 2025 Lancet Countdown shows that beyond rising temperatures, climate change is distorting water availability, weakening food security, degrading air quality, expanding infectious disease risks, and straining health systems.¹ These indirect and interconnected impacts increasingly drive the greatest health burden. Heat should therefore be reviewed not as the primary crisis, but as a warning signal of broader systemic disruption. We first examine heat as the most visible marker of climate risk, then show how cascading impacts on water, food, disease ecology, and health system resilience together constitute a deeper and more enduring threat to health, as summarized conceptually in Figure 1.

RECORD HEAT IS VISIBLE, THE BROADER HEALTH CRISIS IS NOT

Heat-related health risks have risen sharply. Eighty-four percent of recent heatwave days in 2020–2024 would not have occurred without climate change, and heat-related mortality in 2012–2021 is 63.2% higher than in 1990–1999. The mortality burden also remains unevenly distributed across regions, pronounced in Southern and Eastern Europe.² Heat exposure also reduces productivity, disrupts sleep and cognition, and strains cardiovascular and renal systems. In 2024, heat exposure caused 640 billion hours of lost labor productivity and nearly \$1.1 trillion in economic losses.³ The Global Burden of Disease 2023 study further indicates that 1.75 million deaths globally are attributable to non-optimal temperatures, including low temperatures and cold waves.

Yet heat is only the most apparent signal of climate change. Focusing on temperature alone hides broader disruptions to water, food, disease dynamics, and health system stability. As illustrated in Figure 1, heat sits upstream of a broader set of interconnected pathways that operate through hydroclimatic extremes, food systems, infectious disease dynamics, and health systems.

BEYOND HEAT: HYDROCLIMATIC EXTREMES AND THE HEALTH RISKS WE OVERLOOK

Changes in hydrological systems may ultimately prove more damaging to health than heat alone. These risks often remain overlooked because their effects unfold gradually through indirect pathways, and are poorly captured in routine disaster monitoring. In 2015–2024, extreme precipitation increased across 64% of the world's land surface from 1961–1990, while 61% experienced extreme drought in 2024, nearly three times the extent seen in the 1950s. Disruptions to water supply, housing, health services, and food production increasingly shape population health.

Floods and tropical cyclones: Beyond acute deaths to prolonged health burdens

Beyond drowning and injury, floods and tropical cyclones contaminate drinking water, interrupt healthcare, displace households, and damage infrastructure. Long-term increases in cardiovascular, respiratory, mental, and infection-related mortality and morbidity after floods and tropical cyclones are now documented.^{3,4} Displacement, loss of livelihoods, and prolonged recovery generate chronic stress and trauma, increasing risks of anxiety, depression, and post-traumatic stress, particularly where social support and access to mental health services are limited. Because most assessments focus only on direct mortality, the true burden remains underestimated.

Drought and water scarcity: Chronic, cumulative, and socially unequal

Drought is reshaping agricultural livelihoods, accelerating income loss, and contributing to psychological distress. Extended drought can heighten risks of substance use, self-harm, and suicide by impairing livelihoods, increasing financial strain, and prolonging uncertainty, especially where agricultural income loss is severe and mental health services are scarce.⁵ In addition, water scarcity increases the risk of diarrheal illness, kidney disease, and hygiene-related infections.¹ As water availability declines, competition intensifies, and those with fewer resources face the earliest and most severe

shortages. Harms accumulate slowly and are difficult to reverse, making drought a particularly damaging climate stressor.

Gradual but profound risks to food and nutrition security

Through their combined effects on water availability and agricultural conditions, heat and drought reduce crop yields, livestock productivity, and fisheries stability, contributing to 123.7 million more people experiencing moderate or severe food insecurity in 2023 across 124 countries.¹ Undernutrition weakens immune function, heightens infectious disease risks, and impairs child growth and cognitive development. These pressures often interact with poverty, conflict, and market volatility, magnifying inequities. The scale of impact therefore depends on social protection systems, agricultural resilience, market regulation, and access to affordable nutrition, which vary widely across and within countries and determine whether food system shocks translate into long-term health loss.

WILDFIRE SMOKE AND AIR POLLUTION, THE HIDDEN MASS-CASUALTY CRISIS

Wildfire activity is increasing as temperatures rise and vegetation dries. It was estimated that deaths attributable to wildfire-derived air pollution were 1.53 million per year during 2000–2019.⁶ This burden rarely appears in disaster statistics because smoke harms health indirectly, through increased risks of heart disease, stroke, asthma, and respiratory failure.⁵

Unlike heatwaves, smoke events often receive limited public health messaging, and many affected populations are unaware of effective protective measures. Where real-time air quality monitoring, safe shelter, and clean indoor air are limited, smoke exposure adds disproportionate burdens to populations already facing social and environmental inequalities. As a result, wildfire smoke is becoming a recurring seasonal hazard that quietly shapes long-term population health.

INFECTIOUS DISEASES ARE MOVING, AND MANY HEALTH SYSTEMS ARE NOT READY

Climate change is altering the environmental conditions that determine where disease-carrying vectors can survive. Warmer temperatures accelerate mosquito development, shorten viral incubation periods, and expand the geographic and seasonal range of transmission. Changes in rainfall and humidity further create favorable breeding conditions in areas previously unsuitable for vectors.

The 2025 Lancet Countdown reports that dengue transmission potential has increased by 48.5% for *Aedes albopictus* and 11.6% for *Aedes aegypti* since the 1950s. The predicted risk of leishmaniasis has increased by 29.6% in 2015–2024 compared with the 1950s, and warmer water temperatures are also increasing the likelihood of *Vibrio* infections in coastal regions. Disease emergence and spread therefore depend not only on climate variables, but also on surveillance systems, vector control capacity, access to timely healthcare, and uncertainty in early detection and reporting as diseases enter regions with limited epidemiological experience.

These shifts are especially concerning where rapid urban growth, inadequate housing, and limited public health services coverage with changing ecological conditions. Without strengthened public health capacity and adaptation measures, infectious disease threats will continue to grow, particularly in low-resource settings.

ECONOMIC LOSSES AND DECLINING HEALTH SYSTEM RESILIENCE

Climate change is creating growing financial pressures that reduce the ability of health systems to respond to rising health risks. In 2024, extreme weather events caused 304 billion USD in global economic losses.¹ Yet insurance coverage for climate-related disasters has declined, leaving households and local governments to absorb a greater share of recovery costs. When funding is diverted toward rebuilding, fewer resources remain for basic services, prevention, and long-term adaptation. Whether economic losses translate into long-term health impacts depends heavily on governance

Climate Change and Its Cascading Impacts on Health

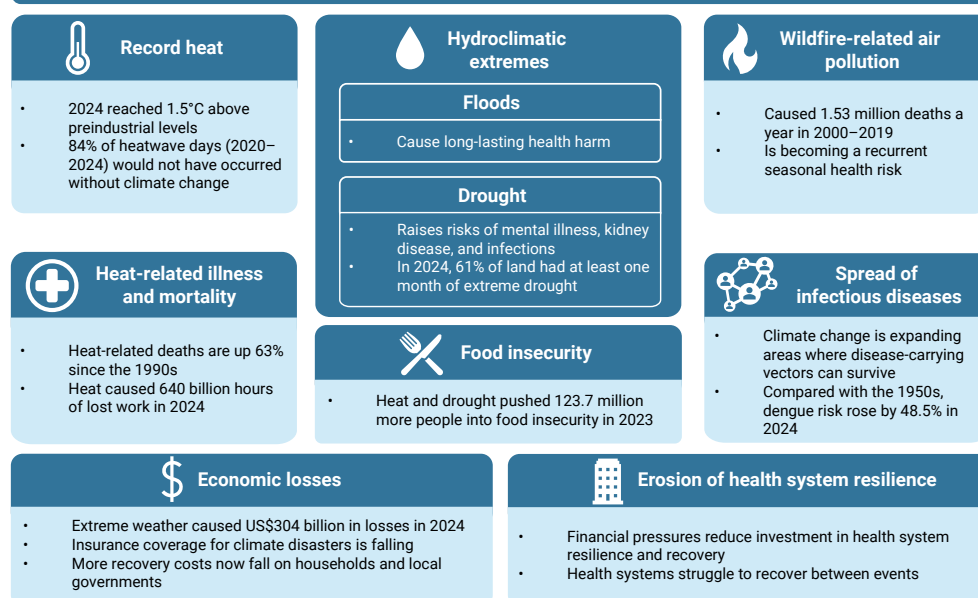


Figure 1. Health crisis caused by climate change.

growing economic strain are altering the environments in which people live, work, and seek healthcare. These disruptions also worsen mental health by creating chronic stress, trauma, and uncertainty about livelihoods and safety. They are gradual enough to be overlooked, yet powerful enough to influence health for generations. The result is not a single crisis, but an interconnected set of risks that accumulate and compound, particularly in communities with the least resources to respond.

However, the report also shows that progress is possible: expanding renewable energy, protecting ecosystems, strengthening health systems, and scaling adaptation can reduce risks while improving equity. Climate change is a health issue, and health must be central to climate policy. The window for prevention remains open, but it is narrowing. The time for decisive action is now.

Declaration of generative AI and AI-assisted technologies in the writing process

capacity, financing mechanisms, and social safety nets that can buffer health systems from repeated shocks.

These economic losses directly translate into weaker health system capacity, shaping how well services can prepare for, absorb, and recover from climate-related shocks. Health systems also face parallel challenges: floods, storms, and power outages disrupt care delivery, while supply chains and staffing are strained during repeated emergencies. As these events become more frequent, health systems have less time and fewer resources to recover between shocks, gradually weakening their resilience. Governance capacity, financing mechanisms, and social safety nets increasingly determine whether communities can withstand and recover from climate-related disruptions. Without strengthened health system resilience, the indirect health burden of climate change will continue to escalate.

POLICY BACKSLIDING, AND THE OPPORTUNITY THAT MUST NOT BE LOST

Despite rising health risks, the 2025 Lancet Countdown shows that progress on adaptation and mitigation not kept pace with the challenge. Government engagement on climate and health declined in recent years, and more high-emitting countries have reduced or reversed climate commitments. At the same time, 956 billion USD in net fossil fuel subsidies were provided in 2023, and in several countries these subsidies exceeded national health budgets.¹ These trends reflect the financial and political constraints that shape decision-making, where immediate economic pressures often outweigh long-term health protection.

Nevertheless, the report highlights notable areas of progress. Renewable energy contributed to 10% of global GDP growth in 2023, and some countries have demonstrated that emissions reduction and economic development can occur together.¹ For example, China recorded a decline in national CO₂ emissions alongside rapid growth in renewable energy capacity, and Brazil significantly reduced primary forest loss. In the health sector, more countries have completed climate and health vulnerability assessments and national adaptation plans, and health systems are beginning to reduce their own emissions.

The evidence shows that tools to protect health already exist. The question is whether they will be implemented at the necessary speed and scale. Aligning climate policy with health goals and ensuring that adaptation resources reach the most vulnerable communities can strengthen resilience and reduce future risks.

SUMMARY

The 2025 Lancet Countdown makes clear that climate change is already reshaping the systems that support health. Heat is only the most visible signal. Floods, droughts, wildfire smoke, shifting disease ecologies, and

During the preparation of this work the authors used ChatGPT in order to improve language and readability. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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AUTHOR CONTRIBUTIONS

YG and SL conceptualized the work. ZY produced the original figures, and drafted the manuscript. All authors contributed to the revision and editing of the manuscript. SL and YG provided administrative, technical, and material support, and supervision and mentorship. All authors contributed to and approved the manuscript.

DECLARATION OF INTERESTS

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