JOINT POLICY POSITION
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Extreme heat and climate-sensitive infectious diseases

An overlooked climate adaptation priority

Extreme heat, floods, and drought are not only a direct cause of illness and death. They also amplify infectious disease risks and weaken the tools, supply chains, and health systems needed to prevent, diagnose, and treat them.

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Extreme heat amplifies disease risks and vulnerabilities Rising temperature and changing rainfall patterns affect disease vectors, pathogens, human exposure, and the geography and seasonality of transmission.	**Climate shifts and extreme heat weaken response capacity** Extreme conditions can disrupt services, supply chains, cold chains, and the performance of medicines, vaccines, diagnostics, and vector-control tools.	**Climate-sensitive disease action is adaptation** Surveillance, prevention, R&D for new products (including climate-smart products), local production, and equitable access are core climate adaptation measures.

We call on governments, climate institutions, and funders to make climate-sensitive infectious diseases a clear priority in climate and health policies, health adaptation plans, and financing decisions.

Developed by the Coalition for Epidemic Preparedness Innovations (CEPI), Drugs for Neglected Diseases initiative (DNDi), Gavi, the Vaccine Alliance, Innovative Vector Control Consortium (IVCC), Medicines for Malaria Venture (MMV), and Unitaid

1. Why this matters now

Climate-sensitive infectious diseases (CSDs) are diseases whose transmission, geographic distribution, seasonality, burden, or control are affected by climatic and environmental conditions, including temperature, rainfall, humidity, drought, flooding, and extreme weather events.

Heatwaves are more frequent and breaking records – increasing demand for medical care, overwhelming health systems, and causing avoidable deaths.[1] Recent episodes have pushed temperatures above 40°C across many parts of Europe and into the 45–50°C range in cities across South Asia. Extreme heat has also affected regions across Africa, North America, Latin America, the Middle East, and East Asia, making it a global public health challenge.

Yet beyond the direct impacts on human health such as heat exhaustion, heatstroke and cardiovascular strain, one major consequence remains insufficiently recognized: more frequent and intense heatwaves and rising temperatures are also increasing infectious disease transmission by creating favourable conditions for pathogens and the insects and other organisms such as mosquitoes and ticks (referred to as vectors) that carry them. Heat can also undermine the stability and effectiveness of medicines and other health tools.

Climate change could worsen more than half of known human infectious diseases caused by pathogens.[2] Diseases once largely confined to warmer regions are now spreading to cooler regions. For example, local dengue cases have emerged in southern France last summer. A key reason is that warming temperatures and changing rainfall patterns have made parts of Europe increasingly suitable for the Asian tiger mosquito (*Aedes albopictus*) that can transmit dengue. Models differ on how much disease patterns will change and where, however, there is broad agreement that climate change is likely to drive major shifts in when and where diseases occur. Some models predict an increase in prevalence of vector-borne diseases: a 2021 study in The Lancet Planetary Health forecast that an additional 4.7 billion people may be at risk of the vector-borne diseases malaria and dengue by 2070[3].

The implications extend well beyond vector ecology. Extreme heat and related weather events can alter human behaviour, force communities to move, compromise health-product stability[4], disrupt supply chains and interrupt essential services. For example, in many countries, communities prefer not to sleep under bed nets in warm weather[5], increasing their exposure to mosquitoes and other vectors that carry malaria, Zika, dengue, and other diseases. Evidence from several countries indicates that when malaria rapid diagnostic tests are exposed to temperatures between 35°C and 60°C for prolonged periods, their sensitivity can decline. The result is a compound risk: more people may be exposed to infection at the same time that health systems are less equipped to detect and respond.

[1] World Health Organization Regional Office for Europe. Feeling the heat: how do we keep health systems fully functional during heatwaves? [Internet]. Copenhagen: WHO Regional Office for Europe; 2026 Oct 16. Available from: https://www.who.int/europe/news-room/feature-stories/item/feeling-the-heat--how-do-we-keep-health-systems-fully-functional-during-heatwaves

[2] Mora C, McKenzie T, Gaw IM, Dean JM, von Hammerstein H, Knudson TA, et al. Over half of known human pathogenic diseases can be aggravated by climate change. Nat Clim Chang. 2022;12:869–75. doi:10.1038/s41558-022-01426-1

[3] Colón-González FJ, Sewe MO, Tompkins AM, Sjödin H, Casallas A, Rocklöv J, et al. Projecting the risk of mosquito-borne diseases in a warmer and more populated world: a multi-model, multi-scenario intercomparison modelling study. Lancet Planet Health. 2021;5(7):e404–14. doi:10.1016/S2542-5196(21)00132-7

[4] Unitaid. Heat-proofing health products: adapting to a hotter planet [Internet]. Geneva: Unitaid; 2026. Available from: https://unitaid.org/uploads/12858-Knowledge-Paper-Heat-Proofing-Health-Products-RGB14.pdf

[5] Ahorlu CS, Adongo P, Koenker H, et al. Understanding the gap between access and use: a qualitative study on barriers and facilitators to insecticide-treated net use in Ghana. Malar J. 2019;18:417. doi:10.1186/s12936-019-3051-0

Extreme heat, drought, and flooding are interconnected climate hazards that often occur in cascading sequences: prolonged heat can intensify drought, while drought-stricken hardened soils absorb less water, increasing the risk of severe flooding when heavy rains occur. Floods and droughts can significantly increase the risk and spread of infectious diseases by altering vector habitats, contaminating water sources, and changing human behaviour. For instance, in 2023, a cyclone and coastal El Niño in Peru contributed to a dengue outbreak 10 times larger than normal, causing an estimated 22,000 additional cases.[6]

A timely warning: El Niño 2026–2027

The anticipated 2026–2027 overall increase in global temperature associated with the El Niño climatic event adds further urgency to this agenda. Forecasts indicate a high probability of above-normal temperatures across much of the Americas, combined with regionally variable drought and heavy rainfall.[7] These conditions will likely increase vector-borne and water-borne disease risks, heat stress, wildfire exposure, displacement, and disruption of health services.[8]

The growing political attention to extreme heat offers an opportunity to build a more comprehensive climate and health response. Heat strategies should address not only illnesses and deaths caused directly by heat, but also build societal and health system resilience, and prevention, preparedness, and response capabilities by addressing heat-related infectious disease risks, as well as health system and product vulnerabilities across their supply chains. Medicines, vaccines, diagnostics, and other health products must remain safe and effective in extreme temperatures, and their production must also be environmentally friendly to not further exacerbate the detrimental effects of global warming.

[6] Stanford University. How climate change is fueling disease outbreaks. Stanford Report [Internet]. 2026 Mar 17. Available from: https://news.stanford.edu/stories/2026/03/climate-change-disease-outbreaks-dengue-fever-research

[7] Observatório de Clima e Saúde (Icict/Fiocruz); Universidade Federal de Santa Maria. Nota técnica: chegada do El Niño e potenciais impactos sobre a saúde, os desastres e a organização da resposta pública no Brasil [Technical note: arrival of El Niño and potential impacts on health, disasters and the organization of the public response in Brazil] [Internet]. Rio de Janeiro: Fiocruz; 2026 Jun 19. Portuguese. Available from: https://climaesaude.icict.fiocruz.br/sites/climaesaude.icict.fiocruz.br/files/Nota_T%C3%A9cnica_El_nino.docx.pdf

[8] Pan American Health Organization; World Health Organization. Public health situation analysis: El Niño in the Americas, 2026–2027 [Internet]. Washington (DC): PAHO/WHO; 2026 Jun 24. Available from: https://www.paho.org/en/documents/public-health-situation-analysis-nino-americas-2026-2027-24-june-2026

2. Pathways of extreme heat driving risks and vulnerabilities to Climate-sensitive Diseases

1 Disease ecology and transmission

- Higher temperatures can affect how long mosquitoes and other disease carriers survive, how quickly they reproduce and bite, and how fast viruses or parasites develop inside them.
- Climatic conditions favourable to vectors and pathogens can lengthen transmission seasons and expand disease risk into new geographic areas and altitudes.
- Heat often interacts with drought, irregular rainfall, and flooding rather than acting alone.

2 Human exposure and vulnerability

- Excessively high temperatures can weaken immunity, especially in highly vulnerable populations such as infants, older adults, immunocompromised people, and pregnant women.
- Drought-related water storage can create mosquito breeding sites.
- Changes in outdoor activity, bed-net use, housing and mobility can increase exposure.
- Decreased efficacy of medicines due to temperature increases affected populations' vulnerability to diseases.
- Extreme heat can place significant physical and mental strain on healthcare workers, increasing the risks of dehydration, heat-related illness, fatigue, and reduced work capacity at a time when demand for health services is often rising
- Population displacement due to drought and desertification heightens vulnerability.

3 Health products and delivery systems

- Heat and humidity can make medicines and vaccines less effective. They can reduce the accuracy, stability, potency, or reliability of diagnostic tests, medicines, vaccines, insecticides, and bed nets and other treated materials. Extreme weather can compromise cold chains, production facilities, storage, and transport.
- Manufacturing and last-mile delivery can be disrupted when infrastructure, energy supplies, and workforces are affected.

4 Health-system pressure

- Heat-related illness and infectious disease can rise simultaneously, increasing demand on already constrained services.
- Surveillance, vaccination, diagnosis, treatment, and vector-control programmes may be interrupted.
- Remote, displaced, and underserved populations are often hardest to reach and last to benefit.

3. Five priorities for policy and investment

Climate and health action should move beyond recognition of risk and support practical ways to implement adaptation approaches. The following priorities align with the Belém Health Action Plan (BHAP) and can be advanced through national adaptation planning, climate-health strategies, development finance, and global health investment.

1

Integrate climate-sensitive diseases into climate adaptation and preparedness

Include response to climate-sensitive infectious diseases in national adaptation plans, health adaptation strategies, disaster preparedness, and BHAP implementation.

- Integrate national immunization programmes and test-and-treat strategies into national climate policy processes, such as national adaptation plans (NAPs), health national adaptation plans (hNAPs), and vulnerability and adaptation (V&A) assessments.
- Link weather and environmental data with information on disease carriers and human infections so authorities can identify rising risks earlier and respond faster.
- Improve collaboration between health, research and development, meteorological, and environmental institutions.
- Develop early-warning systems that combine maps, satellite data, and artificial intelligence to identify growing disease risks and trigger action before outbreaks worsen.
- Strengthen cross-border surveillance to monitor emerging threats.
- Prioritize the identification of vulnerable groups such as children, women, displaced populations, and community health workers facing climate-related health threats in national V&A assessments.
- Adopt a One Health approach that brings human, animal, and environmental health authorities together to assess risks and coordinate action.

2

Invest in a comprehensive prevention and response toolkit

No single intervention will be sufficient. Countries need coordinated investment across surveillance, vector control, vaccines, diagnostics, and treatments.

- Monitor environmental factors that influence climate-sensitive diseases, including changes in temperature, rainfall, and humidity, using both local monitoring systems and satellite-based technologies.
- Prioritize surveillance and research and development for diseases with significant unmet needs, especially where limited commercial returns discourage private investments.
- Invest in R&D for vaccines, diagnostics, therapeutics, and vector control products, including climate-smart tools to accelerate progress towards disease elimination.
- Strengthen research and clinical-trial capacity in endemic and climate-vulnerable regions.
- Train health workers to recognize and respond to climate-related health risks. Support them with updated health policies, coordination across government ministries, and additional resources for rural and disaster-affected areas.

3

Develop climate-resilient health technologies

Consider climate resilience when developing vaccines, medicines, diagnostics, and vector-control products.

- Generate evidence on product performance under higher temperatures and humidity.

- Support heat-stable, long-lasting, and easy-to-administer products that minimize cold-chain and infrastructure requirements.
- Make performance in heat and humidity a requirement in target product profiles – the specifications that guide product development – as well as in procurement and quality standards.
- Support point-of-care diagnostics and simplified treatments suited to remote and emergency settings.

4

Build resilient and equitable innovation and delivery ecosystems

Developing new tools does not automatically translate into access. Adaptation policy must strengthen the full pathway from R&D to delivery of health tools.

- Invest in local and regional innovation ecosystems through R&D funding, technology transfer, manufacturing capacity, regulatory cooperation, workforce development, and institutional strengthening
- Strengthen climate-resilient, environment-friendly supply chains, warehousing, transport, and last-mile delivery.
- Promote the procurement and uptake of climate-smart health technologies and equipment that are simple and long-lasting, use energy efficiently, and produce fewer carbon emissions.
- Expand the use of solar-powered refrigerators and solar energy, as well as solarization of health facilities, warehouses, and storage sites, especially where electricity supplies are unreliable.
- Invest in stronger cold chain systems and digital tools to improve the storage, monitoring, and delivery of health products.
- Strengthen climate-resilient health systems – including laboratory and diagnostic networks, vector surveillance and integrated vector management programmes, and treatment and immunization plans – to ensure continuity of essential services during climate-related disruptions
- Meaningfully engage affected communities in research, design, and implementation.
- Create an enabling policy environment, including attaching conditions to funding to ensure equitable access to new and existing health technologies so that innovations reach those who need them most.

5

Finance CSD interventions as climate adaptation

- Treat action on climate-sensitive infectious diseases as a priority for both international adaptation finance and domestic budgets. Funding should support surveillance, prevention – including immunization, research and development for new health tools, climate-smart products, manufacturing capacity, and measures that ensure equitable access. Together, these investments can reduce vulnerability to climate-related health risks.
- Expand climate funds, development banks, and philanthropic climate-health portfolios to include high-impact CSD interventions.
- Coordinate climate, health, and development financing rather than creating parallel mechanisms.
- Strengthen tracking of climate-health investments and adopt a common method for reporting health spending that supports climate adaptation.
- Use existing implementation platforms and regional partnerships to translate commitments into action.

4. What different actors should do

Governments	Funders and climate institutions	Product developers, procurers, and implementers
Integrate action on climate-sensitive diseases into adaptation policies, preparedness plans, implementation of the Belém Health Action Plan (BHAP), and national investment priorities, with meaningful participation of affected communities and attention to populations facing the greatest risks.	Finance surveillance, climate-smart innovation, climate-resilient products, and local production as climate adaptation investments; ensure equitable access, including by attaching conditions to R&D funding; and prioritize locally identified needs and community-led approaches.	Prioritize diseases neglected by commercial approaches, and build user needs, climate resilience, and environmental sustainability into product design, target product profiles, procurement, storage, delivery, and implementation – with communities involved throughout development and deployment.

Conclusion

Extreme heat is both a direct health emergency and an amplifier of infectious disease risk.

The world is likely to exceed 1.5°C of warming, underscoring the urgent need to accelerate both climate mitigation and adaptation. While every effort must be made to limit further warming, governments, institutions, and communities must also strengthen resilience to the health impacts that are already unfolding and those that can no longer be avoided.

A comprehensive heat and health agenda must therefore protect people not only from immediate heat-related illness, but also from infectious diseases, product failures, service disruptions, and access barriers that heat and related extremes can intensify. Recognizing action on climate-sensitive infectious diseases as climate adaptation is essential to move from fragmented responses to coordinated measures that are resilient, equitable, and implementation-focused.

Illustrative adaptation examples

I. Heat-stable and simplified product platforms that reduce cold-chain and delivery constraints

- CEPI is supporting research into nasal sprays, microarray patches (MAPs), coffee pod-, button-, or pen-like applicators that can withstand temperatures of up to 40°C for two months.
- A key consideration within DNDi target product profiles (TPPs) developed at the start of the R&D process is product stability, which is becoming increasingly important as climate change drives more frequent and intense heatwaves and higher ambient temperatures.
- Building on a comprehensive exploration of heat's impact on health products, Unitaid has launched a USD 11 million investment to generate evidence on the heat and humidity stability of essential health products across their lifecycles, and to invest in solutions that address identified stability issues climate change poses to product efficacy, safety, and supply chain resilience.

II. Long-acting malaria prevention tools and single-dose treatments suited to climate-vulnerable settings

- Several long-acting injectable candidates for malaria are currently in development through Medicines for Malaria Venture and its academic and pharmaceutical partners. A single dose of these long-acting injectables could provide up to six months of protection. These injectables are also heat-stable, require no cold chain for transportation, act across malaria strains, and can be deployed through existing delivery channels.
- Acoziborole is a new single-dose oral treatment for sleeping sickness, which is transmitted by the tsetse fly, a vector sensitive to rising temperatures. Developed by DNDi and partners, acoziborole can advance elimination efforts by simplifying treatment and storage, reducing the need for repeated visits to health facilities, and bringing care closer to people in remote or hard-to-reach areas.

III. R&D partnerships for vaccines and treatments for diseases whose geographic reach or burden is climate-sensitive

- In 2022, the Dengue Alliance was initiated by DNDi and founded in partnership with Translational Health Science and Technology Institute (THSTI) India; Siriraj Hospital, Mahidol University Thailand; FIOCRUZ, Brazil; University of Minas Gerais (UFMG), Brazil; and the Ministry of Health, Malaysia to accelerate innovation and develop therapeutics for dengue treatment.
- CEPI is investing up to USD 560 million in R&D, working with partners and networks around the world to develop vaccines against Lassa fever, Rift Valley fever, Nipah, and Chikungunya – all pathogens with clear links to climate change.

IV. Local manufacturing to strengthen supply of health tools in the Global South

- Medicines for Malaria Venture is working with African manufacturers to strengthen local production of quality-assured malaria medicines, including with Universal Corporation Limited in Kenya, Swiss Pharma Nigeria Limited, and Emzor Pharmaceutical Industries in Nigeria. Such partnerships can help build more resilient regional supply chains and manufacturing capacity in countries facing increasing climate and health pressures, reducing dependence on long, disruption-prone external supply routes and reducing carbon emissions generated through global supply chains.
- CEPI is investing in geographically diversified manufacturing to build regional resilience to climate events and improve access
    - Global South expansion: Shifting production capabilities away from centralized Western hubs to establish robust, geo-diverse manufacturing networks across Africa, Asia, and Latin America
    - Regional ecosystems: Embedding regulatory frameworks and operational, ready-to-use manufacturing capabilities into regional hubs so they can act independently during localized outbreaks and extreme weather events.

V. Climate-resilient approaches to Plasmodium vivax malaria elimination

- Climate change can alter the geographic range and seasonality of P. vivax transmission, including increasing suitability in areas that were previously less suitable for malaria. This creates additional challenges for elimination programmes and strengthens the case for tools that can interrupt transmission and prevent relapse. Tafenoquine, a single-dose treatment for the dormant liver-stage parasites responsible for P. vivax relapse, illustrates how product innovation can support elimination efforts by simplifying radical cure and reducing the burden of repeated treatment.

VI. Next-generation vector-control tools designed for changing patterns of heat, rainfall, resistance, and human behaviour

- Climate change, including rising temperatures and more frequent extreme weather events, is changing both mosquito behaviour and the operating environment for malaria vector control. IVCC is collaborating with industry partners to support the development of new insecticides and modes of action to address resistance, improving the durability and performance of bed nets, and exploring new approaches to protect increasingly exposed outdoors as heat drives changes in evening behaviour and mosquito biting patterns.
- Unitaid is working to ensure climate-affected communities can access new malaria prevention tools, including spatial emanators. As heat, rainfall, and extreme weather change malaria risks, this includes exploring how best to reach remote and humanitarian settings and keep delivery systems working reliably under climate stress, so protection is affordable and sustained.

VII. Embedding environmental sustainability across health systems

- Powering immunization and essential health services through sustainable energy: In 2025, Gavi, the Vaccine Alliance, invested more than USD 30 million to solarize nearly 1,700 primary healthcare facilities across Nigeria, Ethiopia, Pakistan, Uganda, and Zambia, addressing the critical challenge of unreliable electricity in frontline health centres. By providing clean, reliable, and sustainable power, these investments help maintain vaccine cold chains, extend service hours, operate essential medical equipment, and improve the quality and continuity of healthcare services. The initiative is benefiting more than 140 million people across the five countries.
- DNDi and MMV have introduced environmental questionnaires to contract manufacturers and partners to stimulate more environmentally sustainable production of pharmaceutical products for clinical trials and commercial supply.