THE URBAN BURDEN OF DISEASE ESTIMATION FOR POLICY MAKING

POLICY

URBAN HEAT: PROTECTING RESIDENTS' HEALTH AMID CLIMATE CHANGE



Extreme heat and heatwaves are becoming more frequent, bringing with them health impacts ranging from heat stress to premature death. It is a growing problem in cities, where the urban heat island effects traps heat.

This policy brief highlights the health impacts of heat and showcases policy measures already implemented by cities to protect public health.

HEAT IN CITIES

Of all weather and climate-related events in Europe, heat is one of the deadliest. In recent years, Europe has experienced longer and more frequent heatwaves, with each summer being warmer than the previous one.

When exposed to periods of very high temperature, the human body can struggle to regulate itself. This can result in heat stress, heat exhaustion, heat stroke and complications from pre-existing medical conditions, and even premature death.[1]

The summer of 2026 broke heat records, with 52% of the continent being exposed to feels-like temperatures of 38ºC or more,[2] and more than 50,000 excess deaths.[3]

Adaptative measures need to be taken to prevent even more severe impacts of heat on the European population.

Cities all across Europe are already implementing plans and actions to address heat issues and protect residents' health.

SUMMER 2026

52% of the continent being exposed to feels-like temperatures of 38ºC or more

50,000+ excess deaths

WHY CITIES AMPLIFY THE RISK OF HEAT

Residents in cities are particularly at risk when it comes to heat, because of the urban heat island effect (UHI). UHI is a phenomenon in which urban areas experience higher temperatures compared to their surrounding non-urban areas (on average 4-6 degrees Celsius hotter, with peaks that are up to 10 degrees hotter).

It develops when buildings, roads, and other hard surfaces absorb and store heat during the day, while a lack of trees and green spaces limits natural cooling. In addition, heat can get trapped in narrow streets and tall buildings, slowing down nighttime cooling.[4]

Another issue in cities is the combined effect of air pollution and heat exposure. The risk of mortality related to respiratory diseases from air pollutants (especially $PM_{2.5}$ and Ozone) increases with high temperatures.

The increase in mortality risk for combined exposure to extreme heat and $PM_{2.5}$ is estimated at 21%, while separately they are at 6.1% and 5%, respectively.[5]

EU MISSION ON ADAPTATION TO CLIMATE CHANGE

This EU Mission aims for at least 150 European regions and communities to achieve climate resilience by 2030. It focuses on helping these regions and local authorities to understand climate risks, develop adaptation pathways and implement innovative solutions. Over 325 regions and local authorities from 25 EU countries and five associated countries have signed the Mission Charter.[6]

WHAT CITY AUTHORITIES CAN DO TO COOL DOWN

INVEST IN NEW INFRASTRUCTURE MATERIALS

e.g. asphalt that reflects instead of absorbing sunlight, retrofitting buildings, green walls and roofs, to reduce surface temperatures and CO_2 emissions. and contribute to decreasing temperatures

INCREASE URBAN GREEN SPACE

by planting trees, creating pocket parks and green corridors that provide shade, shelter, and contribute to decreasing temperatures



PROVIDE HEAT SHELTERS AND ACCESS TO DRINKING WATER

INVEST IN ACTIVE MOBILITY INFRASTRUCTURE

(walking and cycling) as well as public transport to decrease the use of cars and therefore reduce temperatures and improve air quality and contribute to decreasing temperatures

HEAT IS A GROWING PUBLIC HEALTH CRISIS

During heatwaves, the body is unable to regulate internal temperature and eliminate extra heat, which increases the risk of heat exhaustion and heatstroke. As it tries to cool itself, it also stresses the heart and kidneys, which, as a result, can worsen health risks from chronic conditions. This includes cardiovascular, mental, respiratory and diabetes related conditions and can lead to preterm death.[7]

Nighttime heat is another growing risk that has been dramatically increasing over the past decades, with nights warming faster than days in several areas. This is due to the UHI effect, which traps heat.

As this is usually the time when we get a break from the heat and cool down, increasing nighttime temperatures worsen the health impacts of heat by putting another strain on human bodies. It also affects people's ability to sleep, which causes stress, mood changes, and high blood pressure and can worsen pre-existing heart conditions.[8]



A Heat Index Calculator, developed by ISGlobal, calculates the risks for human health during heatwaves, based on information about ambient temperature and relative humidity.[9] Humidity is another a risk factor, as it makes our natural cooling mechanism (sweat) less efficient.

Older adults, infants and children, pregnant women, and people with chronic illnesses are more vulnerable to extreme heat. Social deprivation is another key factor that makes people likely to experience more health impacts due to heat.[10]

Heat also reduces productivity, as it is difficult to complete work or learn.[11] Heatwaves will cost the EU an estimated €17 billion a year in lost productivity by 2030,[12] with overall higher costs, including health-related costs. Labour productivity has the largest economic impact, but EU GDP is also impacted by lower agricultural output, higher food process costs, higher energy prices with lower energy production, and transport disruption. All together, it has been estimated that this summer of extreme heat could cost the EU €180 billion.[13]

Both mitigation and adaptation measures are essential to address heat in cities.

WILDFIRES, HEAT, AND HEALTH

Climate change causes heat waves and droughts by increasing global temperatures, which increases the risks of wildfires. The 2026 summer is already the worst year on record in Europe.[14] There are also major health impacts from wildfire smoke: coughing, eye and throat irritation, headaches, and shortness of breath. For people with pre-existing health conditions, exposure to smoke can exacerbate symptoms and may require hospital admissions.[15]

EXAMPLES FROM EUROPEAN CITIES

AMSTERDAM (THE NETHERLANDS)

As part of the municipal heat plan, over 70 designated cooling spots are open, with free access to drinking water and seating. In addition, city residents have access to free swimming areas.[16]

BARCELONA (SPAIN)

The city has a heat plan in place and works to reduce the urban heat island effect by using reflecting or green surfaces as well as by increasing greenery. They are also expanding the network of climate shelters and water play areas.[17]

MARSEILLE (FRANCE)

The city is increasing greenery in streets and squares, turning hard, heat-absorbing surfaces into shaded, cooler zones. They are also mapping cool itineraries – green and shaded pathways that allow residents to navigate the city more comfortably during periods of extreme heat.[18]

RETHYMNO (GREECE)

Bioclimatic design is being implemented in public spaces, incorporating the use of compressed soils, cool pavement and reflective road paint to improve residents' comfort.[19]

VIENNA (AUSTRIA)

The city is experimenting with integrating greenery into the very fabric of its infrastructure, from green islands to shaded bus stops, improving residents' comfort as they move around the city in times of heat.[20]

WARSAW (POLAND)

Cooling centres in public places, including the Town Hall, were opened as well as water curtains. A green map was also made available to help residents find parks and shade.[21]

HEAT-HEALTH ADAPTATION PLANS

WHO states that heat-health action plans (HHAP) are crucial to anticipate and prepare for health impacts, protect vulnerable populations, strengthen health system resilience, and reduce avoidable illness and deaths.[22] These plans bring together health and non-health actors to implement preparedness, warning, and response actions that reduce heat-related health risks, with actions taken at different levels.

In their guidance document, WHO identifies eight core elements:

- Solid governance
- Heat-health warning systems
- Identifying populations at increased risk
- Communications on risks for protective action
- Health system resilience
- Reducing heat exposure with prevention measures
- Heat-health surveillance
- Monitoring and evaluation to improve HHAP performance



Heat-health action plans: guidance, second edition. Copenhagen: WHO Regional Office for Europe; 2026. Licence: CC BY-NC-SA 3.0 IGO.



POLICY RECOMMENDATIONS



CITY-LEVEL DECISION-MAKERS

- Adopt heat-health action plans aligned with WHO guidance
- Increase tree canopy coverage by planting trees or creating pocket parks, which can provide shade to residents and cut local temperatures by several degrees
- Create cooling areas in cities, especially for vulnerable groups
- Use alternative surface materials, such as reflective and permeable pavements, that can lower temperatures



EU-LEVEL DECISION-MAKERS

- Integrate the increase of urban green spaces into the Mission for Climate Neutral and Smart Cities framework
- Prioritise nature-based solutions, clean air, and health in upcoming climate risk assessments as well as the upcoming EU climate resilience framework
- Include financing for health and climate resilience – including increasing and restoring green spaces in cities – in the next EU budget 2028-2034
- Emphasise the need for heat adaptation and mitigation measures in the EU Agenda for Cities, encouraging the sharing of best practice between cities

REFERENCES

1 European Environment Agency (2024) The impacts of heat on health: surveillance and preparedness in Europe. https://www.eea.europa.eu/en/analysis/publications/the-impacts-of-heat-on-health

2 Copernicus Climate Change Service (2026) Record heat stress and low river flows marked Europe's 2026 summer. https://climate.copernicus.eu/copernicus-record-heat-stress-and-low-river-flows-marked-europes-2026-summer

3 London School of Hygiene and Tropical Medicine (2026) More than 50,000 heat-related deaths estimated in European urban areas during summer 2026, https://www.lshtm.ac.uk/newsevents/news/2026/more-50000-heat-related-deaths-estimated-european-urban-areas-during-summer

4 European Commission Joint Research Centre (2024) Urban heat islands: managing extreme heat to keep cities cool. https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/urban-heat-islands-managing-extreme-heat-keep-cities-cool-2024-07-22_en

5 Clean Air Fund (2023) The combined effects of heat and air pollution. https://www.cleanairfund.org/news-item/combined-effects-heat/

6 European Commission (2026) EU Mission on Adaptation to Climate Change. https://mission-adaptation-portal.ec.europa.eu/index_en

7 WHO (2026) Climate change, heat and health. https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health

8 He C. et al. (2024) European Heart Journal, Nocturnal heat exposure and stroke risk. https://academic.oup.com/eurheartj/article/45/24/2158/7676519

9 ISGlobal (2024) Heat index calculator. https://www.isglobal.org/en/heat-index-calculator

10 WHO (2026) Climate change, heat and health, *ibid.*

11 *ibid.*

12 European Parliament (2025) The effects of extreme weather conditions on workers' health and safety. https://www.europarl.europa.eu/RegData/etudes/STUD/2025/759353/CASP_STU(2025)759353_EN.pdf

13 Triodos Bank (2026) Hot summer economics. https://www.triodos.com/en/articles/2026/hot-summer-economics

14 European Commission Joint Research Centre (2026) Current wildfire situation in Europe. https://joint-research-centre.ec.europa.eu/projects-and-activities/natural-and-man-made-hazards/forest-fires/current-wildfire-situation-europe_en

15 WHO (2026) Wildfire smoke: a frequently underestimated health risk. https://www.who.int/europe/news/item/31-07-2026-wildfire-smoke--a-frequently-underestimated-health-risk

16 City of Amsterdam (2026) Amsterdams hitteplan actief. https://www.amsterdam.nl/nieuws/nieuwsoverzicht/amsterdams-hitteplan-actief/

17 Barcelona City Council (2025) Heat plan. https://www.barcelona.cat/barcelona-pel-clima/en/pla-clima/heat-plan

18 EU Covenant of Mayors (2024) Refreshing Marseille with cooler, greener and accessible public spaces. https://eu-mayors.ec.europa.eu/en/%20Refreshing-Marseille-with-cooler-greener-and-accessible-public-spaces

19 EU Covenant of Mayors (2024) Keeping Rethymno public spaces fresh with bioclimatic design. https://eu-mayors.ec.europa.eu/en/Keeping-Rethymno-public-spaces-fresh-with-bioclimatic-design

20 European Commission (2025) 200 climate-adapted transport facilities. https://climate-adapt.eea.europa.eu/en/mission/solutions/mission-stories/200-climate-adapted-transport-facilities-story35

21 City of Warsaw (2026) Upały, https://eko.um.warszawa.pl/upaly

22 WHO (2026) Planning heat–health action, https://www.who.int/europe/activities/planning-heat-health-action/planning-heat-health-action

The data presented in this policy brief was gathered as part of the UBDPolicy project: UBD Policy stands for Urban Burden of Disease Policy. This EU-funded project is aimed at estimating the health and socioeconomic costs and benefits of air quality, noise, lack of urban green spaces, heat and temperature, physical activity, and inequity for nearly 1,000 European cities in the EU and monitors three-year trends and impacts of urban planning, transport planning, and environmental policies.

Funded by the European Union

This project has received funding from the European Union's Horizon Europe Framework Programme (HORIZON) under GA No 101094639 - THE URBAN BURDEN OF DISEASE ESTIMATION FOR POLICY MAKING (UBDPolicy).

Author: Marianne Chagnon - Health and Environment Alliance (HEAL)

Review: Silvia Gómez, Mark Nieuwenhuijsen - ISGlobal, Ulrike Gehring - Utrecht University, Anne Stauffer, Helena Uhl - HEAL

Design: Helena Uhl - HEAL, Noble Studio

Published: October 2026