



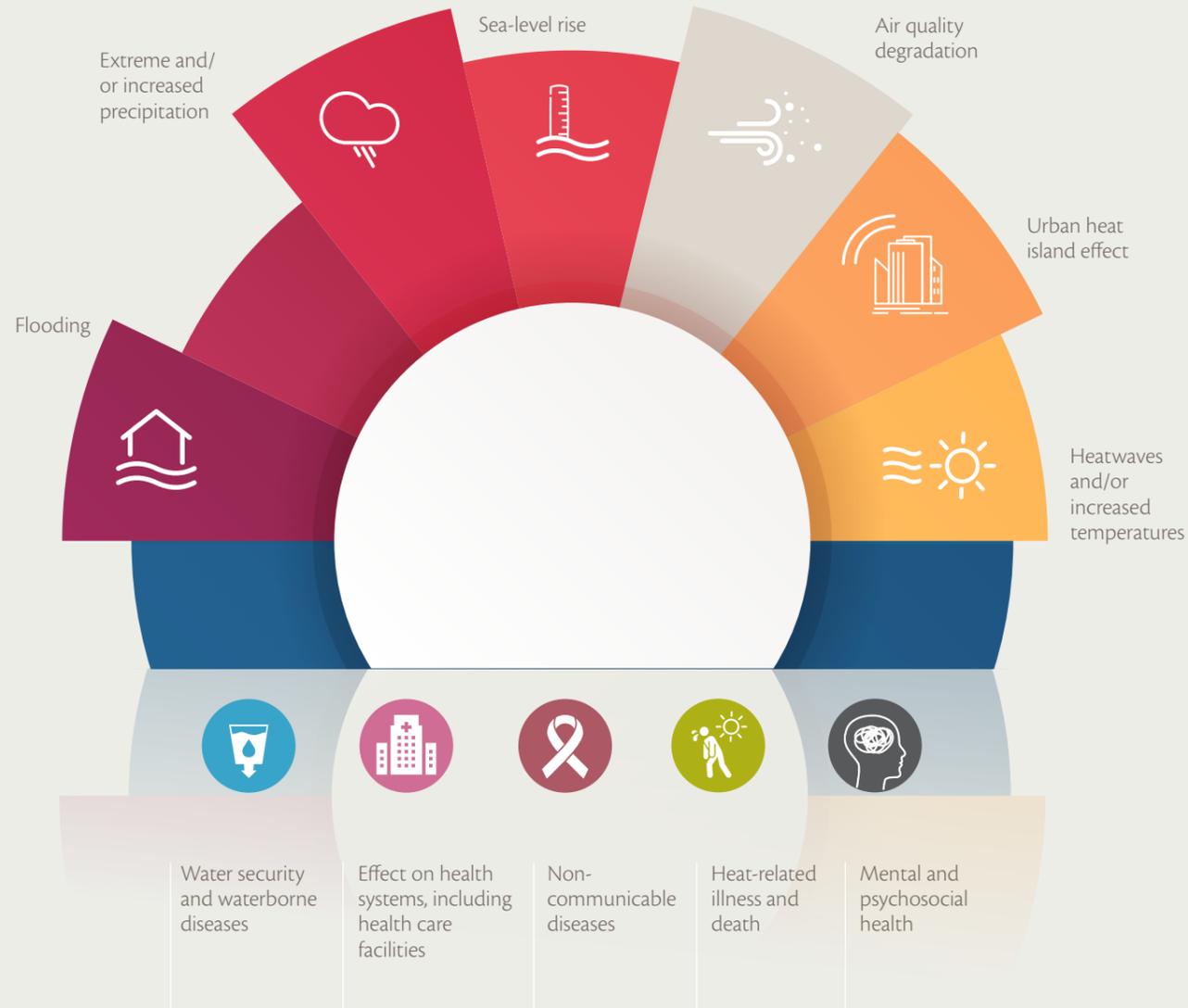
Developed in collaboration with the District of Columbia

2022

HEALTH AND CLIMATE CHANGE URBAN PROFILE **Washington, District of Columbia**

This World Health Organization (WHO) health and climate change urban profile presents a snapshot of key climate hazards, climate-sensitive health risks, and the potential health benefits of climate change adaptation and mitigation. The profile does not provide comprehensive information on all climate hazards, vulnerability factors or health risks but rather provides examples of some immediate risks based on available evidence and reported priorities and initiatives. Outlined in this profile are opportunities to promote policies and projects that protect the climate and environment while having large immediate health benefits at a local level.

Climate hazards and health risks (1, 2, 3)



Health and development indicators

10-year gap in life expectancy

Life expectancy varies drastically by geography, income and race. On average, residents in predominantly Black Wards 7 and 8 have life expectancies 10 years lower than White residents in high-income areas, with a 21-year difference between neighborhoods in highest and lowest economic strata (4, 5).

34% poverty rate

Flood prone Wards 7 and 8 see poverty rates as high as 34%, compared with the city's average of 16% (1, 6, 7).

17% of residents have asthma

One in six Washington, DC residents have asthma, but children living in predominantly Black communities have 20 to 25 times more asthma-related emergency department visits than children in predominantly White communities (8, 9).¹

¹ Air pollution and ozone are particularly harmful to children, older people, and those with asthma and other lung diseases (10).

² Sea level rise projections are based on USACE high emissions scenario with a base year of 2014 (11).

³ For information see Climate Projections and Scenario Development (11).

Evidence to support



Flooding from sea-level rise²

- Local sea levels have risen more than 12 inches (0.3 metres) in the last century, due to both global sea level rise and local subsidence (11, 12).
- Sea levels are projected to rise as much as 1.4 feet (0.43 metres) by 2050, and up to 3.4 feet (1.0 metre) by 2080 (1, 12).
- Coastal flooding due to sea level rise puts the District's critical infrastructure systems at risk and will likely have a larger impact on the physical and mental health of the already vulnerable populations in Wards 7 and 8 (1, 3).



Extreme and/or increased precipitation³

- The number of days per year with greater than 1 inch (2.5 centimetres) of rain in a 24-hour period in the district is projected to increase to 13 days by the 2050s (1).
- Increases in rainfall will negatively impact drainage infrastructure and sewage systems, making efforts to improve water quality more challenging (1, 4).
- Of the 36 monitored waterbody segments, all are considered impaired for use based on water quality – all but one citing *E.coli* exceedances as the primary issue (13).
- In addition to being home to a number of highly vulnerable residents, the District's Ward 7 is home to the largest number of community resources at risk of surface flooding (1, 4).



Heatwaves and/or increased temperatures⁴

- The number of extreme hot days (over 95 °F/35°C) is expected to increase to 30 to 45 days by mid-century, while average heatwaves are projected to lengthen to eight to nine days by the same time (1, 5, 11).
- Those particularly at risk of heat stroke and other heat-related health conditions include older people, people experiencing homelessness, those with underlying medical conditions, and low-income residents who either don't have access to or cannot afford adequate cooling (1).
- Heat-stroke-related emergency department visits have been increasing over the past few years, with a high of 2.13 visits per 100 000 population in 2019 (14).
- Nighttime temperature increases are among the most serious risks to health, as the ability to cool down will become more constrained (11).

Air pollution⁵

6–9 extra days of high ozone

Modelling suggests that, due to climate change, the number of high ozone days (days above 75 ppb) is expected to increase by six to nine days annually in the District by 2050 (15).

11% of PM_{2.5} from transportation

Transportation emissions, largely from other states, makes up 11% of PM_{2.5} 48% of NO_x pollution and approximately 20% of ozone on high ozone days. The District continues to exceed the 2015 National Ambient Air Quality Standards (NAAQS) (16, 17).

Community impact

Communities, particularly communities of colour, living near congested highways experience heavy truck traffic and the worst asthma rates in the District (9).

BreatheLife City - ✓

First US city to join the global campaign to mobilize cities to protect health and the planet from the effects of air pollution (18).⁶

⁴ For more information see Climate Projections & Scenario Development (11).

⁵ Many of the drivers of climate change, such as inefficient and polluting forms of energy and transport systems, also contribute to air pollution.

⁶ The BreatheLife Network and global campaign is a collaboration between WHO, the Climate and Clean Air Coalition, the United Nations Environment Programme, and the World Bank.

Emissions

Net zero target – ✓

Target date: carbon-neutral by 2050⁷

Renewable energy target – ✓

Target date: 100% renewable electricity by 2032⁸

Climate and health commitments

Climate change assessments and plans	Completed?	Health included?
Climate-risk vulnerability assessment	✓	✓
Adaptation plan	✓	✓
Mitigation plan	✓	✓

Climate change and health initiatives	
Global Covenant of Mayors	✓
Resilient Cities Network	✓
C40 Cities	✓
Carbon Neutral Cities Alliance	✓

⁷ The Carbon Free DC strategy will illustrate the District's pathway to becoming carbon neutral by 2050.

⁸ The Clean Energy DC Omnibus Amendment Act of 2018 has set a mandate of 100% renewable electricity and meeting the interim goal of cutting emissions by 50% by 2032.

Adaptation and mitigation actions

Transportation / clean air

- The District is working to significantly reduce air pollution from transportation by electrifying transit and government fleets, prioritizing communities disproportionately burdened by the impacts of poor air quality, including communities of colour and low-income neighborhoods (19, 20).
- The District is working to encourage and enable a shift toward clean, quiet, electric buses and vehicles, and is collaborating regionally to drive emissions reductions (19, 21, 22). Through comprehensive transportation-needs mapping, focused on increasing transportation equity, it is also aiming to increase the share of active and public transit trips to 75% (19, 20).

Benefits to health

Transportation / clean air

- The District has used the MOVES3.03 model to conduct a local estimate of greenhouse gas emissions reductions from the electrification of public vehicles. The findings indicate that 66,601 tons of CO₂ reduction and 8.15 tons of primary particulate matter (PM_{2.5}) reduction could be achieved by electrifying transit, school, and other buses (26).
- PM_{2.5} concentrations and associated health burdens have decreased in the District – down from 240 to 120 cause-specific deaths; and from 40 to 30 asthma emergency department visits per year (2000-2018 estimates). However, improvements have not been evenly distributed, particularly among low-income, and communities of color, underscoring the importance of disaggregated data collection and analysis to address inequities (27).
- The higher initial costs of electric vehicles are offset by savings over the lifetime of the vehicles as well as the associated savings through reduced health costs from accompanying air quality improvements.



Flooding

- Current floodplain regulations already restrict development in recognized floodplains (3, 23). The Department of Energy and Environment (DOEE) is currently updating these regulations as well as developing new mapping tools to incorporate climate change and better protect residents (3).
- DC Water is implementing its Clean Rivers project, which will reduce sewage discharges during heavy rain events by expanding green infrastructure and tunnels (24). The work is expected to significantly reduce the chance of flooding near rivers during heavy rain (24). It is also expected to significantly decrease the amount of hazardous bacteria and improve the water quality to be safe for human use (25).

Flooding

- Flood-risk mapping and preparedness for extreme weather events can lower flood morbidity and mortality and limit damage to critical infrastructure (28).
- The implementation of rainwater collection systems will minimize the risk of flooding during extreme events, limiting the number of injuries and drownings and the spread of waterborne diseases and related risk of poisoning (29).

Heat stress / green space

- In 2020, the District identified neighborhoods most vulnerable to heat, mapping residents' sensitivity and exposure to heat alongside air temperature data (3). These maps are already guiding the District's urban tree planting programmes, working towards Mayor Muriel Bowser's Sustainable DC 2.0 Plan goal of 40% healthy tree canopy coverage of the District by 2032 (4).
- The heat vulnerability maps will also underpin the District's forthcoming citywide heat strategy, ensuring that neighborhoods with the most at-risk residents have sufficient resources to protect their health and safety on the hottest days (4).

Heat stress / green space

- Greening, adding trees or reducing impervious surfaces, could reduce the risk associated with extreme heat and heatwaves in the urban environment. As socio-economic vulnerability is one of the main determinants of heat-related mortality, such interventions should be combined with other initiatives (30).
- A study in Michigan showed that the population living in areas with a high proportion (91%) of non-green space present a higher probability of cardiovascular mortality during extreme heat than individuals living in areas with low proportions (39%) of non-green space (31).
- In addition to the lack of green space, housing types and social isolation may independently increase the vulnerability of the older population to extreme heat-related cardiovascular mortality (31).
- The EPA reports that the ability of trees to help reduce the urban heat island effect can also potentially lead to other significant health benefits, such as reduced symptoms of respiratory distress and reduced risk of heat stroke, dehydration and heat exhaustion, heat-related mortality, and anxiety, and lower mental health-related hospital admissions (32).⁹



⁹ Remote sensing and geospatial analysis allow the calculation of land surface temperature differences attributable to the urban heat island effect and combine demographic data, public health information, existing and estimated tree cover, and characteristics of the built environment (32).

City zoom-in

Climate justice

The District has committed to integrate equity in climate action planning and provide support for vulnerable communities (19). Each recommended action in the Clean Energy DC plan was evaluated to ensure it addressed equity issues. Similarly, an “Equity and People” working group is reviewing and will make recommendations to the existing Sustainable DC plan (3, 33). The District’s Office of Racial Equity is working with agencies to begin incorporating a Racial Equity Impact Assessment tool during policy and program development (34). In addition to planning, DC is currently working with community members to pilot a community-led resilience hub to enable neighbors to help one another in the event of emergencies such as heatwaves and storms (35).

Calls for action



Community-level data to drive targeted solutions

Strengthen disaggregated data to better illustrate city-level conditions. This would allow the District to better prioritize the needs of neighborhoods and residents disproportionately burdened by both health and climate change impacts, and target solutions to meet unique community needs (27).

Regional and national action to augment local leadership

Local action is essential to building a healthy, sustainable city, but the District cannot meet these goals alone, multi-level government action is needed. Bold regional and national action is critical. This includes national emissions standards for heavy-duty vehicles, re-evaluating existing standards to improve health equity, and regional investments to accelerate clean transportation solutions.

Health in all policies

The District has a goal to improve population health by systematically addressing the link between community health and place, including where we are born, live, learn, work, play, worship, and age. Enhancing multi-sector collaboration is critical to finding solutions that address the social determinants of health at the root of current inequities, including the health impacts of climate change (4, 5).

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LEGEND

Key climate hazards⁴



Flooding



Sea-level rise



Extreme and/or increased precipitation



Heatwaves and/or increased temperatures



Drought



Urban heat island effect



Air quality degradation

Key health risks



Heat-related illness and death



Injury and death from extreme weather events



Malnutrition and foodborne disease



Mental and psychosocial health



Non-communicable diseases



Respiratory illness



Vector-borne and infectious diseases



Water security and waterborne diseases



Zoonoses



Effect on health systems, including health care facilities

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⁴ The key climate hazards listed in this legend may not be a comprehensive list of hazards associated with climate change. Other extreme events including tropical storms or wildfires, if identified as a key hazard, will be presented on page 2.