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From the G7 Health Communiqué to Action: Health and Climate - Heat Preparedness through Early Warning Systems



This report has been prepared in coordination with experts from the G7 countries to describe key elements of existing Heat Health Warning Systems and Action Plans.

Climate change is projected to significantly increase population exposure to heatwaves and heat-related morbidity and mortality, according to the latest IPCC findings. Heat is a growing major health risk worldwide due to the observed increase in high temperature conditions and extremes, urbanisation, and aging populations. The 6th IPCC Assessment Report states with high confidence that adaptation for future extreme heat risks include Heat Health Action Plans with incorporated Heat Health Warning Systems.¹

HEAT HEALTH ACTION PLANS (HHAP)

HHAPs provide the coordination and operating framework for planning and implementing Heat Health Warning Systems. HHAPs often specify mechanisms for interagency coordination with defined roles and responsibilities for extreme heat responses, preparedness strategies targeting public awareness and community outreach, capacity building among health care professionals, and a range of individual actions designed to reduce health risks from extreme heat, particularly for vulnerable populations.

HEAT HEALTH WARNING SYSTEMS (HHWS)

HHWS use climate and weather forecasts and predetermined trigger levels of heat stress to provide public advisory and initiate public health interventions designed to reduce health risks before, during, and after periods of extreme heat.

HHWS are critical decision-tools commonly developed and managed jointly by designated public health professionals and meteorologists. HHWS represent a key component of wider HHAP guiding health and social service decision making and protocols for appropriate preparedness, prevention, and response action to extreme heat.

Resources

[Developing Climate Information Systems for Heat Health Early Warning: Workshop report](#) | [Global Heat Health Information Network](#)

[Heat and health in the WHO European Region: updated evidence for effective prevention](#) | [WHO](#)

[Heat-health action planning in the WHO European Region: Status and policy implications](#) | [ScienceDirect](#)

[Heat-health action plans in Europe: Challenges ahead and how to tackle them](#) | [ScienceDirect](#)

[Overview of Existing Heat-Health Warning Systems in Europe](#) | [IJERPH](#)

[Governing heatwaves in Europe: comparing health policy and practices to better understand roles, responsibilities and collaboration](#) | [Health Research Policy and Systems](#)

¹ Intergovernmental Panel on Climate Change. Climate Change 2022: Impacts, Adaptation and Vulnerability. The Working Group II contribution to the IPCC Sixth Assessment Report. <https://www.ipcc.ch/report/ar6/wg2/>

Heat Health Warning System (HHWS)

Heat Health Action Plan (HHAP)

Challenges



UNITED KINGDOM

Responsibilities of involved authorities

- [Heat-Health Alert \(HHA\) Service](#) provided by UK Health Security Agency (UKHSA) and the UK Met Office
- National Severe Weather Warning System (NSWWS) led by Met Office: broader alert system including other sectors

- UKHSA weekly situational awareness meetings with the Met Office feeding into cross-government Summer Resilience Network, chaired by the Cabinet Office to ensure wider system response
- Local level emergency planning run by local government and the NHS, and brought together in the Local Resilience Forum
- Local areas responsible for HHAP development

- Need for faster implementation of adaptation actions due to increase in frequency and impact of heat events, and compounding and cascading events (e.g., wildfires, droughts, flash floods)

Coverage

- HHA covers England, NSWWS covers all of the UK
- Operates from 1 June to 15 September

- [Heatwave plan for England](#) sets out actions to take depending on the alert levels

- Better horizontal and vertical integration of national, regional, and local level planning and preparedness

Characteristics and metrics

- Alert system based on the UK Met Office forecasts and data, and joint dynamic risk assessment between UKHSA and Met Office
- Region-specific trigger thresholds (min night-time and max daytime temperature)
- 5 alert levels (Level 0: Long-term planning to reduce risk from heatwaves - Level 4: Emergency response)
- Recommends series of steps to reduce the risks to health

- HHAP for England aims to prepare, alert, and prevent the major avoidable effects on health during periods of severe heat in England building on existing measures taken by the Department of Health and Social Care, NHS England, and local authorities
- [Guidance](#) for different sectors detailing vulnerability and actions
- Range of comms material for the public and professionals
- Consideration of weekly [Syndromic surveillance reports](#)
- Yearly [heat mortality monitoring](#)

- Improvement of the current system: new impact-based heat health EWS will be implemented in April 2023
- Number of requests by local authorities to support the context-specific implementation of adaptation measures



UNITED STATES

Responsibilities of involved authorities

- National Weather Service - NWS (line office of NOAA) is the sole authority on issuing public alerts
- 122 Weather Forecast Offices responsible for decision-making on issuance of products
- Forecast guidance is provided by the National Centers for Environmental Prediction
- HHWS informed by local public health authorities and Centers for Disease Control and Prevention (CDC)

- [National Integrated Heat Health Information System \(NIHHIS\)](#) launched by NOAA and CDC
- Involved agencies and departments: Occupational Safety and Health Administration (OSHA), Environmental Protection Agency, Housing and Urban Development, Forest Service, Federal Emergency Management Agency, Department of Veterans Affairs

- Managing multiple compounding and cascading impacts, such as heatwaves + fire + drought or heatwaves + power outages

Coverage

- NWS works closely with national, state, and local core partners such as public health and emergency management agencies

- No single Federal Plan but state, local, tribal, and territorial government plans

- Heat alerts and heat data for local action is coarse in resolution, with increasing requests for urban-scale information

Heat Health Warning System (HHWS)

Heat Health Action Plan (HHAP)

Challenges

Characteristics and metrics

- WFOs may consider several forecast tools including but not limited to temperature, heat index, wet-bulb globe temperature, and an NWS Western Region prototype, Heat Risk
- Alert products: Excessive Heat Watch (24-72 hours in advance), Excessive Heat Warning (within 12 hours of onset), and Heat Advisory (within 12 hours of onset)

- [National Integrated Heat Health Information System \(NIHHIS\)](#): interagency system to manage extreme heat risk at all timescales and levels of government
- Many governments have integrated heat planning into existing plans, e.g., All Hazard Plans, Climate Resilience/Sustainability Plans, Transportation Plans
- Emerging practice: establishment of a Chief Heat Officer or a department within local government explicitly tasked with managing extreme heat

- Several agencies track heat mortality using different methods, with challenges in classifying deaths
- Reporting on heat morbidity through National Syndromic Surveillance Program still to be improved
- Burden of heat risk is higher among disadvantaged communities, with less resources to support heat resilience
- More evidence needed to inform heat resilience and management investments and practices



Responsibilities of involved authorities

- Environment and Climate Change Canada (ECCC) issues Heat Warnings
- Health Canada works in collaboration with ECCC to establish evidence-based alert triggers and accompanying public messages

- Provinces and territories play a leadership role in carrying-out health-related emergency preparedness and response
- Federal government increases resiliency to extreme heat by supporting the development of Heat Alert and Response Systems (HARS) across Canada; HARS are similar to the WHO's Heat-Health Action Plans

- Given the division of health system roles and responsibilities, continued collaboration between the federal government and, provincial, and territorial governments is needed

Coverage

- ECCC issues early notifications to notify provincial authorities, health officials and other decision-makers in advance of a heat warning

- No federal heat response plan but many local, regional and provincial heat response plans exist

- Most heat-related deaths in Canada occur indoors. There's a need to tailor response actions to protect the most vulnerable from extreme indoor temperatures

Characteristics and metrics

- HHWS based on region-specific relationships between health effects (i.e., deaths) and heat including temperature or humidex forecast thresholds
- Federated heterogeneous including air temperature, humidex, air pollution & mortality indicators

- [Heat Alert and Response System \(HARS\)](#): Canada's equivalent of a HHAP helps public health authorities protect the health of the public from extreme heat.
- Various stakeholders, including public health authorities and community officials, collaborate to develop heat alerts and heat response plans and associated activities
- HARS are tailored to community circumstances, through engagement with the community and key partners to protect the most vulnerable populations from heat-related illness and death
- HARS responses include heat alert protocol, communication plans, community response actions (e.g., opening of cooling centres) and evaluation plans

- More severe and prolonged heat waves to be expected in many parts of Canada
- Low but growing awareness within the emergency management community and by the public of the risks of extreme heat and protective actions



FRANCE

Responsibilities of involved authorities

- HHWS “[Système d’Alerte Canicule et Santé](#)” in operation since 2003 is based on close collaboration between the French Weather Bureau (Météo France), the National Public Health Agency (Santé Publique France) and the Ministry of Health

- National Public Health Agency, Regional Health Agencies, and relevant local authorities

- Multiplication of warnings since 2015, with very intense temperature

Coverage

- Warnings provided at the departmental scale
- Operates annually from 1 June to 15 September

- Includes local and national level actions

- Manage heat in the overseas territories (completely different climate)

Characteristics and metrics

- Min and max temperature thresholds based on biometeorological indicators
- Inclusion of aggravating meteorological indicators, e.g., relative humidity and duration of the heatwave
- 3 Levels (yellow -> red)
- Aimed at protecting the most vulnerable and coordinated response
- Syndromic surveillance used to support decision-making

- [National Heat Action Plan](#) organized around four major axes: 1. Preventing the effects of a heat wave, 2. Protecting populations by implementing appropriate measures, 3. Inform and communicate, 4. Capitalizing on experiences
- Weekly reports published during the summer, and annual report after each summer
- Multiple recommendations for different stakeholders, to cover the diversity of situations
- Communication material (leaflets, TV and radio spots, technical doc for professionals etc.)

- Consider different settings including exposure at school and at work
- Increase in the mortality burden observed in the recent years
- Increase in frequency and intensity of heatwaves might lead to form of risk trivialization and reduction in preventive measures



GERMANY

Responsibilities of involved authorities

- [Heat Warning System](#) developed by the German Meteorological Service (DWD) and in operation since 2005
- [Emergency Information and Warning App “NINA”](#) includes heat and other weather warnings of the Federal Office of Civil Protection and Disaster Assistance (BBK), based in part on the DWD heat warning system.

- Recommendations for the development of a HHAP adopted by the Federal Ministry for the Environment

- Coordination for sectors and authorities
- Implementation and evaluation of actions

Coverage

- Release for county level and different elevation classes in the counties for warning after two days of heat stress
- Operates annually from May to September

- No systematic implementation at state or local levels
- Recommendations for HHAPs on federal state level, county level and city level

- Project running for heat warnings on city level including social factors

Characteristics and metrics

- Based on human biometeorological criteria and the perceived temperature as an appropriate thermal index for heat stress and mortality
- Warning for acute actions for the elderly and general public
- Includes calculation of indoor thermal comfort for elderly homes
- Considers seasonal heat acclimatization and regional differentiation
- Includes Urban Heat Island information for key cities
- Provides specific information for elderly people

- Warning available free of charge on DWD server
- End of summer analysis of warnings at county and federal state level
- Discussion for the development of Guideline
- Possibilities of funding

- Since 2022 heat trend for day 3 to 6 based on same decision criteria
- Continuous development
- Current focus on risk groups
- Financial support for cities for the development of HHAP

Heat Health Warning System (HHWS)

Heat Health Action Plan (HHAP)

Challenges

JAPAN

Responsibilities of involved authorities

- [Heatstroke Alert](#)* provided by Ministry of the Environment and the Japan Meteorological Agency (JMA)
**Officially named "Heatstroke Alert", it is issued when the risk of heat illness is extremely high.*

- The Japanese government promotes efforts under Heat Illness Prevention Conference

- Continued government and local government cooperation is needed

Coverage

- Announced by each prefectural forecasting district
- Operates annually from April to October

- No systematic plan at local levels

- Further promotion of region-based heatstroke prevention actions

Characteristics and metrics

- Announced when heat stress indicator (Wet Bulb Globe Temperature) is predicted to be 33 or above at any location within the prefectural forecast area

- "Heat Illness Action Plan" (formulated in March 2021, revised in April 2022) supports efforts of relevant government ministries, agencies, and local communities.
- HHAP was formulated by a collaboration of 11 ministries and agencies

- Spreading heat stroke prevention actions to the public based on heatstroke alert

ITALY

Responsibilities of involved authorities

- [Heat Warning System](#) developed and managed by Department of Epidemiology Lazio Regional health service on behalf of Ministry of Health and National Civil Protection
- Forecast data provided by National Civil Protection (Italian Meteorological Service and ARPAE local area models and ECMWF model)

- Ministry of Health National heat action Plan updated annually
- Regional and local authorities adopt local plans annually
- Interagency collaboration (Civil Protection, Health authorities, social services, Met services, emergency services, municipalities) and identification of local lead body in charge

- Improve network of stakeholder communication and collaboration
- Ensure sufficient attention on heat waves and health risks, environment, and emergency response agenda
- Integration with national/local climate change adaptation policy and actions

Coverage

- Currently includes 27 cities (regional capitals and cities with more than 250 inhabitants)
- Operates annually from May to September

- Regions and cities define area specific HHAP

- Extend coverage and monitoring impacts to smaller cities (better resolution forecasts) extension of lead time, include seasonal forecasts for seasonal HHAP preparedness

Characteristics and metrics

- 3-day warnings based on city specific maximum apparent temperature and mortality association and air mass-based models that predict excess deaths
- 4 levels of warning (level 0: no risk; level 1: pre-alert condition; level 2: high risk; level 3: 3 or more consecutive days of level 2 risk)
- Recommendations and actions are modulated based on level of risk

- Ministry of Health National HAP guidance provides evidence on risks, recommendations, and actions
- MoH informative campaign, guidance and informative material for vulnerable groups and health professionals
- Mortality rapid surveillance produces weekly, monthly and seasonal reports for 50 cities
- ER surveillance in sentinel hospitals in cities with HHAP
- Formal identification of vulnerable subgroups each summer for active monitoring.
- Evaluation of changes in heat risks and adaptive capacity, and annual survey of actions and vulnerable surveillance
- Continuous training for health professionals

- HHAP includes air quality recommendations, in future extend to other concomitant environmental risk factors (drought, wildfires etc.)
- Further promotion of formal monitoring and evaluation of HHAP components at different levels to improve action and response