

Checklists to assess vulnerabilities in health care facilities in the context of climate change

The WHO publication *Checklists to Assess vulnerabilities in Health Care Facilities in the Context of Climate Change*, along with other checklists, is available on the WHO website at www.who.int/publications/i/item/checklists-vulnerabilities-health-care-facilities-climate-change.

HEATWAVES

Checklist for assessing climate hazards

ARE THESE AREAS IMPACTED?					
X Current observed impacts O Possible impacts with changed conditions					
CLIMATE HAZARD TYPE	IS HAZARD OR EXPOSURE PRESENT? Yes/No	Health workforce	WASH and health care waste	Energy services	Infrastructure, technologies, products, processes
Flood					
Storm					
Sea-level rise					
Drought					
Heatwave					
Wildfire					
Cold wave					

HEATWAVES: checklist for assessing vulnerabilities

WORKFORCE	Vulnerability level		
	High	Medium	Low
High: unprepared; unable to respond (Higher risk)	High	Medium	Low
Medium: basic or incomplete preparation; low level of response (Medium risk)			
Low: prepared; able to respond (Lower risk)			
Is the health workforce,			
<i>(Human resources)</i>			
equipped with a plan to identify and protect health workers at risk of heat stress?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with appropriate clothes (e.g. light, loose-fitting cotton clothes, and when necessary, a hat)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with sunscreen, hat and plenty of drinking water for staff carrying out outdoor activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with safe water during a heatwave event and stimulated regularly for appropriate water intake?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with a cool space or a shower room for staff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with an information system to manage occupational safety and health in the facility during a heatwave, including rest for staff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Capacity development)</i>			
trained on public health and climate change hazards, including health impacts related to heatwaves?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained to manage hazardous waste (chemical, biological, radiological)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prepared and able to follow-up a contingency plan for emerging health workforce heat stress, water- and air-borne diseases, and cardiovascular and respiratory problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to implement a contingency plan for public health emergencies, in case of high temperature effects, and water and food contamination?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained and have specific and clear guidance on actions to reduce heat risk factors for staff?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of the need for an alternative action plan for the health workforce with outdoor functions to limit their activity to morning and evening hours or reduce their activity demands during the hottest part of the day or try alternate work and rest periods, with rest periods in a cooler area? (more frequent work-rest cycles are better)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Communication and awareness raising)</i>			
aware about impacts of hot temperatures on human health via water quality and quantity (including water- and food-borne diseases) and air quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of the type of patients and symptoms expected during a heatwave?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
informed on how to use and follow a surveillance system to track health outcomes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of the need to keep hydrated and wear appropriate clothing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with a community health educational programme to improve community health in the face of heatwave risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of keeping the facility environment cool (e.g. keep windows that are exposed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

to the sun closed during the day and open at night when the temperature has dropped; close curtains that receive morning or afternoon sun; turn off nonessential lights and electrical equipment that generate heat; sleep in a cooler room or use electric fans for some relief if temperatures are below 35°C)?

WATER, SANITATION AND HEALTH CARE WASTE	Vulnerability level		
	High	Medium	Low
High: unprepared; unable to respond (Higher risk)			
Medium: basic or incomplete preparation; low level of response (Medium risk)			
Low: prepared; able to respond (Lower risk)			
Does the health care facility,			
<i>(Monitoring and assessment)</i>			
verify water safety conditions, including updated risk assessments to map water resources and water supplies for the facility?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an evaluation system to monitor its water system or supply before, during and after the event?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have information on the water system installation that ensures lower risk of being contaminated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a quality monitoring plan for water meant for human consumption?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a monitoring plan for potable water?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Risk management)</i>			
have a water management plan to identify water contamination?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have onsite water purification equipment to provide safe drinking water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provide sufficient drinking-water to staff, patients and visitors?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
keep drinking water cool or refrigerated where possible for staff, patients and visitors?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a contingency plan for monitoring and reducing contaminant concentrations in the facility water system supplies?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have water storage protected from direct sunlight?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have water storage tanks with appropriate covers to protect from excessive heat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have chemicals stored away from excessive heat?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have health care waste stored away from excessive heat in cool and covered spaces?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Health and safety regulation)</i>			
work with water utility agencies to prevent suspension of services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an alternative source of water supply?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a water safety plan in place, in case of water contamination?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a mechanism or regulation to carry out sanitary inspections of water supply, and when necessary establish a temporary ban on use, until improvements are made?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a contingency plan to ensure effective and timely delivery of safe water during extreme temperatures and emergencies over the short- and long-term?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a cross-sectoral water management plan to conserve and protect local or alternative water sources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ENERGY	Vulnerability level		
	High	Medium	Low
High: unprepared; unable to respond (Higher risk)			
Medium: basic or incomplete preparation; low level of response (Medium risk)			
Low: prepared; able to respond (Lower risk)			
Does the health care facility,			
<i>(Monitoring and assessment)</i>			
regularly assess its energy system to ensure it can cope with heatwave conditions?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an emergency backup generator (including fuel, where relevant) that is able to cover at least all critical service areas and equipment during heatwave events?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
periodically check the emergency backup generator (including fuel, where relevant), even if rarely used?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
assess regularly heating, ventilation and air conditioning systems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
assess whether renewable energy (if available, such as solar) is sufficient to power critical equipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
monitor building humidity and if needed adjust the cooling system to control the humidity in operating room areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Risk management)</i>			
have a secure place to protect the backup generator (including fuel or battery storage, where relevant) from damage?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have appliance thermometers in the refrigerator and freezer to determine if food, vaccines and other essential refrigeration-dependent medical supplies are safe?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have adequate daylight to ensure proper visibility during power outages?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have power-operated doors that can be opened manually to permit exit in case of power failure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a clear guidance on heat-risk management for the maintenance of critical infrastructure (air conditioning, medical devices, computers, diagnostic equipment, boiling water, etc.)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Health and safety regulation)</i>			
have an emergency plan for power outages in the short- and long-term (during and after the event)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan or regulation to determine ways to reduce overall energy use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
work with energy utility agencies to prevent suspension of electricity services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a management plan for intermittent energy supplies or system failure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an emergency plan to ensure availability of adequate lighting, communication and information systems, and refrigeration and sterilization equipment during the event?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan to evacuate patients to a cooling station if the facility has lost power and has no other source of energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ensure that walls and roofs are insulated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES	Vulnerability level		
High: unprepared; unable to respond (Higher risk) Medium: basic or incomplete preparation; low level of response (Medium risk) Low: prepared; able to respond (Lower risk)	High	Medium	Low
Does the health care facility,			
<i>(Adaptation of current systems and infrastructures)</i>			
provide greater advocacy on health workforce education to cover heatwave risks and responses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have preparedness and training for periods of extreme heat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
assess the performance and vulnerabilities of each critical part of the facility (structural and nonstructural elements) that can be affected by hot temperatures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
assess the heating, ventilation and air-conditioning systems for capacity to deal with increasing heat and humidity?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
install reflective white roofs to reduce heat impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
install green roofs to mitigate heat impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have pavements and roofs designed to withstand extreme temperatures or solar radiation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have light coloured paving on parking areas and walkways around the facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
review building code design baselines against extreme temperatures to ascertain inventory risks?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
identify vulnerabilities to estimate the possible loss and implemented actions to reduce impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have exterior shading devices, resilient trees or other architectural features that mitigate heat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have windows that can be operated to provide for ventilation and maintain habitable and operational conditions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a system for cooling the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provide an extra medical supply in case of increased demand for treatment of heat stress?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
stimulate increase of water intake by staff and patients?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have insulated loft and cavity walls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan for arranging for extra staffing for emergency support services?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
store chemicals away from excessive heat?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a monitoring and early warning system integrated with other areas to manage risks related to heatwave impacts on the facility?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an effective emergency risk communication plan to communicate clear messages of the danger of heatwaves, emphasizing health protection as a priority?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Promotion of new systems and technologies)</i>			
receive meteorological information on the likelihood of forthcoming hot weather?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a syndromic surveillance system for heat-related illnesses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an updated training programme for the health workforce to detect and track climate change-related human heat stress?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a long-term strategy for reducing heat, such as through building insulation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

perform risk assessments to assist with adaptation measures for heatwaves?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an information system for tracking and monitoring of diseases following heatwave events?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have measures that improve health performance, based on a history of climate variability in the region or locality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
perform evaluations to predict heatwave conditions 1–5 days in advance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
coordinate public broadcasts of information about the anticipated timing, severity and duration of heatwave conditions in its surrounding communities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Sustainability of health care facility operations)</i>			
have a defined and sustained budget as part of core budgeting for emergency preparedness and response to heatwaves?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improve adaptive governance capacity regarding evaluation and measures for risk identification, risk reduction and response?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
assess the length of time people can remain in a place before it gets overheated, requiring evacuation to another facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a thermal stress device to assess temperature and identify heat warning environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have trees and leafy plants near windows to provide natural cooling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
explore the relationship between social learning and adaptation measures in the face of heatwave threats to identify and implement the best behavioural responses from successful health facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a coordinated plan with health municipal department heads to ensure appropriate preparations for ongoing heatwave conditions?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**For further details see Hospital Safety Index (Reference 2 in the Checklist Guidance).
For WASH and health care waste details see WASH FIT (Reference 3 in the Checklist Guidance).*

HEATWAVES: checklist for assessing impacts

HEALTH WORKFORCE		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Danger of life-threatening heat stroke <input type="checkbox"/> Increased likelihood of heat stress effects (heat exhaustion and heat stroke) <input type="checkbox"/> Increased threat to staff with pre-existing health conditions such as heart conditions, cardiovascular diseases, diabetes, lung diseases, respiratory diseases, fluid/electrolyte disorders and some neurological disorders <input type="checkbox"/> Increase in number of respiratory diseases due to elevated ozone levels <input type="checkbox"/> Loss of work capacity and reduced productivity <input type="checkbox"/> Increased workforce absenteeism <input type="checkbox"/> Increased hospital admissions and emergency services overwhelming health workers	<input type="checkbox"/> Increased heat stress effects (heat syncope, heat cramps) <input type="checkbox"/> Increased threat to health workforce due to individual level risk factors (age, sex, culture, body weight; fitness; behaviour; drug treatment; body acclimatization) <input type="checkbox"/> Excessive heat exposure resulting in effects related to cardiovascular and renal systems, and dehydration <input type="checkbox"/> Diseases requiring medical treatment, specifically for those with pre-existing health conditions such as asthma, COPD, respiratory tract infections, diabetes, heart conditions, renal conditions <input type="checkbox"/> Significantly reduced performance capacity <input type="checkbox"/> Increased heat affecting day and nocturnal conditions that heighten health workforce exposures	<input type="checkbox"/> Increased thirst and headaches <input type="checkbox"/> Increase in infectious disease cases among the health workforce from water and food contamination <input type="checkbox"/> Reduction of health workforce functions

WASH AND HEALTH CARE WASTE		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Increased water demand <input type="checkbox"/> Water source contamination <input type="checkbox"/> Shortage of safe water <input type="checkbox"/> No access to drinking water in the premises <input type="checkbox"/> Reduced effectiveness of chemicals used for water treatment	<input type="checkbox"/> Reduced capacity to provide sanitation and hygiene services (floor, toilets, patient rooms, emergency room and other health care facility rooms) <input type="checkbox"/> Reduced capacity to provide water for drinking and cooking <input type="checkbox"/> Reduced capacity to use laundry and dishwashing machines	<input type="checkbox"/> Reduced function of sanitation systems and hygiene practices (flush toilets, showers, sewerage, treatment, hand washing, medical procedures, etc.) <input type="checkbox"/> Increased demand for drinking water from health workers engaged in outdoor activities

ENERGY		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Increased demand for energy consumption <input type="checkbox"/> Power outages <input type="checkbox"/> Disruption of medical equipment and storage of medicines, vaccines and other essential refrigeration-dependent medical supplies <input type="checkbox"/> Loss of vaccines, laboratorial supplies, drugs, pharmaceuticals and other essential refrigeration-dependent medical supplies <input type="checkbox"/> Reduced capacity to use critical facility machines (medical devices) <input type="checkbox"/> Disruption of the fuel supply chain <input type="checkbox"/> Disruption of energy-dependent water pumping and treatment	<input type="checkbox"/> Power shortages <input type="checkbox"/> Intermittent access to electricity causing interruption of health care services <input type="checkbox"/> Difficulty in providing health care services such as dialysis, oxygen supplies, diagnostic equipment <input type="checkbox"/> Patients needing to be transported to other health care facilities <input type="checkbox"/> Reduced capacity to provide cleaning and disinfection services that require electricity (laundry, dishwashing machines)	<input type="checkbox"/> No ambient cooling <input type="checkbox"/> Loss of food or difficulty in keeping food refrigerated <input type="checkbox"/> Difficulty in providing thermal comfort, affecting health workers and patients <input type="checkbox"/> Unable to follow boil water alerts <input type="checkbox"/> Loss of water pumping and treatment systems

INFRASTRUCTURE, TECHNOLOGY, PRODUCTS AND PROCESSES		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Damage to medical and laboratorial equipment and devices <input type="checkbox"/> Damage to communication and information systems <input type="checkbox"/> Increased number of patients presenting with infectious diseases, cardiovascular and respiratory diseases; increasing demand for health care <input type="checkbox"/> Increase in complex and emergency health care services <input type="checkbox"/> Increased electricity demand <input type="checkbox"/> Increased demand for drinking water <input type="checkbox"/> Increased costs for providing all necessary measures to keep staff and infrastructures safe <input type="checkbox"/> Damage to water pipes from heat <input type="checkbox"/> High humidity in operating rooms resulting in cancellation of surgeries	<input type="checkbox"/> Increased hospitalization rates requiring extra medical supplies and health workforce <input type="checkbox"/> Increased demand for cooling areas and rest areas for staff <input type="checkbox"/> Increased demand for adaptation measures and plans to reduce heat effects on health workers and the health care facility <input type="checkbox"/> Insufficient supplies, including fans and air conditioning units <input type="checkbox"/> Increased risk of damage to pharmaceuticals	<input type="checkbox"/> Increased demand for conducting coordinated strategies to ensure the implementation of measures with other sectors <input type="checkbox"/> Overwhelmed health care services

