

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.

COLD WAVES

Checklist for assessing climate hazards

ARE THESE AREAS IMPACTED?					
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					

COLD WAVES: checklist for assessing vulnerabilities

WORKFORCE	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)			
Is the health workforce,			
(Human resources)			
equipped with a plan to identify and protect health workers at risk of cold waves impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with appropriate clothes during cold snaps (e.g. warm, windproof and waterproof clothes, thermal underwear, boots)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with a warm resting place?	<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 cold wave?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with a plan with rescheduled activities regarding outdoor activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Capacity development)			
trained on public health and cold wave risk factors?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained on risk factors related to heating (e.g. carbon monoxide poisoning from certain heating appliances)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prepared and able to follow up a contingency plan for increasing health workforce cardiovascular stresses and respiratory problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to implement a contingency plan for public health emergency, in case of exposure to excessive cold temperatures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained on actions to reduce personal levels of cardiac workload risk factors for staff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
able to manage peak electricity demand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Communication and awareness raising)			
aware of the risk factors of patients and symptoms expected during a cold wave?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
informed on how to use and follow a surveillance system to track health effects from cold exposure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of the need to wear appropriate clothing (ensuring that head, nose, mouth, neck, hands and feet are covered properly; wearing appropriate boots that keep feet warm and prevent from slipping and falling; using several layers of clothing and ensuring the top one is windproof and waterproof), specifically for outdoor activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of avoiding getting their clothes wet?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with a community health educational programme to improve community health in the face of cold wave risks (including homeless, alcohol and drug addicts and other persons who may spend long periods of time outdoors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of the need for an alternative action plan for the health workforce with outdoor responsibilities to reduce or avoid activity during excessive cold?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of the need to take breaks in a warm place that is sheltered from wind and snowfall, when needing to stay outdoors for long periods of time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

aware of the factors that can increase impacts on health (e.g. smoking and drinking alcohol may lower the body temperature leading to hypothermia; some medications can make people more sensitive to cold; certain diseases can be aggravated from cold temperatures, such as heart diseases, lung diseases, malnutrition)?

WATER, SANITATION AND HEALTH CARE WASTE			Vulnerability level
Does the health care facility, <i>(Monitoring and assessment)</i>	High	Medium	Low
verify water safety conditions, which include 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 an event?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have information on water system installation that ensures lower risk of freezing?	<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"/>
provide sufficient drinking water to staff, patients and visitors?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Health and safety regulation)</i>			
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 freezing waters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a contingency plan to ensure effective and timely delivery of safe water during extreme cold 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,			
(Monitoring and assessment)			
regularly assess its energy system to ensure that it can cope with cold wave 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 cold wave events?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
check the emergency backup generator (including fuel, where relevant), prior to cold waves to ensure its capacity to work in freezing conditions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
regularly assess whether the heating system can cope with unexpected cold temperatures?	<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 the heating system to control the functioning of all critical medical equipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Risk management)			
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 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 cold-risk management for the maintenance of critical infrastructures (such as heating systems, medical devices, computers, diagnostic equipment, boiling water)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Health and safety regulation)			
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 heating station or other health care centre 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)	High
Medium: basic or incomplete preparation; low level of response (Medium risk)	Medium
Low: prepared; able to respond (Lower risk)	Low
Does the health care facility, <i>(Adaptation of current systems and infrastructures)</i>	
provide advocacy on health workforce education to cover cold wave risks and responses?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have preparedness and training for periods of extreme cold exposure?	<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 cold temperatures?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
perform necessary and appropriate maintenance work to prepare the facility for winter or severe cold temperatures?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
ensure that the rooms are well ventilated, when using an auxiliary heating system, such as oil-burning furnaces, wood-burning fireplaces, wood-burning stoves, propane heaters generators?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
review building code design baselines against extreme cold temperatures?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
identify vulnerabilities to estimate possible losses and implement actions to reduce impacts from extreme cold or freezing temperatures?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have caulked windows and doors to prevent cold air from coming in?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have insulated loft and cavity walls?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
provide sufficient and necessary materials to supporting staff in outdoor activities, when necessary (e.g. in the case of vehicle breakdown having bottled water, food, blankets, cell phone and charger, shovel, snow brush, traction aids and medication)?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have access to extra medical supplies in case of increased demand for treatment of cold effects?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have a plan for arranging extra staff or emergency support services?*	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
store chemicals away from excessive cold?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have an effective emergency risk communication plan to communicate clear messages of the danger of cold waves, 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 and warnings on the likelihood of forthcoming extreme cold weather conditions?*	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have a syndromic surveillance system for cold-related diseases?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have a long-term strategy for reducing cold effects, such as through building insulation?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
perform risk assessments to assist with adaptation measures for cold waves?*	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
have an information system for tracking and monitoring diseases following cold wave 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"/>
coordinate public broadcasts of information about anticipated timing, severity and duration of cold wave conditions in its surrounding communities?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

(Sustainability of health care facility operations)

have a defined and sustained budget as part of core budgeting for emergency preparedness and response to cold waves?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
assess the length of time people can remain in a place without heating systems (or in case of failure), before requiring evacuation to another facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
explore the relationship between social learning and adaptation measures in the face of cold wave threats to identify and implement the best behavioural responses from successful health facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have adaptive governance capacity regarding evaluation and measures for risk identification, risk reduction and response?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a coordinated plan with local health department teams to ensure appropriate preparations for ongoing cold wave 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).

COLD WAVES: checklist for assessing impacts

HEALTH WORKFORCE		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Life-threatening risks from exposure to excessive cold <input type="checkbox"/> Cold exposure resulting in hypothermia <input type="checkbox"/> Increased likelihood of cardiac workload (heart diseases), respiratory infections (influenza) and respiratory chronic conditions (asthma) <input type="checkbox"/> Loss of work capacity and reduced productivity affecting the health of patients <input type="checkbox"/> Increased workforce absenteeism <input type="checkbox"/> Increased hospital admissions and emergency services overwhelming health workers	<input type="checkbox"/> Increased likelihood of diseases to the health workforce through exposure to outdoor activities <input type="checkbox"/> Diseases requiring medical treatment, specifically for those with pre-existing chronic health conditions such as heart diseases, respiratory diseases (asthma, chronic bronchitis, emphysema), diabetes and certain neurological disorders <input type="checkbox"/> Significantly reduced performance capacity <input type="checkbox"/> Increased difficulty in accessing the health care facility due to freezing conditions	<input type="checkbox"/> Increased threat to the health workforce due to individual-level risk factors (age, pre-existing chronic health conditions, smoking, body acclimatization, reduced mobility) <input type="checkbox"/> Reduction of health workforce functions

WASH AND HEALTH CARE WASTE

Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Increased likelihood of water pipes bursting <input type="checkbox"/> Increased likelihood of water freezing <input type="checkbox"/> Loss of water pressure <input type="checkbox"/> No access to drinking water in the premises <input type="checkbox"/> Defaulting delivery care services due to lack of water access <input type="checkbox"/> Disruption of water pumping and treatment systems	<input type="checkbox"/> Increased likelihood of water shortage <input type="checkbox"/> Reduced capacity to provide sanitation and hygiene services <input type="checkbox"/> Reduced capacity to provide sterilization, laundry and dishwashing services <input type="checkbox"/> Reduced effectiveness of water treatment chemicals <input type="checkbox"/> Reduced capacity for waste collection, storage and transport	<input type="checkbox"/> Reduced capacity to provide water for drinking and cooking <input type="checkbox"/> Reduced functioning of sanitation systems and hygiene practices (flush toilets, showers, sewerage, treatment, hand washing, medical procedures)

ENERGY		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Increased demand for energy consumption <input type="checkbox"/> Power outages <input type="checkbox"/> Increased likelihood of disruption of medical equipment and storage of medicines, vaccines and other essential refrigeration-dependent medical supplies <input type="checkbox"/> Increased likelihood of disruption of the fuel supply chain <input type="checkbox"/> Disruption of energy-dependent water pumping and treatment systems <input type="checkbox"/> Disruption of internal heating systems <input type="checkbox"/> Disruption of communication and information systems	<input type="checkbox"/> Power shortages <input type="checkbox"/> Difficulty in providing health care services <input type="checkbox"/> Patients have to be transported to other health care facilities <input type="checkbox"/> Reduced capacity to use critical facility equipment (medical devices) <input type="checkbox"/> Reduced capacity to provide cleaning and disinfection services that require electricity (sterilization, laundry, dishwashing machines) <input type="checkbox"/> Increased likelihood of loss of vaccines, laboratorial supplies, drugs, pharmaceuticals and other essential refrigeration-dependent medical supplies	<input type="checkbox"/> 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

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES

Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Damage to medical and laboratorial equipment and devices <input type="checkbox"/> Interruption of complex and emergency health care services (surgery, complex treatments, urgent care) <input type="checkbox"/> Increased likelihood of disruption of communication and information systems <input type="checkbox"/> Increased number of patients presenting with cardiovascular and respiratory diseases, frostbite and hypothermia <input type="checkbox"/> Increased demand for emergency health care services <input type="checkbox"/> Increased electricity demand <input type="checkbox"/> Damage to water pipes from cold exposure <input type="checkbox"/> Disruption of health care facility access <input type="checkbox"/> Difficult to transport patients and staff due to disabled transportation systems (ambulance, home assistance care, patient transportation)	<input type="checkbox"/> Increased hospitalization rates requiring extra medical supplies and health workforce <input type="checkbox"/> Increased demand for heating devices <input type="checkbox"/> Difficult transportation access interrupting supply chain <input type="checkbox"/> Increased demand for adaptation measures and plans to reduce cold effects on health workers and the health care facility <input type="checkbox"/> Disruption of supplies including that of heating units <input type="checkbox"/> Breakdown of routine health care services such as ambulatory, immunization, maternity room, pharmacy, medication for chronic diseases, dental, and other primary services <input type="checkbox"/> Interruption of diagnosis due to equipment damage	<input type="checkbox"/> Increased demand for conducting coordinated strategies to ensure the implementation of measures with other sectors <input type="checkbox"/> Overwhelmed health services <input type="checkbox"/> Increased costs for providing all necessary measures to keep staff, patients and technologies safe

COLD WAVES: proposed response actions

HEALTH WORKFORCE

HEALTH WORKFORCE

WASH AND HEALTH CARE WASTE

WASH AND HEALTH CARE WASTE

ENERGY

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES