A.5 HEATWAVE CHECKLISTS

IPCC states that it is very likely that there has been an overall decrease in the number of cold days and nights, and an overall increase in the number of warm days and nights *(7)*. This trend will continue with global average increase in temperature of 1.5 and 2.0°C *(4)*. Moreover, in many regions with sufficient data, there is medium confidence that the length or number of warm spells or heatwaves has increased. Heatwaves can affect the performance of health care workers and can be dangerous to those who work outdoors, such as community health workers. Heatwaves demand more power, potentially generating power outbreaks. Workers and patients need to keep hydrated, resulting in an increased for water demand in the health facility for drinking and for keeping cool.

CHECKLIST FOR ASSESSING VULNERABILITY TO HEATWAVES

HEATWAVES		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
HEALTH WORKFORCE	**Is the health workforce,**			
	(Human resources)			
	equipped with a plan to identify and protect health workers at risk of heat stress?	☐	☐	☐
	provided with appropriate clothes (e.g. light, loose-fitting cotton clothes, and when necessary, a hat)?	☐	☐	☐
	provided with sunscreen, hat and plenty of drinking water for staff carrying out outdoor activities?	☐	☐	☐
	provided with safe water during a heatwave event and stimulated regularly for appropriate water intake?	☐	☐	☐
	provided with a cool space or a shower room for staff?	☐	☐	☐
	provided with an information system to manage occupational safety and health in the facility during a heatwave, including rest for staff?	☐	☐	☐
	(Capacity development)			
	trained on public health and climate change hazards, including health impacts related to heatwaves?	☐	☐	☐
	trained to manage hazardous waste (chemical, biological, radiological)?	☐	☐	☐
	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?	☐	☐	☐
	able to implement a contingency plan for public health emergencies, in case of high temperature effects, and water and food contamination?	☐	☐	☐
	trained and have specific and clear guidance on actions to reduce heat risk factors for staff?*	☐	☐	☐
	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)	☐	☐	☐
	(Communication and awareness raising)			
	aware about impacts of hot temperatures on human health via water quality and quantity (including water- and food-borne diseases) and air quality?	☐	☐	☐
	aware of the type of patients and symptoms expected during a heatwave?	☐	☐	☐

HEATWAVES	Vulnerability level		
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HEALTH WORKFORCE — **Is the health workforce,**			
informed on how to use and follow a surveillance system to track health outcomes?	☐	☐	☐
aware of the need to keep hydrated and wear appropriate clothing?	☐	☐	☐
provided with a community health educational programme to improve community health in the face of heatwave risks?	☐	☐	☐
aware of keeping the facility environment cool (e.g. keep windows that are exposed 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)?	☐	☐	☐
WASH AND HEALTH CARE WASTE — **Does the health care facility,**			
(Monitoring and assessment)			
verify water safety conditions, including updated risk assessments to map water resources and water supplies for the facility?*	☐	☐	☐
have an evaluation system to monitor its water system or supply before, during and after the event?	☐	☐	☐
have information on the water system installation that ensures lower risk of being contaminated?	☐	☐	☐
have a quality monitoring plan for water meant for human consumption?	☐	☐	☐
have a monitoring plan for potable water?*	☐	☐	☐
(Risk management)			
have a water management plan to identify water contamination?	☐	☐	☐
have onsite water purification equipment to provide safe drinking water?	☐	☐	☐
provide sufficient drinking-water to staff, patients and visitors?*	☐	☐	☐
keep drinking water cool or refrigerated where possible for staff, patients and visitors?	☐	☐	☐
have a contingency plan for monitoring and reducing contaminant concentrations in the facility water system supplies?*	☐	☐	☐
have water storage protected from direct sunlight?	☐	☐	☐
have water storage tanks with appropriate covers to protect from excessive heat?	☐	☐	☐
have chemicals stored away from excessive heat?*	☐	☐	☐
have health care waste stored away from excessive heat in cool and covered spaces?	☐	☐	☐
(Health and safety regulation)			
work with water utility agencies to prevent suspension of services?	☐	☐	☐
have an alternative source of water supply?*	☐	☐	☐
have a water safety plan in place, in case of water contamination?	☐	☐	☐
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?	☐	☐	☐
have a contingency plan to ensure effective and timely delivery of safe water during extreme temperatures and emergencies over the short- and long-term?*	☐	☐	☐
have a cross-sectoral water management plan to conserve and protect local or alternative water sources?	☐	☐	☐

HEATWAVES

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

HEATWAVES

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Low: prepared; able to respond (Lower risk)

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

HEATWAVES		Vulnerability level		
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INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES	**Does the health care facility,**			
	have measures that improve health performance, based on a history of climate variability in the region or locality?	☐	☐	☐
	perform evaluations to predict heatwave conditions 1–5 days in advance?	☐	☐	☐
	coordinate public broadcasts of information about the anticipated timing, severity and duration of heatwave conditions in its surrounding communities?	☐	☐	☐
	(Sustainability of health care facility operations)			
	have a defined and sustained budget as part of core budgeting for emergency preparedness and response to heatwaves?	☐	☐	☐
	improve adaptive governance capacity regarding evaluation and measures for risk identification, risk reduction and response?	☐	☐	☐
	assess the length of time people can remain in a place before it gets overheated, requiring evacuation to another facility?	☐	☐	☐
	have a thermal stress device to assess temperature and identify heat warning environment?	☐	☐	☐
	have trees and leafy plants near windows to provide natural cooling?	☐	☐	☐
	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?	☐	☐	☐
	have a coordinated plan with health municipal department heads to ensure appropriate preparations for ongoing heatwave conditions?*	☐	☐	☐

Note: For WASH and health care waste details see WASH FIT (3).

**For further details see Hospital Safety Index (2).*

IMPACTS CHECKLIST FOR HEATWAVES

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

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

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

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

Sources for tables of vulnerabilities and impacts: (2,3,8,21,33,41,44–47,52–55).

HEATWAVES: PROPOSED ACTIONS TO RESPOND TO THE IDENTIFIED IMPACTS

Health workforce
WASH and health care waste
Energy
Infrastructure, technologies, products and processes