

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.

WILDFIRES

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					

WILDFIRES: 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,			
<i>(Human resources)</i>			
equipped with an alternative action plan for the health workforce with outdoor functions to avoid or limit their outdoor activity to avoid smoke and ash exposure (e.g. focusing on only performing high priority tasks, with workers' protection measures in place)?	☐	☐	☐
equipped with a plan to identify and protect health workers at risk of smoke and ash exposure, and heat stress?	☐	☐	☐
prepared with clear guidance on actions to reduce heat and respiratory risk factors for staff, and find alternative human resources?	☐	☐	☐
provided with a cool space and a shower room to offer cooling options for staff?	☐	☐	☐
provided with special care assistance to treat eye and skin irritation, diseases related to hot temperatures, air pollution and ash and smoke exposure, as well as for mental stress, and chronic respiratory and cardiovascular diseases?	☐	☐	☐
equipped with a contingency plan for limiting workers' smoke and ash exposure, including postponing or shortening time spent outdoors, relocating workers or rescheduling work tasks to areas or times of the day that are smoke-free or have less smoke; as well as encouraging and ensuring workers take frequent breaks inside clean air spaces (e.g. enclosed structures or vehicles with windows closed and in recirculating air mode)?	☐	☐	☐
prepared with clear messages on reduction measures for short- and long-term exposures to indoor and outdoor air pollution and smoke (e.g. providing cleaner air spaces; using respirator masks; reducing outdoor activities; setting air conditioners to recirculation mode where safe; avoiding the use of exhaust fans in the kitchen, bathroom, clothes dryer and other facility rooms with exhaust fans)?	☐	☐	☐
provided with adequate personal protective equipment, especially for cleaners (respirator masks (fitting N-95 respirator [#]), leather gloves, safety glasses or goggles, clothes (long-sleeved shirts and long pants), and shoes with rugged soles)?*	☐	☐	☐
<i>(Capacity development)</i>			
trained in public health climate change matters related to wildfire impacts on human health?	☐	☐	☐
trained to an appropriate standard to maintain the correct level of safety of electrical power supply, in both routine and emergency/disaster situations?*	☐	☐	☐
prepared and trained on a contingency plan for rapid increase in health workforce respiratory and cardiovascular problems, increased temperatures, and smoke and ash exposures?	☐	☐	☐

provided with a mechanism to learn about air pollution advisories and warnings, including air quality monitoring information?	☐	☐	☐
equipped with knowledge, experience, training and resources to manage emergency preparedness and response measures to reduce wildfire risks and impacts?	☐	☐	☐
<i>(Communication and awareness raising)</i>			
aware about the potential risks and impacts of wildfire on human health due to poor air quality?	☐	☐	☐
aware about keeping the facility environment cool where possible (e.g. close windows and doors; seal large gaps as much as possible; close curtains that receive morning or afternoon sun; turn off nonessential lights and electrical equipment; sleep or rest in a cooler room)?	☐	☐	☐
provided with guidance to perform risk assessments (including vulnerabilities and exposures) to support the identification, planning, monitoring and evaluation of risk reduction and adaptation strategies to reduce direct and indirect impacts of wildfires?	☐	☐	☐
aware that to prevent overheating they must use cool compresses, misting, showers and drink plenty of water?	☐	☐	☐
aware of appropriate strategies to reduce smoke exposure during evacuation, when necessary because of danger from fires?	☐	☐	☐
aware of wearing tight-fitting respirators to filter ash particles from the air to protect lungs (e.g. N95 respirator mask*), particularly for cleaners and outdoor workers?	☐	☐	☐
aware of wearing gloves, long-sleeved shirts, long pants, shoes, socks and goggles to avoid skin contact (e.g. contact with wet ash can cause chemical burns or skin irritation), particularly among cleaners?	☐	☐	☐
aware of having to change shoes and clothing before leaving a clean-up site to avoid taking ash offsite?	☐	☐	☐
aware of not bringing food or eating at the affected site (and keeping food in a sealed container) and washing hands well before eating?	☐	☐	☐
# Note: surgical masks and one-strap dust masks will not protect lungs.			

WATER, SANITATION AND HEALTH CARE WASTE		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>(Monitoring and assessment)</i>				
have information on water system installation, such as deep tubewells and pipe materials that ensure low risk of contamination?	☐	☐	☐	☐
verify water safety conditions, which include updated risk assessments to map water resources and water supplies for the facility?*	☐	☐	☐	☐
monitor the water distribution system for fire-related pollutants?	☐	☐	☐	☐
map risks to water and sanitation infrastructures to identify where services could be disrupted by wildfires and water scarcity?	☐	☐	☐	☐
have a quality monitoring plan for potable water?*	☐	☐	☐	☐
<i>(Risk management)</i>				
have direct communication with water providers to ensure that water supply is safe to drink?	☐	☐	☐	☐
have a water management plan to identify water contamination?*	☐	☐	☐	☐
have water treatment equipment and materials in sufficient quantity to provide potable water?	☐	☐	☐	☐
have a contingency plan for monitoring and reducing contaminant concentrations in the facility's water supply system?	☐	☐	☐	☐
keep drinking water cool or refrigerated where possible for staff, patients and visitors?	☐	☐	☐	☐
provide sufficient drinking water for staff, patients and visitors?*	☐	☐	☐	☐
have water storage tanks with appropriate covers to protect from excessive heat?*	☐	☐	☐	☐
have chemicals stored away from excessive heat?	☐	☐	☐	☐
<i>(Health and safety regulation)</i>				
have a water management plan to protect the water supply and alternative water sources from contamination by wildfire particles?	☐	☐	☐	☐
work with water utility agencies to prevent suspension of services?	☐	☐	☐	☐
have an alternative source of water supply?*	☐	☐	☐	☐
have additional water treatment and storage capacity to account for interruption, quality and quantity?	☐	☐	☐	☐
have a quality monitoring plan for water meant for human consumption?	☐	☐	☐	☐
have a contingency plan to ensure effective and timely delivery of safe water during a wildfire and emergencies over the short- and long-term?*	☐	☐	☐	☐
have a cross-sectoral water management plan to conserve and protect local or alternative water sources?	☐	☐	☐	☐

ENERGY	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>(Monitoring and assessment)</i>			
regularly assess its energy system to ensure it can cope with conditions of heat?*	☐	☐	☐
have an emergency backup generator (including fuel, where relevant) that is able to cover at least all critical service areas and equipment during and after the event?*	☐	☐	☐
periodically check the emergency backup generator (including fuel, where relevant)?*	☐	☐	☐
assess heating, ventilation and air conditioning ductwork pipes to ensure good functioning to cope with wildfire impacts?*	☐	☐	☐
assess whether renewable energy (if available, such as solar) is sufficient to power critical equipment?	☐	☐	☐
<i>(Risk management)</i>			
have a secure place to protect the backup generator (including fuel or battery storage, where relevant) from fire?*	☐	☐	☐
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 an emergency?	☐	☐	☐
have a clear guidance to alert staff on safety measures, (e.g. never restore power when the power is off, until a professional inspects and ensures the integrity of the electrical system; do not use electrical equipment that has been exposed to heat from a fire until checked by an electrician; use extreme caution when equipment is moved near overhead power lines; do not stand or work in areas with thick smoke (smoke hides electrical lines and equipment)?	☐	☐	☐
have a clear guidance on heat-risk management for the maintenance of critical infrastructure (e.g. air conditioning, medical devices, computers, diagnostic equipment, boiling water)?*	☐	☐	☐
<i>(Health and safety regulation)</i>			
have an emergency plan for power outages in the short- and long-term?	☐	☐	☐
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 generator backup or renewable energy sources (e.g. solar, wind power, small-scale hydroelectric power plants) that can be used for water pumping?	☐	☐	☐
have an emergency plan to ensure availability of adequate lighting, communication and information systems, and refrigeration and sterilization equipment during a wildfire?*	☐	☐	☐
have a plan to evacuate patients to a cooling station if the facility has lost power and has no other sources of energy?	☐	☐	☐

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>			
work with the local government to support vulnerable local populations to actively participate in risk reduction management, policy making, planning and implementation?	☐	☐	☐
provide advocacy on health workforce education to cover climate change wildfire risks and responses?	☐	☐	☐
have a monitoring and early warning system integrated with other areas to manage risk reduction?*	☐	☐	☐
have an indoor air quality contingency plan in place for hazard-reduction burning, before the start of the fire season, as well as during and after a wildfire to assist in planning and decision-making?	☐	☐	☐
in their annual planning consider how climate risks may change in the future?	☐	☐	☐
have a mechanism in place to filter indoor and ambient air pollutants?	☐	☐	☐
review building code design baselines against wildfire, wind speeds, high temperature, smoke to assess each risk?	☐	☐	☐
map the location of the building relative to wildfire hazards?	☐	☐	☐
assess the performance and vulnerabilities of each critical part of the facility (structural and nonstructural elements) that can be affected by high temperatures and smoke from wildfire hazards?	☐	☐	☐
utilize the assessed information as a basis to plan and prioritize measures to reduce risk impact?	☐	☐	☐
have a coordinated mechanism across the health sector at different levels of government, to manage the responses and risks of public health emergencies and disasters (including sharing of resources and supplies, transferring of patients, and health workforce support)?*	☐	☐	☐
have a safe space within or external to the facility for the storage and stockpiling of additional supplies, considering ease of access, security, temperature, ventilation, light and smoke exposure and humidity?	☐	☐	☐
have a contingency plan in place for safe and efficient personnel evacuation (including health staff and patients)?*	☐	☐	☐
have a plan to transfer critical equipment and medical supplies to another place or to a cool storage to avoid or reduce damage?	☐	☐	☐
regularly monitor air quality (temperature and humidity), especially during and after wildfire exposures?	☐	☐	☐
have available appropriate air filters in indoor working areas to reduce overall smoke and dust exposure?	☐	☐	☐
assess if the filters of the heating, ventilating and air conditioning systems are not dirty, damaged, dislodged or leaking around the edges, before the wildfire season and during smoke events to ensure necessary repairs and appropriate maintenance?*	☐	☐	☐

have appropriate portable air cleaners to reduce indoor particle levels?	☐	☐	☐
have appropriate ceiling fans or portable fans for room cooling?	☐	☐	☐
have a management plan for the use of personal protective equipment for wildfires in the medical stockpile?	☐	☐	☐
maintain partnerships with key partners and stakeholders (e.g. air quality agencies, local health providers, health departments, fire department, land management agencies, and others) for effective wildfire response and recovery?	☐	☐	☐
<i>(Promotion of new systems and technologies)</i>			
have an information system between the health sector and meteorological services, and other relevant sectors, to communicate about the risks of wildfires, or hazard-reduction burning, and expected number of hot and smoky days?*	☐	☐	☐
monitor information alerts from local announcements, air quality forecasts, and changing smoke conditions?	☐	☐	☐
have emergency plan and procedures in place related to wildfire effects (such as hot temperature, air pollution, smoke, ash) on the facility,?	☐	☐	☐
have reliable communication and information systems to facilitate measures to avoid or reduce impacts from wildfire hazard?*	☐	☐	☐
have established, clear and consistent knowledge transfer procedures in case of a public health emergency?*	☐	☐	☐
have an established plan to review, evaluate and catalogue risks related to wildfires for the health care facility supply chain?*	☐	☐	☐
have a calibrated carbon monoxide alarm with a digital display and battery backup function to identify air contamination?	☐	☐	☐
<i>(Sustainability of health care facility operations)</i>			
offer a pleasant cool and protected environment that can avoid any kind of stress from high temperatures and smoke?	☐	☐	☐
have adaptive governance capacity regarding evaluation and measures for risk identification, risk reduction and response?	☐	☐	☐
have established partnerships between the facility, community and local authorities to reduce vulnerabilities in the surrounding areas?	☐	☐	☐
store chemical materials away from excessive heat or wildfires?*	☐	☐	☐
have arrangements to transfer patients to temporary safe shelters?*	☐	☐	☐
assess the length of time people (including health workforce and patients) can remain in place before evacuating?	☐	☐	☐
have a clean-up plan with appropriate measures to avoid contamination and stir up ash in the air (e.g. store in plastic bags or other containers to prevent stirring up; avoid washing ash into storm drains; use a high-efficiency particulate air vacuum to clean dusty surfaces; avoid stirring up or sifting through ash)?	☐	☐	☐
have a trained and prepared team or a dedicated person for occupational health and safety, to manage hazards (e.g. providing respirator masks that are appropriate for the hazard and work situation; medical evaluation for safe respirator use; fit testing for tight-fitting respirators; training on topics such as how to use and maintain respirator masks; and programme evaluation)?	☐	☐	☐
have a secure plan to ensure continuity of the facility's supply and delivery chain?	☐	☐	☐
have a safe location for fuel storage systems (e.g. gas, gasoline, diesel) or other protection measures in place?*	☐	☐	☐

*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)*.

WILDFIRES: checklist for assessing impacts

HEALTH WORKFORCE		
Level of impact		
MAJOR	MODERATE	MINOR
☐ High risk of disease or death from chronic respiratory and cardiovascular diseases ☐ Life-threatening or serious harm and injuries from burnt and unstable structures ☐ Increased risk of heat-related illnesses, including heat exhaustion, heat stroke and death ☐ Diseases requiring hospitalization or medical treatment specifically for those with pre-existing health conditions such as asthma, chronic pulmonary obstructive disease, diabetes, heart conditions and other cardiovascular diseases ☐ Loss of work capacity due to smoke, ash and high temperature ☐ Cessation of all programmes or service availability requiring relocating to other facilities ☐ Increased demand for medical visits or hospitalization for lung and heart diseases ☐ Effects on mental health of staff ☐ Health professionals are unable to arrive or depart from the facility building due to fire threat	☐ Increased threat to the health workforce resulting in physical injuries or intoxications from air pollution (smoke and ash, and from chemicals released into the air from burning of structures) ☐ Increased impacts of noncommunicable diseases (cardiovascular diseases, respiratory diseases), especially among pregnant women, older health workers and outdoor workers ☐ Increased threat of exposure to dust, ash and other products during clean-up operations, resulting in impacts on eyes, nose or skin irritation, coughing and other health effects ☐ Cessation of some programmes or service availability ☐ Significantly reduced performance capacity of the health workforce ☐ Reduced availability and capacity of health services ☐ Health workforce shortage due to reduced, or lack, of transport	☐ Minor injuries to health workers not requiring immediate medical treatment ☐ Increased discomfort to health workers and patients due to air pollution and higher temperatures ☐ Difficulty or interruption in delivering services, including primary care services at home ☐ Emotional stress and mental and physical fatigue ☐ Reduction of health workforce functions

WASH AND HEALTH CARE WASTE		
Level of impact		
MAJOR	MODERATE	MINOR
☐ Degradation of water quality from forested catchment areas ☐ Disruption of the water system supply ☐ Shortage of safe water ☐ Possible interruption of water pumping due to power outages ☐ Increased demand for water causing water shortage ☐ Water contamination (from wildfire ash, dead animals, fire retardants, or damaged water pipes) ☐ Reduced capacity to use medical and laboratorial equipment that require potable water	☐ Possible degradation of drinking water treatment plants ☐ Likely unsafe water supply ☐ Reduced function of sanitation systems and hygiene practices ☐ Reduced capacity to use laundry and dishwashing machines ☐ Reduced capacity for accessing water for drinking and cooking ☐ Increased dependence on less safe water sources ☐ Damage to plastic pipes lying close to the surface	☐ Increased demand for drinking water for health workers, especially for those that have outdoor activities ☐ Changes in demand of water use ☐ Minor disruption of health care deliveries

ENERGY		
Level of impact		
MAJOR	MODERATE	MINOR
☐ Interruption of power (if electricity supplies are deliberately disconnected for safety reasons, or as a direct result of the fire) ☐ Interruption of medical procedures that rely on electricity, such as dialysis, intensive care rooms, laboratories, oxygen therapy, radiotherapy, imaging and diagnostic equipment) ☐ Disruption of safe storage of medicines, vaccines and other essential refrigeration-dependent medical supplies ☐ Loss of medical and laboratorial supplies, vaccines, pharmaceuticals, milk, blood bank supplies, and other essential refrigeration-dependent medical supplies ☐ Disruption of fuel supply chain ☐ Disruption of energy-dependent water pumping and treatment	☐ Intermittent access to electricity leading to damage of medical and laboratorial equipment and devices ☐ Loss of alternative energy sources (such as power generators) ☐ Threats to stored fuels ☐ Increased demand for energy consumption from air conditioning ☐ Reduced capacity to provide health care that relies on electricity, such as dialysis equipment, intensive treatment rooms, laboratorial rooms, oxygen therapy, radiotherapy, imaging and diagnostic equipment ☐ Reduced capacity to use critical medical devices ☐ Increased general demand for energy consumption ☐ Increased energy use and costs	☐ Difficulty to provide thermal control causing increasing discomfort to health workers and patients ☐ Loss of food or difficulty in keeping food refrigerated ☐ Reduced capacity to use medical devices that rely on energy ☐ Possible downed/damaged power poles with potentially energized power lines, increasing the risk of electrocution ☐ Reduced capacity to provide cleaning and disinfection services that require electricity (laundry, dishwashing machines, autoclave, microwave) ☐ Difficulty following boil water alerts

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES		
Level of impact		
MAJOR	MODERATE	MINOR
☐ Fire damage to the premises ☐ Interruption of the supply chain for essential medical and laboratorial supplies ☐ Damage to medical and laboratorial equipment and devices (refrigeration of vaccines and some medications, sterilization processes, diagnosis and therapy equipment) ☐ Damage to communication and information systems ☐ Increase in cardiovascular and respiratory problems, burns, and complex emergencies, overwhelming the capacity of the facility ☐ Increasing indoor air contamination from smoke, threatening the health of patients and staff	☐ Increased hospitalization rates requiring extra medical treatment, supplies and health workforce ☐ Possible indoor air pollution ☐ Possible indoor higher temperature ☐ Increased demand for medication dispensations for respiratory problems (asthma, bronchitis, chest pain, COPD, respiratory infections and cardiovascular diseases) ☐ Increased hospitalization rates requiring extra medical supplies and health workforce ☐ Increased demand for cooling areas and rest areas for staff	☐ Increased demand for conducting coordinated strategies with health departments, other sectors, fire department and volunteers ☐ Increased demand for adaptation measures and plans to reduce heat effects, and smoke and ash exposure to the facility ☐ Increased costs for providing safety measures ☐ Disruption of food supplies ☐ Melted roadways disrupting transportation access ☐ Interruption of the supply chain including fans and air conditioning units

WILDFIRES: proposed response actions

[illegible]