

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.

STORMS




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					

STORMS: checklist for assessing vulnerabilities

WORKFORCE	Vulnerability level		
	High	Medium	Low
High: unprepared; unable to respond (Higher risk)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medium: basic or incomplete preparation; low level of response (Medium risk)			
Low: prepared; able to respond (Lower risk)			
<i>Is the health workforce,</i>			
<i>(Human resources)</i>			
provided with programmes for supporting staff with regards to mental health, injuries, medical treatment and related support measures?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with an emergency plan for shift relay or replacement of health professionals to ensure that staff get adequate rest after their high-demand duties from a severe storm event?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prepared with a contingency plan for accessing additional health workforce to strengthen performance capacity?*	<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 storm?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with an emergency plan to protect health workers from multiple biological and chemical hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with a poststorm employee recovery assistance programme according to staff needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with a coordinated plan, including volunteers on stand-by, to assist during an emergency or to support health professionals?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with full personal protective equipment, especially for clean-up crews (including waterproof safety boots, goggles, work gloves and masks)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provided with safe water and food during an event?	<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 different kinds of storms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with knowledge, experience, training and resources to manage storm risk reduction at the facility and in the local communities?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
engaged in the development of plans and responses to storm risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prepared and able to implement risk reduction actions for protecting themselves?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with a contingency plan for continuing to provide services at other facilities or in the local communities (health primary care), if necessary?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained to manage hazardous chemicals in emergency situations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained in multihazard assessments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained to maintain correct level of water quality controls in an emergency or disaster situations?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
trained to an appropriate standard to maintain the correct level of safety of electrical power supply, in both routine and emergency/disaster situations?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

trained to detect posttraumatic stress disorder among staff to take prompt action?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Communication and awareness raising)</i>			
provided with a safe internal communication system, specially in emergency situations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
aware of contingency plans for accessing and leaving the facility during flood and strong wind emergencies, and health workforce transportation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
regularly participating in community disaster planning committees to: improve knowledge on how to reduce risks, be prepared and respond to storm hazards, and recover better than before through adaptation measures?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prepared with clear messaging about water and food safety during and after a storm?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
prepared with clear messaging, and staff trained on exit and evacuation routes that are clearly marked and free of obstacles to enable emergency evacuation?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with a community health educational programme to assist the community in reducing vulnerability to storm impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equipped with a community health educational programme to improve community health in the face of storm risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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,

(Monitoring and assessment)

assess the capacity of the existing stormwater management system, to ensure adequacy for anticipated 50- or 100-year storm events today?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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"/>
regularly assess its sanitation systems for any possible damage in the event of storms and severe winds?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have information on water system installation that ensures lower risk of contamination?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a water quality monitoring plan for drinking water during and after the event?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
monitor sewer overflows to fix pumps in advance of a storm and after the event?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Risk management)

have a stormwater management system able to cope with storm-caused floods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a stormwater management system to avoid standing water near the facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
store hazardous chemicals, radioactive and biological wastes in a safe place and on a level above the ground floor?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

have a schedule for emptying latrines in advance of storms to avoid overflows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have water storage tanks supported and anchored to resist strong winds and rainfall?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a safe system for waste disposal after a storm?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an established safe management approach to health care waste transport (including hazardous waste) during and after a storm?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
provide appropriate covers for water storage tanks to prevent damage and 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"/>
have nonreturn valves installed on water supply pipes to prevent backflows, in case of flooding?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a surveillance system for diseases related to water quality and sanitation?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Health and safety regulation)</i>			
have an assessment plan that maps risks to water and sanitation infrastructures to identify where services could be disrupted during storms, floods and landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an emergency water supply plan?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan to verify safety conditions and proper functioning of all elements of the water distribution system, including storage tanks, cisterns, valves, pipes and connections, as well as water disinfection to avoid or reduce impacts from a storm?*	<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 an emergency plan for maintenance and restoration of waste management systems?*	<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 that it can cope with storm events and minimize their impacts (e.g. solar photovoltaic panels, either rooftop or ground mounted)?	<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 and after the event?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
periodically check emergency backup generators (including fuel, where relevant)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
identify priority areas within the facility which would require emergency power when needed?	<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"/>
<i>(Risk management)</i>			
have a secure place to protect the backup generator (e.g. elevated and anchored in areas prone to floods and strong winds; 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 a power outage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have power-operated doors that can be opened manually to permit exit during power failure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 flood waters until checked by an electrician; unless power is off, never enter flooded areas or touch electrical equipment if the ground is wet)?	<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 (before, during and after a storm)?	<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 a plan or regulation to determine ways to reduce overall energy use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an emergency plan to ensure availability of adequate lighting, communication and information systems, as well as refrigeration and sterilization equipment during a storm?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES	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>(Adaptation of current systems and infrastructures)</i>			
have knowledge, experience (considering previous damages) and resources (including human, material, financial, supplies chain and logistics) to reduce disaster risk related to storms?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
work with the local government to support vulnerable local populations to actively participate in risk reduction management, policy making, planning and implementation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
conduct climate risk and vulnerability assessments for all facility sectors to identify risk scenarios, vulnerabilities and the facility's response capacity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a monitoring and early warning system to manage and reduce the risks of storm-related health effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
utilize the assessed information as a basis to plan and prioritize measures to reduce risk impact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
in their annual planning consider how climate risks may change in the future?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have resources available to adopt risk reduction measures on the building and its infrastructure, technologies, products and processes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
regularly update these assessments, considering emerging scientific information?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a schedule to inspect the facility regularly, both internally and externally, for signs of deterioration (e.g. broken plaster, cracks or sinking structural elements) to avoid or reduce storm impacts (including flood impacts)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
evaluate the condition and safety of structural and nonstructural elements of the facility, impacted by previous exposures to storms or similar hazards?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an effective emergency risk communication plan to reduce risks and impacts for health workers and patients?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a contingency plan in place for safe and efficient personnel evacuation (including health staff and patients) before, during and following a storm?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan to transfer critical equipment and medical supplies to another health care facility or to a secure storage?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan for relocating medical devices, medicines, mobile equipment and other supplies and services in case of operational disruption or outbreaks and epidemics that overwhelm the facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have evaluation tools (e.g. forms) to identify damages and minimum needs in terms of health workers and medical supplies to ensure continuous functioning of services?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a mechanism for providing prompt maintenance and repair of equipments required for essential services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have procedures to store food and bottled water on shelves that will be safely out of the way of contaminated water in case of flooding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have established procedures or plans for procuring, transporting and storing bottled water and food supplies during an emergency?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have established procedures for procuring, and safely transporting and storing medical devices, vaccines, pharmaceuticals, parenteral nutrition and blood supplies,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

laboratorial supplies, and other essential medical supplies?			
assess the performance and vulnerabilities of each critical part of the facility (structural and nonstructural elements) that can be affected by storm hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
calculate possible losses and implement measures to reduce impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan to house staff at the health care facility if shelter in place is required (sleeping rooms, food, water)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have roof drainage systems and adequate capacity in the event of excessive rainfall?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have roofs that are leak-proof and insulated?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have safe roofing designed to withstand wind velocity of 175-250 kph (e.g. in a high intensity tropical storm)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have rooftop structures and equipment which have been reviewed for anticipated storm and high wind speeds?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have machine rooms that are resistant to flooding or high wind/rooftop damage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have stairwell construction fortified against high-wind events?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have measures in place to remove mosquito breeding sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have glass walls, doors and windows able to resist basic wind speeds up to 200-250 kph?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have laminated or protected glass windows to prevent risk of shattering during a storm?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have leak proof windows and doors with wind protection devices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have walls that are protected and insulated against moisture and mold?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ensure removal of equipment and power supplies from basements and ground floor level to avoid damage from flooding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have health care agreements with other health care providers for additional health services and clinical resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a coordinated mechanism across the health sector in different levels of government, to manage the response and risks of public health emergencies and disasters (including sharing of resources and supplies, transferring of patients, and health workforce support)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a plan on continuity of operational processes during a storm and for building back better through training and workshops?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
conduct site and building maintenance procedures that include specifications on how the weather may affect the safety and continued functioning of the facility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a space within or external to the facility for the storage and stockpiling of additional supplies, considering ease of access, security, temperature, ventilation, light exposure and humidity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an established poststorm recovery plan for all infrastructure (structural and nonstructural elements) of the facility?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Promotion of new systems and technologies)</i>			
have an information system between the health sector and meteorological services to communicate about climate hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an established plan to review, evaluate and catalogue climate risks related to storms for the health care facility location?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an established plan to review, evaluate and catalogue risks related to storms for the health care facility supply chain?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an established, clear and consistent knowledge transfer procedure in case of a public health emergency?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have electronic patient health records to make available to other receiving facilities in case of evacuation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ensure information and communication flow between the health workforce and policy makers, particularly during high-stress situations and demands created by emergencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have information and communication systems safely secured with backup arrangement (via cloud, satellite) to satisfy the facility's demand?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an information system for tracking and monitoring diseases following storm events?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have more than one access route, especially if the facility is critical to higher demand following a storm event?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>(Sustainability of health care facility operations)</i>			
review building code design baselines against storm, wind speeds, rainfall volumes, and map each risk?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a defined and sustained budget as part of core budgeting for emergency preparedness and response, including for storm hazards?*	<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"/>
have trees planted in a secure place that will not block access to the facility or fall on the building during an event?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have established partnerships between the facility, community and local authorities to identify and reduce vulnerabilities in the surrounding areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have an access route for public transportation which is likely to remain operational during or immediately following a storm event?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a secure storage for critical chemicals and materials to avoid their damage or release during or following a storm event?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have estimates of the consumption of essential medical, pharmaceutical, nutritional and laboratorial supplies, personal protective equipment, food, etc. (such as amount used per week), using the most likely storm scenario (including flood impact)?*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
undertake risk assessments of the supply chain for essential medical and nonmedical products?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have a secure plan to ensure continuity of the facility's supply and delivery chain?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have secure access to essential backup services such as sterilization, laundry and cleaning services, via multiple agreements with different facilities to maintain functioning of critical services during or immediately following a storm event?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
have secure access to essential backup food sources via multiple agreements with different vendors and through cooperative agreements with other health care facilities to maintain functioning of critical services?*	<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).

STORMS: checklist for assessing impacts

HEALTH WORKFORCE		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Deaths, life-threatening injuries or illness among health workers <input type="checkbox"/> Loss of work capacity <input type="checkbox"/> Cessation of critical programmes or service availability with possible overflow to other locations <input type="checkbox"/> Significantly reduced performance capacity of health workforce; needing additional support (local, regional or national) <input type="checkbox"/> Increased risks of occupational hazards, including water-, food- and vector-borne diseases, animal bites, electrical shocks and hazardous chemicals exposure <input type="checkbox"/> Increased health care demand for infectious diseases (water-, food- and vector-borne diseases), animal bites (including poisonous animals), noncommunicable diseases, and toxic chemicals exposure, increasing health workforce overload and availability <input type="checkbox"/> Increased work overload with stress	<input type="checkbox"/> Serious harm, injury or illness causing hospitalization and medical treatment <input type="checkbox"/> Health professionals not able to arrive at or depart from the health care facility <input type="checkbox"/> Reduction of health workforce functions <input type="checkbox"/> Restrictions to the provision of some health care services and programmes <input type="checkbox"/> Effects on mental health due to disaster trauma resulting in diminishing ability to provide adequate care to patients <input type="checkbox"/> Increased respiratory diseases from dust storms	<input type="checkbox"/> Minor injuries to health workers requiring minimal or short-term medical treatment <input type="checkbox"/> Difficulty in providing medications and home primary services to the communities <input type="checkbox"/> Reduced functioning of health workers if the facility lacks a plan to respond to overcrowding of patients and visitors <input type="checkbox"/> Service delivery and programme delays

WASH AND HEALTH CARE WASTE		
Level of impact		
MAJOR	MODERATE	MINOR
<ul style="list-style-type: none"> <input type="checkbox"/> Overflow of storm water and wastewater containment systems leading to surpassing the capacity of water treatment and distribution systems <input type="checkbox"/> Severe damage to water supply system and infrastructure <input type="checkbox"/> Severe disruption of wastewater and sewage systems <input type="checkbox"/> Heavy rainfall risks the flushing of pathogens into water sources <input type="checkbox"/> Large-scale water contamination <input type="checkbox"/> Shortage of safe water <input type="checkbox"/> No access to drinking water <input type="checkbox"/> Unable to provide sanitation and hygiene services <input type="checkbox"/> Damage to waste storage causing environmental contamination from biological and chemical hazards <input type="checkbox"/> Sharps containers and specific biological and medical bins damaged, potentially releasing hazardous materials <input type="checkbox"/> Increased risk of contamination of medical devices, instruments and equipment, and other medical supplies 	<ul style="list-style-type: none"> <input type="checkbox"/> Increased health workforce infections from water and health care waste contamination <input type="checkbox"/> Reduced capacity to provide efficient clean services (floor, toilets, patient rooms, emergency room and other rooms in the facility) <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, etc.) <input type="checkbox"/> Damaged sewage systems causing cross-contamination <input type="checkbox"/> Possible damage to emergency water sources <input type="checkbox"/> Increased nutrient loads <input type="checkbox"/> Possible overflow of effluents into streams and rivers if surface water enters septic tanks <input type="checkbox"/> Increased possibility of contamination of groundwater due to infiltration of pollutants (including during dust or sand storms) 	<ul style="list-style-type: none"> <input type="checkbox"/> Reduced access to water for health care practices <input type="checkbox"/> Reduced hygiene capacity (flush toilets, showers, etc.) <input type="checkbox"/> Reduced capacity for using laundry and dishwashing machines <input type="checkbox"/> Heavy sediment and pollution loads that make treatment ineffective <input type="checkbox"/> Increased risk of breakdown of final waste collection and transportation systems within/outside the health care facilities

ENERGY		
Level of impact		
MAJOR	MODERATE	MINOR
<ul style="list-style-type: none"> <input type="checkbox"/> Power outage (wind- and lightning-related) <input type="checkbox"/> Interruption of acute medical care or other health services that rely on electricity (such as dialysis, intensive treatment rooms, oxygen therapy, radiotherapy, laboratory room, imaging and diagnostic equipment, and other areas) <input type="checkbox"/> Loss of vaccines, laboratorial supplies, pharmaceuticals, drugs, milk, parenteral nutrition and blood supplies, and other essential refrigeration-dependent medical supplies <input type="checkbox"/> Disruption of the fuel supply chain <input type="checkbox"/> Damage to solar photovoltaic panels or other energy sources <input type="checkbox"/> Disruption of energy-dependent water pumping and treatment systems 	<ul style="list-style-type: none"> <input type="checkbox"/> Difficulty in providing health care services (such as dialysis, intensive care rooms, oxygen therapy, radiotherapy, imaging and diagnostic equipments), resulting in patients being transported to other facilities <input type="checkbox"/> Reduced capacity to provide cleaning services that need electricity (laundry, dishwashing machines) <input type="checkbox"/> Reduced capacity to provide disinfection services that need electricity (autoclave, microwave) <input type="checkbox"/> Reduced electricity capacity resulting in loss of medical supplies and decrease in health care services <input type="checkbox"/> Possible damage to the emergency generator or other sources of energy 	<ul style="list-style-type: none"> <input type="checkbox"/> No ambient cooling, thereby increasing staff and patient discomfort <input type="checkbox"/> Loss of food or difficulty in keeping food refrigerated <input type="checkbox"/> Reduced capacity to follow boil water advisories

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES		
Level of impact		
MAJOR	MODERATE	MINOR
<input type="checkbox"/> Direct damage to infrastructure (water storage tanks, roofs) from high winds <input type="checkbox"/> Structural failure of the building <input type="checkbox"/> Disruption to building access <input type="checkbox"/> Damage to machine rooms <input type="checkbox"/> Damage to communication and information systems and assets <input type="checkbox"/> Loss or damage of essential supplies (medications, treatments, medical devices, drugs, pharmaceuticals, vaccines, etc.) <input type="checkbox"/> Interruption of complex and emergency health care services (surgery, complex treatment, urgent health care, etc.) <input type="checkbox"/> Disruption of health care services and operations <input type="checkbox"/> Cessation of services or prolonged disruption of services due to loss or damage <input type="checkbox"/> Breakdown of routine health care services (such as ambulatory, immunization, maternity room, pharmacy, medication for chronic diseases, and other primary services) <input type="checkbox"/> Interruption of diagnosis due to equipment damages <input type="checkbox"/> Interruption of supply chains <input type="checkbox"/> Long-term effect on the environment, requiring external assistance/interventions <input type="checkbox"/> Damage to internal transportation systems (elevators, ramps, corridors, garage, etc.) <input type="checkbox"/> Increased treatment demand for infectious, cardiovascular and respiratory diseases Increase in complex and emergency health care services (complex treatments, outbreaks, etc.)	<input type="checkbox"/> Structural damage to the building <input type="checkbox"/> Damage to road, impairing access <input type="checkbox"/> Difficult to transport patients due to damaged or disabled transportation systems <input type="checkbox"/> Reduced capacity to deliver health care services due to damaged and reduced supplies <input type="checkbox"/> Temporary suspension of service deliveries <input type="checkbox"/> Damage to paper medical record storage <input type="checkbox"/> Reduced capacity to access clinical and laboratorial supplies <input type="checkbox"/> Impacts from trees falling on the facility causing damage to building infrastructure and injuries to people <input type="checkbox"/> Increased hospitalization rates requiring extra medical supplies and health workforce <input type="checkbox"/> Increased costs due to high demand of critical supplies during and after the event <input type="checkbox"/> Increased costs due to necessary financial investment in the recovery of facility infrastructure (structural and nonstructural), postevent	<input type="checkbox"/> Localized disruption of services with minor losses and damage <input type="checkbox"/> Damage or loss of documents and records <input type="checkbox"/> No lasting effect on the external environment of the facility <input type="checkbox"/> Minimal impact on local operations and equipment, without compromising health care service deliveries Minimal impact on the supply chain

STORMS: proposed response actions

HEALTH WORKFORCE

WASH AND HEALTH CARE WASTE

ENERGY

INFRASTRUCTURE, TECHNOLOGIES, PRODUCTS AND PROCESSES