



Climate change REsilience framework for health SYStems and hospiTALs

DA1.2 - [Capacity Assessment Matrix]

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Executive summary

This deliverable was produced as part of action A1.2 of the LIFE RESYSTAL project, which aims to assess the capacities and training needs of each pilot hospital. An adaptative capacity assessment matrix (or checklist) was designed. It covers the different dimensions of hospital's climate resilience: governance & leadership, crisis management, buildings and infrastructure. Interviews were then conducted with targeted members of the communities of practice of each hospital, and climate resilience capacity profiles were produced.

The deliverable comprises the following:

- A presentation of the methodological approach and steps followed for the assessment (including a literature review on existing capacity assessment methods specific for the health sector)
- The capacity assessment matrix
- The presentation of the different pilot hospitals' profiles
- A proposition of next steps



Table of content

Executive summary 3

Definition of the main concepts and their application to the health sector 6

Analytical framework and methodology 9

 Objectives of the climate resilience capacity assessment 9

 Scope of the assessment..... 9

 Geographic scope..... 9

 Thematic scope 10

 Temporal scope..... 10

Steps followed to conduct the assessment 10

 Step 1: Analysis of capacity assessment methodologies (October-November 2021) 10

 Step 2: Elaboration of the capacity assessment checklist (December 2021) 11

 Step 3: Data gathering through interviews and written responses (January-February 2022) 15

 Step 4: Drafting of the profiles and pf the report (March-May 2022)..... 15

Challenges and limitations 16

Climate Resilience Capacity Assessment Survey Questionnaire for Hospitals and other Healthcare Facilities 17

 Leadership, Governance and Data..... 17

 Buildings..... 20

 Green Infrastructure & Nature-Based Solutions 22

 Utilities 23

 Access to the hospital (Communication & Transportation) 26

 Emergency Preparedness & Management 27



Table of abbreviations	
Abbreviations	Meaning
ARS	Agence Régionale de Santé
CCA	Climate Change Adaptation
CH MILLAU	Hospital Center of Millau
CoP	Community of Practice
HCWHE	Health Care Without Harm Europe
NCSR	National Center for Scientific Research Demokritos
NHOSP	General State Hospital of Nikaia “Agios Panteleimon”
NGO	Non-Governmental Organization
PCAET	Local Climate, Air and Energy Action Plan
POLIBARI	University hospital complex of the polyclinic of Bari and the Giovanni XXIII hospital
RINA-C	RINA Consulting
SERGAS	Galician Health Service
UCAM	University of Cambridge



Definition of the main concepts and their application to the health sector

Adaptation: it is the process of adjustment to actual or expected climate. It refers to actions that reduce the negative impact of climate change, while taking advantage of potential new opportunities.

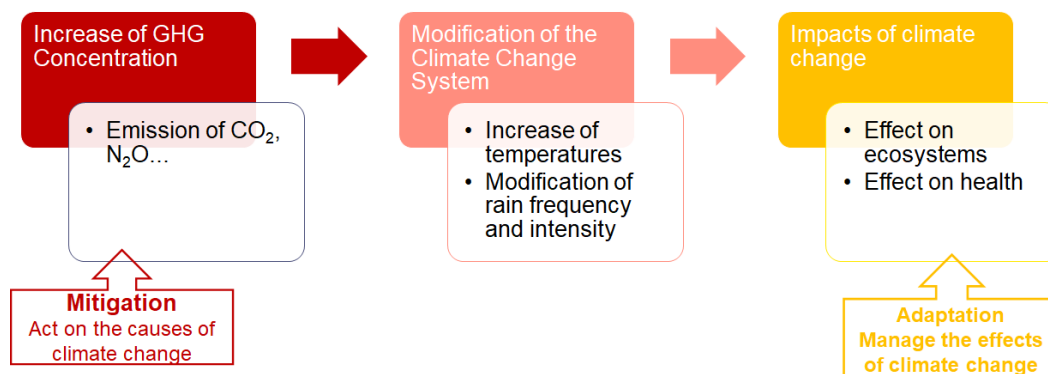


Figure 1 Mitigation vs. Adaptation

Health care facility: it refers to a hospital, clinic, outpost or institution that provides comprehensive medical care to a significant number of people in a given area.

Health system resilience: it is the capacity of health actors, institutions and populations to prepare for and effectively respond to crises; maintain core functions when a crisis hits; as well as stay informed through lessons learned during the crisis and reorganize if conditions require it¹.

¹ WHO (2020) WHO Guidance for Climate-Resilient and Environmentally Sustainable Healthcare Facilities.

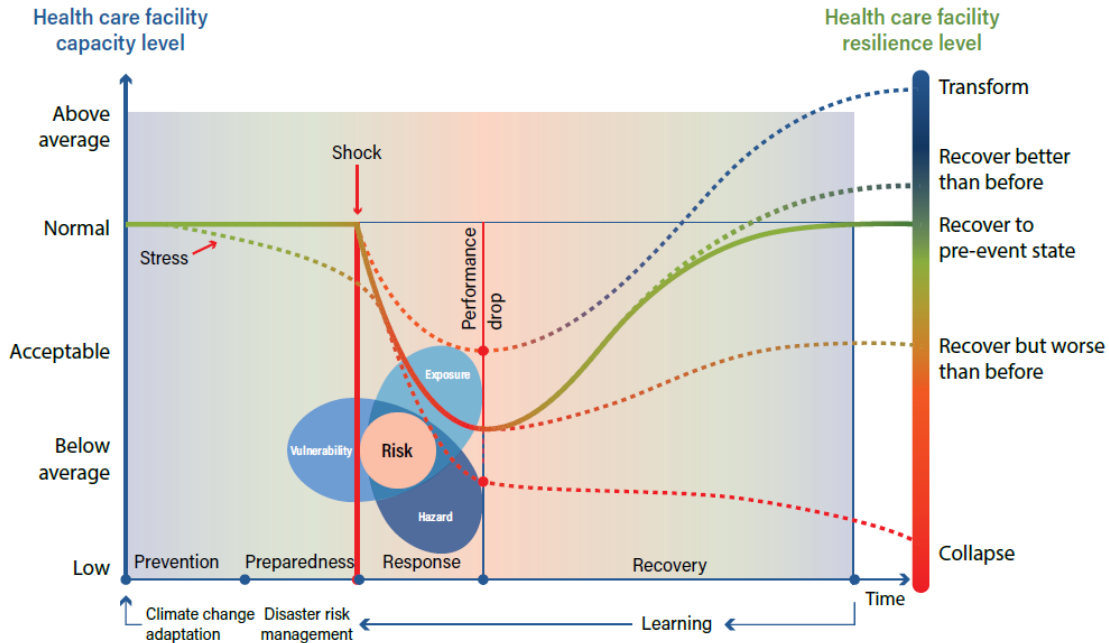


Figure 2 Health system resilience (Source: WHO Guidance for Climate-Resilient And Environmentally Sustainable Health Care Facilities, 2020)

Mitigation: It refers to the human intervention to reduce the sources or enhance the sinks of GHGs.

Coping Capacity: the ability of people, institutions, organizations, and systems, using available skills, values, beliefs, resources, and opportunities, to address, manage, and overcome adverse conditions in the short to medium term.

Adaptive (or Resilience) Capacity: Set of factors which determine the capacity of a system to generate and implement adaptation measures. Resilience Capacity and Adaptive Capacity are quasi-synonyms. For some people, they slightly differ in the sense that Resilience Capacity covers measures that deal with the management of crises and emergencies, while adaptation measures does not.

Hazard: The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage [...] and environmental resources.

Risk: Risk is often defined broadly as the effect of uncertainty on objectives. In the context of climate change, it results from the dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards

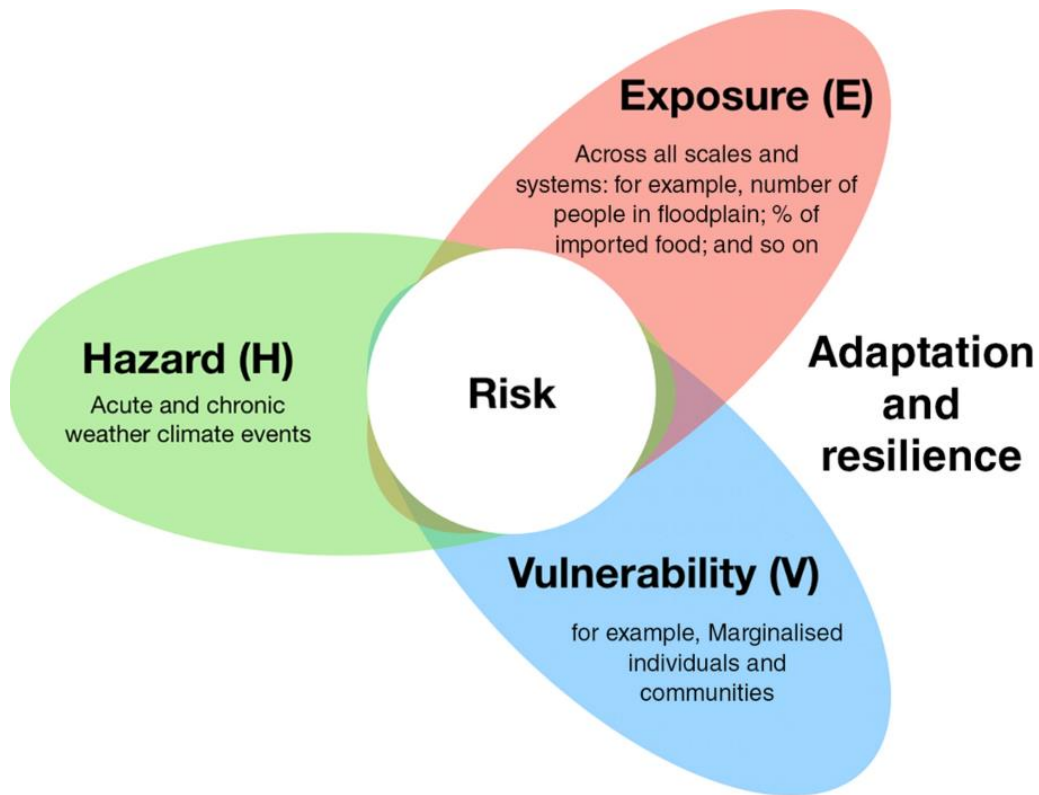


Figure 3 Definition of risk in the context of climate change

Vulnerability: The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes.



Analytical framework and methodology

Objectives of the climate resilience capacity assessment

The objective of DA1.2 is to get shared overview of the LIFE RESYSTAL project seven pilot hospitals’ existing capacities to cope and adapt to climate change challenges. In this aim, DA1.2 provides i) solid baseline data ; ii) an index of resilience capacity for each healthcare facility.

This deliverable is the third step (see figure below) of the incremental approach to build the site-level communities of practice of the LIFE RESYSTAL project (Action A1 of the LIFE RESYSTAL Project “Building of climate resilient healthcare Communities of Practice”).

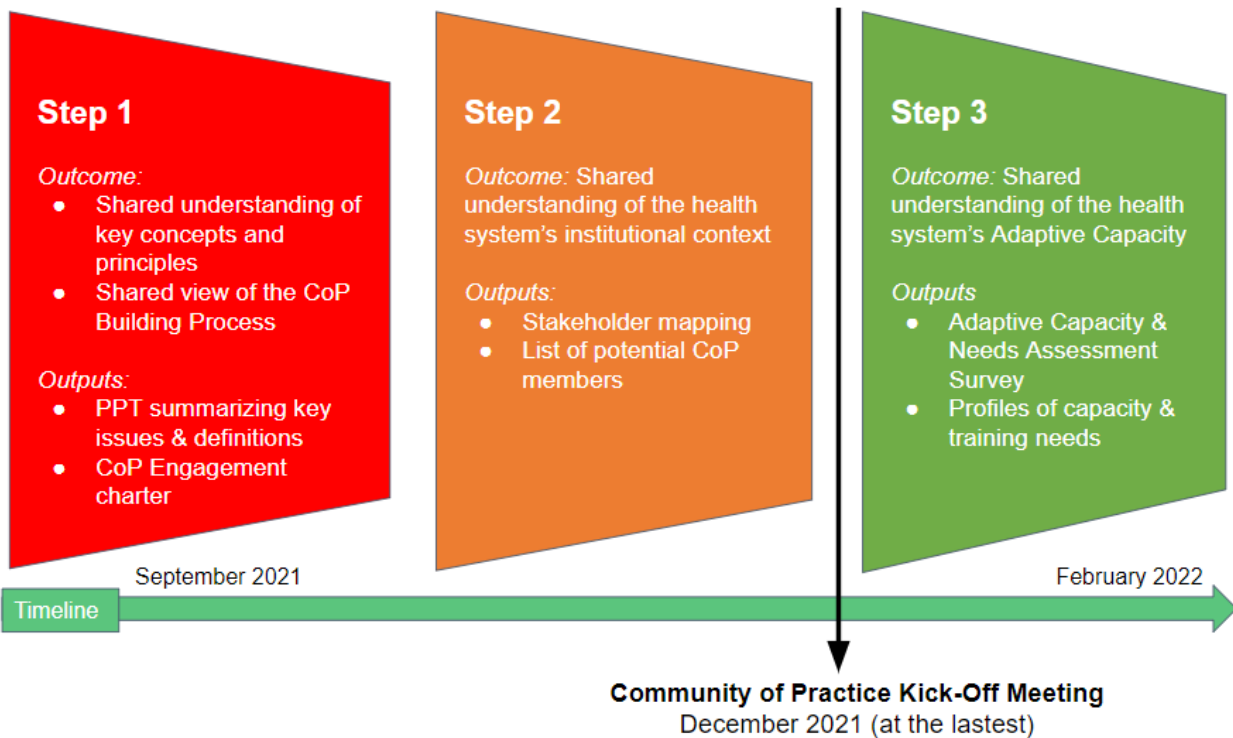


Figure 4 An incremental approach for CoP building

Scope of the assessment

Geographic scope

The analysis in this deliverable is restricted to the 7 pilot hospitals of the RESYSTAL project. For instance, the state of other critical infrastructures (power grid, water, wastewater, transportation networks) on which the hospital has to rely were not considered (or at least to a marginal extent). The same applies to crisis management stakeholders that are external to the hospitals (i.e. firefighters, etc.) which were not considered for this assessment.

The seven hospitals are:

- Centre Hospitalier de Millau, France,
- Centre Hospitalier Emile Borel de Saint-Affrique, France



- *Hospital Universitario de Ourense, Spain*
- *Hospital Público de Verín, Spain*
- *Hospital Público do Barco de Valdeorras, Spain*
- *Γενικό Νοσοκομείο Νίκαιας Πειραιά «Άγιος Παντελεήμων» (General State Hospital of Nikaia “Saint Panteleimon”), Greece*
- *Azienda Ospedaliero-Universitaria Policlinico di Bari, Italy.*



Figure 5 Location of the LIFE RESYSTAL project's pilot hospitals

NB: As the French (Millau & Saint-Affrique) and Spanish (Verin, Valdeorras & Ourense) hospitals are not autonomous entities but are managed by a mother institution or have a shared management team, one single profile has been drafted for each of them.

Thematic scope

The analysis covers the different dimensions of climate resilience for healthcare facilities, which were clustered into three broad categories:

- **Leadership, Governance and Data:** this category encompasses all aspects related to the institutional and organizational capacity of healthcare facilities to deal with climate change impacts
- **Buildings and Infrastructures:** this category deals with the physical capacity of healthcare's buildings and infrastructures to cope with climate challenges and adapt. It included 4 subcategories: Buildings, Green Infrastructure, Utilities and Communication & Transportation.
- **Emergency Preparedness and Management:** this category aims to assess the level of preparedness of healthcare facilities to face climate-related disasters and crisis events.

Temporal scope

We analyzed the existing capacities of the hospitals vis-à-vis climate change challenges. Hence, plans or projects to increase the capacities of the hospitals in the future were not considered.

Steps followed to conduct the assessment

This assessment was conducted between October 2021 and May 2022. Four main steps were followed. They are presented below:

Step 1: Analysis of capacity assessment methodologies (October-November 2021)

In order to identify the different dimensions of climate resilience for healthcare facilities and to produce the capacity assessment checklist, ACTERRA undertook a desk review of climate resilience frameworks



and capacity assessment methods & tools, with a focus on the ones specific to the health sector. The desk review used Google search. The terms used for this search included: health, healthcare, capacity, assessment, adaptive capacity, climate resilience, climate risks. The documents that were reviewed are presented in the table below. They are of three types:

- Methodological guides & handbooks
- Research articles which inform about climate resilience frameworks
- Assessment forms
- Climate resilience frameworks. Some of these frameworks are presented in detail in DA4.1 “Benchmark study and gap for specifying the resilience framework” drafted by HCWHE.

Step 2: Elaboration of the capacity assessment checklist (December 2021)

Based on this analysis of capacity assessment methodologies, ACTERRA produced the capacity assessment checklist. This checklist relied on the Sustainable and Climate-Resilient Health Care Facilities Toolkit (U.S. Department of Health and Human Services), which was the only one specifically targeting healthcare facilities (besides the Health Care Facility Climate Change Resiliency Toolkit of the Canadian Coalition for Green Healthcare) as because it appeared to be the most comprehensive. The toolkit was then simplified and adapted to the European context and the RESYSTAL project’s objectives:

- The questions that were not fully linked to climate resilience – but related more to climate mitigation or sustainable development – were not included.
- Climate hazards that are specific to the US context (hurricanes and high winds) were not considered for the LIFE RESYSTAL checklist.

In addition, **an index to assess the climate resilience capacity of health care facilities** was designed based on self-assessment questions asked in the checklist.

A first draft of the capacity assessment checklist was submitted to LIFE RESYSTAL partners on November 10, 2021 for review. The final version of the checklist was then submitted on December 22, 2021.

The checklist was then translated into French and Spanish for ease of dissemination.

*List of references reviewed to elaborate the Capacity Assessment Checklist:*

Title	Institution / Author	Year	Type	Short description	Analyzed in DA4.12?	Link
Climate change & Health Care Capacity Assessment Documents						
Sustainable and Climate-Resilient Health Care Facilities Toolkit	U.S. Department of Health and Human Services	2014	Climate resilience framework, assessment form & Guide	This toolkit consists of an overview guide document (entitled “Primary protection: Enhancing Health Care Resilience for a Changing Climate) and a suite of online tools and resources that highlight emerging best practices for developing sustainable and climate-resilient health care facilities.	Yes	https://toolkit.climate.gov/topics/human-health/building-climate-resilience-health-sector
The Health Care Facility Climate Change Resiliency Toolkit	Canadian Coalition for Green Health Care	2017	Assessment form	This toolkit help health care facilities to assess their resiliency to climate change.	No	https://greenhealthcare.ca/climate-change-resiliency-toolkit/
Operational Framework for Building Climate Resilient Health Systems	WHO	2016	Climate resilience framework	This document presents the WHO Operational framework for building climate resilient health systems	Yes	https://www.who.int/publications/i/item/9789241565073
WHO Guidance for Climate-Resilience and Environmentally Sustainable Health Care Facilities	WHO	2020	Climate resilience framework	The guide builds upon WHO’s Operational framework for building climate resilient health systems by focusing on health care facilities and specifically on opportunities to enhance their climate resilience.	Yes	https://www.who.int/publications/i/item/9789240012226
Protecting Health from Climate Change. Vulnerability and Adaptation Assessment	WHO	2013	Guide	This document builds on WHO past guidance and technical tools to outline a flexible process for vulnerability and adaptation assessment.	No	https://apps.who.int/iris/handle/10665/104200
Assessing the institutional capacity to adapt to climate change: a case study in the	K. Bowen, F. Miller	2014	Research article	This study aimed to assess the capacity of organizations to implement climate change activities in Cambodia in order to provide such a	No	https://www.tandfonline.com/doi/full/10.1080/14693062.2014.937385

2 DA4.1 Benchmark study and gaps for specifying the resilience framework, is a deliverable produced as part of the EU LIFE RESYSTAL project by HCWHE.



Cambodian health and water sectors				basis for building capacity. Four elements of capacity were investigated.		
Enhancing the sustainability and climate resiliency of health care facilities: a comparison of initiatives and toolkits	J. Balbus, et. al	2016	Research article	Special Report summarizes several initiatives and compares three toolkits for implementing sustainability and resiliency measures for health care facilities.	No	https://www.scielo.org/pdf/rpsp/2016.v40n3/174-180
Methods of assessing human health vulnerability and public health adaptation to climate change	WHO	2003	Guide	This publication is designed to address this need by providing practical information to governments, health agencies and environmental and meteorological institutions in both industrialized and developing countries on quantitative and qualitative methods of assessing human health vulnerability and public health adaptation to climate change.	No	https://www.euro.who.int/__data/assets/pdf_file/0009/91098/E81923.pdf
Health Care (only) Capacity Assessment Documents						
Toolkit for Assessing Health System Capacity for Crisis Management	WHO	2012	Assessment form & Guide	It is a methodology for assessing the preparedness of a health system for crises. It includes an assessment form and a user manual.	No	https://reliefweb.int/report/world/toolkit-assessing-health-system-capacity-crisis-management
A Guide to Monitoring and Evaluation of Capacity-Building Interventions in the Health Sector in Developing Countries	Measure Evaluation & USAID	2003	Guide	This document aims to assist health planners and evaluators to: gain a clear understanding of the concepts of capacity and capacity building; critically evaluate the strengths and limitations of current approaches to capacity measurement; and design a capacity-building M&E plan that outlines a systematic approach to measuring capacity and assessing the results of the capacity-building interventions in the health sector.	No	https://www.measureevaluation.org/resources/publications/ms-03-07.html
How to do Capacity Assessments for Health Policy and Systems Research in University Settings: A Handbook	Consortium for Health Policy and Systems Analysis in Africa	2014	Guide	This capacity assessment focused on both capacity 'assets' and 'needs', and covered the wider context, as well as organizational and individual capacity levels. Six thematic areas of capacity were examined.	No	https://www.hst.org.za/publications/NonHST%20Publications/Chepsaa%20Handbook%20complete%20Jan%2015th.pdf



Field Manual for Capacity Assessment of Health Facilities in Responding to Emergencies	WHO	2007	Assessment form	This is a management tool for health professionals evaluating the preparedness of their respective health facilities for dealing with disasters.	No	https://reliefweb.int/report/world/field-manual-capacity-assessment-health-facilities-responding-emergencies
Hospital Safety Index	WHO / PAHO	2017	Assessment form & Guide	This Guide provides a step-by-step explanation of how the evaluation can be used to obtain a rating of the structural and nonstructural safety, and the emergency and disaster management capacity, of the hospital.	Yes	https://iris.paho.org/handle/10665.2/51448
Climate Change (only) Capacity Assessment Documents						
Capacity Assessment Scorecard / Institutional Capacities for Climate Change	UNDP	?	Assessment form	This capacity assessment scorecard helps to identify Institutional Capacities for Climate Change, which will allow a prioritized Capacity Development Plan to be prepared.	No	https://procurement-notices.undp.org/view_file.cfm?doc_id=26040
Global Climate Change (GCC) Institutional Capacity Assessment	USAID	2016	Assessment form	It is a structured tool for assessing an organization's or institution's capacity to address climate change issues. It can be used as a baseline assessment tool to inform assistance and enable an evaluation of impact at a later date.	No	https://www.climatelinks.org/resources/global-climate-change-institutional-capacity-assessment
Climate Vulnerability and Capacity Analysis Handbook (CVCA)	CARE	2019	Guide	It is used to gather and analyze information on community-level vulnerabilities to and capacities for climate change. It informs the identification of actions, at the community level or more broadly, that support communities in increasing their resilience to climate change.	No	https://careclimatechange.org/cvca/
The Vulnerability Sourcebook. Concept and guidelines for standardised vulnerability assessments	GIZ	2017	Guide	The Vulnerability Sourcebook offers a practical and scientifically sound methodological approach to vulnerability assessments and their application for monitoring and evaluation of adaptation.	No	https://www.adaptationcommunity.net/download/va/vulnerability-guides-manuals-reports/vuln_source_2017_EN.pdf



Step 3: Data gathering through interviews and written responses (January-February 2022)

To collect the responses to the checklist:

- The final version of the checklist was submitted to the pilot hospitals’ LIFE RESYSTAL focal points, which were asked to fill it in;
- 10 targeted online group interviews (as in-person interviews were finally not possible due to the sanitary situation) were conducted with pilot hospitals (4 with CH MILLAU, 1 with NHOSP, 2 with POLIBARI and 3 with SERGAS). Most of the interviews were recorded (they are available upon request). For these interviews, the checklist was used as starting base and respondents were encouraged to elaborate on their responses and provide information on areas for improvement, thereby moving away from it (following the methodology of semi-structured interviews).

In parallel, the technical partner conducted also an online review to factcheck the responses of the pilot hospitals to the questionnaire. Additional documents (crisis management plans for Polibari, Saint-Affrique and Sergas hospitals) were also provided, on which the technical partner relied to draft the profile of capacity.

Step 4: Drafting of the profiles and pf the report (March-May 2022)

During this phase, Climate Resilience Profiles were drafted and the **Climate Resilience Index** was calculated. Once drafted, the profiles were submitted to pilot hospitals for review and validation.

In order to calculate the climate resilience index, a 4-class evaluation scheme was used:

- The response “Exemplary” was given a score of 4 (highest class)
- The response “Functional” was given a score of 3
- The response “Marginal” was given a score of 2
- The response “None” was given a score of 1 (lowest class)

The responses, and therefore scoring, is based on self-reporting/assessment of hospital representatives who participated.

Then, the average value for the six dimension of climate resilience for healthcare facilities identified – (i) Leadership, Governance and Data, (ii) Buildings, (iii) Green Infrastructure and Nature-based Solutions, (iv) Utilities, (v) Communication and Transportation, and (vi) Emergency Preparedness and Management – was used to calculate the climate resilience index.*List of questions of the checklist used to calculate the Climate Resilience Index*

Leadership, governance & data
Based upon the responses to questions above, rank the level of effective leadership and organizational capacity to build climate resilience
Based upon the responses to questions above, rank the degree of inclusion and support of other organizations in the hospital’s climate adaptation process
Based on the answers to the above questions, assess the hospital's climate action monitoring and evaluation mechanism (its ability to collect, analyze and monitor data)
Buildings



Based on answers to the above, rank the overall status of critical building construction for each campus
Based on answers to the above, rank the commitment of your hospital to build the climate resilience of its buildings and sites
Green infrastructure and nature-based solutions
Based on answers to the above, rank the commitment of your hospital to enhance climate resilience through green infrastructure and nature-based solutions
Utilities
Based on your responses, rank the resilience of your energy systems (their capability to continue functioning in a climate-related emergency and the commitment of your hospital to improve it)
Based on the above, rank your overall water supply & wastewater infrastructure current resilience and the commitment to increase it
Rank the overall performance of your waste management programs, based on answers to the questions above
Access to the hospital (communication & transportation)
Rank your communication and information system resilience based on the answers to the questions above
Based on answers to the above, rank the resilience of transportation and site access
Emergency preparedness & management
Assess your overall clinical care vulnerabilities and support vulnerabilities in an extreme weather event based on your answers to the questions above
Based upon the responses to questions above, rank the level of preparation of your hospital to cope with extreme weather events
Assess your overall provisions for anticipated patient surge during and following extreme weather events based on your responses to the questions above

Challenges and limitations

The main limitation of this assessment mainly deals with **the difficulty to access data** and/or organize interviews with some hospitals (especially with the Italian hospital Policlinico di Bari), which is explained by their heavy workload dealing with the fourth wave of the Covid-19 crisis as well as the fact that climate resilience issues are not a priority for some of the hospitals (providing day-to-day care is perceived as more urgent).

10 interviews were **nevertheless conducted** with hospital and +20 staff for the 7 hospitals and health systems provided responses to the questionnaire.

Overall, the assessment is conceived as first attempt to provide background information on pilot hospitals' climate resilience capacities. Additional data could then be gathered by LIFE RESYSTAL technical partners depending on the needs identified throughout the project.



Climate Resilience Capacity Assessment Survey Questionnaire for Hospitals and other Healthcare Facilities³

Leadership, Governance and Data

Section objectives	Review i) if climate change is explicitly incorporated in the hospital’s organizational structure, in processes/procedures/budgets/plans and if the hospital’s leadership team is committed to climate change adaptation, ii) if relevant stakeholders (internal and external) are involved and supporting the hospital’s climate change adaptation endeavor (including on the financial side), iii) the hospital’s mechanisms in place to monitor and inform on climate risks and vulnerabilities within the hospital/health system.
Potential participants	Hospital Director/Management, Board Member, Chief financial officer, Human resources director, IT manager, Staff responsible for addressing climate change issues, Health professionals
Illustrative supporting documentation	Hospital’s Organizational chart, Documentation on how roles and responsibilities are defined within the organization, guidance or policies for acquiring, assessing the quality of and monitoring climate change adaptation, annual reports, surveys or interviews of staff

1.1 Leadership and Organizational Capacity to Build Climate Resilience

1.1.1 Is there a someone responsible for sustainable development issues within the hospital? What is the position of this/these person/people in the organizational chart (project manager, department head, director)?

Is there someone in charge of climate change issues within the hospital? Is/are he/she/these the same person/people as for sustainable development issues? What is the position of this/these person/people in the organizational chart (project manager, department head, director)?

Is this person in charge of climate change mitigation issues (limiting GHGs produced by the hospital)?

Is this person dealing with climate adaptation issues (limiting the effect of climate change)?

1.1.2 Does the hospital have a written plan to implement its (mitigation and/or adaptation) mission or objectives?

If not, are climate change adaptation or mitigation issues addressed through other plans (hospital project / strategic plan, medical project)

When was the plan elaborated?

Is it publicly available?

If a plan exists, but is not publicly available, can LIFE RESYSTAL team members have access to it?

Is the plan—and its climate change objectives - used in guiding management decisions and operational planning? Can you give some examples?

³ Responses to the questions are “Yes”, “Somewhat”, “No”, “Unknown” and “N/A”, except for the question in bold (self-assessment question used to build the climate resilience index) for which the possible answers are written at the end of the question.



Did you benefit from technical support to elaborate this plan? Can you name the institution(s) which supported you in plan elaboration?

Are you regularly monitoring the implementation of the plan?

1.1.3 Are financial resources to increase resilience to climate variability and climate change included as a line item in the hospital investment plan? If yes, how significant is this line item?

1.1.4 Has your hospital obtained funding for actions with climatic, adaptation or mitigation co-benefits (such as improving the thermal comfort of the building to adapt to heat waves)? Has the hospital participated in any climate mitigation/adaptation projects or programs?

Were these actions / projects / programs financed via national or international funding (European Union, state agencies, donors, etc.)? Can you name the funders?

1.1.5 Based upon the responses to questions above, rank the level of effective leadership and organizational capacity to build climate resilience (“Exemplary”, “Functional”, “Marginal”, “None” and “N/A”)

What is your level of confidence in the ranking? (“Highly confident”, “Confident”, “Unsure”, “Unknown”, “N/A”)

1.2 Enabling Environment

1.2.1 Is your hospital affected by these weather hazards? What are the risks of greatest concern to the hospital (in your opinion)?

Heatwave

Extreme cold

Snow cover / ice

Strong winds / Storm

Heavy rain

Floods (including coastal flooding)

Other, please specify

Does your health care facility receive notifications of weather warnings, alerts, and advisories for these hazard conditions?

Which organization inform the hospital in this case (local government, meteorological service, regional health agency)?

1.2.2 Are the supervisory bodies of the hospital (Health Regional Agency, Health Ministry) equipped with knowledge, experience and resources to support the hospital in disaster risk reduction and climate change adaptation? Can you elaborate on this?

1.2.3 Are local governments (municipalities, metropolises, provinces, regions, etc.) equipped with knowledge, experience and resources to manage disaster risk reduction and climate change adaptation at a community or neighborhood level?

Does the population benefiting from the hospital's healthcare offer face any particular weaknesses (elderly population, low income, isolation, etc.) which could reinforce health needs and/or patient surge during an extreme event?

Is there an assessment of the health vulnerabilities of the community that will likely increase admissions during an extreme event? If yes, by whom? What is your level of confidence in the data?

Are there particular health vulnerabilities in the community that you could mention?



Are there any measures implemented like education or prevention programs to diminish disease burden linked to climate hazards?

12.4 Does your hospital have partnerships with universities or other climate and health-focused organizations to inform your understanding of climate and health risks?

1.2.5 Based upon the responses to questions above, rank the degree of inclusion and support of other organizations in the hospital's climate adaptation process ("Exemplary", "Functional", "Marginal", "None" and "N/A")

What is your level of confidence in the ranking? ("Highly confident", "Confident", "Unsure", "Unknown", "N/A")

1.3 Mechanisms to Collect and Monitor Climate Data

1.3.1 Has the hospital experienced extreme weather events over the past 20 years (such as the 2003 European heatwave)?

Has a comprehensive feedback/an ex-post evaluation been conducted following this climate event to assess the hospital's crisis management response?

Did the feedback help you get better prepared to face other extreme weather and crisis events?

Do you think feedbacks are relevant tools to increase the hospital's emergency preparedness?

1.3.2 Has your hospital reviewed, evaluated and cataloged the impact of extreme weather risks in each site (extreme temperatures, flooding and other extreme weather hazards)? Can you provide some details?

Does your hospital has experience in assessing future climate impacts? If yes, what is the preferred source of climate weather data provider? (national authority, RTD institute, open databases)

When identifying climate risks, is uncertainty around changing weather patterns, including future climate variability, considered?

Does your hospital consider how indirect climate risks (drought, food prices, water availability, fossil fuel price increases) may affect future vulnerabilities or risks?

Is this assessment periodically reviewed for improvements or deterioration of vulnerabilities?

1.3.3 Does your health care facility collect best practices and lessons learned regarding infrastructure and related systems resilience from other health care facilities that have experienced extreme weather disasters?

1.3.4 Have you tracked or is there a system in place to track the number of patients injured and/or died as a result of the climate, including the elderly?

1.3.5 Is there a monitoring system for GHG emissions and/or an assessment of carbon footprint?

1.3.6 Have indicators been defined by the hospital regarding its climate action (mitigation and/or adaptation)? If so, what are these indicators? What data is collected to monitor them?

Are there external bodies that collaborate with or support the hospital in monitoring activities? If so, which ones? At what level are they involved (what kind of activity are they involved in, which contribution do they provide)?

Are any interpretations, elaborations, analyses, etc. carried out on the collected data? If yes, which kind of processing is carried out? If yes, what is the role of person responsible for this data analysis/processing activities?



Does the hospital have information, documents related to their monitoring activities and instruments in place (reports, monitoring plan, technical sheets, status report on monitoring equipment, other...)?

Are they regularly updated? When was the last update carried out?

Are they available for consultation?

1.3.7 Based on the answers to the above questions, assess the hospital's climate action monitoring and evaluation mechanism (its ability to collect, analyze and monitor data) (“Exemplary”, “Functional”, “Marginal”, “None” and “N/A”)

What is your level of confidence in the ranking (“Highly confident”, “Confident”, “Unsure”, “Unknown”, “N/A”)

Buildings

Section objectives	Review if measures have been taken to build the adaptive capacity & resilience to climate change of i) buildings, ii) infrastructure.
Potential participants	Technical services / Engineering department of the hospital, Maintenance company
Illustrative supporting documentation	Survey or interview of staff, Environmental impact assessment study, Feasibility studies for adaptation measures, field observation if possible, etc.

2.1 Site Location

2.1.1 Understand the physical parameters of each site or facilities located in areas that are subjected to higher levels of hazards. Is/are the site located:

near a coastal region?

near 100-year floodplains or wetlands/valleys?

in close proximity to major levees or dams?

in close proximity to steep slopes subject to erosion?

on a clay soil with a high shrink–swell capacity?

in close proximity to an area subject to fire risk (near a dense forest)?

2.1.2 If you answered ‘yes’ or ‘somewhat’ to the questions above, have you or any public agency developed a comprehensive hazard vulnerability assessment or hazard mitigation plan for affected hospital sites?

2.2 Status of Critical Building Construction

2.2.1 How many buildings / campuses comprises your hospital?

Develop inventory of the vulnerability of each campus targeted by the project:

2.2.2 When have the buildings been constructed?

Are they in a sound state according to you?

Did that code include design standards to address prominent climate hazards (flooding, heat waves, etc.)?



2.2.2 Have you mapped building locations relative to hazard maps (for floods, heatwaves, wildfires, other climate hazards)?

2.2.3 Have you compiled data about the environmental/climate performance of each critical building (including regarding the building envelope)?

Are they resistant to extreme weather events (high wind speeds, extreme precipitation, flood elevation especially)? More especially:

Is the roof well insulated?

Are there any heat sensitive elements under the roof (air conditioning, IT systems/data center?)

Are the glasses and windows protected from shattering during disasters? Are they exposed to heat losses?

Are there sufficient emergency exits and are stairs dispersed in the buildings to facilitate evacuation when a disaster happens?

Is the capacity of the existing stormwater management system adequate for anticipated 50- or 100-year storm events today?

2.2.4 Are buildings regularly inspected (exterior and interior) for signs of deterioration?

Which frequency do these inspections occur?

Do site and building maintenance procedures include specifications on how weather may affect the safety and continued functioning of your facility?

Are the individuals responsible for maintenance of your health care campuses and building envelopes trained to manage an extreme weather-related emergency or disaster (for example of climate-related hazards)? If yes, what is their training?

2.2.5 If mechanical/electrical systems are disabled for an extended period of time, during extreme heat:

Are there exterior shading devices, trees or other architectural features that mitigate solar gain? To what extent are these devices used? (e.g., might be good for one building, but not others)

Have you assessed the length of time people can remain in place before overheating requires evacuation?

2.2.6 If mechanical/electrical systems are disabled for an extended period of time, during extreme cold:

Do building orientation, glazing and/or shading devices provide for supplemental daytime solar gain?

Is the building well-insulated, with high efficiency glazing systems?

Does the building have significant thermal mass to reduce heat loss?

Are there any sources of supplemental building heat (emergency heater)?

Have you assessed the length of time people can remain in place before extreme cold requires evacuation?

2.2.7 Are there buildings that are more vulnerable to climate change than others?

If yes, which ones and why?

Have measures been taken to reduce the vulnerability of these buildings? What are these measures?

2.2.8 Based on answers to the above, rank the overall status of critical building construction for each campus

What is your level of confidence in the ranking



2.3 Measures to Enhance Climate Resilience

2.3.1 Do new buildings or upgraded buildings comply with contemporary energy codes regarding building insulation & windows?

2.3.2 Do you design and construct buildings use green design best practices, standards or guiding principles (e.g. Leadership in Energy and Environmental Design (LEED), Living Building Challenge, or equivalent)?

2.3.3 Regarding heat island contributors:

Have you installed reflective white roofs on buildings to reduce heat island impacts?

Do you have high-albedo, light colored paving on parking areas and walkways?

Have you installed green roofs or green walls to mitigate heat-island impacts?

2.3.4 Has the hospital taken out insurance to cover it against risks, particularly climatic ones, that could impact its buildings?

2.3.5 Based on answers to the above, rank the commitment of your hospital to build the climate resilience of its buildings and sites

What is your level of confidence in the ranking

Green Infrastructure & Nature-Based Solutions

Nature-based solutions (NBS) have a key role to help your hospital prepare for and manage the effects of climate change, and more especially: i) manage flooding, ii) prepare for droughts, iii) reduce urban heat island effect, iv) lower building energy demand, v) protect coastal areas but also vi) enhance the hospital's food security. Review the hospital's green infrastructure vulnerability and resilience capacity through NBS.

2.4.1 Is your facility or campus inside the limits of any of the following sensitive sites:

Endangered species habitat

Wetlands

Prime agricultural land

Prime forest

If yes, have you implemented measures to mitigate negative impacts from your site development (measures may include applying setbacks, land covenant protections, etc)?

2.4.2 How many hectares / m² of green spaces are there in your hospital?

Are green spaces equally distributed with your hospital?

Has the surface of green spaces increased over the past 5 years?

2.4.3 Does your facility practice any of the following sustainable stormwater management practices to reduce local flooding in extreme rain events?

Permeable paving

Green roofs

Bioswales

Open space for groundwater recharge (retention ponds)

2.4.4 Inventory plant vulnerabilities (on site)

Are existing trees and plants resilient to climate change effects, both in general climate terms and pest/disease risks?

Are they drought tolerant?



In coastal areas, are they salt-tolerant to storm surge?

2.4.5 Does your hospital apply any of the following practices to reduce the vulnerability of plants to climatic hazards and their dependence on tap water?

Native and drought tolerant species

Drip irrigation system

Rainwater harvesting

2.4.6 Sustainable food programs can include a variety of elements that enhance resilience / food security. Does your health facility undertake any of the following sustainable food activities?

Choose local food suppliers to promote short circuits (which limits the risks of supply disruption)

On-site food production (greenhouse, roof gardens)

Organic food procurement (quality of the land, health of the inhabitants/patients)

2.4.7 Does the hospital have a system for monitoring the resilience of the hospital's green and blue infrastructure (green walls / roofs, tree planting, bioswales to reduce the air temperature and protect against heat, reduce air pollution, prevent the risk of flooding)?

Do you have sensors (temperature, air quality, etc.), or other data acquisition system?

What indicators are you monitoring? For example, air temperature, level of runoff, air pollution (e.g., PM10), etc.

Are you currently using the monitoring system and the devices that you have?

How often do you monitor these indicators (i.e., daily, weekly, monthly, every three months, every six months, annually)?

Are the indicators monitored manually or automatically?

Which is the role of person responsible for monitoring (i.e.: Operation & Maintenance responsible, on-site technician, HSE manager, Prevention and Protection Service Manager-RSPP, other roles?)

In your hospital do you generally ask to your patients to fill-in a short voluntary survey aimed at collecting their feedback about the installation of green/blue infrastructures to understand if these infrastructures have led an improvement in their health and well-being?

Is there a responsible person within the hospital to collect and synthesize the data from this survey? If not, who would be able to do it (i.e., hospital staff, human resources department, head nurse ...)?

2.4.8 Based on answers to the above, rank the commitment of your hospital to enhance climate resilience through green infrastructure and nature-based solutions

What is your level of confidence in the ranking

Utilities

2.5 Energy

Status of Energy Infrastructure

Climate change may result in more power outages in your community, which may result in increased frequency and/or duration of power disruptions at your hospital. Review energy and utility infrastructure vulnerabilities and parameters of operating without essential utilities (island operation) that may be required in extreme weather events.

Power system:



- 2.5.1 What is the current anticipated length of time you can operate without grid power or refueling? (96 hours is the minimum requirement, but some campuses may have circumstances that require a longer period of time.)
- 2.5.2 Is this adequate to meet the projections for extreme weather event durations?
- 2.5.3 Are all critical facilities equally equipped to operate without grid power for extended outages?
- 2.5.4 If not, are there plans in place to address identified shortfalls and vulnerabilities?
- 2.5.5 Do you produce electricity (from renewable sources, or CHP - Combined Heat and Power) on-site for normal power provisions?
If yes, what is the percentage of electricity produced on site?
- 2.5.6 What percentage of your base electrical demand is covered by emergency generators?
- 2.5.7 Is food refrigeration equipment on emergency power?
- 2.5.8 Do you have external connections for portable emergency generators?
- 2.5.9 Does the emergency generators have a dedicated fuel source?
- Thermal system: In extreme events, thermal (cooling & heating) energy systems may be taxed. Review the following items related to thermal systems:
- 2.5.10 What is the duration of "island operation" that may be required for the thermal (heat or cooling) plant in extreme weather events?
- 2.5.11 What is your heating system's energy source? (Electricity, Fuel, Gas from the municipal grid, other sources)
If the heating system relies on electricity, is it on the emergency power system?
If it relies on fuel, how many hours of steam production are possible with fuel reserves?
- 2.5.12 What is your hot water system's energy source (Electricity, Fuel, Gas from the municipal grid, other sources)?
If the hot water system relies on electricity, is it on the emergency power system?
- 2.5.13 Is your cooling plant capable of operating when grid power is lost?
- Energy Efficiency Measures to Build Energy Climate Resilience
- Energy efficiency initiatives contribute to resiliency by reducing future climate-related health risks (through greenhouse gas emission reductions) and reducing reliance on energy on a regular basis (to be better prepared when power supply is disrupted).
- 2.5.21 Extreme weather could have cost implications for your health care facility (if air conditioning units will need to run at higher intensities and for longer periods of time during a heat wave). Do you consider how future climate variability, increasing utility or energy costs could affect costs to run equipment when developing future plans, strategies and programs (e.g., when investments are made)?
- 2.5.14 Does your health care facility have an energy conservation program?
- 2.5.15 Have you set energy or greenhouse gas reduction targets?
- 2.5.16 Do you monitor or track energy use?
- 2.5.17 Do you evaluate energy reduction strategies, monitor cost savings, and greenhouse gas reductions?
- 2.5.18 Do you educate staff, patients and visitors about energy reduction strategies (energy awareness campaigns)?
- 2.5.19 Have you engaged in any of the following energy conservation measures?
Low-energy lighting, such as T-5 or LED?
Install lighting control systems to minimize energy consumption?
Install energy efficient medical/non-medical equipment?



2.5.20 Has your facility or system investigated the possibility of diversifying energy sources and including renewable energy sources for your buildings or campuses?

Solar (photovoltaic or thermal)

Wind

Methane (from landfill or industrial/agricultural sources)

Biomass

2.5.22 Based on your responses, rank the resilience of your energy systems (their capability to continue functioning in a climate-related emergency and the commitment of your hospital to improve it)

What is your level of confidence in the ranking

2.6 Water & Sanitation

Status of Water & Sewage

2.6.1 Climate change may cause more water restrictions or contamination. Does your health care facility have sufficient plans for water resources in the event of a water related emergency?

Are there two independent water sources to the facility?

Is there a functioning well on your site?

If yes, is it adequate to supply the facility?

Is the water source potable without treatment?

If treatment is required, is there a sufficient supply?

2.6.2 Is there a surface water source; ie, pond, lake, etc that can provide process water needs in an emergency?

2.6.3 How much on-site emergency water storage do you have (liter)?

2.6.4 What duration of operation can this storage provide (hours)?

2.6.5 Do you rely on bottled drinking water for emergencies?

2.6.6 If so, how much do you store and for what duration?

Sewage and Wastewater systems may be impacted by climate related events. Inventory backflow prevention systems for all critical buildings or campuses.

2.6.7 Do buildings have check valves or equivalent backflow prevention devices installed on the main sewer discharge line to prevent sewage from flowing back into the building during a major flood event?

2.6.8 Are all floor drains below flood elevation outfitted with drain plugs?

2.6.9 Do you have any provisions for storing sewage in the event municipal systems are disabled or lost?

Measures to Build the Water & Sanitation System's Climate Resilience

2.6.10 Water usage tracking and benchmarking can help you understand needs and vulnerabilities. Have you audited and benchmarked your water usage (L/day)?

If yes, do you track or monitor water use for performance measures?

Do you monitor cost savings of water use reduction strategies?

2.6.11 Do you have a campaign to increase awareness about water conservation/use in the facility among staff, visitors and patients?

2.6.12 A water conservation program could include a variety of initiatives. Has your health care facility adopted any of the following water conservation related strategies?

Low flow showers and faucets?



- Low flow toilets?
- Water efficient landscaping practices (drip or no irrigation systems)?
- Water efficient laundry equipment?
- Water efficient food service equipment?
- Water efficient sterilization equipment?

2.6.13 Based on the above, rank your overall water supply & wastewater infrastructure current resilience and the commitment to increase it

What is your level of confidence in the ranking

2.7 Solid Waste management

- 2.4.7 Does your facility or system compost food waste?
- 2.7.2 Minimizing waste production can have co-benefits (cost-savings, environmental benefits, health benefits) and contributes to a climate resilient health care facility. Has your health care facility adopted any of the following sustainable waste management strategies?
 - Audit all waste streams
 - Conserve and reduce all waste streams, measure and report progress
 - Segregate waste to minimize regulated medical waste (RMW)
 - Purchase reusable products and products that minimize packaging and waste
 - Alternative disposal and treatment technologies (e.g., anaerobic digestion of organic waste, autoclave landfill)
 - Recycling programs
- 2.7.3 Does Hospital measure the amount of waste generated?
 - If yes, which kind of documentation is available?
- 2.7.4 Rank the overall performance of your waste management programs, based on answers to the questions above
 - What is your level of confidence in the ranking

[Access to the hospital \(Communication & Transportation\)](#)

2.8 Communication & Information

Communication Means

- 2.8.1 Climate related events can disrupt power and communication systems. Does your facility have multiple communication systems in the event of extreme weather emergencies?
 - Landline telephone systems
 - Mobile phone systems
 - Radio systems
 - Other (specify)
- 2.8.2 Is your hospital part of a regional network with coordinated communication systems and protocols?
 - Medical Information Infrastructure
- 2.8.3 Hospitals require Medical Information Systems (MIS) to remain available in order to continue to deliver patient care. Does your facility or system have the following systems in place?



Electronic Medical Records

Paper record storage in appropriate location (above flood level or in safe rooms)

Off-site data center(s)

2.8.4 In the event of extreme weather emergencies:

Are Medical Information Systems on emergency power?

Is there an off-site data center or backup to on-site Medical Information Systems?

Are paper medical records safe from flooding?

2.8.5 Rank your communication and information system resilience based on the answers to the questions above

What is your level of confidence in the ranking

2.9 Mobility and Site Access Resilience

Access roads & evacuation routes

2.9.1 Have you assessed evacuation routes during or following an extreme weather event?

2.9.2 Are evacuation routes vulnerable to falling trees, utilities (fallen wires or poles)?

2.9.3 Are evacuation routes above flood elevation?

2.9.4 Is there an alternative route in case the first one is blocked?

2.9.5 Are pavements designed to withstand extreme temperatures, freezing and thawing, or solar radiation?

2.9.6 Does your hospital have a system to provide “essential personnel” credentials to all required staff during or following extreme weather events, when traffic may be restricted and gasoline rationed?

Transportation systems

2.9.7 Is the building or campus served by public transportation systems?

Light rail

Subway

Bus

Other, please specify

2.9.8 If so, have local public transportation systems undertaken climate resilience efforts?

2.9.9 Is public transportation likely to remain operational during or immediately following an extreme weather event?

2.9.10 Does your health care facility take any of the following measures to contribute to sustainable & resilient transportation?

Support local suppliers to reduce transportation miles for supplies

Support mass transit, carpooling or ride sharing

Support active transportation (walking or biking)

Helipad

2.9.12 Is there a helipad?

2.9.13 Have you evaluated the location of the helipad against extreme weather risks? (For example, at grade flooding or rooftop vulnerability to damage from high winds.)

2.9.14 Based on answers to the above, rank the resilience of transportation and site access

What is your level of confidence in the ranking

Emergency Preparedness & Management



Section objectives	Review the level of preparedness of the hospital to face disasters & crisis events (including climate related ones).
Potential participants	Medical staff and staff involved in emergency response (crisis unit to face an exceptional health situation, etc.), IT Department
Illustrative supporting documentation	Survey or interview of staff, contingent plan, documentation on general crisis management recommendations, documentation on the usual management of urgent medical assistance crisis management plan, business continuity plans, feedbacks, etc.

3.1 Sensitivity to Climate Risks

3.1.1 Determine the appropriate length of time for self-sustaining care within the facility without re-supply of equipment, supplies and staff

3.1.2 Determine Average Daily Occupancy in 2019 and in 2020 (the average daily number of occupied beds)

Personnel Availability

3.1.3 Have you calculated the number of personnel that will not likely report to work due to inability to travel, illness or safety concerns (e.g., 40% or 200 out of 500)?

3.1.4 Have you prepared a Staffing Strategy during a surge? (who can work from home, who can work from an alternate location?)

3.1.5 Does your health care facility have a protocol to receive external assistance from outside partners (e.g. other health care facilities, regional agency, national agency) in the event of a climate-related emergency, including through a relocation plan (for instance in case of flood)?

Support from another hospital or healthcare facility (public or private one)

Support from local doctors (community health center)

Support from the health reserve (retired physicians)

Other support to mention (medical students, etc.)

3.1.6 If there are protocols for patient transfers, how are these transfers organized?

Exposed locations

3.1.7 Inventory the locations of critical medical care departments, support services and diagnostic equipment listed below. Are these departments or services accessible and with functioning capacity (including electricity, air conditioning, heating system, ventilation system, water supply system, telecommunications) in case of an extreme weather event?

Urgent Care

Emergency Services

Main Lobby/ Building Entrances

Helipad

Imaging

Critical Care and/or Bed Units

Pharmacy

Medical Records/ IT

Emergency Command Center

Kitchen/ Food and Potable Water Storage

Clinical Supplies accessible

Clinical Laboratories

Hazardous Waste Storage



Morgue

Ambulance Fleet Refueling/ Garage

Internal building connecting corridors/links

3.1.8 Based on your inventory above, do you have workaround and/or contingency plans for possible disruption of vulnerable services and functions related to an extreme weather-related event?

3.1.9 Assess your overall clinical care vulnerabilities and support vulnerabilities in an extreme weather event based on your answers to the questions above

What is your level of confidence in the ranking

3.2 Emergency Response Capacity

Response System

3.2.1 Do you have a recommended crisis doctrine?

3.2.2 Do you have a crisis management plan?

3.2.3 Have you set up institutional governance for crisis management?

3.2.4 Do you have an early warning system in place to be informed about climate-related emergencies? If yes, in relation to which authorities?

3.2.5 Do you have a crisis management steering entity?

If yes, does it integrate climate-related risks?

3.2.6 Do you have specific tools (software) for crisis management?

3.2.7 Are such plans regularly evaluated and updated?

3.2.8 Are feedback sessions organized following crisis events to assess crisis management performance & gaps

If yes, was this performed for the Covid-19 pandemic?

Are you able to identify emergency management successes and dysfunctions from Covid-19 pandemic? What are they?

Are these dysfunctions due to internal or external factors to the hospital (if they are external, due to: the regional health agency, municipality, Ministry of Health, etc.)?

3.2.9 Is hospital staff involved in community disaster planning activities/committees (e.g. when emergency management or community vulnerability assessments are undertaken, or when simulation exercises are organized)? If yes, by whom are the trainings carried out?

3.2.10 Based upon the responses to questions above, rank the level of preparation of your hospital to cope with extreme weather events

What is your level of confidence in the ranking

Location for Anticipated Patient Surge

3.2.12 Have you inventoried and assessed Expanded Treatment Areas (ETA) (additional areas on campus or off-campus at locations owned or operated by the hospital) for treating lower acuity patients, either admits or transfers from the hospital?

3.2.13 Have you inventoried and ranked Alternate Care Sites (off-campus locations owned or operated by businesses other than the hospital) to which lower acuity hospital patients may be transferred for treatment by attending hospital staff? (These may be churches, schools, hotels/motels, etc., not large regional community-wide alternate care sites established by the community.)

3.2.14 Do you have a plan for Mass Fatality management and accommodation associated with extreme weather events?

Morgue Capacity

Portable Refrigerated Trailers

Spaces capable of additional cooling



Personnel

3.2.15 Have you identified Temporary Staffing Sources - ie, Red Cross, Emergency Response Teams, etc?

Do you have a tool (such as a software) to mobilize health staff during normal operation of the hospital?

Do you have a tool (such as a software) to mobilize and contact temporary staffing sources when there is a patient surge?

3.2.19 Do you have a Dependent Care Plan that Identifies essential staff dependent care options, both on and off-site?

3.2.19 Do your response and recovery plans for climate-related emergencies or disasters include the provision of psychological support to address mental health impacts of health care facility staff in the short term and long-term?

Healthcare supplies

3.2.23 Do you have a plan to accommodate increased supply storage for the extended period of time that the facility will be self-sufficient?

3.2.24 Do you currently have access to sufficient inventories of essential supplies and resources to continue to provide care during one or more climate-related emergencies? Please respond according to essential back-up supplies listed below.

Medications, treatments, drugs, pharmaceuticals, vaccines

Medical equipment: dialysers, etc.

Food

Water

Non-medical materials, such as bed linens, cleaning supplies

3.2.25 Assess your overall provisions for anticipated patient surge during and following extreme weather events based on your responses to the questions above

What is your level of confidence in the ranking