



# Climate change REsilience framework for health SYStems and hospiTALs

## DC5.8 - [Community Approach Replication Guide]

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**NB:** This document is a first draft which will be improved with HCWHE and the Scaling Network (once it is established). A formatted and easy-to-read version of this document would also be issued at a later stage.

## Executive summary

The upsurge and violence of extreme weather events in recent years linked to climate change (heat waves, floods, etc.) have demonstrated the need for hospitals to be supported in analyzing the impacts of climate change for hospitals and being prepared and resilient to crises and emergency situations, whether they are climatic and/or health related.

### LIFE RESYSTAL project's scope and objective

This community approach replication guide is initiated within the framework of the LIFE RESYSTAL<sup>1</sup> whose objective is to address gaps in the European health systems' climate resilience. This 4-year project (2021-2025) will develop, demonstrate, evaluate, and disseminate a framework for climate-resilient health systems which will be tested with 7 pilot hospitals across four countries.



Figure 1 List and map of the pilot hospitals on the LIFE RESYSTAL project

### Purpose of the community approach replication guide

This guide provides a **methodology to establish a local Community of Practice to support and sustain a climate adaptation planning process at the scale of healthcare facilities**. It is primarily based on the experience within the LIFE RESYSTAL project, mainly the establishment of four local CoPs.

### Who is it for?

This guide targets future replicators of the scaling network, and more broadly any European healthcare facility with the ambition to understand climate risks and vulnerabilities for its facility and to drive a climate adaptation process. It may also be used by facilitators who wishes to support healthcare facilities in the building of a climate resilience community of practice.

### How to use this guide?

This guide comprises two main sections:

- A presentation of the steps to establish a community of practice, including a timeline and a draft agenda of proposed meetings and workshop
- An annex that includes material to support the community establishment.

<sup>1</sup> <https://life-resystal.eu/>



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## Introduction

### Why engaging stakeholders?

The participation and active engagement of cross-sectoral and multi-scale stakeholders from the local and regional communities is key to the successful implementation of adaptation measures with regards to climate change, including at the scale of hospital. Within this context, communities of practice, represent an interesting tool for stakeholders' mobilization.

### What is a Community of Practice and what are its objectives?

The Community of Practice is a place of actionable knowledge and solutions regarding the climate resilience of healthcare facilities where contributors i.e. members of the CoP are free to share their knowledge as well as their personal and professional experience. The CoP's overarching goal is to **build a collective climate-resilient pathway for the hospital and its dependent critical infrastructures**.

Specific objectives include:

- **Objective 1:** Facilitate the collection of data needed for the climate risk assessment and the development of adaptation pathways;
- **Objective 2:** Ensure the buy-in of local stakeholders to the climate adaptation process and the endorsement of the hospital's adaptation strategy;
- **Objective 3:** Monitor the progress of the hospital's adaptation process.

### What are the steps to establish a CoP?

Three preparatory steps are outlined to establish – in an incremental approach – a community of practice. These three steps are summarized in the diagram below.

- **Step 1** aims to get a shared understanding climate resilience challenges and agree with the hospital team or focal point on the process;
- **Step 2** aims to get an overview of the stakeholders that contribute to the healthcare facilities' climate resilience;
- **Step 3** aims to get an understanding of the healthcare facility's resilience and adaptive capacities.

Once established the community of practice needs to be sustained through the different activities and roles that it could perform including to design the adaptation strategy as well as sustain and monitor the adaptation process of the healthcare facility. The section “next steps” briefly presents some of the ways to sustain the activities of the CoP and keep stakeholders engaged in the adaptation process.

### Who should be involved in the CoP?

The CoP will be moderated by a core team (steering committee) of hospital staff, or at least a focal point from the hospital. Other stakeholders internal and external to the hospital would then contribute to the CoP activities. It is preferable that at least one person from the management staff of the hospital is in the CoP, in order to ensure the ownership of the climate adaptation approach by the healthcare facility.

### How long should it take to establish a CoP?

A minimum of 4 to 6 months is recommended to mobilize stakeholders and officially launch the community of practice through a kick-off meeting.



## An Incremental Approach for Community Building

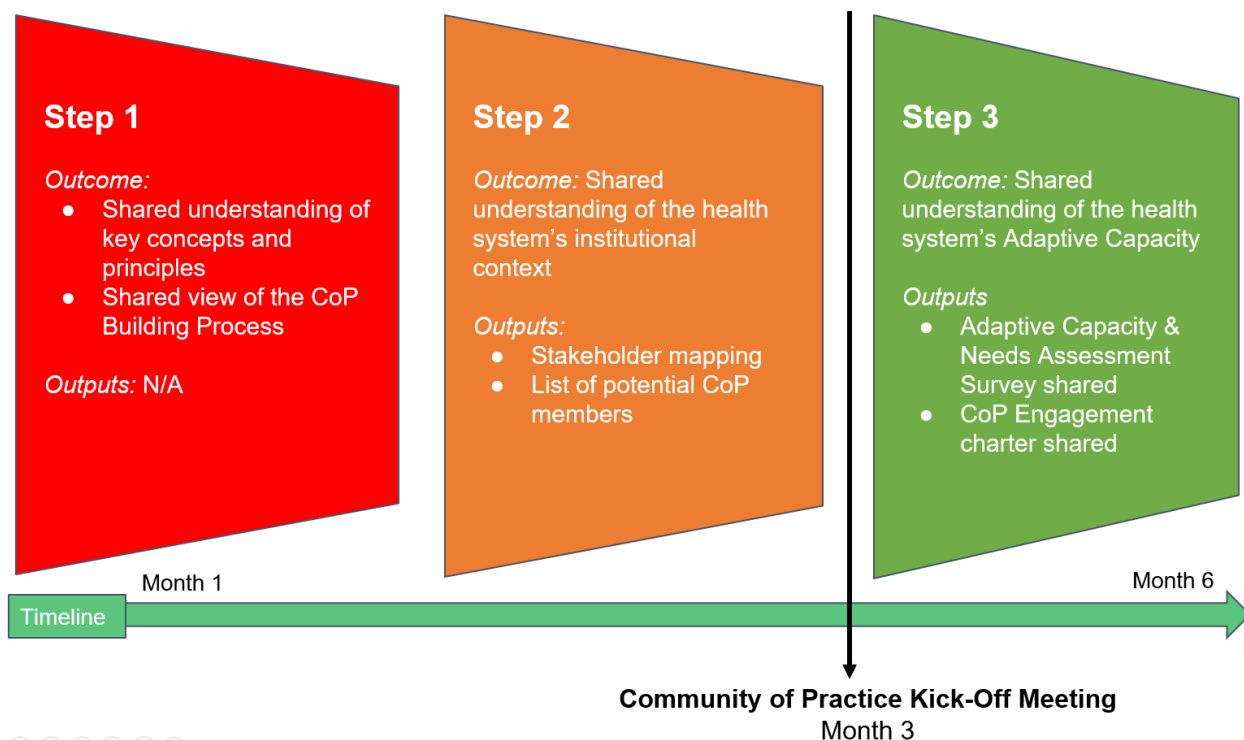


Figure 2 Steps to establish a community of practice

### Step 1: Understanding climate resilience challenges and agreeing on the process

To achieve this step, one **introductory meeting** may be organized either by a facilitator with the **hospital's focal point or team**, or by the hospital staff member initiating the climate adaptation approach to present it to management. Three activities may be performed during the meeting:

- Discuss the overall purpose of the CoP – build the resilience of the healthcare facility – through a brief introduction on climate change challenges for healthcare facilities.
- Outline the specific outputs and activities of the CoP. The table below provides a list of potential outputs and of the role that the CoP could play in this matter.
- Agree on the community building strategy, including on the approach to map stakeholders and prioritize the ones that will join the community of practice (step 2)

**Key material:** PowerPoint presentation for the introductory meeting (Annex 1); Community Engagement Charter (Annex 5)

**Output:** N/A



Table 1 Possible outputs and roles of the CoP

Possible specific output for the CoP	Role of the CoP
<b>Facilitate the organization of trainings to raise the awareness of the health community on climate hazards and their impacts on healthcare facilities and health systems</b>	Assess awareness raising and capacity building needs  Identify and mobilize relevant stakeholders that would benefit from the trainings
<b>Develop a climate risk and vulnerability assessment</b>	Facilitate climate vulnerability data collection & assess the relevance of the methodology in the local context  Facilitate the engagement of hospital management (and that of related critical infrastructure organizations)
<b>Develop climate adaptation pathways and an action plan relevant for the healthcare facility</b>	Contribute to the elaboration of the adaptation action plan  Facilitate the endorsement of the adaptation action plan
<b>Improve the emergency preparedness and crisis management response to extreme weather events and other climate-induced situations</b>	Facilitate the revision of the hospital's crisis management / contingency plan to better consider climate risks  Ensure that the crisis management plan is well coordinated with the adaptation strategy
<b>Monitor and evaluate the adaptation actions implemented as part of the climate adaptation plan of the healthcare facilities</b>	Facilitate the endorsement of monitoring indicators by hospital management  Follow-up the implementation of adaptation actions and contribute to the adaptation strategy update
<b>Communicate and share knowledge on the activities of the healthcare facility with regards to climate resilience</b>	Support the communications and dissemination activities of the healthcare facility as well as other stakeholders involved in the CoP with regards to climate resilience

## Step 2: Mapping stakeholders contributing to the healthcare facility's climate resilience

During this second step, a second meeting may be organized by the facilitator with the hospital's focal point or team, or this step may be conducted directly by the focal point/team. The main objective is to map the stakeholders that contribute to the healthcare facility's climate resilience. The figure and table below present a typology of stakeholders that may contribute to a healthcare facility's resilience.

To map stakeholders, the hospital team or focal point may need the support of other stakeholders. Therefore, it may be interesting for him/her to share a leaflet (Annex 2) that briefly outlines the role and objective of the community of practice.

**Key material:** Leaflet (Annex 2) & Stakeholders' matrix (Annex 3)



**Output:** Stakeholder's matrix is completed; a list of CoP members to invite to the CoP kick-off meeting is proposed. Such list should not only consider the relevance of the stakeholders but also their availability and motivation.

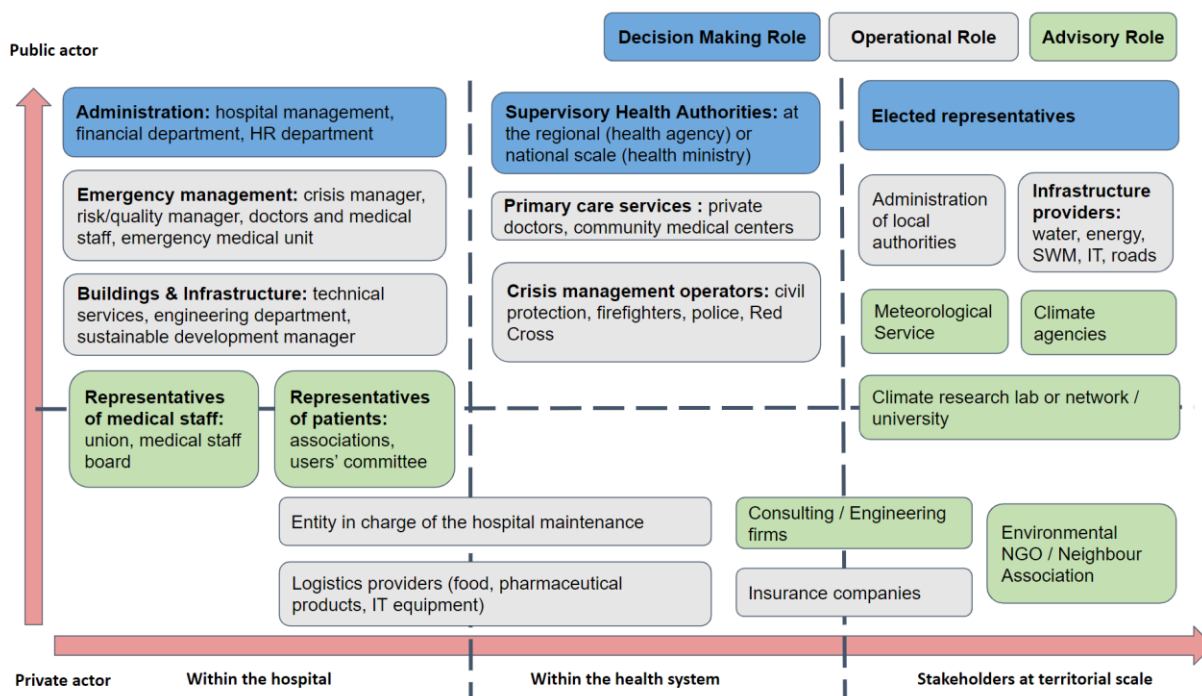


Figure 3 Two-dimensional diagram classifying stakeholders contributing to a healthcare facility's climate resilience. Stakeholders are classified according to their **proximity to the hospital** (x-axis) and according to their **public or private status** (y-axis). In addition, they are also distinguished according to the function that they perform whether they have a **"decision making role"** (colored in blue), i.e. that takes decisions, such as elected representative and the hospital director, an **"operational role"** (in grey) i.e. which implement essential functions for the health system to operate, or an **"advisory role"** (in green) indicating that the stakeholder has scientific / expert / profane knowledge to provide, to facilitate the climate adaptation process.

The categories of stakeholders identified are described in the table below:

Key categories	Key representatives identified	Role in climate adaptation and interest for the project
<b>Within the hospital:</b> these stakeholders constitute the core team of the Community of Practice		
<b>Hospital Administration</b>	Management staff (hospital director, other managers), representatives of the HR department and finance department	They take decisions, especially on human and financial resources, which can tremendously impact the hospital's climate resilience capacity
<b>Emergency Management</b>	Crisis managers / Emergency medical units, medical staff (heads of clinics, doctors, nurses)	They are on the front line when a crisis occurs. Their experience coping with the Covid-19 crisis will be extremely valuable when designing the hospitals' climate adaptation strategy.
<b>Buildings and Infrastructure</b>	Technical services or engineering division, IT department, Sustainable development manager	These stakeholders can determine the strategic areas where resilience / adaptation actions regarding infrastructure (including IT infrastructure) and buildings can be implemented
<b>Entity in charge of hospital maintenance</b>	Either a private company or a unit fully integrated to the hospital	It could identify the maintenance issues that may increase the hospital buildings' vulnerability to hazards.
<b>Representatives of medical staff</b>	Unions, medical board/committee	As climate change has an impact on working conditions, it is appropriate to integrate medical staff representatives





Key categories	Key representatives identified	Role in climate adaptation and interest for the project
<b>Representatives of patients</b>	Users' committee, patients' association	They should be consulted since they are the direct beneficiaries of the care offer.
<b>Within the health system:</b> this category includes the stakeholders of the health system, with which the hospital interacts.		
<b>Supervisory Health Authorities</b>	Regional health agency, ministry of health (depending on the organization of the health system in the pilot country), consortium of hospitals	They have significant decision-making power as they decide (among other things) on the budget allocated to hospitals. They may also facilitate the transfer of patients to other hospitals in case beds are lacking. Hence, it is crucial to include them.
<b>Primary care services</b>	Community medical centers, doctors	They have a key role decongest the hospital in case of massive influx of patients due to a (climate-induced) health crisis.
<b>Crisis management operators</b>	Police, fire department, civil protection, NGOs such as the Red Cross	Being on the front line during an emergency, they have practical knowledge about crisis management as well as a good understanding of their community's vulnerabilities to climate/weather events (fires, floods, falling trees, etc.). Their experience of Covid-19 can be interesting to mobilize in view of the climate crisis.
<b>Logistics provider</b>	Logistics providers of food, pharmaceutical products, medical equipment, non-medical material such as bed linens, cleaning supplies, etc.	They must be prepared in case a climate hazard interrupts the supply of food or medicine, putting the lives of patients as well as the entire hospital organization at risk.
<b>Stakeholders at the territorial scale:</b> this category includes stakeholders which are not directly in the health system or hospital's resilience but could contribute to it via their expertise and role in the development of the local territory and its adaptation to climate change.		
<b>Elected representatives</b>	Local elected representatives interested in and involved on climate issues and/or risk management	They can play lead role to facilitate the adaptation to climate change of a territory and, indirectly, that of hospitals.
<b>Administration of local authorities</b>	Municipalities, inter-municipal governments (in particular the departments responsible for risk management / health / climate change issues)	They have a key role to implement decisions regarding a territory's adaptation to climate change (and, indirectly, that of hospital)
<b>Infrastructure provider</b>	Providers of utilities (energy, water, SWM, IT network) + road transportation	They must be prepared in case a climate hazard interrupts the supply of energy/water/wastewater, but also the transport infrastructure putting the lives of patients as well as the entire hospital organization at risk.
<b>Climate agencies</b>	Climate / environmental Agencies	Actor in charge of designing and implementing a Climate Action Plan at the local scale. They may also have previously carried out adaptation projects or vulnerability assessments at the territorial scale.
<b>Research organizations</b>	Universities / Research lab, think tanks, networks	These actors have significant academic / research expertise to bring which can be useful in the adaptation strategy.
<b>Meteorological Service</b>	Meteorological agency	They provide data, products, and services, such as daily forecasts of temperature, humidity and air-quality as well as long-range predictions and severe weather warnings, that help in monitoring disease outbreaks important for planning and providing public health.
<b>NGOs / Citizen groups</b>	Environment association / network, neighborhood association	It may be important to involve citizens concerned about climate issues or the preservation of their heritage.
<b>Consultancy</b>	Consulting / Engineering firms	They could bring expert knowledge on the topics of resilience, climate change or hospital organization. Civil engineering firms could also bring their expertise regarding building soundness.
<b>Insurance scheme</b>	Health insurance, building insurance, etc.	The emergence and recurrence of diseases, in addition to extreme weather events would potentially require insurance schemes to be updated / adapted.



## Step 3: Understanding the health system's adaptive and resilience capacities

This last step aims to get an understanding of the healthcare facility's resilience and adaptive capacities. A kick-off meeting maybe organized in this aim, with three objectives:

- Present the challenges of climate resilience for healthcare facilities and hospitals to a wider audience and get the perception of participants vis-à-vis climate change.
- Give an overview of the RESYSTAL project
- Present the community of practice, including a timeline to sustain the engagement of stakeholders.

**Nota:** To mobilize and motivate stakeholders, using animation tools such as Klaxoon (see below) is key, even more if the meeting cannot take place in person.

### 1. WHAT IS YOUR LEVEL OF UNDERSTANDING AND AWARENESS OF CLIMATE ISSUES AND THEIR IMPACT ON HEALTH?

1. Did you observe an increase of climate (direct or indirect) hazards over the past years in your hospital or in the territory where it is located? Which hazard?

2. What were the socio-economic impacts of these hazards? Were there impacts on the health of the population?

Figure 4 Screenshot of the Klaxoon platform used for the kick-off meeting of the community of practice at the Nikaia General State hospital

Following the meeting, a Draft Community of Practice Engagement Charter may be shared with participants to confirm their engagement. In addition, a climate resilience assessment questionnaire to be filled by hospital staff (excluding then stakeholders that are external to the hospital) may be filled in writing or via phone/VC/in person interviews.

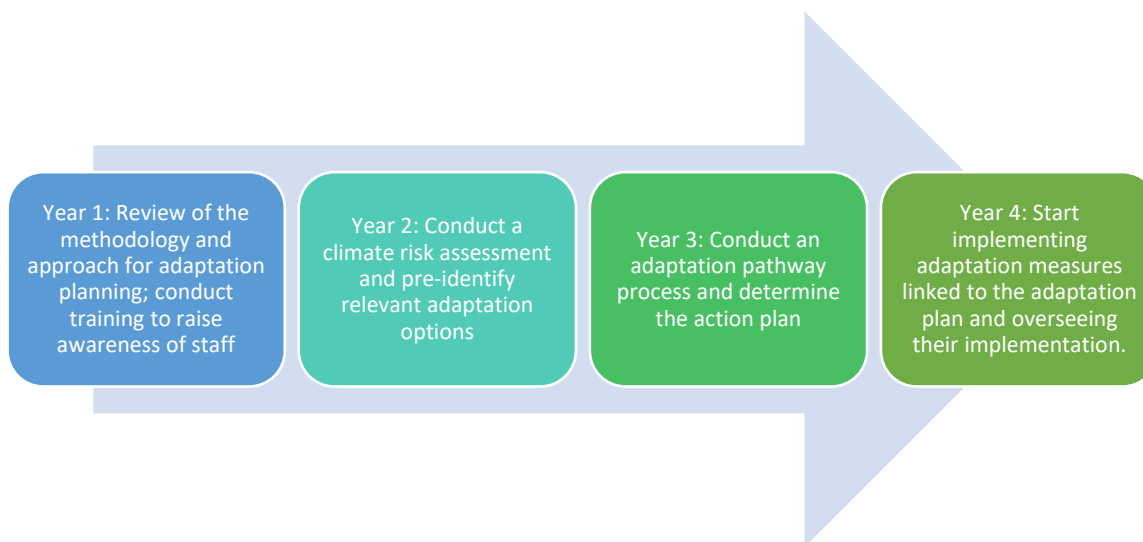
**Key material:** PowerPoint presentation for the kick-off meeting (Annex 4), Draft CoP engagement charter (Annex 5) and Resilience Capacity Assessment questionnaire (Annex 6)

**Output:** CoP engagement charter is shared with participants as well as assessment questionnaire with relevant hospital staff.



## Next steps

To keep the Community of Practice alive and active, one key aspect is to define the activities in which the CoP will be involved (in link with the outputs defined in step 1), but also to set a timeline for implementation. Below is a tentative timeline of activities of a community of practice over a 4-year period:



It is also advised to organize regular meetings (one every 6 months at least). Additional workshops would be organized to conduct the climate risk assessment and the adaptation pathway process<sup>2</sup>.

## Material (Annexes)

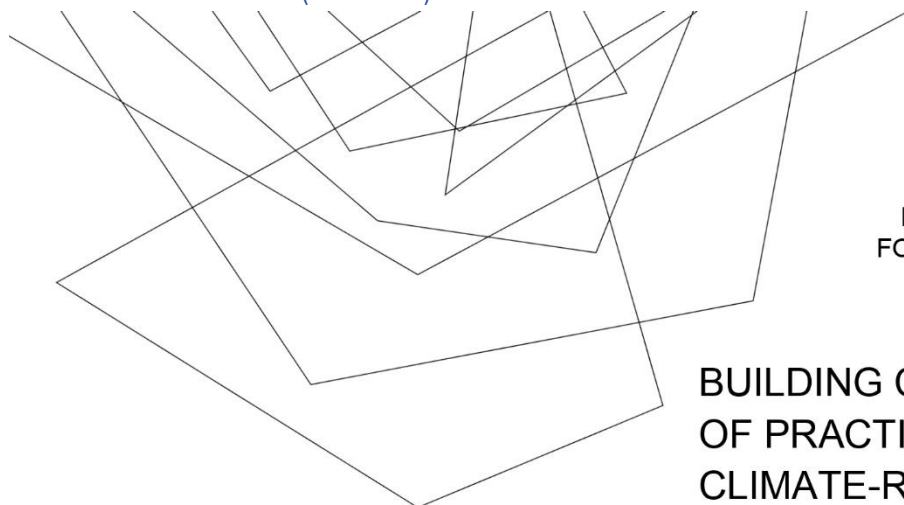
- PowerPoint presentation for the introductory meeting (Annex 1) that includes a stakeholders' matrix (Annex 3)
- Leaflet (Annex 2)
- PowerPoint presentation for the kick-off meeting (Annex 4)
- Draft CoP engagement charter (Annex 5)
- Resilience Capacity Assessment questionnaire (Annex 6)

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<sup>2</sup> For more information on the types of workshops to be organized, we refer to the **DC1.5 "Methodological Guide Explaining the Web-Based tools"**.



PowerPoint presentation for the introductory meeting (Annex 1) that includes a stakeholders' matrix (Annex 3)



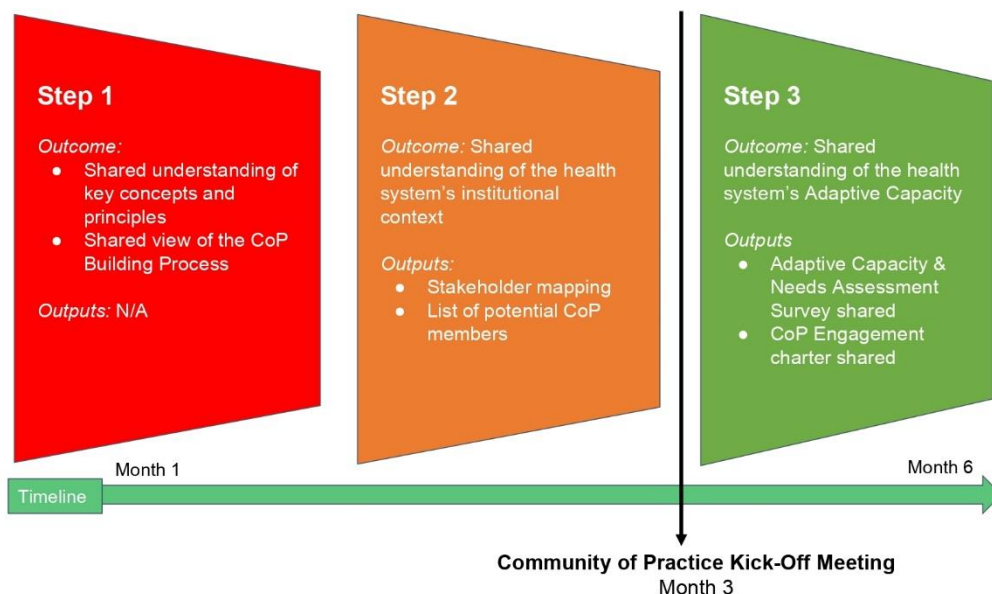
CLIMATE CHANGE  
RESILIENCE FRAMEWORK  
FOR HEALTH SYSTEMS AND  
HOSPITALS

## BUILDING COMMUNITIES OF PRACTICE FOR CLIMATE-RESILIENT HEALTH CARE FACILITIES

Introductory meeting #1



### An Incremental Approach for Community Building

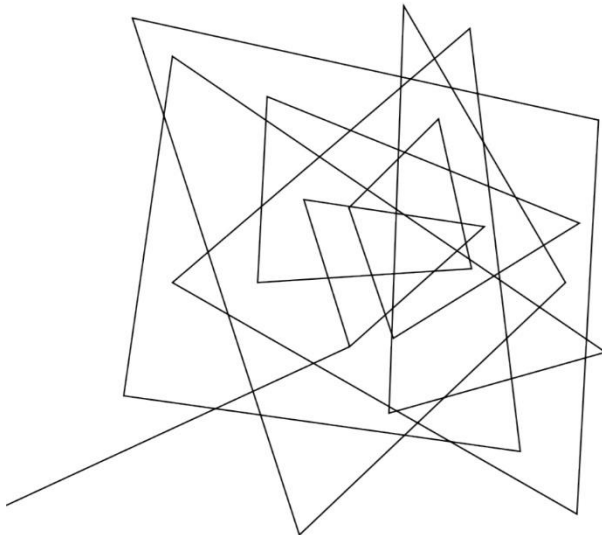
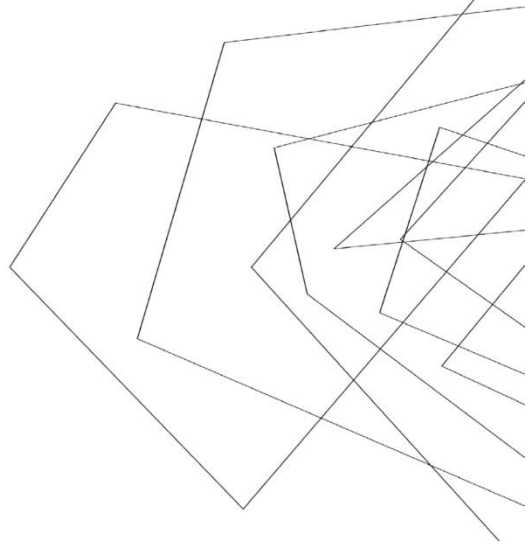




## MEETING OBJECTIVES

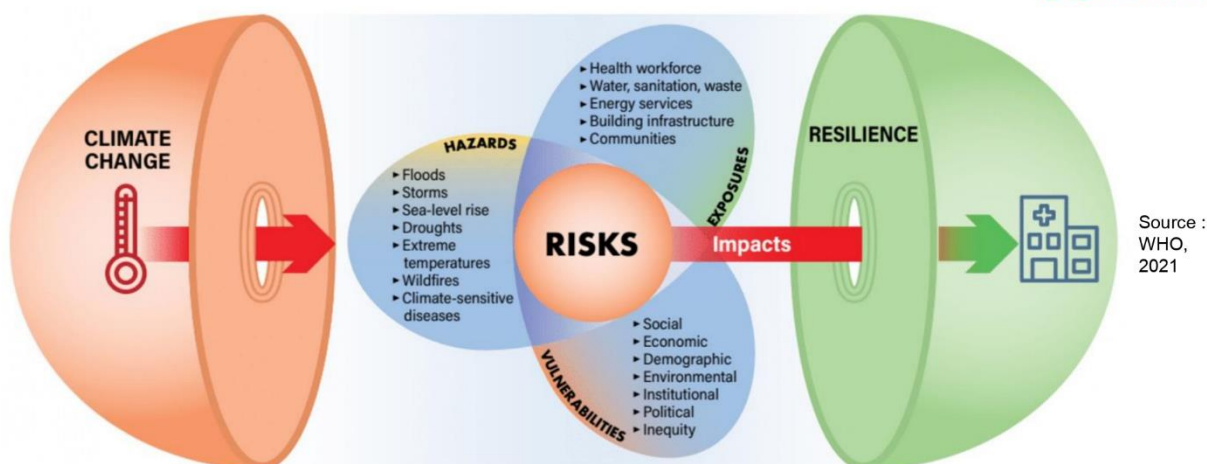
1. Discuss the CoP purpose and building strategy
2. Agree the approach to map stakeholders and prioritize the ones that will join the community of practice
3. Agree on the next steps

3



## 1. CoP Rationale and Purpose

## Definition of Key Concepts and their Application to Health Facilities



A **health facility** refers to a hospital, clinic, outpost or institution that provides comprehensive medical care to a significant number of people in a given area.

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## Definition of Key Concepts and their Application to Health Facilities

**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.”

**Exposure:** “The nature and degree to which a system is exposed to significant climatic variations.”

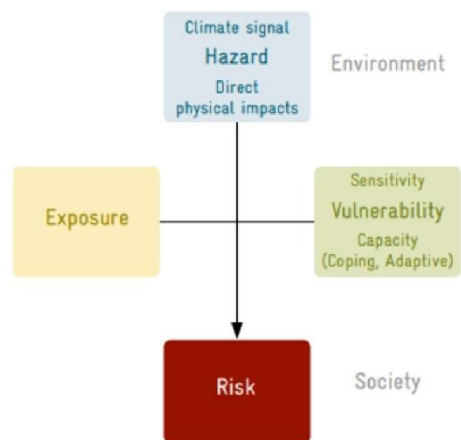
**Sensitivity:** “The degree to which a system is affected, either adversely or beneficially, by climate-related stimuli.”

**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.”

**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 Capacity:** “Set of factors which determine the capacity of a system to generate and implement adaptation measures.”

**Risk:** “Result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards”



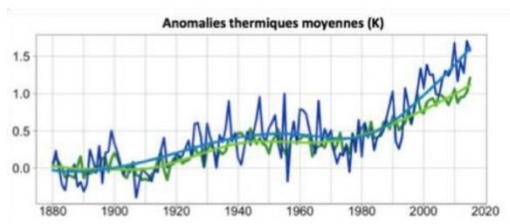
Source : GIZ, 2017

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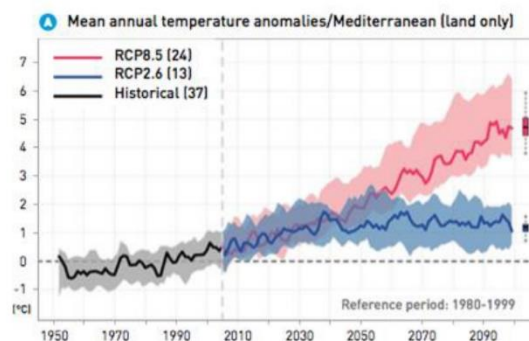


## A Worrying Evolution of Climate hazards: the Mediterranean region as a **climate hotspot**

- An overall temperature increase (IPCC, 2021) : +1,1°C compared to pre-industrial period
- An Increased frequency and intensity of climate hazards (floods, heatwaves, drought, wildfire, sea-level rise) for all scenarii



**Blue** : mean temperature anomalies in the **Mediterranean region only**  
**Green** : Global mean temperature anomalies



Projected change in annual temperature (for pathway RCP2.6 and RCP8.5)

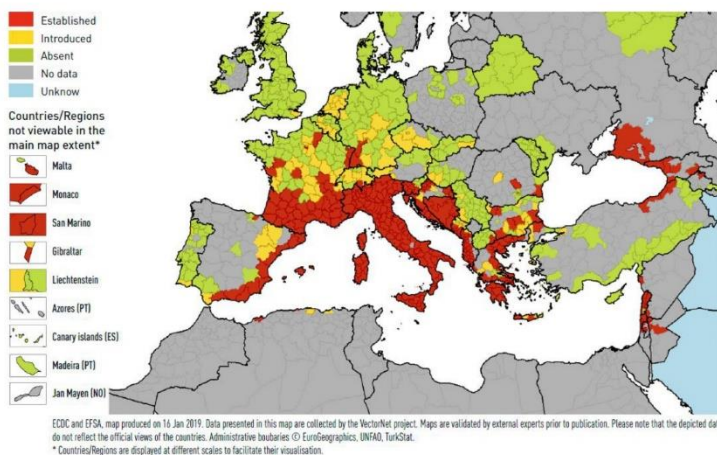
Source: MEDDEC

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## An Increased Impact of Climate Change on Public Health

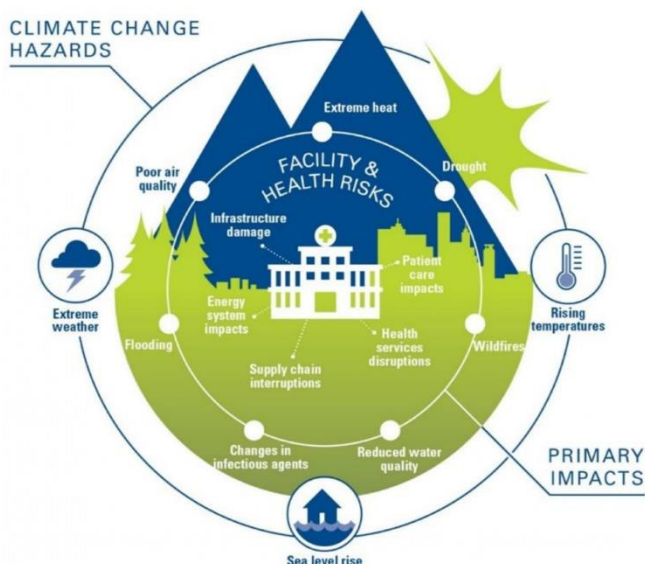
- Increasing heat-related/respiratory (due to ozone formation) morbidity and mortality
- Climate-sensitive diseases and health outcomes - airborne / waterborne / vectorborne diseases - for instance due to the spread of non-indigenous species (mosquitoes)
- Water and food scarcity leading to undernutrition

Source: MEDDEC (2020)



**Figure 5.1 | Distribution of the tiger mosquito, *Aedes albopictus*, in 2019 - a known vector of chikungunya and dengue viruses (from ECDC 2019).**

## Main Climate Impacts on Healthcare Infrastructure



Source : Aubie Vines G. et al, 2018

- **Material damages on healthcare infrastructures including hospitals** (air conditioning system) and dependent critical infrastructure (roads) and value chains (logistics)
- **Crisis Management:** large influx of vulnerable population (especially the elderly) jeopardizing the health system capacity to provide medical care

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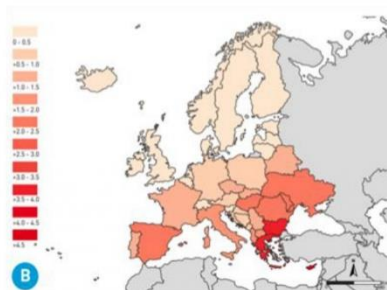
## An Example of Climate Impact on Health Infrastructure: The 2003 Heatwave in Europe & Prospects for the Future

2003 = Hottest summer on record in Europe for several centuries  
It led to health crises in several countries

In France, the ex-post evaluation revealed:

- No existing action plan to cope with the heatwave and dysfunction in the flow of information
- Lack of anticipation that led to a delayed adaptation of the hospital system
- Poor staffing of geriatric services and no referral of vulnerable elderly

*Projection of heat-related death fractions in 2050, A) RCP4.5 and B) RCP8.5 scenarii (according to Kendrovski et al., 2017)*



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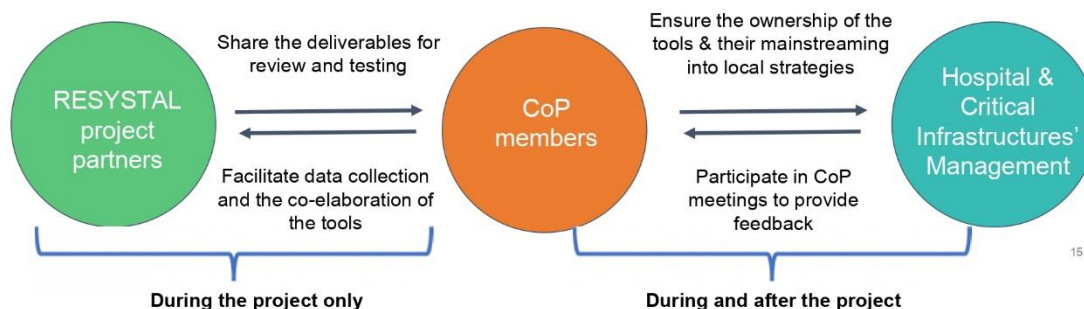




## Definition & Purpose of the CoP



- **Definition:** A working group, where contributors of the community are free to share their knowledge, their personal and professional experience.
- **Overarching goal:** Engage stakeholders in order to build a collective climate-resilient pathway
- **Specific objectives:**



Topics	Key technical partner(s) involved	Step 1: Facilitate data collection and the co-elaboration of tools (during the project)	Step 2: Facilitate the ownership and mainstreaming of tools (during the project)	Step 3: Ensure the sustainability & updating of the tools created at the local scale (after the project)
Climate Risk Prevention (Capacity Building)	ACTERRA	<b>Outcome:</b> Capacity building needs and interests are assessed <b>Role of the CoP:</b> Channel capacity building needs	<b>Outcome:</b> CoP members are well aware of climate risk for the health sectors as well as of adaptation solutions <b>Role of the CoP:</b> Identify and mobilize relevant stakeholders that would benefit from the trainings	<b>Outcome:</b> Knowledge & capacities are regularly assessed and increased <b>Role of the CoP:</b> Assess capacity building needs and train new employees to use the toolbox
Climate Risk and Vulnerability Assessment	NCSR, RINA-C	<b>Outcome:</b> Climate vulnerabilities and associated risks are assessed using a state-of-the-art risk assessment methodology & economic valuation tool <b>Role of the CoP:</b> Facilitate climate vulnerability data collection & assess the relevance of the methodology in the local context	<b>Outcome:</b> A policy for when and how to assess risks & vulnerabilities is designed and mainstreamed into the hospital strategy <b>Role of the CoP:</b> Facilitate engagement of hospital management (and that of related critical infrastructure organizations)	<b>Outcome:</b> The climate risk assessment policy is up to date <b>Role of the CoP:</b> Review the risk assessment tools, ensure that it is taken into account into the organizations' strategies
Adaptation Pathways & Action Plan	ACTERRA, UCAM, HCWHE, RINA-C	<b>Outcome:</b> Adaptation actions are identified and assessed using an adaptation pathway methodology as well as a cost-benefit analysis (CBA) tool <b>Role of the CoP:</b> Contribute to the elaboration of the adaptation action plan	<b>Outcome:</b> Adaptation pathways are mainstreamed into hospital & critical infrastructures' strategy <b>Role of the CoP:</b> Facilitate the endorsement of the adaptation action plan	<b>Outcome:</b> Adaptation strategies are implemented & regularly updated <b>Role of the CoP:</b> Follow-up the implementation of adaptation actions and contribute to the adaptation strategy update
Emergency Preparedness & Crisis Management	CRISISOFT	<b>Outcome:</b> Requirements to integrate climate adaptation issues into crisis management are assessed <b>Role of the CoP:</b> Facilitate the engagement of local stakeholders in software development	<b>Outcome:</b> The hospital's crisis management policy is revised to take into account the adaptation issues <b>Role of the CoP:</b> Facilitate the revision of the hospital's crisis management / business continuity plan (together with other concerned stakeholders)	<b>Outcome:</b> Crisis management policy is regularly updated <b>Role of the CoP:</b> Ensure that the crisis management plan is well coordinated with the adaptation strategy
Monitoring & Evaluation	RINA-C	<b>Outcome:</b> Relevant indicators are identified <b>Role of the CoP:</b> Review and approve the choice of indicators	<b>Outcome:</b> Indicators are mainstreamed into the hospital's M&E system <b>Role of the CoP:</b> Facilitate endorsement of monitoring parameters by hospital management	<b>Outcome:</b> Adaptation actions are regularly monitored <b>Role of the CoP:</b> Organize yearly meetings to assess progress
Communication & Knowledge Sharing	CH MILLAU, HCWHE	<b>Outcome:</b> Experience is shared and synergies are built at the European level <b>Role of the CoP:</b> Share lessons learned with other CoPs for climate-resilient healthcare facilities; support the communications and dissemination activities of the RESYSTAL project through their cooperation with pilot hospitals to raise awareness of the importance of building climate-resilient health systems.		



## CoP Key Roles

**6 areas for action** aligned with the RESYSTAL project activities:

- Climate Risk Prevention
- Climate Risk & Vulnerability Assessment
- Adaptation Pathways
- Crisis Management
- Monitoring and Evaluation
- Communication & Knowledge Sharing



## CoP Organization and Resources



### Internal organization:

- A core team of hospital staff (1 or several people) will manage the CoP and lead the discussions.
- RESYSTAL project's partners will support them technically
- Other roles will be, if needed, further specified during the CoP kick-off meeting



### Financial resources:

- No specific resources (beyond the EU contribution for the pilots hospitals)
- Additional sources of funding maybe triggered (possible grant from public authorities, or even funds from investors/insurers) depending on needs...

### Convening venues would/could include:



In-person or virtual  
workshops / meetings



Online repository of  
resources



Whatsapp group



Newsletter

Meeting frequency : 1 meeting every 6 months at least

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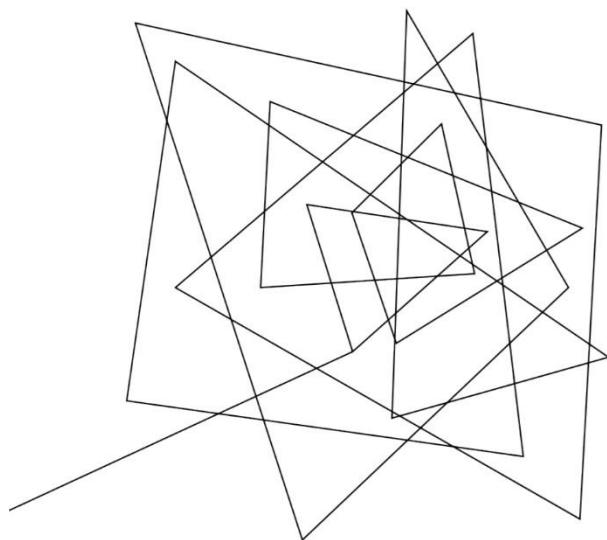
## A tool supporting the CoP engagement framework: the Community Engagement Charter



Draft version will be  
translated and  
adapted to the local  
context

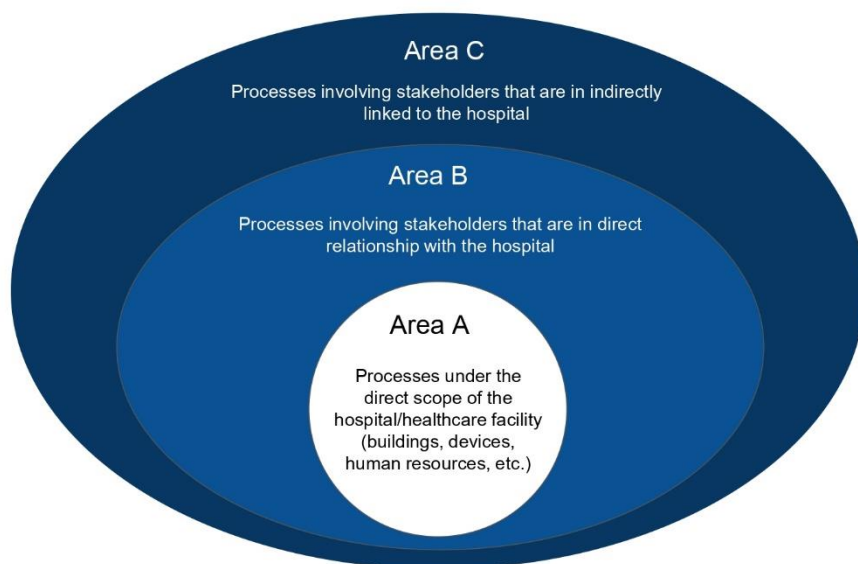
Each CoP member  
will review and sign  
the Charter

18



## 2. Mapping of stakeholders

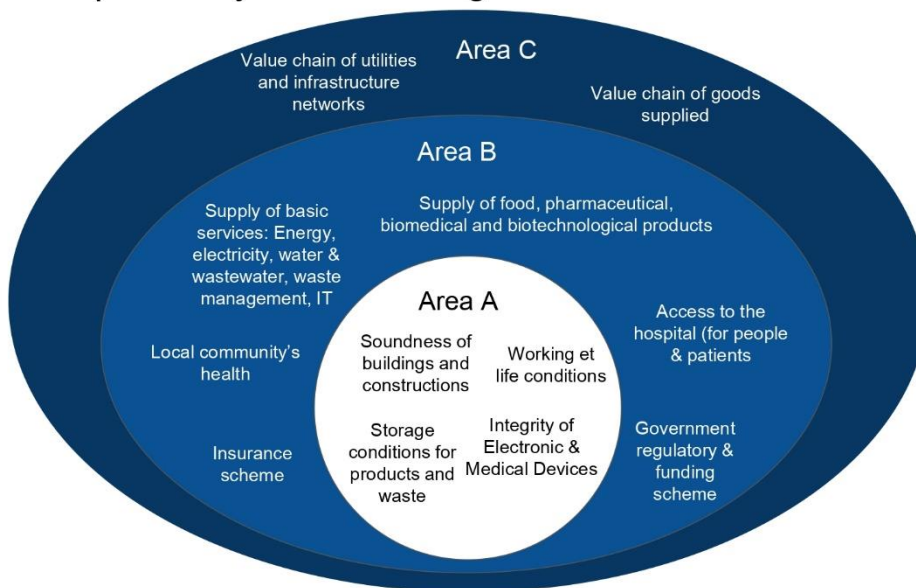
Visualization of the healthcare sector's value chain  
impacted by climate change



**Process:**  
a series of **actions** that  
you take in **order** to  
**achieve a result**

20

## Visualization of the healthcare sector's value chain impacted by climate change



**Main processes**  
to ensure  
hospital's normal  
operation and  
climate  
resilience

21

## Critical processes to ensure health service provision

### Health system scale



Local community's health



Supply of goods (food, pharmaceutical, biomedical, biotechnological products)



Access to the hospital (for employees & patients)



Supply of utility services



Insurance scheme



Government regulatory & funding schemes impacting the hospital

### Hospital scale



Soundness of buildings to withstand climate change (including heating/cooling system)



Integrity of key electronic & medical devices



Sound storage conditions for goods & waste



Working and living conditions (during normal operation & crisis events)



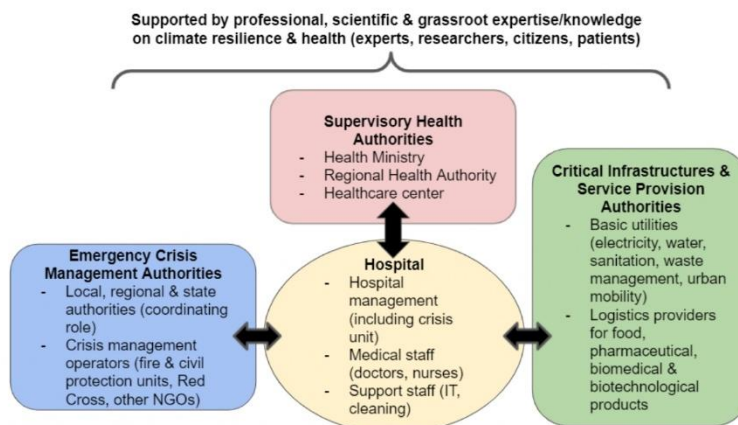


## Stakeholders Assessment and Prioritization



### Types of actors to be involved:

- Stakeholders who have influence over potential impacts and implementation of adaptation actions:
  - ◆ Supervisory / management role
  - ◆ Operational role (doctors, crisis operators)
  - ◆ Support role (financial, IT aspects, logistics, etc.)
- Stakeholders who are most likely to be affected by the risks (patients, hospital staff)
- Need a voice and/or have expertise & experience to bring



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## Example of Stakeholders' Matrix



Stakeholder Description		Assessment of Awareness on Climate Impacts and Influence on Climate Adaptation Actions			Potential Role in the CoP		
Name of the Stakeholder	Role (in the hospital & health system)	How is the stakeholder impacted by Climate Change (Example of concrete climate impacts it may cope with)	Has the stakeholder already implemented Climate Adaptation Actions?	Climate Adaptation Barriers and Levers/Needs	Interest for the CoP (what the stakeholder could bring)	Name of Contact Person, and Contact Details (optional)	Engagement Strategy (only if it is identified to join the CoP)
Within the Hospital							
Within the Health System							
Within the Territory							

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## Leaflet (Annex 2)



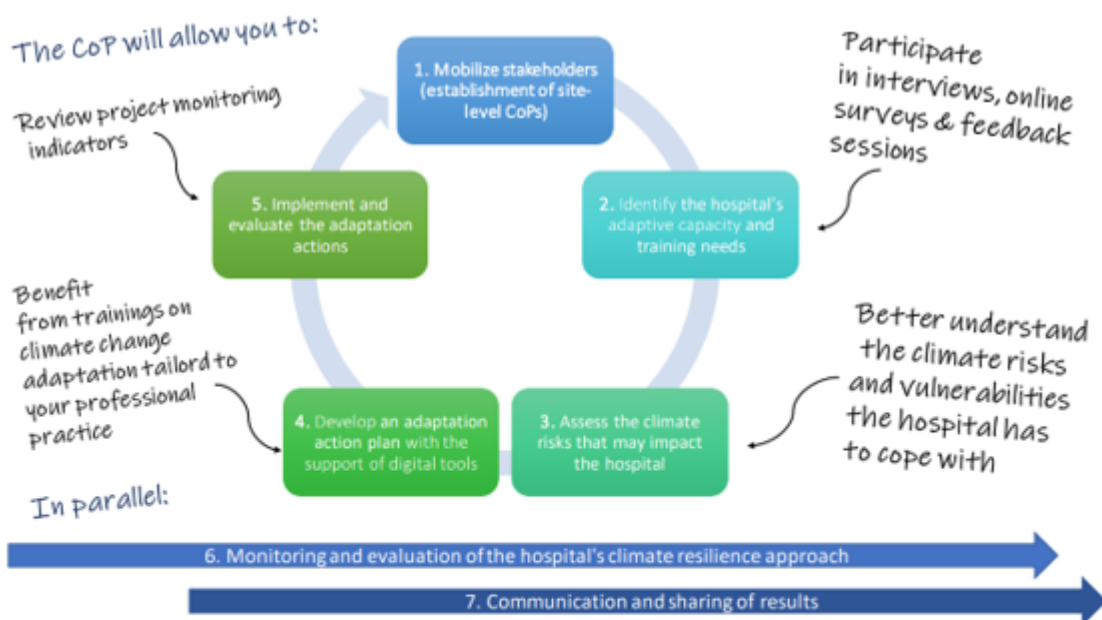
## Presentation of the community of practice (CoP) for adaptation to climate change at the (Pilot Hospital)

### The RESYSTAL (RESilience Framework for health SYStems and hospiTALs) project

RESYSTAL is a 4-year European project (2021-2025) that aims to support seven pilot hospitals in Spain, Italy, France and Greece in the advancement and implementation of their resilience strategy. Climate effects are to a large extent already impacting them: [fires jeopardizing the national Covid-19 vaccination strategy](#), [floods forcing an evacuation of the hospital and creating significant damage](#), [heat waves clogging emergency services in the face of the influx of vulnerable elderly populations](#).

### The community of practice

The project is based on communities of practice or working groups that bring together in each territory the stakeholders who contribute to hospital operation and/or who can provide expertise and experience in the medical, infrastructure, emergency, public health, [climate](#) or territorial fields. Each community is led by a small group of hospital staff and meets **once every six months** to discuss, exchange, debate and, ultimately, build the climate resilience pathway for the hospital and the critical infrastructures on which it relies. Membership of the CoP is free and voluntary, and is achieved by signing a charter.



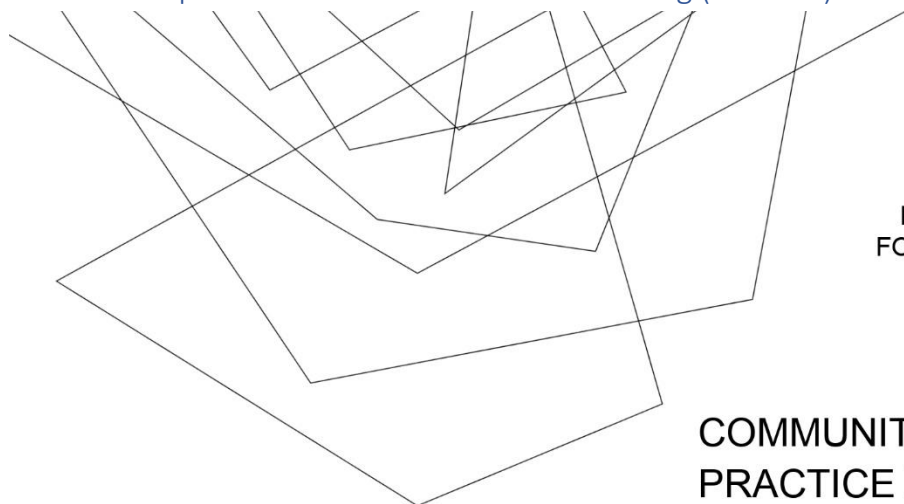
*Overview of the role of the communities of practice in the different stages of the RESYSTAL project*

### Establishment of the CoP

The kick-off meeting of the CoP will take place in **December 2021** in the premises of **(the pilot hospital)**. This meeting will allow you to better understand the main climate impacts that hospitals face and the existing solutions, to learn about the organization and role of the CoP throughout the RESYSTAL project, and finally, to participate in the climate adaptive capacity assessment survey of **(the pilot hospital)**.



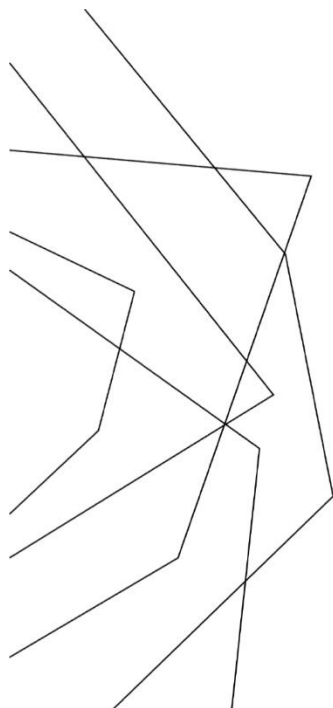
PowerPoint presentation for the kick-off meeting (Annex 4)



CLIMATE CHANGE  
RESILIENCE FRAMEWORK  
FOR HEALTH SYSTEMS AND  
HOSPITALS

## COMMUNITY OF PRACTICE FOR THE CLIMATE ADAPTATION OF NIKAIA HOSPITAL

Kick-off meeting



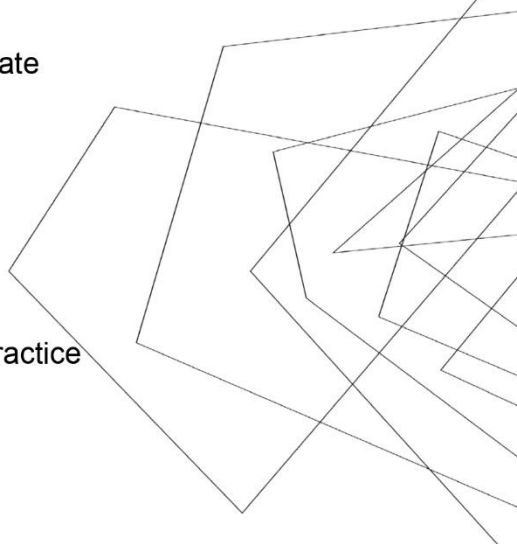
## Round of introductions

2

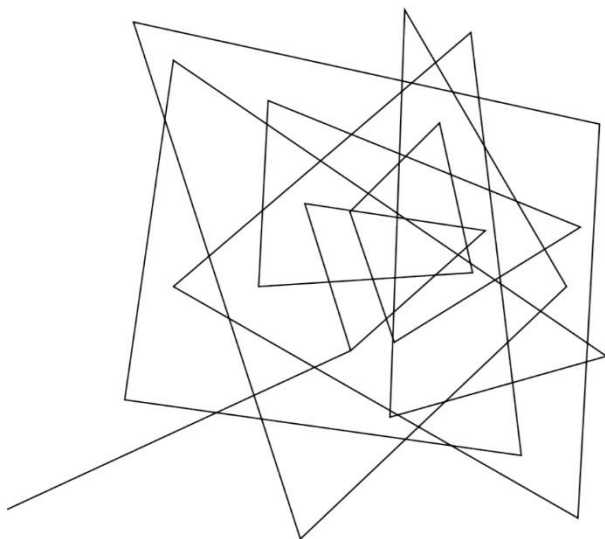


## MEETING AGENDA

1. Introductory remarks: The challenges of climate resilience for health facilities and hospitals
2. Interactive session #1: perception of climate change
3. Overview of the RESYSTAL project and presentation of the NHOSP Community of Practice



3



Introductory remarks: The challenges of climate resilience for health facilities and hospitals



## Health & Climate Change: Increasingly intertwined issues



“As observed during COVID-19 pandemic, **health systems are the main line of defence** in protecting populations from emerging threats, including the impacts of a changing and more variable climate.” COP26, 2021)



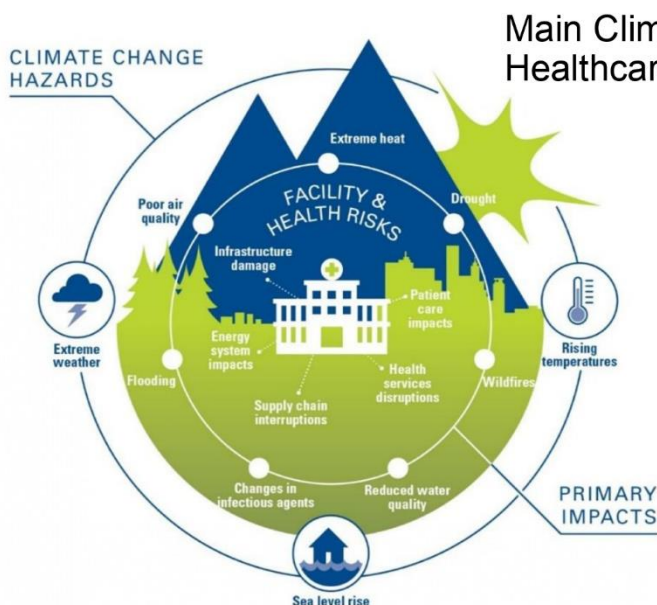
### COP26 Health Programme

#### Country commitments to build climate resilient and sustainable health systems

Commitment area 1 on Climate resilient health systems:

- Conducting climate change and health **vulnerability and adaptation assessments** at population level and/or health care facility
- **Developing a health National Adaptation Plan (HNAP)** informed by the health V&A, which forms part of the National Adaptation Plan
- Using V&A and HNAP to **facilitate access to climate change funding for health** (e.g. project proposals submitted to the Global Environmental Facility (GEF), Green Climate Fund (GCF) or Adaptation Fund (AF) or EU LIFE program)

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- **Short-term impacts:** large influx of vulnerable population (especially the elderly) jeopardizing the health system capacity to provide medical care
- **Middle/long-term impacts:** Physical damages and faster degradation on healthcare infrastructures including hospitals (eg air conditioning system) and dependent critical infrastructure (roads) and value chains (logistics)
- **Governance challenge:** the **hospital has to redirect** investments to anticipate the climate impacts.

“Cost of adaptation is less than cost of inaction”

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### EXAMPLE 1: Cool Roofing on the Adamant Hospital Barge in Paris (France)



Climate impact addressed:

Implementing entity: **COOL ROOF**Resilience strategy: **"Passive cooling"** approach for roofs

→ Provision of a white coating which has thermo-reflective and anti-UV properties

Results and feedbacks :

→ The temperature felt in the barge was reduced by **[6;15]°C**  
 → Better comfort for hospital staff and for patients  
 → Decrease of air conditioning costs during a hot weather

Level of transformation: **+++**

- No changes to the structure of the buildings
- No changes on the staff organization

Cost : **€€€**

7

### EXAMPLE 2 : Climate risk assessment in Nanaimo Regional General Hospital (Canada)



Climate hazard addressed : all-hazards approach

Special Case			Climate Parameter and Risk Score														
Low Risk			Medium Risk														
High Risk																	
Division	Category	Infrastructure Component	Contaminated Water	Heat Waves	Strong Winds	Storm Intensity and Frequency	Warmer Wetters	Air Pollution (Forest Fire)	Cold Snap	Winter Storm (Ice Storm)	Humidity	Daily Temperature Range	Dryer and Warmer Summers	Water Shortages	Sea Level Rise	Warmer Domestic Supply	Flooding
Mechanical	Cooling Plant	Back-up cooling water															
Mechanical	Critical Air Systems (DR, NICU, PAR, MDI)	Cooling Coils	42								42						
Mechanical	Cooling Plant	Cooling Towers															
Mechanical	Thermal Plant	Boilers													36		
Mechanical	Cooling Plant	Chilled Water Pumps & Distribution	35												36		
Mechanical	Cooling Plant	Chillers															
Mechanical	Cooling Plant	Condenser Water Pumps & Distribution	35								35						
Mechanical	Cooling Plant	Condenser Water Pumps & Distribution															
Mechanical	Cooling Plant	Cooling Towers	35								35						
Mechanical	Cooling Plant	Cooling Towers															
Mechanical	Critical Air Systems (DR, NICU, PAR, MDI)	Air Distribution (Ductwork, dampers, etc.)									35						
Mechanical	Cooling Plant	Cooling Coils	35								35						
Mechanical	Critical Air Systems (DR, NICU, PAR, MDI)	Fans															
Mechanical	Critical Air Systems (DR, NICU, PAR, MDI)	Medical Air															
Mechanical	Medical Gases	Oxygen (O2)															
Mechanical	Other Central Air Systems	Cooling Coils															

Level of transformation: **+++**

- Changes focused on identified infrastructures
- Changes in the hospital organization : taking into account climate risks

Cost : **€€€**Resilience strategy: **integrating climate risks into governance**

→ Nanaimo Hospital developed a comprehensive **climate risk assessment matrix** which became an **integral part of their organizational decision-making**

→ It built on the the **risk assessment protocol** developed by the Public Infrastructure Engineering Vulnerability Committee (PIEVC) of Engineers Canada.

Results:

→ Allowing hospital management to make **rational decisions** about capital investments in the context of likely climate impacts in the future

→ **Investing on the prevention** of climate-related emergencies is considerably less costly recovering from them

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### EXAMPLE 3 : Coping with floods in the Spaulding Rehabilitation Hospital (Boston, USA)



Climate hazard addressed :



Level of transformation: +++

- Full upgrading of the construction

Cost : €€€

#### Resilience strategy: Coping with floods

- Objective : keeping the site next to the water, because water activities comprise a key part of the rehab program
- The building was raised much higher than required by the code, keeping water out even with a catastrophic flood.

#### Results:

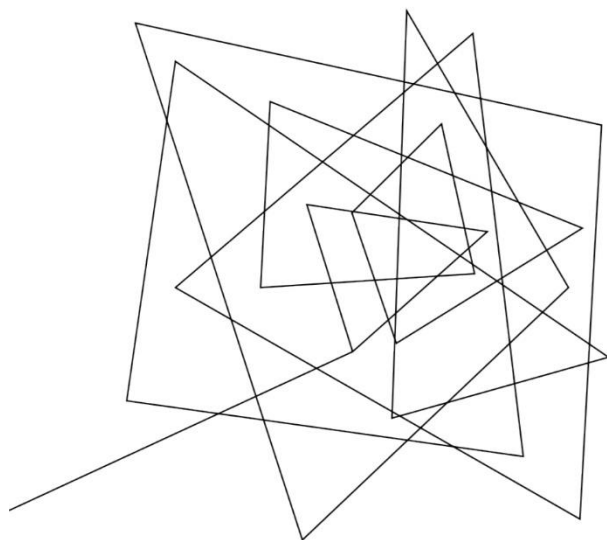
- The entire first floor of the building could be flooded with only minor damage and while enabling the upper floors of the building to remain fully occupied and operational
- Better comfort patients that have access to sea view/activities

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## Klaxoon session #1 Climate change perception

10



## Presentation of the Community of Practice

### Definition & Purpose of the CoP



→ **Overarching goal:** Engage stakeholders from the hospital and beyond (critical infrastructure, climate authorities, local authorities) to build a collective climate-resilient pathway for the Nikaia Hospital

→ **Specific objectives:**

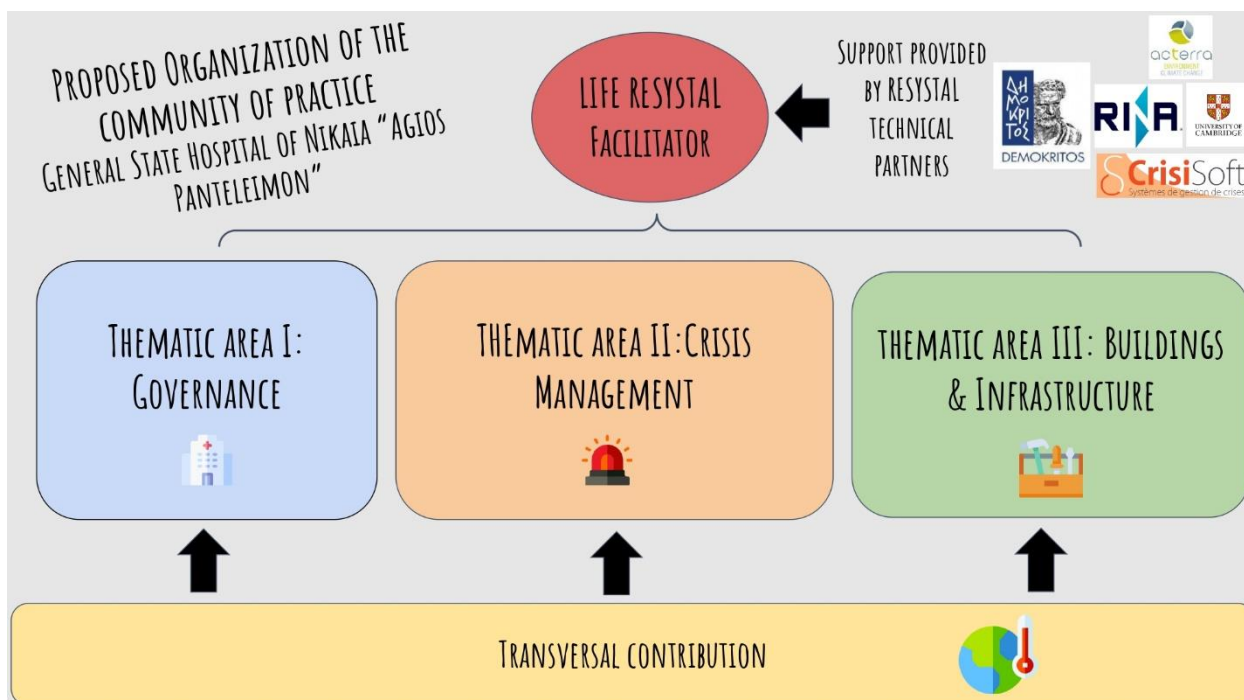
- Facilitate the collection of data by technical partners
- Ensure that project deliverables and tools created respond to the needs of the hospital
- Monitor the progress of the hospital's adaptation process and ensure the engagement of local stakeholders during the project and after



***Definition:** an exchange platform, where contributors of the community share their knowledge, their personal and professional experience on the climate change and health challenges and solutions*

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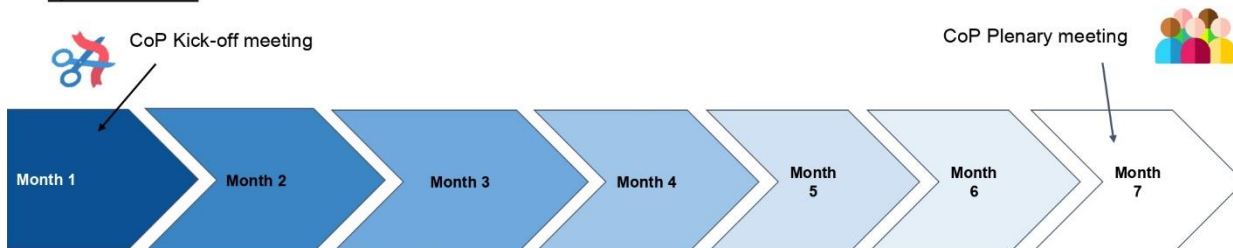


### Tentative timeline of CoP activities

→ Plenary meeting every 6 months to **monitor the progress of the hospital's adaptation process and ensure that the outputs of technical partners meet the expectations**

→ Additional working group meetings or interviews with CoP members will be organized depending on the needs assessed during project implementation

#### 1) CoP activities





## A tool supporting the CoP engagement framework: the Community Engagement Charter

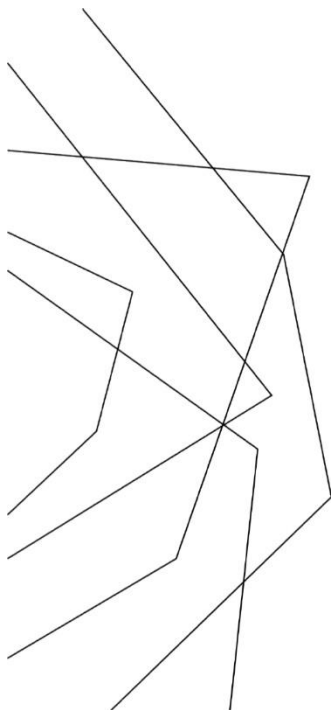


Non-binding document



Each CoP member  
will review and **sign**  
**the Charter**

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# Klaxoon

## session #2

Perception of the  
RESYSTAL project

17



## Next steps : Data collection



→ *January 2022*: Individual or group interviews organized with hospital staff to evaluate the **hospital's capacity to adapt to climate change**. 3 topics:



### 1) Governance

**Who is involved?**

Representatives from human resources and finance, hospital administration



### 2) Crisis management

**Who is involved?**

Medical staff and staff involved in emergency response



### 3) Buildings and infrastructure

**Who is involved?**

engineering division, maintenance company (optional), IT department





## Climate change REsilience framework for health SYStems and hospiTALs

### Community of Practice for Climate Resilience Healthcare Facilities' Engagement Charter General State Hospital of Nikaia "Agios Panteleimon"

#### **Background and Rationale**

The upsurge and violence of extreme weather events in recent years linked to climate change (heat waves, floods, etc.) have demonstrated the need for hospitals to be supported in analyzing the impacts of climate change for hospitals and being prepared and resilient to crises and emergency situations, whether they are climatic and/or health-related.

This community of practice (CoP) is initiated within the framework of the LIFE RESYSTAL project whose objective is to increase the climate adaptation capacities and resilience of the European Health Infrastructure and related dependent critical infrastructures. This 4-year project (2021-2025) will develop, demonstrate, evaluate and disseminate a framework for climate-resilient health systems in four sites and seven pilot hospitals:

- In France, the Hospital Center of Millau comprising the hospitals of Millau and the hospital of Saint-Affrique
- In Spain, the Galician Health Service (SERGAS) comprising the University hospital of Ourense, the public hospital of Verin and the public hospital of Valdeorras;
- In Italy, the university hospital complex of the polyclinic of Bari and the Giovanni XXIII hospital;
- In Greece, the Nikaia General State Hospital, located in Piraeus, Athens.

The LIFE RESYSTAL project and its CoPs contribute to address the current gaps in Climate Change Adaptation (CCA) policies and strategies to strengthen the climate resilience of health systems and consequently of hospitals. Current CCA strategies focus primarily on enhancing the resilience of key infrastructure, such as energy, transport and buildings, but overlook the CCA needs of the healthcare sector and its dependency on critical infrastructures.

#### **Definition and Purpose**

The Community of Practice is a place of actionable knowledge and solutions regarding the climate resilience of healthcare facilities where contributors i.e. members of the CoP are free to share their knowledge as well as their personal and professional experience.





The CoP's overarching goal is to **build a collective climate-resilient pathway for the hospital and its dependent critical infrastructures.**

Specific objectives include (see annex 1 for more details):

- **Objective 1:** To facilitate the collection of data needed for the elaboration of the climate adaptation toolbox and other project outputs produced by technical partners<sup>3</sup>, and ensure that they respond to the needs of the hospital
- **Objective 2:** Ensure the buy-in of local stakeholders to the project overarching goal and the endorsement of the hospital's adaptation strategy
- **Objective 3:** Monitor the progress of the hospital's adaptation process.

The establishment of the Communities of Practice will constitute the first step of a larger European-scale (scaling) network to initiate synergies between stakeholders for more climate resilient health infrastructure.

### **Membership**

The CoP member organizations and their representatives are presented in the table below:

Name of the Organization/Department/Entity <sup>4</sup>

This list may evolve during the course of the project. Participation is free and voluntary. When they join the CoP, members commit to actively engage in its activities.

### **Community Organization**

The CoP will be moderated by a core team (steering committee) of hospital staff, supported by the inputs of RESYSTAL technical partners. In order to facilitate discussion, it is proposed to set up working groups (see annex 3). Other roles will be, if needed, further specified during the CoP meetings.

---

<sup>3</sup> Technical partners of the RESYSTAL project include: ACTERRA, NCSR, CRISISOFT, RINA-C and UCAM.

<sup>4</sup> Add as many rows as needed.



## **Resources**

The CoP will be maintained thanks to internal resources but potentially also funding coming from the enabled environment created through the project (possible grant from public authorities, or even funds from investors/insurers).

## **Platform and Other Convening Venues**

Convening venues of the CoP will be discussed by members. They may include (but are not restricted to):

- In-person / virtual meetings for technical workshops and trainings.
- Whatsapp / Teams group discussions
- A newsletter which will aim at sharing information on climate change adaptation issues at the scale of healthcare infrastructure
- A platform (possibly hosted in the website created for the project) that could include a repository of online resources on healthcare and climate change trends.

## **Activities and Key Topics for Discussion**

A kick-off meeting of the Community of Practice is scheduled for December 2021. **One plenary meeting gathering all stakeholders will be organized every 6 months** (see the tentative agenda of the CoP meetings in annex 2).

Additional meetings or interview will be organized with CoP members depending on needs assessed during project implementation.

## **Community Charter approval**

The undersigned acknowledge they have reviewed the CoP engagement charter and agree to launch the Community of Practice for Climate-Resilient Healthcare Facilities. Changes to this community charter will be coordinated with and approved by the undersigned or their designated representatives.

Name / Title / Role

Signature

## **Annex 1 – Role of the CoP**

## **Annex 2 – Tentative agenda of CoP Plenary meetings**

## **Annex 3 – Proposed internal organization of the CoP**



## Resilience Capacity Assessment questionnaire (Annex 6)

### **Leadership, Governance and Data**

<b>Section objectives</b>	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.
<b>Potential participants</b>	Hospital Director/Management, Board Member, Chief financial officer, Human resources director, IT manager, Staff responsible for addressing climate change issues, Health professionals
<b>Illustrative supporting documentation</b>	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?

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 and Infrastructure**

<b>Section objectives</b>	Review if measures have been taken to build the adaptive capacity & resilience to climate change of i) buildings, ii) infrastructure.
<b>Potential participants</b>	Technical services / Engineering department of the hospital, Maintenance company
<b>Illustrative supporting documentation</b>	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**

## **2.4 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**

## 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

## **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**