



## **WP1 | DIAGNOSIS & RESILIENCE ASSESSMENT TOOL DEVELOPMENT**


### **D1.1 (D1) Scoping Review – Interim report**

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## History of Changes

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## 1. Introduction

The **RESIL-Card project** aims to contribute to enhance European health systems' resilience to maintain essential healthcare for people with cardiovascular (CV) diseases during any future crisis that impacts care delivery, such as extreme climatic events, pandemics, or other. In specific, the RESIL-Card project will develop a '**resilience assessment tool**' for **European CV care pathways**, which will encompass guidance to assess and improve health systems' preparedness to absorb shocks, notably focusing on people with CV diseases, recommendations for the maintenance of essential CV care during these events, as well as resources to develop or refine local, regional, national or international guidelines.

The RESIL-Card consortium is set to **learn from the COVID-19 pandemic** disruptions, innovations and good practices. Building from these lessons learned, the project intends to foster collaboration among stakeholders in the CV ecosystem with a people-centeredness focus, including strengthening components such as health literacy and communication, ultimately contributing to reduce the burden of CV diseases.

**Work Package 1 (WP1)** is responsible for the development of the 'resilience assessment tool' for European healthcare systems to use during crisis, which will be piloted in WP2. The specific objectives of WP1 are:

1. To map and compare existing **CV care pathways** and experienced **disruptions** during the COVID-19 pandemic in European health care systems;
2. To identify **adaptations** with a specific focus on innovative **data-driven** practices and tools in CV care delivery;
3. To **develop** a 'resilience assessment tool for CV care pathways' to support European health care systems in strengthening the continuity of CV care delivery.

The work developed by WP1 encompasses: a **literature review (T1.1; D1.1)**, a survey to members of a large community of cardiologists (T1.2; D1.2), and focus groups with stakeholders involved in the CV care pathway at the various health system levels (T1.3, D1.3), which culminates with the 'resilience assessment tool' (T1.4, D1.4), which will be piloted in WP2.

This deliverable is the **intermediate deliverable of the literature review** (month 6). The aim of the literature review is to map the disruptions, adaptations, and innovations during the COVID-19 pandemic. This deliverable outlines the **methodology** of the literature review, which includes: a) the update of a previous scoping review, b) the development of a new search strategy to retrieve additional scientific articles focusing on relevant components of resilience, as well as the c) search of grey literature. The deliverable also includes some **preliminary results** from the grey literature search.

The **final review** will be the result of the **development and continuous update of this scoping review** until the end of the project (month 36).

## 2. Aims of the Scoping Review

The scoping review aims to map and compare existing CV care pathways and disruptions during the COVID-19 pandemic, focusing on innovative tools and practices to ensure continuity of care during crises and to tackle health inequalities. Innovations can address services delivery re-design, enhanced stakeholder cooperation, improved data collection and use, digital technologies, task shifting and substitution, as well as enhanced surge capacity.

### 2.1. Research questions

The scoping review intends to answer the following research questions:

- 1) How can existing European **CV pathways** be described and compared?
- 2) How can the **care disruptions** for patients with cardiovascular diseases across the CV pathway be **assessed and measured**?
- 3) What **innovative tools and practices** have emerged during the COVID-19 pandemic to ensure care continuity and what benefits and challenges related to these innovations were identified?
  - 3.1) What guidance, recommendations, or guidelines are available to face the COVID-19 pandemic to ensure care continuity to patients with cardiovascular diseases?
- 4) Which **domains and indicators of resilience** are relevant to assess detection, absorption, recovery, and adaptation of cardiovascular care pathways during crises?

### 2.2. Key terms

We used the Population (or participants)/Concept/Context framework - **PCC framework** (Pollock et al., 2023) - to identify the concepts applicable to the primary research questions of the scoping review and inform the development of the search strategy (Table 1).

Table 1 – PCC framework

<b>Participants</b>	Patients with acute cardiovascular diseases that need emergent/urgent treatment, with substantial impact on quality and length of life: acute myocardial infarction, unstable angina and valvular disease (left-sided valvular emergencies).
<b>Concept</b>	Resilience of European CV pathways focusing on the inputs, outputs and outcomes of patients with CV diseases during crises
<b>Context</b>	CV care delivery in European health systems during the COVID-19 pandemic

Based on the research questions and the PCC framework, a concept table was developed, in which the key concepts are identified (Table 2), to inform the development of the search strategy to apply in the scientific databases.

Table 2 – Concept table

<b>Key concepts</b>			
<b>Concept 1</b>	<b>Concept 2</b>	<b>Concept 3</b>	<b>Concept 4</b>
COVID-19 Pandemic	Acute heart diseases	Resilience Adaptability Flexibility Preparedness Strategies/Guidance	Innovation Innovative tools

### 3. Methods

The scoping review will follow the methodological framework developed by Arksey and O’Malley (Arksey & O’Malley, 2005) and Levac et al (Levac et al., 2010). The PRISMA checklist—extension for scoping reviews (Tricco et al., 2018) will be used for reporting.

A scoping review methodology allows to map the literature (Levac et al., 2010; Lockwood et al., 2019; Munn et al., 2018), to synthesise and communicate emerging evidence (Levac et al., 2010; Lockwood et al., 2019), as well as to identify knowledge gaps.

This scoping review will build on two previous studies: a scoping review published by the Amsterdam UMC research group (de Lange et al., 2022) and work conducted by the We CARE initiative with the input of healthcare professionals.

### 3.1. Inclusion and exclusion criteria

**Inclusion criteria:**

- studies describing structure, process, or outcome indicators of care provided to patients with cardiac diseases during the COVID-19 pandemic;
- diseases management guidelines or recommendations and health services organization recommendations providing guidance about healthcare delivery to patients with cardiac diseases during the COVID-19 pandemic;
- studies describing the use of innovative practices in healthcare delivery to patients with cardiac diseases during the COVID-19 pandemic to ensure care continuity;
- studies or reports that assess the resilience of health systems in healthcare delivery to patients with cardiac diseases during the COVID-19 pandemic;
- original journal articles with empirical data, including those using quantitative or qualitative methods, such as randomized controlled trials, cohort studies, case-control, cross-sectional designs, case reports, systematic reviews, meta-analyses.

**Exclusion criteria:**

- non-primary studies (editorials, commentaries);
- prediction models;
- studies conducted in low-income countries,
- studies about impact on children or pregnant women.

**Language limitation:**

No exclusion regarding language. Google translate will be used to translate articles written in languages other than English, Dutch, Portuguese, Spanish, French, or Italian.

**Time limitation**

2019-onward.

### 3.2. Data sources

**Databases to search for scientific publications:**

PubMed (Medline) and Embase.

**Grey literature key sources:**

- CORDIS, European Union research results (<https://cordis.europa.eu/>)



- COVID-19 Health System Response Monitor (HSRM) of the WHO Regional Office for Europe, the European Commission, and the European Observatory on Health Systems and Policies (<https://www.covid19healthsystem.org>)
- OpenGrey ([www.opengrey.eu](http://www.opengrey.eu))
- Organisation for Economic Co-operation and Development (OECD) (<https://www.oecd.org/>)
- WHO library database (<http://kohahq.searo.who.int/>)

### 3.3. Search strategy

#### a) Updated search strategy from previous scoping review

A previously published scoping review (de Lange et al., 2022) has provided an overview of the impact of the COVID-19 pandemic on care delivery for patients with cardiac diseases, as assessed through performance indicators. The **list of retrieved studies will be updated** using the same search strategy in the Pubmed and Embase databases. This update will facilitate a complete overview for the entire COVID-19 pandemic period.

#### b) New search strategy

Based on the key terms identified (Table 2), a new search strategy is being developed for the Embase database, which currently stands as:

*(pandemic/mj/exp OR 'coronavirus disease 2019'/mj/de OR 'Severe acute respiratory syndrome coronavirus 2'/mj/de OR (pandemic\* OR coronavirus-disease-2019 OR covid19 OR covid-19 OR sars-cov-2 OR 2019-novel-coronavirus OR 2019-ncov OR lockdown OR lock-down):ti) AND ('heart disease'/exp OR cardiology/de OR 'interventional cardiology':ti OR STEMI:ti OR NSTEMI:ti OR ACS:ti OR 'acute coronary syndrome':ti OR TAVI:ti OR 'acute heart failure':ti OR 'heart failure':ti OR (('emergency ward'/exp OR 'emergency care'/de)) OR 'cardiovascular disease'/exp OR hypertension/exp OR (((heart OR cardiovascul\*) NEAR/3 (disease\* OR patient\* OR emergenc\*)) OR cardiolog\* OR (((emergency OR acute) NEAR/3 (ward\* OR care OR department\*))))):ab,ti) AND resilience:ti,ab OR innovation:ti,ab NOT (model/exp/mj OR (model\*):ti) NOT ([conference abstract]/lim AND [2000-2019]/py) NOT ([animals]/lim NOT [humans]/lim) NOT (pregnancy/exp/mj OR 'pregnant woman'/mj OR (((COVID-19 OR COVID19 OR coronavirus\* OR corona-virus\* OR SARS-CoV-2) NEAR/3 (outcome\* OR case\* OR patient\* OR pneumoni\* OR progression\* OR prognos\* OR mortalit\* OR fatal\* OR sever\* OR vaccine\*)) OR pregnan\* OR ((COVID-19 OR COVID19 OR coronavirus\* OR corona-virus\* OR SARS-CoV-2) NEAR/3 (mortalit\* OR outcome\* OR fatal\*)):ab)) NOT ((child/exp NOT adult/exp) OR (pediatr\* OR paediatr\* OR child\* OR infan\* OR adolescen\*):ti) NOT ('practice guideline'/de OR (guideline\*):ti)*

This search strategy will be piloted and refined over the coming months to ensure that the publications retrieved adequately and relevantly answer the research questions.

#### c) Grey literature

The search of grey literature will focus on the work conducted by regional, national, and international organisations at the European level on the topic of ‘health systems resilience’, as well as the evidence about the impact of the pandemic for patients with cardiac diseases conducted by the We CARE Alliance and by other national and international organisations.

## 4. Data extraction

A table for data extraction will be developed to collect data obtained through the updated search strategy (3.3-a). This table will be piloted by more than one researcher in some of the studies to ensure its applicability. A first draft of the template for data extraction is presented in Table 3.

*Table 3 – Draft for template for data extraction for the articles retrieved in the new search strategy*

<b>Fields</b>	<b>Possible categories</b>
Title	
Author	
doi	
General topic of the study	Recommendations / Guidelines; Patient Perspective; Impact On Care; Workforce; Innovation Resilience
Phase of care pathway	Access, Diagnosis, Treatment, Outpatient, Outcome Cross-Cutting
Resilience themes	Workforce Care delivery Governance and trust Communication and cooperation Medicals devices and products Data collection and use
Cardiac disease/ clinical area	Heart Failure Acute Coronary Syndromes Laboratory Analysis Imaging

## 5. Data analysis

A qualitative content analysis (Pollock et al., 2023) will be used to identify key characteristics related to the concept of resilience and inform the development of the resilience tool.

## 6. Preliminary results

### 6.1. Impact of the COVID-19 pandemic and performance indicators

In the **scoping review previously conducted** by the Amsterdam UMC team, the authors have analysed more than 1600 indicators which were sourced from 94 scientific papers, reporting on 109 countries (Figure 1) (de Lange et al., 2022).

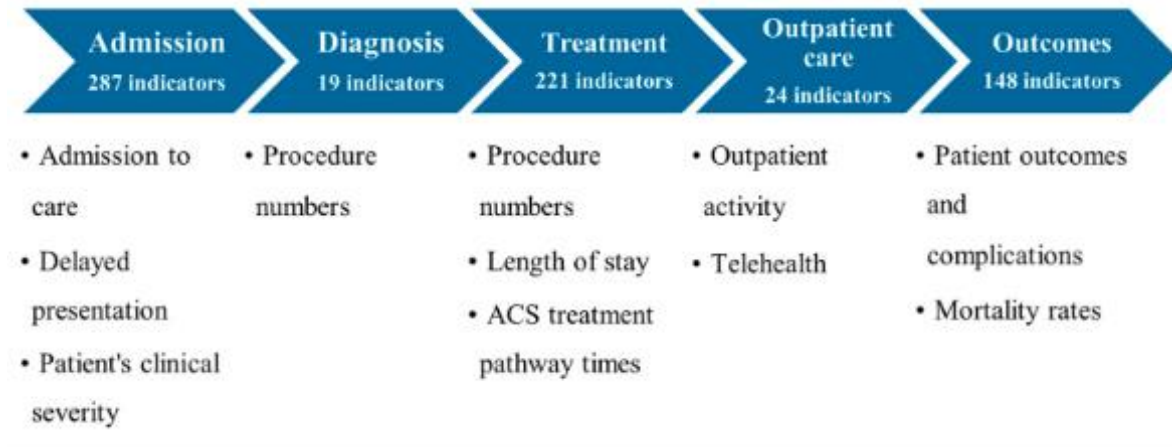


Figure 1 – Categorisation of indicators retrieved in the scoping review, organized following the phased of the hospital care pathway. Source: de Lange M, Carvalho AS, Brito Fernandes Ó, Lingsma H, Klazinga N, Kringos D. *The Impact of the COVID-19 Pandemic on Hospital Services for Patients with Cardiac Diseases: A Scoping Review*. International Journal of Environmental Research and Public Health. 2022; 19(6):3172. <https://doi.org/10.3390/ijerph19063172>

The findings from this literature review showed that all phases of the hospital care pathway, from admission, diagnosis, treatment, outpatient care, and outcomes were affected during the COVID-19 pandemic. The results also showed that these indicators were able to provide information about the impact of changes in care delivery during a crisis (Figure 2). Thus, the indicators retrieved in this review will be a source of information to inform the development of potential indicators to monitor care delivery to patients with cardiac diseased closely crises.

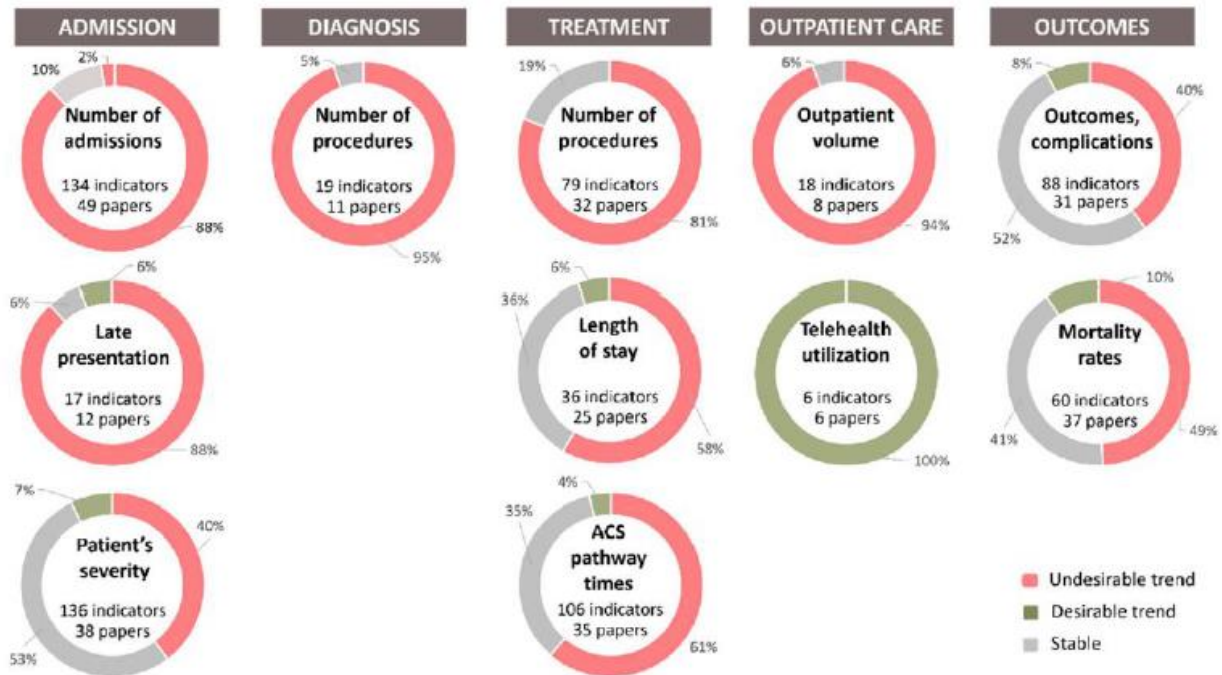


Figure 2 – Trends of the indicators across the Hospital Cardiac Care Pathway during the COVID-19 Pandemic's early stages (January–June 2020). Source: de Lange M, Carvalho AS, Brito Fernandes Ó, Lingsma H, Klazinga N, Kringos D. The Impact of the COVID-19 Pandemic on Hospital Services for Patients with Cardiac Diseases: A Scoping Review. *International Journal of Environmental Research and Public Health*. 2022; 19(6):3172. <https://doi.org/10.3390/ijerph19063172>

The work conducted by the **We CARE Alliance** (Roffi et al., 2020) has shown a decrease in access to essential care to patients with CV diseases, as well as the identification of good practices implemented at the global level during the COVID-19 pandemic, focusing on acute and chronic patients. We CARE has also provided advice related to communication strategies among the various stakeholders, and has also investigated new care pathways to ensure care continuity.

A survey replied by more than 600 interventional cardiologists (mainly from Europe) during the period of 1 April to 15 April 2020 (Roffi et al., 2020) has identified the impact on the cardiac catheterisation laboratory (cath lab) personnel availability, for both physicians and paramedics; a considerable reduction in cath lab activity, particularly for elective procedures, as well as the identification of general protective measures in the cath lab. In addition, it has also identified a major impact on the activity of the cath lab (Figure 3).

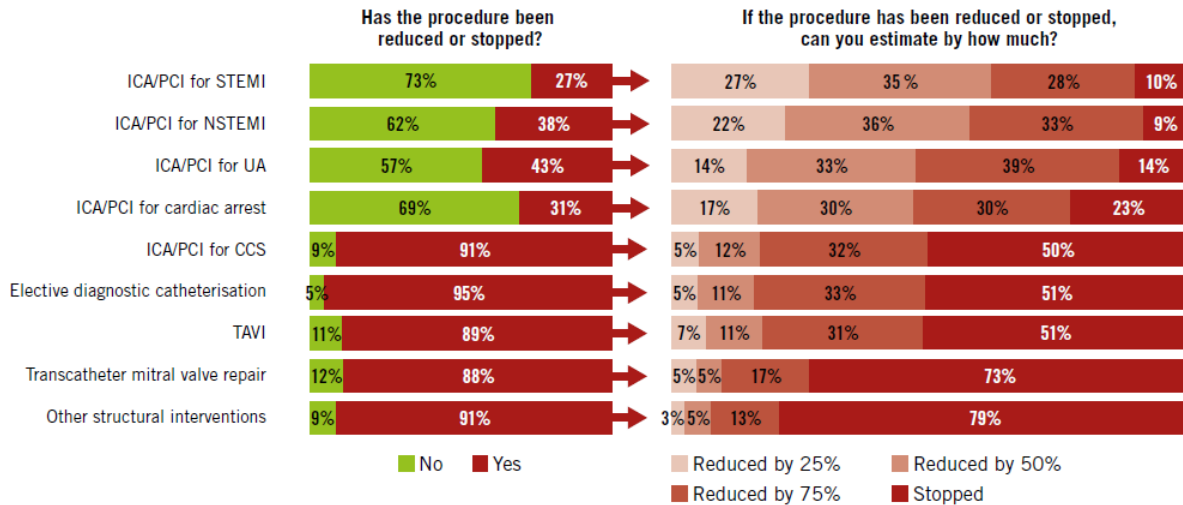


Figure 3 – Impact of the COVID-19 pandemic on cath lab activity. Source: Roffi, M., Capodanno, D., Windecker, S., Baumbach, A., & Dudek, D. (2020). Impact of the COVID-19 pandemic on interventional cardiology practice: results of the EAPCI survey. *EuroIntervention*, 16(3).

These results will inform the development of the resilience tool, namely informing the development of recommendations about prioritisation of patients during crises and improvements in communication strategies.

## 6.2. Conceptualisation of resilience

**Resilience is defined as the** "...institutions' and health actors' capacities to prepare for, recover from and absorb shocks, while maintaining core functions and serving the ongoing and acute care needs of their communities." (Haldane et al., 2021). Resilience comprises four key phases (Figure 4).

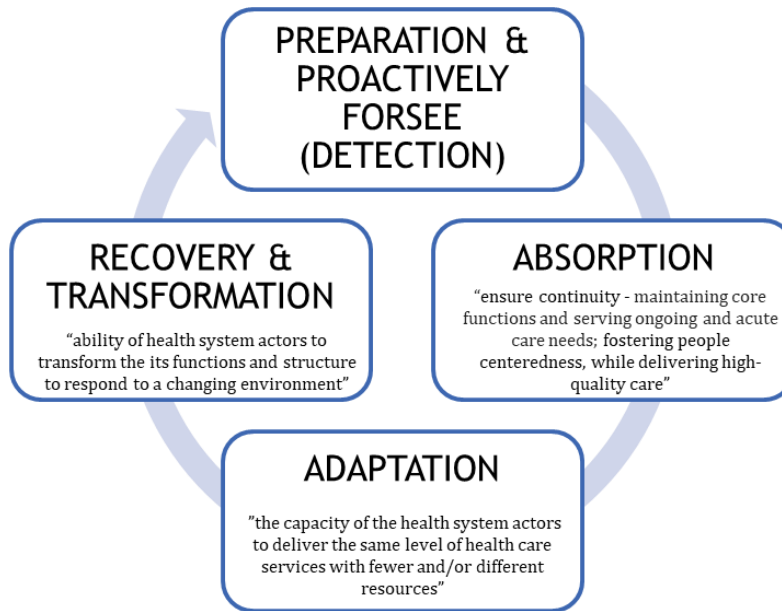


Figure 4 – Phases of resilience. Adapted from: Rogers, Heather L., et al. "Resilience testing of health systems: How can it be done?." *International journal of environmental research and public health* 18.9 (2021): 4742. (<https://www.mdpi.com/1660-4601/18/9/4742> ) and Haldane, V., De Foo, C., Abdalla, S. M., Jung, A., Tan, M., Wu, S., Chua, A., Verma, M., Shrestha, P., Singh, S., Perez, T., Tan, S. M., Bartos, M., Mabuchi, S., Bonk, M., McNab, C., Werner, G. K., Panjabi, R., & Nordström, A. (2021). *Health systems resilience in managing the COVID-19 pandemic: Lessons from 28 countries. Nature Medicine*, 27(6), 964-980. <https://doi.org/10.1038/s41591-021-01381-y>

Furthermore, health systems’ resilience encompasses several themes, which are mapped in Table 4.

Table 4 – Health systems’ resilience themes

Resilience themes	Subtopics
<b>Workforce</b>	Workforce shortages <ul style="list-style-type: none"> <li>• Workforce retention and recruitment)</li> </ul>
	Task shifting / skill-mix
	Workforce health protection
<b>Medical devices &amp; products</b>	Supply chain resilience
<b>Cope with surge in demand</b>	Scale up
	Repurpose
	Redistribution
<b>Communication &amp; cooperation</b>	Communication among stakeholders – patients and physicians, GP and medical specialties
	Media communication to inform population

	International cooperation
<b>Data</b>	Data collection and use
	Transfer evidence from research to policy
<b>Governance</b>	Governance, trust, and coordination
<b>Innovations</b>	New models of care delivery, including: <ul style="list-style-type: none"> <li>• Digitalisation/ digital health</li> <li>• Telemedicine (remote consultations)</li> <li>• Flexible care pathways</li> </ul>
<b>Changes in care delivery</b>	Prioritisation processes & use of guidelines
	Treatment substitution possibilities
	Proactive role in hospital organization

Sources: Thomas, S., Sagan, A., Larkin, J., Cylus, J., Figueras, J., & Karanikolos, M. (2020). Strengthening health systems resilience. Key concepts and strategies. Policy Brief 36. Health Policy and Analysis. Regional Office for Europe. WHO. ; [https://www.wecareabouthearts.org/wp-content/uploads/2021/05/Advocating-for-continuity-of-cardiac-care-during-pandemics\\_Dr-Flavio-Ribichini.pdf](https://www.wecareabouthearts.org/wp-content/uploads/2021/05/Advocating-for-continuity-of-cardiac-care-during-pandemics_Dr-Flavio-Ribichini.pdf) (accessed 16-01-2024); OECD (2023), Ready for the Next Crisis? Investing in Health System Resilience, OECD Health Policy Studies, OECD Publishing, Paris, <https://doi.org/10.1787/1e53cf80-en>.

### 6.3. Preliminary functions and uses of the resilience tool

The update to the scoping review will inform the development of a resilience tool. This tool is expected to inform decision-making of various stakeholders across all phases of resilience (Table 5).

*Table 5 - Anticipated uses and functions of the resilience tool in development*

Phase of Resilience	Uses/functions of the resilience tool:	How will the tool contribute to this function/use?
		<p><b>What?</b> Toolbox to provide a methodology to assess and improve resilience.</p> <p><b>For whom?</b> <i>Target users:</i> different users focusing on the micro and meso level</p> <p><b>How?</b> Indicators, red/green flags, identify stakeholders and specific actions</p>
1. Preparation/Foresee	<ul style="list-style-type: none"> <li>○ Guidance to <b>prepare</b> for and <b>foresee</b> a crisis</li> </ul>	<ul style="list-style-type: none"> <li>- Indicators to assess preparation (stress test – “what if” scenarios - assess baseline conditions and perform stress test adapting the tool to their own context)</li> <li>- Key Indicators to detect</li> </ul>

		<ul style="list-style-type: none"> <li>- Recommendations to prepare such as training, stakeholders identified</li> <li>- Scorecard in the end</li> </ul>
2. Absorption	<ul style="list-style-type: none"> <li>○ Guidance to <b>set minimal standards</b> of care (core functions regarding diagnosis, treatment and follow-up)</li> <li>○ Guidance to set <b>boundaries regarding the quality of care</b> provided during a crisis (eg 1.working hours, 2.task substitution - what is reasonable/safe and what is not, 3.treatment substitution)</li> <li>○ Guidance on how to <b>measure the impact</b> of a crisis</li> </ul>	<ul style="list-style-type: none"> <li>-Red/green flags about minimal standards of care</li> <li>-Red/green flags regarding quality of care boundaries</li> <li>-Minimal standards recommendations (guide prioritisation)</li> </ul>
3. Adaptation	<ul style="list-style-type: none"> <li>○ Identify <b>decision-making processes</b> (to improve absorption and recovery, such as prioritisation and innovation)</li> <li>○ Guidance to <b>identify innovative tools</b> (which, how sustainable)</li> </ul>	<ul style="list-style-type: none"> <li>- List possible strategies to adapt</li> <li>- Guidance on how to cooperate</li> </ul>
4. Recovery	Ability to change in a sustainable way	



## 6.4. Health systems and services delivery domains to include in the resilience tool

The development of the resilience tool will embed notions of recent developments in the field of health system performance assessment (HSPA) frameworks. Notably, common HSPA domains and sub-domains will be used to organise the items within the resilience tool in development (Table 6).

Table 6 – Health systems and services delivery domains to include in the resilience tool

Health system INPUTS	Health system OUTPUTS (health system delivery)	OUTCOMES
<b>1-Physical infrastructure</b> (Emergency department capacity, inpatient beds, rooms for invasive procedures)	<b>1-Access</b> (number of admitted patients, delayed presentation/ clinical severity at admission)	<b>1-Complications and outcomes</b>
<b>2-Workforce</b> (General practitioners, cardiologists, emergency doctors, nurses, ...)	<b>2-Diagnosis</b> (number of procedures, waiting times)	<b>2-Mortality rates</b>
<b>3-Medical devices and products</b>	<b>3-Treatment</b> (number of procedures, length of stay, acute coronary syndrome treatment times, waiting times)	<b>3-Financial protection</b>
<b>4-Information system / Data infrastructure</b>	<b>4-Outpatient care</b> (outpatient activity, telehealth)	
<b>5-Governance, leadership, health system cooperation</b>	<b>Equity</b>	
Efficiency		
Financing arrangements (individuals, patients, providers)		

**Adapted from:** Rogers, Heather L., et al. "Resilience testing of health systems: How can it be done?." *International journal of environmental research and public health* 18.9 (2021): 4742; **Indicators from:** de Lange, M; Carvalho, AS, et al. "The impact of the COVID-19 pandemic on hospital services for patients with cardiac diseases: a scoping review." *International journal of environmental research and public health* 19.6 (2022): 3172.

## 7. Phases and timeline

WP1 is expected to run until year 3 (2026) of the RESIL-Card project. Specifically, Deliverable 1.1 - scoping review - will be the result of the continuous update until the end of the project (month 36) (Table 7).

Table 7 – Deliverable 1.1 timeline overview

	Year 1 (2024)	Year 2 (2025)	Year 3 (2026)
Research Protocol			
New search strategy test and run (Databases)			
Update search strategies			
Search Grey literature			
Ti/Abs selection			
Full-text selection			
Build and test data extraction form			
Data extraction			
Data synthesis			
Final deliverable preparation			

## 8. References

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