Generic Resilience Management Guidelines Adapted to Healthcare

VERSION
Version 1.0

DATE
31-10-2017

ABSTRACT
The DARWIN project considers the Healthcare as one of the two application domains – together with the Air Traffic Management (ATM) - chosen to investigate the resilience of critical infrastructures. The main purpose of the deliverable D2.2 is to adapt the DARWIN Generic Resilience Management Guidelines (DRMG) and their “building blocks” (Concept Cards) - developed in the Task 2.1 and described in D2.1 - to the healthcare domain. This document includes the description of the overall adaptation process consisting of two main phases:

1. the assessment for the adaptability of the generic DRMG/concept cards by means of a quantitative and qualitative SWOT analysis;
2. the adaptation of the generic DRMG/concept cards to healthcare domain, and the release of the adapted guidelines/concept cards.

The adapted concept cards were also included. This report is complemented with a DARWIN DRMG Wiki. To ensure cross-sector applicability, a new EU-Wide DARWIN Community of Crisis and Resilience Practitioners (DCoP) including stakeholders and end-users from various domains and critical infrastructures have been established. Members of DCoP provided feedback on the guidelines. The document is addressed and useful for policy makers, healthcare crisis managers, healthcare critical infrastructure managers and community of practice and other CIs as source of inspiration when adapting resilience guidelines for their domains. Readers from the DARWIN project will use this document as a basis for training and evaluation of the resilience management guidelines as well as the update of the generic guidelines themselves.

KEYWORDS:
Resilience, Crisis Management, DARWIN Resilience Management Guideline, Concept Card, HealthCare, Adaptation process, evolving process, methodology, SWOT analysis, adaptability assessment and criteria, interview, DARWIN wiki
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Executive Summary

This deliverable contributes to achieve the following DARWIN project objectives:

- **O1** make resilience guidelines available for a particular infrastructure operators by adapting the guidelines to the needs of the Healthcare domain;
- **O3** facilitate evolution of resilience guidelines by involving and integrating the views and concerns of Healthcare and other stakeholders in the process;
- **O5** build on lessons learned in the area of resilience as the establishment of the link between resilience concepts, approaches and practices to domain specific practices. This is based on the experience shared from experts and practitioners from diverse domains;
- **O6** carry-out pilots - Healthcare and ATM by supporting the evaluation and updating resilience management guidelines and
- **O7** establish activities that will lead to project results being adapted to, and later adopted by practitioners in domains other than health and aviation through interaction and involvement of practitioners represented in the DARWIN Community of Crisis and Resilience Practitioners (DCoP).

The main purpose of the deliverables D2.2 is to adapt the DARWIN Generic Resilience Management Guidelines (DRMG) and their “building blocks” (Concept Cards) - developed in the Task 2.1 and described in D2.1 - to the healthcare domain.

The DARWIN Resilience Management Guidelines (DRMG) consist of guiding principles to help or advise any organization in the creation, assessment or improvement of its own reference guidelines and procedures. Therefore, the guidelines adapted to the healthcare domain will help healthcare organizations to enhance their resilience capabilities and practices and support system response when facing expected and unexpected events.

This document includes the description of the overall adaptation process consisting of two main phases:

1. the assessment for the adaptability of the generic DRMG/concept cards by means of a quantitative and qualitative SWOT analysis;
2. the adaptation of the generic DRMG/concept cards to healthcare domain, and the release of the adapted guidelines/concept cards.

The adaptation of DRMGs consisted of several iterative and strictly intertwined phases.

Two main criticalities arose in the adaptation process:

a) The considerable effort required to be synchronized with the T2.1 activities to start the adaptation process;

b) The effort required for the identification of the right level of abstraction in the adaptation of the generic DRMG/concept cards to the healthcare domain.

An added value is the identification of resilient practices and strategies across domains through collaboration between ATM and HC across countries. These practices are traced in the specific concept card. We would like to highlight the contribution from DCoP and real interaction among DARWIN partners in the elaboration of results.

**About the project:** The DARWIN project aims to develop state of the art resilience guidelines and innovative training modules for crisis management. The guidelines, which will evolve to accommodate the changing nature of crises, are developed for those with the responsibility of protecting population or critical services from policy to practice.

The guidelines address the following resilience capabilities and key areas:

- Capability to anticipate
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- Mapping possible interdependencies
- Build skills to notice patterns using visualisations

- Capability to monitor
  - Identify resilience related indicators, addressing potential for cascade
  - Establish indicators that are used and continuously updated

- Capability to respond and adapt (readiness to respond to the expected and the unexpected)
  - Conduct a set of pilot studies
  - Investigate successful strategies for resilient responses

- Capability to learn and evolve
  - Explore how multiple actors and stakeholders operate in rapidly changing environments
  - Enable cross-domain learning on complex events

- Key areas: social media and crisis communication; living and user-centred guidelines; continuous evaluation and serious gaming
1 Introduction

1.1 Purpose of the document

The purpose of the deliverables D2.2 is to adapt the DARWIN Resilience Management Guidelines (DRMG) that have been developed in the Task 2.1 - to the healthcare domain.

The adaptation of DRMGs is a challenging activity made up of several iterative and strictly intertwined phases, from the definition and the application of a methodology to assess the adaptability of the DRMG, through the definition and the application of a methodology to adapt the DRMG, to the final delivery of the adapted concept cards. Means and tools have been defined accordingly.

1.1.2 Purpose of the adapted guideline to the Healthcare domain

The DARWIN Resilience Management Guidelines (DRMG) consist of guiding principles to help or advise any organization in the creation, assessment or improvement of its own reference guidelines and procedures. These guiding principles are developed within the Concept Cards (CCs) that constitute the building blocks of the DRMG. CCs propose interventions that can be implemented in order to reach the resilience management capabilities targeted by the conceptual requirements identified in the deliverable D1.3 “Practitioner and academic requirements for resilience management guidelines”. In other words, CCs describe HOW the resilience conceptual requirements need to be implemented by the organizations to develop a critical view of its own crisis management activities (management of resources, procedures, training, etc.). Adapted Concept Cards could be complementary to guidelines, procedures and practices already present in the organizations of the two domains, fostering their revision, improvement or even creation of new guidelines.

The deliverable D2.1, which is the main input for this interim document, describes the DRMG development process as a 4-step process established to be collaborative and iterative. The process changed and solidified during the course of the task as a result of the evolving understanding of what type and content of guidelines would be useful to develop and of how to produce such guidelines while fulfilling the various objectives of the project.

Similarly, the adapted guidelines – as well as the DRMG – can be described as an evolving design object and process, as stated in D2.1 (p.13). The current work is finalized with description of a methodology to adapt guidelines to specific domain. The associated concept cards will continue to evolve and new cards are produced. Latest issue of the guidelines is in a wiki format and final delivery documented in D2.4.

“Following classic literature on problem solving [2], the development of resilience management guidelines is a typical “ill-defined” problem, i.e. corresponds to a problem for which there is no clear end goal, nor clear path to a solution. The nature of such a problem is further complicated by the typical scope, scale and complexity of the domain of crisis management for which the guidelines are developed. The main consequence is that the DRMG development process is fundamentally an iterative discovery process, during which the development team makes attempts and learns about what the end-product (the guidelines) should be, as well as about the process to reach a satisfying solution.”

Ref D2.1, p. 13

1.2 Authorship

This document represents strong cooperation of the DARWIN resilience management guidelines developers team, the development of the content of the DRMG being a highly collaborative and iterative effort.

In terms of establishing the process:
- ISS, as main responsible of the adaptation to the Healthcare domain, has led and contributed to the elaboration of this document and has been instrumental in the definition of the adaptation process (in collaboration with ENAV), SWOT analysis, templates of interviews, involvement of DCoP members on domain specific concept cards.

- SINTEF has been strongly involved in the definition of the overall methodology, development of structure and contents of the guidelines (report and wiki), support to harmonization of concept cards and involvement of DCoP experts in the adaptation process.

- DBL has lead the harmonization of the concept cards, and supported the definition of the development and adaptation processes.

In terms of applying the process and producing content:

- Development and revision of generic content:
  o Main contributors: SINTEF and DBL
  o Supporting contributors: FOI and BGU

- Development of adapted content to healthcare:
  o Main contributors: ISS and KMC
  o Supporting contributors: DBL and FOI

1.3 Intended readership
This D2.2 “Generic Resilience Management Guidelines Adapted to the Healthcare” deliverable is addressed and useful for policy, healthcare crisis managers, healthcare critical infrastructure managers and community of practice healthcare and other CIs as source of inspiration when adapting resilience guidelines for their domains. Readers from the DARWIN project will use this document as a basis for training and evaluation of the resilience management guidelines as well as the update of the generic guidelines themselves.

This D2.2 “Generic Resilience Management Guidelines Adapted to the Healthcare” is addressed to the following DARWIN work and associated WPs as follows:

- **WP2** “Development of evolving resilience management guidelines”. The intended readership is, in particular, those working in Task T2.1 “Development of evolving resilience management guidelines”, providing valuable feedback for the definition of D2.4 “Revised Generic Resilience Guidelines” which are a revised version of D2.1 guidelines after the implementation of recommendations from pilots’ lessons learned.

- **WP3** “Enabling Tools for resilience management guidelines” The intended readership is in particular, those working in T3.3 “Training tutorials for resilience management” providing input for the development of training material and tutorials.

- **WP4** “Pilots: Demonstration and evaluation” The intended readership is, in particular, those working on Task 4.2 “Implementation of Pilot cases” and Task 4.3 “Evaluation cycles of guidelines” providing input for the adaptation of Guidelines.

- **WP5** “Outreach: Facilitating a community of crisis and resilience practitioners” The intended readership is here those working in providing useful material to be discussed and evaluated during innovative workshops.

1.4 Structure of this document

**Chapter 1** introduces the document by describing its purpose and intended readership, and by relating it to other deliverables in the DARWIN project. A list of acronyms and abbreviations used in the document is provided.

**Chapter 1.1.2** presents the purpose of the adapted guidelines to Healthcare domain.

**Chapter 2** presents the methodology that has been applied for the adaptation of the DARWIN Resilience Management Guidelines to the Healthcare domain.
Chapter 3 presents the SWOT analysis findings collected during the experts' adaptability assessments.

Chapter 4 presents the Generic Resilience Management Guideline adapted to the Healthcare domain.

Chapter 5 presents conclusions, limitations of the adapted guidelines developed and lessons learnt.

Chapter 6 contains the main references used in this document.

Appendix A contains the templates and raw materials used for the activities described in this document and a table describing the level of achievement of requirements for the development of the DRMG.

1.5 Stakeholders involvement

Stakeholders' involvement was performed through a series of workshops, involvement of end users and stakeholders, thus ensuring transnational, cross-sector applicability and long-term relevance - the main objective and core result of the DARWIN project - gathered in the following:

09/2016 – 1st evaluation workshop (Rome)

Participants: 3 healthcare experts from ISS; 2 ATM experts from ENAV

Focus: Initial versions of 3 CCs.

Outcome: The evaluation essentially tested “prototypes” of the 3 Concept Cards considered, i.e. the general concepts proposed as well as initial content of the guidelines. Feedback received for each CC included its perceived applicability, shortcomings and suggestions for improvement (specific to the CC content or general to CCs format). Among the main general messages from the experts was the need to be as specific as possible and to simplify content. These comments led to the addition, when possible, of “triggering questions” to the CCs in order to help users focus on the essential issues.

10/2016 – 2nd evaluation workshop (Linköping)

Participants: 3 healthcare experts from KMC, 2 crisis management researchers from FOI.

Focus: Revisions of 3 CCs.

Outcome: 3 initial Concept Cards were revised based on the 1st evaluation workshop, and presented to new experts. Expert feedback confirmed the improvement of the 3 CCs (e.g., clarity, applicability, TRL assessment). The 2 workshops allowed for the solidification of the CC template and level of content (the “triggering questions” were perceived very favourably). During the two evaluation events, the introduction of new concepts (e.g., “brittleness”) led to rich discussions, but was a somewhat divisive topic. Comments led to the position that new concepts should be limited to a minimum for CCs to be applicable by a variety of users. See D4.2 for more details.

11/2016 – DCoP webinar

Participants: DCoP members

Focus: WP2 general approach and brief presentations of 3 initial CCs.

Outcome: The webinar was an opportunity to update participating members of the DCoP on the progress of the project, with a focus on the development of the guidelines. The presentations led to discussions about issues perceived and suggestions for improvement specific to the CCs presented. Due to their short nature, discussions were limited in scope, but confirmed that the project needed to integrate the guidelines in the context of activities and capabilities already existing in organisations. This is part of the objectives of the guidelines adapted by T2.2 and T2.3, and the guidelines' aim should be to support change through the development of a resilience-inspired mindset in addition to providing guidance based on methods and tools.

Since 11/2016 – SWOT analysis conducted for Health care and Air Traffic Management
Participants: Experts from healthcare (ISS, KMC, FOI) and ATM (ENAV)

Focus: 3 initial and 2 additional CCs.

Outcome: Detailed qualitative and quantitative assessment of applicability of CCs provided rich practitioner feedback. SWOT analyses allowed for an important evolution of the guidelines development process, in which design incorporates user-centered assessment early. More details are provided in the following sections of this document.

28-29/03/2017 – DCoP workshop

Participants: DCoP members

Focus: Gather information for concept cards adaptation

Outcome: The workshop was an opportunity to present adaptation to specific domain and distribute questionnaires related to the adaptation of concept cards. The work in this deliverable benefits from feedback from ATM, HC and other domains such as Air Traffic Domain (Sweden and France), Spanish Medical Emergency Service, Ministry of Health, Irish Water Swedish Red Cross, Urgent Medical Center-Prishtina, Swedish Civil Contingencies Agency, National Center for Epidemiology, Surveillance and Health Promotion, Civil protection Department of Autonomous province of Trento, SmartHelp (Norway), London Ambulance Service, Resilient Cities representative from Rockefeller Foundation. More details are provided in the following sections of this document.

1.6 Relationship with other deliverables and tasks

The adaptation of DRMG to healthcare receives inputs from the following deliverables and tasks

- D1.3 – Practitioner and academic requirements for resilience management guidelines, presenting requirements that, at higher level, have been taken into account, as for T2.1, for the evaluation of the initial DRMG, and, as for T2.2, for the identification of priority resilience concepts to adapt into healthcare and ATM.
- D2.1 – Generic Resilience Management Guidelines, presenting resilience concepts and corresponding DRMG. Particularly, the D2.1 provides the Generic Concept Cards - as prototype of DRMG - to adapt to the healthcare domain.
- D4.1 – Evaluation Plan, identifying important characteristics of the guidelines that will be subject to evaluation and testing in WP4. In particular, D4.1 provides useful input not only in the evaluation but also in the adaptation of DRMG to the specific domain.
- D4.2 – Initial Evaluation of Guidelines, providing feedback and suggestions for the enhancement of guidelines. The results of the first cycle of evaluation of Concept Cards have been integrated with the adaptability study of DRMG.
- D5.3 – DARWIN DCoP resilience concepts, users and academia interactive workshop, collecting feedbacks from the DCoP members (especially from healthcare and ATM DCoP Members) for the adaptation of the DRMG provided within the task 2.2.

The adaptation of DRMG to healthcare presented in this document provides inputs to the following deliverables and tasks:

- D2.4 – Revised Generic Resilience Management guidelines. This deliverable will provide useful inputs for the final revision of the DRMG.
- D3.3 – DARWIN Resilience management guidelines toolkit, containing simulation tools and serious games for specific purpose. The content of this interim document will provide D3.3 with useful indications for the development of training tutorials for the operationalization of resilience concepts.
- D4.3 – Pilot's Implementation and Evaluation, for the Adapted DRMG (if available) to be used in the Pilot Exercices.
- D4.4 – Final guidelines evaluation report, containing the results of the DRMG evaluation.
D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

- **D5.3** - DARWIN DCoP resilience concepts, users and academia interactive workshop: collecting feedback provided by the DCoP members. The adapted drafted DRMG provided by this interim document could be proposed to DCoP during innovative workshops.

- **Task 6.1 – Dissemination.** The content of this interim document will provide all information about the draft of the adapted DRMG to be included in different dissemination activities.

- **Task 6.2 – Exploitation.** The content of this interim document will provide a first overview of the adaptation process to be evaluated for possible development and exploitation beyond the life of the project.

According to what has been defined in the DARWIN DoA, the diagram in Figure 1-1 illustrates the relationships between this deliverable and other deliverables and tasks of the DARWIN project.

This document, the **D2.2 Generic Resilience Management Guidelines Adapted to the Healthcare** is placed in the centre of the figure. The arrows connecting the boxes are coloured and depicted according to the different kinds of relationships:

- Black arrows represent direct input-output links.
- Green arrows underline the direct relationship between D2.1 and D2.4 (which are the output of T2.1), the final version of D2.2 and D4.3.
- Dotted gray arrows represent a simple exchange of information between the D2.2 document and other deliverables and other tasks.

---

**Figure 1-1:** Relationships between **Generic Resilience Management Guidelines Adapted to the Healthcare** and other DARWIN tasks and deliverables
1.7 Acronyms and abbreviations

Table 1: List of abbreviations

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>Concept Card</td>
</tr>
<tr>
<td>DCoP</td>
<td>DARWIN Community of Crisis and Resilience Practitioners</td>
</tr>
<tr>
<td>DoA</td>
<td>Description of Action</td>
</tr>
<tr>
<td>DRMG</td>
<td>DARWIN Resilience Management Guidelines</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
</tr>
<tr>
<td>HC</td>
<td>Health Care</td>
</tr>
<tr>
<td>I</td>
<td>Indicator</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities, Threats</td>
</tr>
</tbody>
</table>

Table 2: List of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptation</td>
<td>Enrichment of the interventions proposed in the guidelines, from the perspective of a specific domain such as complementary information on domain characteristics, related existing practices, domain-specific examples etc.</td>
</tr>
<tr>
<td>Approaches</td>
<td>A way of considering or dealing with a situation, challenge or problem.</td>
</tr>
<tr>
<td>Concept</td>
<td>A set or conjunction of characteristic features/entities related to a common scope and rationale that is (at least partly) entangled with or concerns the scope of DARWIN, and with a presumed coherence related to an overall and wide understanding of &quot;resilience&quot;.</td>
</tr>
<tr>
<td>Criteria</td>
<td>A principle or standard by which something may be judged or decided.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>The making of a judgement about the amount, number, or value of something; assessment.</td>
</tr>
<tr>
<td>DARWIN DRMG</td>
<td>DARWIN Manifesto The DARWIN Resilience Management Guidelines (DRMGs) consist of guiding principles to help or advice a certain organisation in the creation, assessment or improvement of its own guidelines. Such principles should help the organisation in developing a critical view on its own crisis management activities (management of resources, procedures, training, etc.) based on resilience management concepts. It is important to underline that the DRMGs could become complementary to guidelines, procedures and practices already present in a certain organisation, but they are not intended to replace them. Consistently with this nature, the DRMGs are mainly addressed to policy makers, decision makers and managers at different levels in an organisation. They can only indirectly affect the activities of front line operators or first responders in crisis management, since these actors are users of those guidelines, procedures, practices that may have been redesigned or generated ex novo, after the adoption of the DRMGs by their organisation.</td>
</tr>
</tbody>
</table>

The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.
<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Viable Solution</td>
<td>Also known as minimum viable product (MVP) is the set of minimum set of features required to test or experiment a solution. Its purpose is to get through the “build-measure-learn feedback cycle as quickly and efficiently as possible. [1] The DARWIN project proposed this solution based on interactions with experts (managers and frontline operations). This approach contrast the traditional product development of designing, performing preliminary and critical reviews, producing and testing and perfecting the product. The lean start up emphasises interaction with market to minimize efforts that could be wasteful in terms of addressing customer or market assumptions that are incorrect. Using minimum viable solutions, we emphasize on exploitation by proposing realistic solutions from the development phases.</td>
</tr>
<tr>
<td>Needs</td>
<td>Represent something that is essential for someone to be able to achieve a certain goal or task. The ultimate goal of resilience could be thought of as ensuring performance, safety and security.</td>
</tr>
<tr>
<td>Practices</td>
<td>Represent a solution that has been incorporated/implemented in a real environment.</td>
</tr>
</tbody>
</table>
| Resilience              | The term resilience is increasingly popular and has many definitions and understandings. The DARWIN project builds on systematic literature review on journals addressing resilience for crisis management, consortium knowledge and experience in the areas of Resilience Engineering and Community Resilience. DARWIN relates to proven resilience abilities:  
  - Anticipate threats, opportunities and cascade effects. It is not only about identifying single events, but how parts may interact and affect each other.  
  - Monitor in a flexible way means that the system’s own performance and external conditions focus on what it is essential to the operation  
  - Respond and adapt to expected and unexpected crisis in a robust and flexible manner. The system is designed to provide a limited range of responses, there is still a necessity to adjust responses in a flexible way.  
  - Learn and evolve from experience of actual events, successes and failures what to learn and how the learning is reflected in the organization. |
| Resilience Management   | Resilience management addresses the enhancement of the abilities of an organisation to sustain adaptability and continue operations as required when facing expected and unexpected events. It includes “everyday operation” as this information is essential to ensure that the organisation functions. This information includes how multiple activities work together to produce successful outcomes for different kinds of systems and organisations at different levels. |
2 Methodology for the Generic Resilience Management Guidelines adaptation to the Healthcare

This chapter contains the description of the methodology applied to adapt the DRMG to the healthcare, given the actual fact that Healthcare and ATM have carried out a collaborative work to co-construct a common approach for the adaptation. The established methodology is a systematic step by step approach strictly intertwined with the other DARWN activities, in particular those relevant to development of generic guidelines (T2.1), to evaluation (WP4) and to interaction with practitioners (WP5).

The chapter consists of four sections: 1) an overview of the interactions between guidelines development tasks, 2) a short description of the methodological process, 3) the explanation for the selection of adaptable Concept Cards, and 4) the description of the strategy for the development of adaptable concept cards.

2.1 Interaction between guidelines development tasks

As shown in Figure 2-1, the activity performed by the developers in Task 2.2 together with Task 2.3 is based on the output of the developers in Task 2.1, namely the DARWIN Resilience Management Guidelines based on Concept Cards that are their building blocks. Also information from DARWIN Description of Action (DoA) have been taken into account in order to keep in mind the expected results of the DARWIN project.

The relationship between T2.2 and T2.3 is mainly related to the common methodology for the adaptation of the DRMG.

The final goal is to produce Adapted DRMG (as Concept Cards) to ATM and healthcare domains.

![Figure 2-1: Overview of the interaction between development tasks in the guidelines’ adaptation process](image)

More details on the activities performed by developers in Task 2.2 (grey oval in the figure) are provided in the next section and represented in Figure 2-2.
2.2 Methodological process

The adaptation process consists of two main steps:

**Step 1 - Selection of adaptable Concept Cards;**
- Application of the methodology based on quantitative and qualitative SWOT analysis (see paragraphs 2.3.3) that assesses if a Concept Card is adaptable.
- At the end of the adaptability assessment, two lists are expected: the list of *un-adaptable* Concept Cards, with the rationale to justify their *un-adaptability*, and the list of *adaptable* concept cards, with the rationale to justify their *adaptability* (see sections 3.1 and 3.2). In addition, the SWOT analysis findings address relevant actions for Task 2.1 concerning the improvement of the generic guideline content. In particular, the SWOT analysis – although carried out outside of the generic guidelines development team - has been included in the development process of the DRMG, by filling a gap in the developing process and providing an operational assessment of the generic guidelines.

**Step 2 - Adaptation of adaptable Concept Cards.**
Once a concept card is evaluated as adaptable, the second step of the adaptation process begins. The process leading to the development of the Adapted Concept Cards is performed by:
- integrating several sources (see Figure 2-3), namely:
  - The findings of the qualitative SWOT analysis performed in the Step 1 (Ref. section 2.3.3);
  - The information collected during ad-hoc interviews with domain specific experts (Ref. section 2.4.1);
  - The information provided by the specific domain experts that have been involved in the “initial evaluation of guidelines” (ref. D4.2);
The feedback provided by the DARWIN Community of Practitioners (DCoP) during the workshops organized in the scope of the WP5 activities (Ref. section 0);
- The results collected during the implementation of Pilot exercises (Ref. section 2.4.2).

Figure 2-3 : Step 2 – Adaptation of adaptable Concept Cards

2.3 Step 1: Selection of adaptable concept cards to Healthcare

The strategy that has been defined for the selection of adaptable Concept Cards foresees several activities:
- Identification of panels of experts, whose detail is provided in section 2.3.1;
- Identification of the fields of the Concept Cards to be integrated for adaptation, whose detail is provided in section 2.3.2;
- Execution of a SWOT analysis (quantitative and qualitative), whose detail is provided in section 2.3.3.

2.3.1 Identification of panels of experts within the healthcare domain

Both the steps of the adaptation process described in Figure 2-2 (i.e. selection of adaptable CCs by means of the SWOT analysis and the adaptation of adaptable CCs) rely on the involvement of a panel of experts selected within the healthcare DARWIN end-users: the Istituto Superiore di Sanità (ISS – Italian National Institute of Health) and the Katastrofmedicinsk Centrum (KMC - Sweden).

The panel of experts has been set up to oversee the entire adaptation process. They aim at guaranteeing the coexistence of several perspectives within the domain, by enhancing multidisciplinary and crosscutting aspects among the organizational levels. The experts involved are internal to ISS and KMC but not project-members, thus allowing an adequate level of independence of the collected information.

Some general criteria were established to recruit internal experts complying with the project perspectives and DRMG, in particular:
- Field of expertise
D2.2–Generic Resilience Management Guidelines Adapted to Healthcare

- Healthcare domain: e.g. epidemiology; organ transplant, emergency medicine, prevention medicine, quality assurance, health technology assessment;
- **Role** (e.g. researcher, policy maker, safety manager, operational personnel/first responder);
- **Area** (international, national, regional, local);
- **Commitment and interest in the project topic.**

The composition of the panels of experts is shown in Table 2-1.

**Table 2-1: Composition of the panels of experts**

<table>
<thead>
<tr>
<th><strong>Darwin Healthcare End-user organization</strong></th>
<th><strong>Number of experts</strong></th>
<th><strong>Field of expertise</strong></th>
<th><strong>Role</strong></th>
<th><strong>Area</strong></th>
<th><strong>Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ISS</td>
<td>2</td>
<td>Epidemiology</td>
<td>Researcher/ policy making consultant</td>
<td>National/ International</td>
<td>- 1 expert involved in the SWOT analysis of CCs DR-27, 30, 77, 83-A, 85. - 1 expert involved in the SWOT analysis of CCs 30, 77, and in the adaptation of CCs DR-27 and 83-A.</td>
</tr>
<tr>
<td>ISS</td>
<td>1</td>
<td>Organ transplant</td>
<td>Operational personnel (physician)</td>
<td>National/ Regional</td>
<td>Expert involved in the SWOT analysis of CCs DR-46, 84.</td>
</tr>
<tr>
<td>ISS</td>
<td>1</td>
<td>Prevention medicine</td>
<td>Sr. Researcher/First responder (past experience in Hospital Emergency)</td>
<td>National / Regional</td>
<td>Expert involved in the SWOT analysis of CCs DR-46, 84.</td>
</tr>
<tr>
<td>ISS</td>
<td>1</td>
<td>Epidemiology - Surveillance and Health Promotion</td>
<td>Head of Epidemiology Centre; Expert on National and Regional plan of Prevention</td>
<td>International/ National/ Regional</td>
<td>Expert involved in the SWOT analysis of CCs DR-27, 83-A, and in the adaptation of CC 83-A.</td>
</tr>
<tr>
<td>ISS</td>
<td>1</td>
<td>Medical devices and health technologies</td>
<td>Researcher and Policy-making consultant</td>
<td>International/ National</td>
<td>Expert involved in the SWOT analysis of CCs DR-46, 84.</td>
</tr>
</tbody>
</table>
# D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

<table>
<thead>
<tr>
<th>Darwin Healthcare End-user organization</th>
<th>Number of experts</th>
<th>Field of expertise</th>
<th>Role</th>
<th>Area</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>KMC (Healthcare)</td>
<td>2</td>
<td>Teaching &amp; Research in Disaster Medicine and Traumatology</td>
<td>Training</td>
<td>National / Regional</td>
<td>Expert was involved in the SWOT analysis of all CCs.</td>
</tr>
</tbody>
</table>

| 1 | Food security | Researcher | International/ National/ Regional | Expert involved in SWOT analysis of CCs DR-47 and DR-83-B. |
| National Center for Evaluation and Control of immunobiological products (vaccines, human immunoglobulins and biotech products). Quality and safety assessment | Quality Assurance Unit - Contact person for Quality and safety assessment of vaccine and training | International/ National | Expert involved in the SWOT analysis of CCs DR-47 and DR-83-B and in the adaptation of the CC DR-47. |

**Note:** not all the experts have been involved in all activities foreseen by the adaptation process. They participated according to their availability, interest and area of expertise, complying with the purposes of each adaptation activity.

## 2.3.2 Identification of fields of the Concept Cards to be integrated for the adaptation

Generic Concept Cards consist of several sections and “fields” aiding for their application in real organizational environments (see D2.1, Annex C.1, p. 129).

During the first and second evaluation workshop held in Rome and Linköping (09/2016 and 10/2016, respectively, see par.1.5 “Stakeholders involvement” above), while testing the “prototypes” of the Concept Cards, some useful insights - concerning the CCs template and its fields – also arose.

Feedback received from the healthcare experts – (DARWIN end-user organizations) included suggestions for the improvement of specific CC fields, reflecting also on their applicability in the specific domains. Some fields were valued as more useful and adaptable.

The fields - already included in the DRMG - of the Concept Cards to be integrated for the adaptation are:

- **Actor(s) of crisis management.** It should define actors whose work has been impacted by the change described in the card. Often, the actors are crisis managers at various levels of the system/ domain.

- **Illustrative case.** It defines case relevant for the application of the resilience aspect implemented by the CC.

- **Implementation before a crisis.** It describes interventions and actions to be implemented by actors - before a crisis - to improve the concept of the CC.

- **Implementation during a crisis.** It describes interventions and actions to be implemented by actors – during a crisis - to improve the concept of the CC.
The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

2.2.3 Implementation after a crisis. It describes interventions and actions to be implemented by actors - after a crisis - to improve the concept of the CC.

- **Relevant practices, methods and tools.** It contains examples of practices, methods and tools matching the CC. They are provided as references and resources for further investigations of the CC content.

- **Background and context information:** the description of:
  - “Further purposes” that support the application of the CC to the specific domain;
  - “Challenges” associated to the CC application (i.e. facilitating or hindering factors both internal and external to the specific domain);
  - “Expected benefits/ results” deriving from the CC application to the specific domain;
  - “Cost of implementation” to apply the resilience principle developed in the Concept Card within the healthcare organizations. Specifically, this field includes the “Minimum viable solution” identified for the application of the CC content.

### 2.3.3 SWOT analysis to assess the adaptability of the generic concept cards

The SWOT analysis methodology (Ref. [4], [5] and [6]) is usually used to develop a deep understanding of all kinds of situations in business, organizations, and for individuals to support the decision-making process.

It provides a framework for reviewing strategies, positions, and directions. It aims at identifying both strengths and weaknesses (internal of a certain organization/ project, etc.), and external opportunities and threats linked to the situation under evaluation.

A generic example of SWOT analysis template is provided in the Figure 2-4. The efficacy and strength of this method is closely linked to its flexibility and experienced application.

![SWOT Analysis Template](image)

**Figure 2-4:** An example of SWOT analysis template.

According to what described in the DoA, Tasks 2.2 consists of several sub-tasks, among them the “identification of priority resilience concepts for assuring resilience in case of an unexpected event” (DoA, p.13). In order to accomplish this task in the adaptation process, the SWOT analysis was applied to select those generic resilience concepts that can be implemented within the healthcare domain.

In particular, the SWOT analysis was used to assess the adaptability of each generic concept card, by taking into account the four SWOT areas, and focusing them on the project purposes. The four SWOT areas are described as follows:
- **S (Strengths)** – MAINTAIN AND IMPROVE - Internal elements and aspects of the concept card that are currently well implemented, relevant and useful for the adaptation.

- **W (Weaknesses)** – REMEDY OR CHANGE - Internal elements and aspects of the concept card that are currently not adequately implemented, relevant and useful for the adaptation.

- **O (Opportunities)** – PRIORITIZE, CAPTURE AND OPTIMIZE - Elements and aspects of the concept card that are good and relevant in the long term, with respect to the application of the card in the healthcare;

- **T (Threats)** – MANAGE - Elements and aspects of the concept card that could not find application in healthcare in the long term.

For the assessment of the generic Concept Cards, the following novel SWOT analysis (novel, as it takes into account quantitative SWOT analysis, not usually performed) has been set up to combine the quantitative and qualitative approaches for a richer collection of data.

The quantitative and qualitative SWOT analysis was led by ISS project-members (in Italy) and KMC project-members (in Sweden) and it involved respectively ISS and KMC experts external to the Darwin project.

### 2.3.3.1 Quantitative SWOT analysis: indicators definition and assessment

The quantitative SWOT analysis was based on the definition of a set of Indicators \((I)\) that were identified starting from the adaptable fields of the CC.

Seventeen Indicators have been established, each of them categorized according to the four areas of the S-W-O-T. According to the explanation above (see the previous paragraph):

- the **Strengths/Weaknesses (S/W)** areas include indicators concerning internal aspects of the CC (i.e. specific contents of the CC fields).

- the **Opportunity/Threats (O/T)** areas include indicators whose assessment needs to take into account a longer term perspective and the interdependency with external factors linked to the contexts of the CC application.

The description of each indicator is provided in the Table 2-2. For more information on which criterion is based and who was responsible for the assessment, see Table 2-1: *Composition of the panels of experts*

#### Table 2-2: Quantitative SWOT analysis: description of the Indicators

<table>
<thead>
<tr>
<th>Indicator ((I))</th>
<th>Description</th>
<th>Explanation</th>
<th>Areas of the SWOT analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I_01)</td>
<td>“The CC overlaps with other CCs”</td>
<td>Some overlaps among CCs are unavoidable. Yet, if they concern many contents of the CC - and the links among the related CCs are not explained - they represent a critical issue to be addressed and solved. Moreover, the overlapping could evidence that a CC is transversal to many other CCs. This characteristic raises the CC to the rank of “meta-card”, making the adaptation more challenging.</td>
<td>W/S</td>
</tr>
</tbody>
</table>

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**The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.**

<table>
<thead>
<tr>
<th>Indicator (I)</th>
<th>Description</th>
<th>Explanation</th>
<th>Areas of the SWOT analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I_02</td>
<td>“The CC is applicable to local healthcare contexts (where the card will be used)”</td>
<td>This indicator is one of the most relevant. The applicability of the CC to local context is the condition <em>sine qua non</em> the CC cannot be used in real environments.</td>
<td>O/T</td>
</tr>
<tr>
<td>I_03</td>
<td>“The CC can be complementary to local healthcare artefacts (i.e. procedures, regulations)”</td>
<td>It concerns the possibility that the CC can be applied within the specific domain to integrate the existing procedures and regulations.</td>
<td>O/T</td>
</tr>
<tr>
<td>I_04</td>
<td>“Actors – as they are described in the CC - are identifiable in the healthcare domain”</td>
<td>It assesses the content adequacy of the <em>Actors</em> field for its adaptation to the specific domain.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_05</td>
<td>“The roles and responsibilities of the actors – as they are described in the CC - are clear in the healthcare domain”</td>
<td>It assesses the content adequacy of the <em>Actors</em> field – specifically addressing the description of actors’ roles and responsibilities – for its adaptation to the specific domain.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_06</td>
<td>“It is possible to identify actors, roles and responsibilities – as they are described in the CC - in case of sudden changes in the healthcare domain (i.e. regulatory bodies, organization structures, etc.)”</td>
<td>It assesses the content adequacy and “hardiness” of the <em>Actors</em> field.</td>
<td>O/T</td>
</tr>
<tr>
<td>I_07</td>
<td>“It is possible to identify actors, roles and responsibilities – as they are described in the CC - in case of future changes in the healthcare domain (i.e. regulatory bodies, organization structures, etc.)”</td>
<td>It assesses the content adequacy of the <em>Actors</em> field, in the long-term perspective.</td>
<td>O/T</td>
</tr>
<tr>
<td>I_08</td>
<td>“The implementation BEFORE – as it is developed in the CC – is relevant for the healthcare domain and adaptable”</td>
<td>It assesses the adequacy and relevance of the <em>implementation BEFORE</em> field, for its adaptation to the specific domain.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_09</td>
<td>“The implementation DURING – as it is developed in the CC – is relevant for the healthcare domain and adaptable”</td>
<td>It assesses the adequacy and relevance of the <em>implementation DURING</em> field, for its adaptation to the specific domain.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_10</td>
<td>“The implementation AFTER – as it is developed in the CC – is relevant for the healthcare domain and adaptable”</td>
<td>It assesses the adequacy and relevance of the <em>implementation AFTER</em> field, for its adaptation to the specific domain.</td>
<td>S/ W</td>
</tr>
<tr>
<td>Indicator (I)</td>
<td>Description</td>
<td>Explanation</td>
<td>Areas of the SWOT analysis</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>I_11</td>
<td>“Internal factors of the healthcare domain – facilitating or hindering the implementation of the contents of the CC – can be easily identified and explained”</td>
<td>It assesses how, in the specific domain, it is easy to identify and explain those internal factors that could facilitate or hinder the implementation of the contents of the CC, among them also implementation costs.</td>
<td>O/T</td>
</tr>
<tr>
<td>I_12</td>
<td>“External factors (cultural, social, economic environment) – facilitating or hindering the implementation of the contents of the CC – can be easily identified and explained”</td>
<td>It assesses how, in the specific domain, it is easy to identify and explains those external factors (cultural, social, economic environmental) that could facilitate or hinder the implementation of the contents of the CC.</td>
<td>O/T</td>
</tr>
<tr>
<td>I_13</td>
<td>“Expected results – that can be inferred from the CC – can be identified and explained within the healthcare domain”</td>
<td>It assesses if the CC implementation in the specific domain supports the identification of specific results.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_14</td>
<td>“Illustrative cases and/or lessons learnt – linked to the contents of the CC – are available in healthcare domain”</td>
<td>It assesses if the specific domain provides relevant illustrative case, lessons learned to be described in the adapted CC.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_15</td>
<td>“Practices – linked to the contents of the CC – are available in healthcare domain”</td>
<td>It assesses if the specific domain provides relevant <em>Examples of practices</em> to be described in the adapted CC.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_16</td>
<td>“Methods – linked to the contents of the CC – are available in healthcare domain”</td>
<td>It assesses if the specific domain provides relevant <em>Examples of methods</em> to be described in the adapted CC.</td>
<td>S/ W</td>
</tr>
<tr>
<td>I_17</td>
<td>“Tools – linked to the contents of the CC – are available in healthcare domain”</td>
<td>It assesses if the specific domain provides relevant <em>Examples of tools</em> to be described in the adapted CC.</td>
<td>S/ W</td>
</tr>
</tbody>
</table>

The experts’ assessments were measured by seventeen questions. The answers for each question were scaled upon 5-point Likert scale. In other terms, ISS and KMC experts were asked to indicate their level of agreement with each statement describing indicators (see Table 2–22 – Description column). The 5-point scale ranges from “Disagree” to “Very Strongly Agree”, with “Somewhat agree” in the middle. A numeric value was assigned to each level of the scale, starting from 1 (=disagree) to 5 (=very strongly agree) and incrementing by one for each level, as shown in 2-3.

---

1 In order to take into account the way the I-01 sentence is formulated, only for this indicator the scale is inverted (e.g. "Very Strongly agree" = 1 and "Disagree" = 5)
Table 2-3: Applied Likert scale

<table>
<thead>
<tr>
<th>Numeric value</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of agreement</strong></td>
<td>Disagree</td>
<td>Slightly agree</td>
<td>Somewhat agree</td>
<td>Strongly agree</td>
<td>Very strongly agree</td>
</tr>
</tbody>
</table>

Numeric values were used to measure the mean score of each Indicator $I$, to classify it as strength, weakness, opportunity and threat (see the first part of the section 2.3.3.1 and Table 2-22 - Areas of the SWOT analysis column). According to the $I$ mean value, the assessment of each $I$ was classified according to the criteria described in the Table 2-.

Table 2-4: Criteria for the classification of the SWOT analysis results

<table>
<thead>
<tr>
<th>Indicator Mean Score &gt; 3</th>
<th><strong>Strengths - Opportunities</strong>, helpful to the CC adaptation to the healthcare domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator Mean Score &lt; 3</td>
<td><strong>Weaknesses – Threats</strong>, harmful to the CC adaptation to the healthcare domain</td>
</tr>
</tbody>
</table>

| Indicator Mean Score = 3 | This mean score for the specific Indicator - corresponding to the medium step of the Likert scale (“somewhat agree” = 3) – has been classified by taking into account qualitative experts’ comments collected by the qualitative part of the SWOT analysis (see Section 2.3.3.2). If the majority of the experts provided comments that mainly emphasized positive elements, the Indicator has been classified as “Strength”/ “Opportunity”; on the contrary, if comments emphasized lacks and missing points, the Indicator has been classified as “weaknesses”/ “threats”. |

The qualitative SWOT analysis findings (i.e. rationale) were listed within the four areas of the SWOT analysis template, according to the mean values for each indicator from the Quantitative SWOT analysis (seeTable 2-).

Each rationale included all issues arisen from the qualitative assessment by gathering together the similar ones and specifying who said what. Also, the rationales fully contrasting the evaluation average for the specific indicator have been kept (and typed in red) for the sake of richness of data.

In addition to the CCs adaptability assessment, the qualitative SWOT analysis results are included among the expert sources of information used to adapt the CCs content to the specific domain, as it is shown in Figure 2-3.

The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.
The qualitative SWOT analysis template is reported in Appendix A.2.

2.3.3.3 Adaptability criteria

Some criteria were established to evaluate the adaptability of each CC to the specific domain. They were based on two mean scores of the SWOT analysis results:

- **I-02 mean score.** This indicator directly refers to the applicability of the CC to local healthcare contexts. The applicability is the condition *sine qua non* the CC can be used in real environments.
- **Total mean score of all CC indicators.** This value provides a synthetic measure of the “adequacy” and maturity of the CC fields for the adaptation purposes.

The combination of these two mean scores – as explained in the following table – defines the adaptability of each CC.
Table 2-5: Adaptability criteria

<table>
<thead>
<tr>
<th>CC total Mean score</th>
<th>&lt;3</th>
<th>=3</th>
<th>&gt;3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;3</strong></td>
<td>Not Adaptable in the specific context because:  - the concept is valid at a general level but difficult to be adapted. It is not applicable in the local HC domain (i.e. due to organization and current policies of the local HC systems);  - the CC is not adequately developed to be adapted. Major amendments are needed.  Action: Issue to be discussed among WP2 members.</td>
<td>Partially Adaptable in the specific context because:  - the concept is valid at a general level. It is partially applicable in the local HC domain (i.e. due to organization and current policies of the local HC systems);  - the CC is not adequately developed to be adapted. Major amendments are needed.  Action: Issue to be discussed among WP2 members.</td>
<td>Adaptable in the specific context because:  - the CC is applicable in the local HC domain. However a big effort is needed to adapt it (e.g. the CC is not adequately developed to be adapted. Major amendments are needed.).  Action: Issue to be discussed among WP2 members.</td>
</tr>
<tr>
<td><strong>=3</strong></td>
<td>Not Adaptable in the specific context because:  - the concept is not applicable in the local HC domain (i.e. due to organization and current policies of the local HC systems);  - some fields of the CC are not developed enough to be adapted. Amendments could be needed.  Action: Issue to be discussed among WP2 members.</td>
<td>Adaptable in the specific context because:  - the concept is valid at a general level. It is partially applicable in the local HC domain (i.e. due to organization and current policies of the local HC systems);  - some fields of the CC are not developed enough to be adapted. Amendments could be needed.  Action: CC Adaptation and some issues to be discussed among WP2 members.</td>
<td>Adaptable in the specific context because:  - the CC is applicable in the local HC domain. However some effort is needed to adapt it.  - some fields of the CC are not developed enough to be adapted. Amendments could be needed.  Action: CC Adaptation and some issues to be discussed among WP2 members.</td>
</tr>
<tr>
<td><strong>&gt;3</strong></td>
<td>Not Adaptable in the specific context because:  - the concept is valid at general level but difficult to be adapted. It is not applicable in the local HC domain (i.e. due to organization and current policies of the local HC systems).  Action: Issue to be discussed among WP2 members.</td>
<td>Adaptable in the specific context because:  - the concept is valid at a general level. It is partially applicable in the local HC domain (i.e. due to organization and current policies of the local HC systems).  Action: CC Adaptation.</td>
<td>Adaptable in the specific context because:  - the CC is applicable in the local HC domain;  - fields of the CC are adequately developed.  Action: CC Adaptation.</td>
</tr>
</tbody>
</table>
In order to clarify the relationships between the step 1 and 2 of the adaptation process, the following Figure 2-5: includes the adaptability criteria by means of which generic Concept Cards have been selected to start the adaptation process (step 2).

Figure 2-5: Flow chart of Step 1 criteria: ensuring maturity and relevance to specific domains.

2.4 Step 2: Strategy for the development of adapted concept cards

For the implementation of the adaptable CCs content, specific data from the healthcare domain need to be collected. Several sources of information are taken into account, as shown in the Figure 2-3: Step 2 – Adaptation of adaptable Concept Cards (paragraph 2.1) and it is fully described in the following paragraphs.

2.4.1 Interviews with experts

Semi-structured interviews with the panel experts are carried out in order to collect data from healthcare experts, and develop the adapted concept cards (at least one interview for each CC).
An interview guide has been set up to elicit the experts’ answers. It provides essential instruction to plan the interview according to the steps before, during and after the interview.

The interview starts with the narration of the illustrative case or lesson learnt that – according to the expert’s perspective – better supports the discussion on the contents of the specific CC applied to the domain. Having in mind the illustrative case described, the other answers – re-grouped in blocks - concern:

**Actors** involved in the crisis management at several levels;

**Implementation before the crisis.** Actions/ practices undertaken to enhance the preparedness and the ability to respond. Other possible interventions that should be made to improve this phase;

**Implementation during the crisis.** Actions/ practices undertaken to manage and cope with the emergency. Other possible interventions that should be made to improve this phase;

**Implementation after the crisis.** Actions/ practices undertaken to learn and evolve from the emergency. Possible interventions that should be made to improve this phase;

**Other illustrative cases** regarding the specific issue of the specific CC;

**Background and context information**, concerning:

- *Internal* and *external* factors of the specific domain that could facilitate the application of the concept/ principle of the CC (taking into account also what happened in the illustrative case described);
- *Benefits* and *results* that the application of the principle/ concept of the CC helps to achieve (e.g. outputs, outcomes, impact);
- *Cost of implementation/ Minimum viable solution* for the application of the CC.

**Relevant practices, methods and tools** to be recommended to support the specific domain personnel to apply the concept/ principle of the CC.

*Note: when asking questions on the implementation phases, the interviewer should:*

a) check if actions and interventions reported by the expert are already included within the CC;
b) recall the actions identified and described in the specific CC field to verify their relevance and compliance with the specific domain.

The interview guide is reported in appendix A.3.

### 2.4.2 Involvement of DCoP members

As anticipated in Chapter 2, the adaptation process foresees the involvement of DCoP to gather information for the Concept Cards adaptation.

In the context of WP5 “Outreach: facilitating a community of crisis and resilience practitioners”, several innovative workshops are planned. Particularly, a specific session involving the DCoP members was carried out during the two-day interactive workshop that was performed on the 28 - 29 March 2017 in Linköping (Sweden), and was aimed at enhancing the participation of the stakeholders in the co-creation and development of the DRMG.

At the moment of the DCoP workshop, ten CCs - with different maturity level - were developed. Given the time constraints and the workshop full agenda, only two questionnaires/ per person were administered among the DCoP. Thus, the welcome kit provided by the hosting partner KMC contained two questionnaires (concerning two different Concept Cards chosen randomly among the ten generic Concept Cards available) to be filled out.
The first day of the workshop, a short presentation of the activities of Task 2.2, together with T2.3, was provided to the audience presenting the questionnaires and highlighting the importance of the collection of DCoP feedbacks for the purposes of the Tasks 2.2.

The questionnaires were anonymous.

The Concepts Cards that have been addressed are summarized in Table 2-.

### Table 2-6: Adaptation Questionnaires – Addressed CCs

<table>
<thead>
<tr>
<th>CC ID</th>
<th>Concept Card short title and description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-27</td>
<td>Understanding roles and responsibilities</td>
</tr>
<tr>
<td></td>
<td>“Ensure that the actors involved in resilience management have a clear understanding of their responsibilities and the responsibilities of other involved actors”</td>
</tr>
<tr>
<td></td>
<td>This includes knowing what resources, plans, experiences and expertise the involved actors have. The objective is to identify gaps and cooperate before, during and after a crisis. Actors should understand their own and other's roles so that effective actions are taken.</td>
</tr>
<tr>
<td>DR-30</td>
<td>Establishing networks</td>
</tr>
<tr>
<td></td>
<td>“Establish networks for promoting inter-organizational collaboration”</td>
</tr>
<tr>
<td></td>
<td>The identification of relevant stakeholder organisations prior to a crisis and cultivating positive relationships among them is extremely important for successful crisis response. Establishing pre-crisis relationships among the organizations that may be jointly involved in managing a crisis paves the way for more effective collaboration and communication during crisis and post crisis responses.</td>
</tr>
<tr>
<td>DR-46</td>
<td>Adaptation relative to events</td>
</tr>
<tr>
<td></td>
<td>“Organization should be supported in their capacities to both expected and unexpected situations (all-hazard approach)”</td>
</tr>
<tr>
<td></td>
<td>Organizations need to ensure that roles, processes, training in place support their capacity to adapt to both expected and unexpected situations. Emergency response plans do not guide a specific action in a specific event. The “thinking process” prepares the relevant actors with a framework for action rather than a blueprint for action. The “framework for action” needs to be periodically verified through monitoring and control activities.</td>
</tr>
<tr>
<td>DR-47</td>
<td>Adaptation relative to procedures</td>
</tr>
<tr>
<td></td>
<td>“Support, articulate and maintain a legitimate and transparent space of manoeuvre relative to plans and procedures”</td>
</tr>
<tr>
<td></td>
<td>Resilience is positioned in complement to plans and procedures. Plans and procedures often are not fully useful and have to be used as “skeletons” to base actions on rather than as comprehensive and accurate guides. Flexibility and improvisation compensate for gaps in the procedures, providing solutions needed on the spot.</td>
</tr>
<tr>
<td>CC ID</td>
<td>Concept Card short title and description</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>DR-77</td>
<td>Establishing common ground</td>
</tr>
<tr>
<td></td>
<td>“Promoting common ground in cross-organizational collaboration in crisis management”</td>
</tr>
<tr>
<td></td>
<td>In order to collaborate effectively at the time of crisis, first responders of different organizations need to have a sufficiently clear understanding of their mutual goals, expectations, capabilities, operational procedures and needs, in order to operate effectively and safely while minimizing losses. Establishing such a common ground needs the promotion of periodic cross-organisational dissemination exercises.</td>
</tr>
<tr>
<td>DR-83-A</td>
<td>Noticing brittleness</td>
</tr>
<tr>
<td></td>
<td>Noticing brittleness is the approach that aims at revealing and understanding the factors that are fragile in the system under consideration. Brittle performance means that the system might break down, especially in the face of surprising situations, at the boundaries of what the system typically handles correctly. This assessment supports preparedness (e.g., related to planning or training) and the avoidance of challenging conditions that would result in potential harm or damage, for instance by anticipating potential bottlenecks in the response to a crisis situation.</td>
</tr>
<tr>
<td>DR-83-B</td>
<td>Identifying sources of resilience</td>
</tr>
<tr>
<td></td>
<td>“Learning from what goes well. How organization successfully adjust performance to under-expected and unexpected conditions (changes/disturbances/opportunities)”</td>
</tr>
<tr>
<td></td>
<td>One of the aims of resilience engineering is providing a deepened understanding of everyday performances, in order to learn from not only failures but also from successful operations. Learning from what goes well during normal operations in safety critical work as well as incidents and crises can lead to better preparedness and learning and thus increased resilience.</td>
</tr>
<tr>
<td>DR-83-C</td>
<td>Assessing community resilience</td>
</tr>
<tr>
<td></td>
<td>“Assessing community resilience to understand and develop its capacity to manage crises”</td>
</tr>
<tr>
<td></td>
<td>The assessment and monitoring of community resilience prior to, during and after the occurrence of crises allow policy makers to establish interventions and plans in collaboration with community leaders and members, in order to ensure that communities will be better able to manage and recover from future events.</td>
</tr>
<tr>
<td>DR-84</td>
<td>Interacting with the public not yet involved</td>
</tr>
<tr>
<td></td>
<td>“Communication strategies for interacting with the public not yet affected by or involved in a crisis”</td>
</tr>
<tr>
<td></td>
<td>A major part of managing crisis is managing people, the people involved in the response and the public, both the people directly affected and the people that are at risk of being affected. The response of the public is a contributor and in some situations a decisive factor to the outcome of a crisis. Therefore, organizations need to develop communication strategies that facilitate interactions with the targeted public and increase the probability of public responses that are beneficial for the management of a crisis.</td>
</tr>
</tbody>
</table>
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement nº 653289.

### CC ID | Concept Card short title and description
--- | ---
**DR-85** | Communication between policy makers and first responders

“Systematic management of policies involving policy-makers and operational personnel for dealing with emergencies and disruptions”

The purpose is to encourage working systematically with management of policies and using relevant means to facilitate dialogue among operational personnel and policy-makers, as well as among policy-maker groups. In order to achieve adaptive and holistic policy management for emerging risks and threats, such dialogue needs to take place across domains, organisations and geographical borders. Policy management includes simplifying, modifying or redesigning policies to learn from ways of working and compensating strategies that operational personnel uses to handle emerging risks and threats and get the job done.

Each questionnaire contains a short description of the concept and a list of open questions to collect useful information for CCs adaptation and possibly for the improvement of DRMG. All the DCoP experts, not only the healthcare and ATM experts, were asked to fill out the questionnaires.

Task 2.2 worked out the information provided by healthcare experts. The DCoP inputs enable identification and enrichment of concept cards in terms of e.g. stakeholders identification, relevance and clarity of the concept card, interest of DCoP, methods, practices or strategies existing in a particular organization or country. One example is the information identified related to “promoting common grounds CC” (section 4.3.1). The answers of ATM experts were taken into account by T2.3, while experts’ answers of the other domains attending the workshop were summarized in D5.3.

Hereafter the specific items of the questionnaire are listed:

- Country of the DCoP expert,
- Domain of the DCoP (i.e. healthcare, ATM, etc),
- Specify the type of crisis you choose to answer the questions (i.e. earthquake, flood, epidemic, etc.),
- According to your own experience, list the 3 actions that you consider relevant BEFORE CRISIS,
- According to your own experience, list the 3 actions that you consider relevant DURING CRISIS,
- According to your own experience, list the 3 actions that you consider relevant AFTER CRISIS,
- Do you know any useful methods and/or practices that support the concept above that are worth to be mentioned?
- Do you know any useful tools that support the concept above that are worth to be mentioned?
- Do you have any other comment?

The template of the questionnaire is provided in Appendix A.5

As follows, some statistics related to the DCoP questionnaires concerning the healthcare members:
Table 2-7: Adaptation questionnaires (healthcare domain) – Statistics

<table>
<thead>
<tr>
<th>Concept Card ID</th>
<th>Nr. questionnaires filled in</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-27</td>
<td>1</td>
<td>Spain</td>
</tr>
<tr>
<td>DR-30</td>
<td>4</td>
<td>Israel, Spain, Rep. Kosovo, Italy</td>
</tr>
<tr>
<td>DR-46</td>
<td>1</td>
<td>Rep. Kosovo</td>
</tr>
<tr>
<td>DR-47</td>
<td>1</td>
<td>Spain</td>
</tr>
<tr>
<td>DR-77</td>
<td>1</td>
<td>Israel</td>
</tr>
<tr>
<td>DR-83-A</td>
<td>2</td>
<td>Italy, Rep. Kosovo</td>
</tr>
<tr>
<td>DR-83-B</td>
<td>2</td>
<td>Israel, Italy</td>
</tr>
<tr>
<td>DR-83-C</td>
<td>2</td>
<td>Israel, Italy</td>
</tr>
<tr>
<td>DR-84</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>DR-85</td>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

2.4.2 Feedback from pilot exercises

This section contains a brief description of the interactions between the Tasks 2.2 and the activities foreseen in Task 4.2 “Implementation of Pilot cases”, with special regard to the implementation of the pilots 1, 3 and 4 that especially addressed healthcare scenarios (pilots 3 and 4) and issues (pilot 1).

The pilot cases (WP4 – task 4.2) - performed during the periods May / June 2017 and October 2017 - represented an opportunity to receive rich feedback from a user perspective on the guidelines that were used in the exercise and, therefore, to improve the operationalization and the adaptation of the generic guidelines to the specific domain.

Such feedback was useful both to revise the content of the adapted Concept Cards that have been finalized before the start of the pilot cases, and gather insights for the adaptation.

In particular, they provided a useful content to improve the following fields of the CC and:
- practices/ methods/ tools;
- actors actually involved in the management of specific crises;
- triggering questions.
3 Selection of adaptable generic Concept Cards: findings of the experts assessment

3.1 Quantitative and qualitative SWOT analysis results

The adaptability assessment of the Concept Cards was gradually carried out during the development process of the generic CCs. Once the T2.1 team released the assessable version – because mature enough - of each CC, the SWOT analysis started. In the table 3-1, the timeline of the adaptability assessment is summarized, in relation to the development status of generic CCs.

Table 3-1: Adaptability assessment (SWOT) Timeline – Healthcare

<table>
<thead>
<tr>
<th>Concept Card</th>
<th>Generic CC ready for the internal assessment</th>
<th>Adaptability assessment (SWOT) – Healthcare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding roles and responsibilities (DR-27)</td>
<td>10/2016</td>
<td>Assessed dates: 11/2016 - 03/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 experts</td>
</tr>
<tr>
<td>Establishing common ground (DR-77)</td>
<td>03/2017</td>
<td>Assessed dates: 03-04/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 experts</td>
</tr>
<tr>
<td>Establishing networks (DR-30)</td>
<td>03/2017</td>
<td>Assessed dates: 03-04/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 experts</td>
</tr>
<tr>
<td>Adaptation relative to events (DR-46)</td>
<td>11/2016</td>
<td>Assessed dates: 12/2016 - 03/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 healthcare experts</td>
</tr>
<tr>
<td>Adaptation relative to procedures (DR-47)</td>
<td>07/2017</td>
<td>Assessed dates: 31/03/2017; 24-27/07/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 experts</td>
</tr>
<tr>
<td>Noticing brittleness (DR-83-A)</td>
<td>10/2016</td>
<td>Assessed dates: 11/2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 experts</td>
</tr>
<tr>
<td>Identifying sources of resilience (DR-83-B)</td>
<td>05/2017</td>
<td>Assessed dates: 31/03/2017 – 24-27/07/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 experts</td>
</tr>
<tr>
<td>Assessing community resilience (DR-83-C)</td>
<td>Not to be assessed</td>
<td>Not to be assessed</td>
</tr>
<tr>
<td>Communication between policy makers and first responders (DR-85)</td>
<td>10/2016</td>
<td>Assessed dates: 12/2016 - 03/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 healthcare experts</td>
</tr>
<tr>
<td>Interacting with the public not yet</td>
<td>11/2016</td>
<td>Assessed</td>
</tr>
</tbody>
</table>
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

In *Table 3-2: Healthcare domain: concept cards adaptability results*, the “adaptability”/“un-adaptability” of each generic CC to the healthcare domain – and the rationale behind the assessment – are included. The rationale is a summary of the main results of the SWOT analysis.

The detailed findings of the quantitative and qualitative SWOT analysis - applied to each generic CC - are included in the appendix A.4.

**Table 3-2: Healthcare domain: concept cards adaptability results**

<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-27</td>
<td>Understanding roles and responsibilities</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>“Ensure that the actors involved in resilience management have a clear understanding of their responsibilities and the responsibilities of other involved actors”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rationale</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>I-02 Mean value = 3.75</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>All Indicators Mean value = 3.40</em></td>
<td></td>
</tr>
</tbody>
</table>
### Strengths
- The CC is overall well developed;
- DR-027 relates to DR-077 and DR-030 and they can be considered as steps in a common process of developing pre-preparation plans;
- The identification of actors in the healthcare domain is possible starting from the generic description given by the CC. Actors’ roles and responsibilities are clear, even if described at general level;
- The implementation phases are rather exhaustive and fitting with the healthcare domain. Many recommended actions - identified in these fields - already exist in the Swedish healthcare domain. The before phase – as it is developed in the CC - is identified as the most relevant and useful. The during and after phases need to be more developed by including actions;
- Domain specific practices, methods and tools are identifiable and available.

### Weaknesses:
- Illustrative cases and/or lesson learnt are difficult to be identified because they are not systematically framed and reported.

### Opportunity:
- The CC is applicable to local HC contexts. Many actions foreseen by the implementation fields of the card already exist in Sweden;
- The CC can be complementary to local HC artefacts.

### Threats:
- It is not possible to clearly identify actors, their roles and responsibilities both in the case of sudden and future changes because a specific stakeholder analysis is missing;
- Internal factors - facilitating or hindering the implementation of content of the CC – are not easily identifiable and explainable in the HC domain;
- External facilitating/ hindering factors can be hardly identified unless at a general level (e.g. the competition among the actors – rather than the collaboration - fostered by policies, is a hindering factor).
Establish networks
“Establish networks for promoting inter-organizational collaboration”  Y (However, some amendments are needed to improve the CC fields)

<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-30</td>
<td>Establish networks</td>
<td>Y (However, some amendments are needed to improve the CC fields)</td>
</tr>
</tbody>
</table>

**Rationale**

I-02 Mean value = 3.67  All Indicators Mean value = 2.90

**Strengths:**
- The identification of actors in the healthcare domain is possible starting from the generic description given by the CC, even though a more detailed description is desirable;
- The field implementation before a crisis is exhaustive and adequate for the healthcare domain. All actions present in the five-step protocol are in force in Sweden;
- Illustrative cases/lessons learnt are clearly identified in the healthcare domain;
- Practices – linked to the content of the CC – are available and can be described

**Weakness:**
- Links and differences among DR-027, DR-030 and DR-077 need more evidence, establishing a hierarchy among the three CCs;
- The description of actors’ roles and responsibilities needs to be improved;
- The fields implementation during and after a crisis need to be implemented because currently are totally missing;
- Methods and tools concerning the specific concept of the CC are hardly available in the healthcare domain. A great effort is required to identify them.

**Opportunity:**
- The CC is applicable to local HC contexts. Many actions foreseen by the implementation fields of the card already exist in Sweden;
- The CC is complementary to local HC artefacts (e.g. National Pandemic Plan, the 1082/2013/EU Decision, Vector Borne Disease regulation);
- Some internal factors - facilitating or hindering the implementation of content of the CC – can be identified in the HC domain (e.g. hierarchical structure of the HC system is an hindering factor).

**Threats:**
- It is not possible to clearly identify actors, their roles and responsibilities - both in the case of sudden and future changes – because their current description needs to be improved;
- External facilitating/hindering factors can be quite/hardly identified unless at a general level (e.g. consensus of the general public is facilitating factor).
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adaptation relative to events</td>
<td>Y</td>
</tr>
<tr>
<td>“Adaptation relative to both expected and unexpected events (all-hazard approach)”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rationale

**I-02 Mean value = 3.50**

All indicators Mean value = 3.51

**Strengths**
- Despite its limitations, the CC is concise enough to be used in practice and support the action in the field, in a critical time;
- The identification of actors in the healthcare domain is possible starting from the generic description given by the CC, even though some categories of actors are missing. The description of the actors’ roles and responsibilities is basic but clear and adaptable;
- The fields implementation before, during and after a crisis are exhaustive enough and adequate for the healthcare domain. The triggering questions are relevant. Minor amendments are needed;
- Illustrative cases/lessons learnt can be identified although hardly identifiable since they are not systematically reported;
- Practices, methods and tools are available, although hardly identifiable in healthcare literature.

**Weaknesses**
- The contents of the CC are described at general level. The risk is that content could be too generic to be applied.

**Opportunity:**
- The CC is applicable to local HC contexts with some revisions (e.g. by including an audit phase to systematically verify roles, process and response plans based on the organization routines). However, the CC application requests a strong effort by the sanitary operational personnel, because the current organization of the Italian national health system does not support the operational personnel that take in charge also the approach described within the CC;
- The integration of the CC with existing local HC artefacts is possible even if local HC artefacts addressing this specific issue have not been developed yet;
- Internal factors facilitating or hindering success of intervention are quite identifiable and explainable;
- External factors facilitating or hindering success of intervention are identifiable and explainable in the HC domain (the level and quality of the information and participation of citizens is a crucial factor, both facilitating and hindering the success of the intervention).

**Threats:**
- It is not possible to identify actors, their roles and responsibilities - both in the case of sudden and future changes - because their current description is missing.
Adaptation relative to procedures
“Ensure sufficient flexibility relative to plans and procedures”

Rationale

<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-47</td>
<td>Adaptation relative to procedures</td>
<td>Y</td>
</tr>
</tbody>
</table>

I-02 Mean value = 4.00
All Indicators Mean value = 3.35

Strengths
- Actors are specified enough and can be identified in the HC domain;
- The fields implementation before, during and after a crisis are adequate also for the HC domain. All relevant aspects have been included. However, descriptions are often too theoretical. The content organization in subsections - that are transversal to the implementation phases - is functional and helpful for the CC use;
- Methods and tools are available in the HC domain.

Weaknesses
- The description of actors’ roles and responsibilities could be improved, also identifying the other involved/affected roles and responsibilities (not only at managerial level).
- Illustrative cases and practices can be hardly identified in the HC domain and a major effort is needed.

Opportunity:
- The CC is applicable to local HC contexts;
- The CC is complementary to local HC artefacts (e.g. aligned to the ISO 9000 standards);
- Internal factors - facilitating or hindering the implementation of CC content – can be identified in the HC domain (e.g. the actors’ refusal to accept roles and responsibilities is a hindering factor; the control of the procedures application at national level by external European and international institutions (e.g. WHO) could be a facilitating factor);
- External facilitating/hindering factors can be identified, even if at general level.

Threats
- It is not possible to identify actors, their roles and responsibilities - both in the case of sudden and future changes - because their current description is lacking.
<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-77</td>
<td>Establishing common ground</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>“Promoting common ground in cross-organizational collaboration in crisis management”</td>
<td></td>
</tr>
</tbody>
</table>

**Rationale**

**I-02 Mean value = 4**

All indicators Mean value = 3.04

**Strengths**
- The field implementation before a crisis is exhaustive and adequate for the healthcare domain. All relevant actions have been included in the field. Many recommended actions - identified in these fields - already exist in the Swedish healthcare domain;
- Illustrative cases/ lessons learnt can be identified in the healthcare domain;
- Domain specific practices, methods and tools are identifiable and available.

**Weaknesses**
- Links and differences among DR-027, DR-030 and DR-077 need more evidence. a hierarchy among the three CCs should be established;
- Actors are not specified enough. Their identification in the healthcare domain - starting from the generic description given by the CC – is not obvious. Also the description of actors’ roles and responsibilities needs to be improved;
- The fields implementation during and after a crisis need to be defined since currently missing.

**Opportunity:**
- The CC is applicable to local HC contexts;
- The CC can be complementary to local HC artefacts even if joint training among organizations is not homogeneously spread out and not fully regulated by law in Italy as other aspects are (i.e. networking);
- Internal factors - facilitating or hindering the implementation of CC content – can be identified in the HC domain (e.g. funding, human resources availability, commitment of the organizations involved, leadership and responsibilities acknowledgement are critical factors).

**Threats**
- It is not possible to identify actors, their roles and responsibilities - both in the case of sudden and future changes - because their current description is lacking;
- External facilitating/ hindering factors can be hardly identified unless at a general level.
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-83-A</td>
<td>Noticing brittleness “Identifying sources of brittleness to invest in their correction”</td>
<td>Y (However, some amendments are needed to improve the CC fields)</td>
</tr>
</tbody>
</table>

**Rationale**

- **I-02 Mean value = 3.25**
- **All Indicators Mean value = 2.78**

**Strengths**

- The content of the field implementation during a crisis is a good base for further development. The triggering questions identified are already taken into account by decision makers in Sweden, when handling an emergency;
- Illustrative cases/lessons learnt are easy to be identified, especially in the epidemic field;
- Practices, methods and tools in the healthcare domain are available from international literature, observational studies and existing guidelines.

**Weaknesses**

- The CC is a meta-card. It needs to be more technically and operationally developed;
- The identification of actors in the healthcare domain - starting from the generic description given by the CC - is too generic. Reduce levels of possible actors involved to give more operative recommendations. Actors’ roles and responsibilities are not clear since actors are not specified;
- The content of the field implementation before a crisis is potentially relevant for the healthcare domain, but the way it is dealt is not useful. Some relevant actions are missing. Triggering questions need to be clustered or prioritized;
- The content of the field implementation after a crisis needs to be more developed. This phase is particularly relevant for the healthcare domain.

**Opportunity:**

- The CC is applicable to local HC contexts but at policy and managerial level. The applicability is more complex for HC organizations that “provide care”, as hospitals, emergency rooms etc.
- Internal factors - facilitating or hindering the implementation of CC content – can be identified in the HC domain (e.g. hierarchical structure and the inability of the HC system to efficaciously communicate with the generic public, are internal hindering factor).

**Threats**

- The CC is not complementary to existing local HC artefacts since other similar procedures do not exist. The integration of the CC with existing local HC artefact is not taken for granted even if the HC system possesses procedures that would benefit of the CC;
- It is not possible to identify actors, their roles and responsibilities - both in the case of sudden and future changes – because actors are not specified at all;
- External facilitating/hindering factors can be hardly identified unless at a general level.
D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

**CC ID**

**Identifying source of resilience**

“Learning from what goes well. Identifying sources of resilience in order to amplify and make use of them”

<table>
<thead>
<tr>
<th>CC ID</th>
<th>CC Title</th>
<th>Adaptable (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-83-B</td>
<td>Identifying source of resilience</td>
<td>Y (However, some amendments are needed to improve the CC fields)</td>
</tr>
</tbody>
</table>

**Rationale**

I-02 Mean value = 4.00

| All Indicators Mean value = 2.92 |

**Strengths**

- The content of the fields implementation before, during and after a crisis contains relevant points, even if very shortly described. The content could be improved.
- Practices – linked to the content of the CC – are available in the HC domain. Currently, practices in the CC, are totally missing.

**Weaknesses**

- The CC appears as a table of relevant contents that have to be further developed.
- Actors are not specified, just as their roles and responsibilities. Their identification needs to be improved;
- Illustrative cases/ lessons learnt – linked to the contents of the CC - can be hardly identified in the HC domain and a big effort to identify them is needed. The current field contains only ID references that are not understandable;
- Methods and tools concerning the specific concept of the CC are difficult to be identified in the HC domain. Currently, methods and tools in the CC, are totally missing.

**Opportunity**

- The CC is highly applicable to local HC contexts;
- The CC can be complementary to local HC artefacts (e.g. Quality and safety assessment of immunobiological products);
- Internal factors - facilitating or hindering the implementation of CC content – can be identified in the HC domain (e.g. the lack of a training that focuses on learning from normal everyday practices);
- External facilitating/ hindering factors can be identified, even if at general level.

**Threats**

- It is not possible to identify actors, their roles and responsibilities - both in the case of sudden and future changes - because their current description is lacking.
Interacting with public not yet involved
“Communication strategies for interacting with the public not yet affected by or involved in a crisis”

Rationale

I-02 Mean value = 4.25
All indicators Mean value = 3.41

Strengths
- The identification of actors in the healthcare domain is possible starting from the generic description given by the CC. However, some categories of actors are missing;
- The field implementation before a crisis is exhaustive and the content well explored. However, it could be better understood and useful if triggering questions are transformed into actions with specific objectives;
- The field implementation during and after a crisis are exhaustive enough for the healthcare domain;
- Illustrative cases/lessons learnt can be identified. A good healthcare example is already provided by the CC;
- Domain specific practices, methods and tools are identifiable yet hardly available.

Weaknesses
- Too many triggering questions. They are useful to reflect upon a specific issue (for instance, during training activities) however, assertive recommendations to act when an emergency occurs are more useful;
- Actors’ roles and responsibilities are not described.

Opportunity:
- The CC is highly applicable to local HC contexts;
- The integration of the CC with existing local HC artefacts is possible even if local HC artefacts addressing this specific issue have not been developed yet (for instance, health communication plans need to be developed);
- Internal factors - facilitating or hindering the implementation of CC content – can be identified in the HC domain (e.g. absence of both communication plans with the generic public and roles and responsibilities that are charged with this tasks; lack of communication coordination among actors; self-reference of the HC system);
- External facilitating/hindering factors can be identified.

Threats
- It is not possible to identify actors, their roles and responsibilities - both in the case of sudden and future changes - because currently they are described at very general level.
### Rationale

<table>
<thead>
<tr>
<th>I-02 Mean value</th>
<th>All indicators Mean value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.75</td>
<td>2.76</td>
</tr>
</tbody>
</table>

CC is partially applicable to local healthcare context, due to the culture, organization and policies of the local systems. The concept is valid at general level but burdensome to be pursued in every European country (while in Sweden already an operational principle, in Italy still difficult to be applied. The CC adaptation has to be discussed within the WP2. The adaptation will be led and carried out by the Swedish task members.

### Weaknesses

- The CC’s reading is time-consuming. It needs to be synthetized;
- The field implementation before a crisis has to be improved, although quite exhaustive in terms of policy-/decision-makers’ perspective. On the contrary, the operational personnel’s point of view is underrated. The evaluation of the policy flexibility is to be further developed.
- The field implementation during a crisis has to be improved. Some relevant aspects are missing, for instance the relationships among decision-/policy-makers at national and regional/local levels during the crisis;
- The field implementation after a crisis has to be improved. Specific actions are needed;
- Domain specific practices are not available in the healthcare domain concerning the specific concept of the CC. Methods and tools are totally missing.

### Opportunity:

- The integration of the CC with existing local HC artefacts is possible even if it needs effort;
- In case of future changes in the HC domain, the current description of actors’ roles and responsibilities are useful for adaptation;
- External factors facilitating or hindering success of intervention are identifiable and explainable (e.g. the time spent for the delivery of new policies is a hindering factor).

### Threats

- The CC is slightly/not applicable to local HC contexts. It is necessary to take into account the asymmetry among EU countries particularly with respect to the application of the European policies on emergency management. In Italy, policy makers and operational personnel work at different levels. Moreover, operational personnel usually lack of trust in policy makers because of a perception of misalignment between policy/theory and practice;
- It is not possible to identify actors, their roles and responsibilities in HC, in the case of sudden changes, especially with respect to policy makers;
- Internal factors - facilitating or hindering the implementation of content of the CC – are not easily explainable. That’s for sure that the complexity of the policy-making process – at national, regional and local level – hinders the CC applicability.
4 Generic Resilience Management Guideline adapted to Healthcare

4.1 Introduction

The adaptation process consists of those activities described in paragraph 2.2, including information gathered from several sources, then followed by a first evaluation cycle workshops (D4.2), quantitative and qualitative SWOT analysis results, and interviews with experts. The CCs “Understanding roles and responsibilities” (DR-027) and “Noticing brittleness” (DR-083-A) were the first two concept cards to be adapted to the healthcare domain in March 2017.

The first drafts of adapted CCs were carried out assuming that the adaptation process was a translation of the generic CCs content into domain specific content, so that using a domain specific terminology and referring to illustrative cases, practices, tools, and methods commonly used in such a domain.

The output was a type of CC that partially replicated the generic CC, in particular for what concerned the content of the implementation fields before, during, and after a crisis. The adapted actions and interventions included in these fields were quite similar to those of the generic CCs, because they needed to be generic enough to be used in several sectors of the healthcare domain. Moreover, during the adaptation, other actions/ interventions were identified, even at general level, contributing to improve the generic CCs. Further, it was agreed that many of these adapted actions could be used also in the ATM domain.

Sharing these considerations among the WP2 tasks members – and taking into account the perspective of people involved in evaluation (WP4) on pilot exercises – a consensus on adaptable content and its relationship with the generic CCs was reached: the adaptation process enriches the content available in the generic guidelines by providing domain-specific information on specific fields as described in section 4.2 (see Table 4-1).

The adaptation is carried out directly on the wiki pages of each generic CC, where some fields have been replicated for the healthcare domain.

4.2 How to use the guideline

The guidelines include different elements of content, which serve different purposes to users (as described in deliverable D2.1). These elements of content are organised in associated sections in the visualisation format developed for end-users (see deliverable D3.2 and DARWIN wiki). In that context, the adaptation process enriches the content available in the generic guidelines by providing domain-specific information. Table 4-1 summarises the elements of content included the guidelines, their intended use, and the potential adapted content.

Table 4-1: Guidelines content, intended use, and adaptation.

<table>
<thead>
<tr>
<th>Elements of content and intended use</th>
<th>Adapted content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implementation</strong>, i.e. descriptions of the proposed interventions organised by phases of crisis management (across phases, before, during and after). This information represents the core content of the guidelines for end-users. These descriptions often include “triggering questions” that aim to capture essential issues users should think or try to address. These questions also aim to help users adopt a resilience-oriented perspective, which might differ from typical views on risk and safety.</td>
<td>The adaptation process can provide an operational perspective for each phase. When relevant, the content describes aspects of relevance and applicability of the interventions proposed and triggering questions to the kinds of crises experienced.</td>
</tr>
</tbody>
</table>
The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

<table>
<thead>
<tr>
<th>Elements of content and intended use</th>
<th>Adapted content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background and context information</strong>, to describe the objectives and rationale underlying the resilience management capability addressed, as well as associated benefits, challenges, actors of crisis management and cost of implementation. When possible, CCs provide examples illustrative of the capability addressed or the approach.</td>
<td>Domain-specific content can be provided for targeted actors, and for illustrations. In addition, a general description of background and context can be made for the domain to emphasise specific characteristics or elements of context.</td>
</tr>
<tr>
<td><strong>Relevant material</strong>, to describe succinctly strategies, practices, methods and tools mentioned in the implementation section, and provide references for further reading.</td>
<td>Practices, methods and tools might be provided for each domain, as well as specific references.</td>
</tr>
<tr>
<td><strong>Categorisation information</strong>, which associates the CC with high-level themes or categories, resilience abilities, functions of crisis management, and types of stakeholders. An important purpose of the categorisation information is to serve as a navigation mechanism and suggest associated content in order to facilitate the implementation of the CC in the general context of the guidelines.</td>
<td>No domain-specific content provided for this section</td>
</tr>
<tr>
<td><strong>Management information</strong>, such as references to initial requirements or status and versioning, used internally by the development team, and not shown to users.</td>
<td>No domain-specific content provided for this section.</td>
</tr>
</tbody>
</table>

The approach adopted is that domain-specific information should be available “on demand”, i.e. provided in sections that can be consulted or not, depending on the interests and objectives of the users. Organisations of the same domains will find directly relevant information about the implementation of the guidelines and references to existing domain-specific practices and tools they can consider for their own operational context. Organisations from different domains can recognise similar characteristics in the domains presented and find inspiration for their own purposes.

Section 4.3 provides the guidelines adapted to Healthcare. In order to account for the paper format of this document and make the contributions of each task more apparent, two modifications have been made to the presentation of the guidelines in the wiki described above:

- Only the adaptation information for the healthcare domain associated with the document section is provided;
- All “on demand” sections of the guidelines are expanded.

In other words, the generic content of the guidelines is provided in its entirety with the addition of specific content from the healthcare domain.

Users are expected to read the whole content of the CCs and enrich their understanding of the generic content with domain-specific content when it is available. This content is provided in clearly identified blocks of text and is not conceived as stand-alone information: healthcare-specific information aims to be complementary to the generic content, i.e. to further specify or contrast it.
4.3 Adapted Concept cards

This section provides the content of the guidelines adapted to the Healthcare domain. Rather than providing the entire concept cards (which are available on the DARWIN wiki), the adapted content is extracted for each of the concept cards, along with the selected generic content it enriches. For instance, actors specific to the domain are presented along with generic actors targeted by the concept card. To quickly differentiate generic from adapted content and better focus on the latter, generic content is provided in brown colour.

Two important points need to be kept in mind:

- The DRMG are constantly evolving as a result of internal and external feedback, and of on-going efforts to expand and improve their content. As a result, the guidelines’ content provided here is a snapshot of the DRMG content at the moment of the production of this document (31/10/2017). It does not aim to be the final version of the adapted guidelines, and anyone interested in the most up-to-date content should refer to the DARWIN Wiki.

- The adaptation process is a process of enrichment of the generic content, and aims to capture aspects of the domain that shed a particular light on the generic content (e.g., complement it or make it more specific to the operational domain). In many cases, the generic content applies to the domain considered, and did not require, in our judgment, the addition of domain-specific content.

The following adapted Concept Card are grouped per DRMG Themes, namely:

- Supporting coordination and synchronisation of distributed operations;
- Managing adaptive capacity;
- Assessing resilience;
- Developing and revising procedures and checklists;
- Involving the public in Resilience Management.

They can be found at the following link:

4.3.1 Supporting coordination and synchronisation of distributed operations

**Promoting common ground in cross-organizational collaboration in crisis management**

Promote periodic cross-organisational dissemination exercises to increase organisations mutual awareness of other motives, perspectives, terminologies and working practices. In turn, this can support improved collaboration at the time of crises, because first responders are more aware of the behaviour to expect from staff of other organisations.

**Background**

**Actors**

- The card implementing user include relevant back-end roles that are able to implement the actions mandated by the card. Arguably, these will be middle managers and/or relevant experts that maintain close ties with other organizations;
- Actors: different teams of front-end crisis response operators.

**Specific to Healthcare**

Involved actors should be identified and predetermined to participate in the rescue, regardless of the nature of the event. Analysis can then be made jointly by the actors with the purpose of identifying eventually additional actors that may be involved in the specific event. In Sweden, all actors mentioned below are involved in the response, regardless of event. However, in addition to these ones, more may be called depending on the type of event that occurred. Common Grounds - as a concept - should be discussed and practised at all levels, starting from front-line operators to management. This involves both inter- and intra-agency communication in all agencies, independently of the crisis scenario.

- The healthcare staff is responsible for the medical care.
- The police are responsible for the security on site and for the identification and registration of the victims. They also inform relatives in case of fatalities.
- The municipality is responsible for both acute and follow- up crisis/psychological support.
- The fire brigade and the municipality provide meeting halls for the care of mildly injured and for those who are in need of crisis support.
- Communication with the media takes place in collaboration where each actor pronounces information according to their area of responsibility.
- The National board of health and welfare, Ministry of Social Affairs and the Government (on the national level) will gather an overall picture of the situation from different perspectives.

**Illustration in the Healthcare domain**

School shootings are examples that illustrate the importance of “Establishing common grounds”. These events may involve several injured pupils and teachers and require for example effective interaction and collaboration among a number of different actors at the national, regional and local level.
Lessons learned from school shootings concern the effective collaboration that can be quickly activated if the actors have "Established common grounds", prior to the event. This has shown to imply that the Emergency Medical Services gain access to patients and by that beginning a quicker life-saving treatment. Sometimes, depending on the type of scenario, the healthcare and police sector may be better balanced to maximize the benefit for the victims.

**Elements of the Healthcare context**

**Associated Challenges**

Implementation of "Establishing common grounds" on a policy level require, however, that legislation and guidelines support this type of collaboration. On the strategic level, opportunities for collaborative planning are required while, at the operational level, opportunities for training, in order to implement in normal procedures and in crisis situations.

**Interventions proposed**

**Across phases**

**Healthcare perspective**

In order to "Establish common grounds", involved actors need to plan and discuss this issue jointly prior to the event. The predetermined common grounds is then implemented during the event. After the event, it is important to analyse the work performed and examine what can be improved.

**Before a crisis**

To promote improved cooperation and collaboration among the front-end staff of different first responders' organizations involved in crisis management, cross-dissemination exercises can be organized.

*What is needed before crisis:*

- **Identify potential gaps in the mutual understanding** between your organization and other organization with whom there is a collaboration in place for the management of potential crises.

- **Organise cross-fertilisation dissemination workshops.** The main goal of these workshops is that of allowing the staff of your organization to gain useful insights into the mission, culture and operating methods of other organisations involved in crisis management. Such workshops can be organised by inviting relevant staff members of other organisations:
  - to attend presentations about own organisational mission, resources, dependencies and expectations (from other organisations), working methods and practices;
  - to provide their presentations about their own organisational mission, resources, dependencies and expectations (from other organisations), working methods and practices.

- **Organise periodic visits of own staff to facilities of other organisations,** so as to provide an opportunity to own staff to learn about the resources and procedures of other relevant organisations. Host similar visits by other organisations.

- **Organise joint crisis preparation exercises** in order to address potential sources of joint activity breakdowns. These include, for instance, the use of inconsistent maps by different actors to
refer to the same crisis area; the use of specialist terminologies that may be unclear or ambiguous to the teams of other organisations; conflicts in resource usage. These conditions may slow down understanding between team members of different organisations, thus slowing down the crisis response process. Thus crisis preparation exercises—such as drills, review of emergency plans, review of past disasters—should be conducted jointly, i.e., at least one operational expert from each relevant organisation need to be involved in order to achieve an adequate representation of the organisation that may have to cooperate at the time of the crisis. Besides the identification of breakdowns, these exercises can be helpful for the identification of potential synergies in (for instance, the knowing about useful resources available by another partner may be helpful in case own resources are insufficient).

**Triggering questions**

**Identification of gaps in mutual understanding**

- What is our understanding of the mission, culture and operating methods of other organisations with whom we need to collaborate in crisis management?
- What is the level of understanding of our mission, culture and operating methods by other organisations with whom we need to collaborate in crisis management?

**Cross-fertilization workshops**

- Are there opportunities for organizing workshops with one or more of the organizations collaborating with us in crisis management and for sharing presentations about our respective mission, culture and operating methods?
- If such workshops were already organized in the past, is there a need to repeat such experiences to take into account relevant changes in each organization and the turnover of our respective staff members?

**Visit to other organizations**

- Are there opportunities for organizing visits of our staff members to the facilities of other organizations collaborating with us in crisis management and vice-versa?
- If such visits were already organized in the past, is there a need to repeat such experiences to take into account relevant changes in each organization and the turnover of our respective staff members?

**Joint drills and crisis preparation exercises**

- Are there opportunities for organizing joint drills and crisis preparation exercises with other organizations collaborating with us in crisis management?
- Do we use specialist terminologies that may be unclear or ambiguous to the teams of other organisations and should be addressed in joint crisis preparation exercises?
- Can we think of possible sources of joint activity breakdowns that should be addressed in crisis preparation exercises?
- Can we envision the presence of conflicts in resource usage that should be addressed in joint crisis preparation exercises?
- Can we think of potential synergies between our organization and other organizations that should be addressed in joint crisis preparation exercises?

**Healthcare perspective**

*Establishing common ground* could be implemented in the perspective by setting up a strategy for collaboration. A strategy would describe how the interaction should be done between different
actors before, during and after major incidents that require interaction between actors. The aim with the cooperation is that resources are used efficiently and responsibly. This could be implemented as a regional committee, including managers at strategic level from different actors, which meets regularly a couple of times a year. These could include:

- Health care
- County council
- Police
- Municipalities
- Fire brigade
- Civil protection
- Military forces

The regional committee is a strategic function that decides on issues that have an overall character in terms of long-term planning, such as establishing and/or revising strategies, plan regional joint exercises and initiate education opportunities.

Examples from such implementations could be common education between different actors conducted regularly every year while exercises take place every four years. These common activities (e.g. table-top exercises, real-life simulation or workshops) are focused on real events where the importance of actors’ cooperation have been identified, such as during; school shooting, fires, and CBRNE incidents.

Every two months, representatives from operational levels could gather for the purpose of disseminating information about ongoing and upcoming activities with each other with the intention of increase the potential for cooperation between them.

During a crisis

Healthcare perspective

The implementation of the concept card could have be implemented by developing a operational collaborative group.

- According to the group´s developed strategy, an operational collaborative group (Point of Contact Designated Duty Officer) with predetermined functions could be initiated within different actors, in case of a threat or major accident. The group´s task is to assess if the threat or major accident require coordination and cooperation. This group should have the mandate to initiate a structure for cooperation and on immediate actions.

- Rapid initiation of the group create conditions for proactive coordination through collaboration.

After a crisis

Healthcare perspective
The implementation of the concept card could involve joint after-action meetings regarding events where collaboration has been essential. During these meetings representatives from collaborating actors gather every two months, or so, with the purpose of identifying strengths and weaknesses in the co-operative management of the event. Identification of collaborative indicators can be used in the work of analyzing/ reviewing the management of the event to create a structure.

Example of collaborative indicators:

- Tetra radio interagency coordination channel assigned from dispatch
- Dispatch initiate radio check and provide current incident orientation according to ETHANE structure (ref ETHANE)
- Agency Incident commanders initiate coordination via Tetra radio coordination channel

Content: Preliminary rendezouz point, approach vector, decision on coordinated response strategy

- First unit from any agency provide initial situation report
- Establish interagency command site. (REF # Collaborative indicators: Instruktörsmans manual Samverkan CBRN, Katastrofmedicinskt centrum.pdf)

**Relevant material specific to Healthcare**

*Practices, methods and tools*

In Sweden, several organizations have introduced good practices and methods with the aim to establish Common Grounds.

For example, in the Region Ostergötland in Sweden implementation of the concept Common grounds for cooperation and management is implemented throughout the crisis response system. This results in a consensus regarding terminology, approaches and working procedures among players important for the crisis management. This implementation generates conditions for more actor-wide activities in all phases e.g.:

- Before: Proactive development of strategies for how to manage a crisis by e.g. common workshops and/or educations
- During: Effective working procedures for actor-wide management of social disturbances with common approaches.
- After: Actor-based follow-up based on indicators for stakeholder cooperation.

**References**

1. Samverkan Östergötland: Samverkan Östergötland (Inter-agency Coordination County Östergötland):
   

1. MSB´s Gemensamma grunder för samverkan och ledning vid samhällsstörningar: See page

1. Samverkan Stockholm: See page
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1. Socialstyrelsens föreskrift 2013:22 See document

1. Collaborative indicators: Instruktörsmanual Samverkan CBRN, Katastrofmedicinskt centrum.pdf

Read the full text of this guideline at:
Establish networks for promoting inter-organizational collaboration

Establishing pre-crisis relationships between the organizations that may be jointly involved in managing a crisis paves the way for more effective collaboration and communication during crisis and post crisis responses across organisations.

Background

Actors

The card is directed to top management roles involved in strategic decision making (e.g., executive management, policy makers).

Specific to Healthcare

Down below is example of actors that may be jointly involved in managing a crisis:

- health care
- police
- rescue services
- municipality
- county concil
- military
- refugee agency
- joint rescue coordination and airborne evacuation coordination

National level - **Policymakers - National Board of Health and Welfare**: responsible for policy and national coordination. E.g. supporting coordination among counties but primarily by requesting a situation report that is then relayed to the Ministry of Health and the Government. This level is also active in strategic decision making during a crisis.

Regional level - The **Regional medical major incident management**: manage resources in order to optimize response with respect to the situation. They have mandate to command all available resources within affected county according to the scenario. This level is also active in strategic decision making on the regional level during a crisis.

Local level - **First responders are prehospital command and control**: responsible to managing the incident scene regarding casualty treatment and coordination with other agencies at the scene.

These actors may be involved during mass-Casualty events such as fire, train crash, terrorist attacks, traffic accidents and ship accidents.

Illustration in the Healthcare domain

Fire in buildings illustrates the importance of **Establishing networks**. In order to efficiently handle a fire in a building with many people, contacts and identified responsibilities among different actors should be identified prior to the event. Actors managing the crisis have different responsibilities, skills and resources that affect their approach. It is of importance that these factors are examined before the event since it will facilitate the managing of the crisis.
Fire at a hotel or at a refugee housing results in many severe burn injuries. For example, in the Region Östergötland in Sweden, Point of Contacts and communication protocols are communicated and implemented well in advance in order to ensure a rapid all-agencies coordination. Any agency should be able to request and initiate multi-agency coordination.

The case illustrates the need of establishing pre-crisis relationships among the organizations that may be jointly involved in managing a crisis (in this case Firebrigade/ Police/ EMS - Emergency Medical Services). Example of outcome of pre-crisis relationships could be predefined liaison channels and procedures for collaboration. When the involved actors have agreed on rules and structure for collaboration, they can focus on identifying operational goals and action plans for network.

In case of fire in a refugee housing, successful management involves relevant stakeholders in migration management, municipality Authorities, County Councils and first responders who take care of casualties and provide for the psychosocial support of the victims.

This is a prerequisite for effective collaboration and communication during crisis and post crisis responses across organisations.

**Elements of the Healthcare context**

Associated Challenges The need for multiple actors from different sectors and jurisdictions to rapidly form a network to coordinate the response, stress the need of previously established structures for a successful management of crisis. The actors need to invest time and effort to establish these structures but will in turn save valuable time in critical stages in mobilizing a crisis response.

Further purposes Disaster medicine doctrines should rely on an all-hazard approach where there are the same designated point of contact at each agencies who is contacted regardless of incident scenario. Otherwise there is a risk that time is wasted on figuring out who should be contacted depending on the scenario.

---Minimum viable solution--- Expected benefit/ results To implement the concept "Establish network", all agencies’ PoCs should attend a conference call when each PoC can inform about potential contributions that can be made to the joint response. For example, a fire with a large number of casualties and potential antagonistic aspects needs to be managed by several agencies. These agencies need well established communication protocols in order to act proactively in a joint effort. The communication protocols should support coordination relating to: - Scene safety - Fire management - Care for injured - Care of uninjured - Evacuation within and between counties/regions - Information management between agencies

**Interventions proposed**

**Across phases**

**Healthcare perspective**

In order to "Establish networks" one actor should be assigned with the responsibility of implement and maintain updated contact details for agencies and actors that potentially can be involved in incident coordination.
This network should jointly meet and discuss important issues. This will enhance the managing of the crisis. The network thereafter analyse the work preformed and examine what can be improved.

**Before a crisis**

Protocol for promoting inter-organizational coordination. A five-step protocol is recommended to establish effective inter-organizational collaboration across the relevant organizations that may have to work together in a crisis situation.

1. **Identify.** Based on the crisis-scenarios resulting from the internal risk assessment, specify the relevant organisations with whom collaboration may be necessary at the time of the crisis response. These may be located at: International, National, Regional, and local level(s).

2. **Specify.** For each organisation identified at each level, specify the rationale for collaborating with it depending on the type of crisis scenario. As part of the exercise, it should be clarified as a minimum what are own expectations about the partner organisation, the expected communication means, etc.

3. **Approach.** Approach the relevant organisations in order to establish a communication challenge and meet with representatives of the other organisations;

4. **Maintain a record of the status of inter-organisational relationships.** Create and periodically update a record about the status of the relationship with the other organisations.

5. **Establish collaboration terms of reference.** This steps provides the basis for joint shared action. There are two options at this stage:
   - Define memorandum of understanding. Formalise a declaration of intent that clarifies the current rationale (i.e., why do we need to collaborate?), objectives (i.e., what do we want to achieve?) and mechanisms (i.e., how shall we collaborate?) for inter-organisational collaboration. The same declaration should also clarify the potential for future developments (i.e., how the scope of the present collaboration may increase in the future?)
   - Define a stable framework for collaboration in pre-crisis, crisis, and post-crisis situations. The framework defines the actual collaboration measures that have to be implemented, including details of resources to be committed, roles involved, type and frequency of meetings, either bilateral or multilateral involving also other organisations. The framework should contain at least one of the following measures:
     - Define and periodically review role and responsibilities of each organisation in case of crisis (see card Understanding roles and responsibilities of other actors);
     - Implement shared actions to improve common ground between the involved organisations (see card Establishing common ground).

**Triggering questions**

**Identify**

- When thinking of a specific type of crisis, are there organizations that may be involved together with us in the management of it. Among these organizations, are there any with whom we do not have any collaboration yet in place?
- If there is no collaboration yet in place, would it be worth establishing it?
- When thinking of new possible collaborations, are we considering all relevant levels, including the local, regional, national and international level?

**Specify**
What type of collaboration do we expect to have with an organization we have decided to include in our network?

What do we expect to achieve from the collaboration?

Which communication modalities do we want to adopt in order to interact with such organizations?

**Approach**

- Do we know with which person/s should we get in touch in order to activate the collaboration?

**Establish Memorandum of Understanding**

- Have we clearly defined why we need to collaborate?
- Have we clarified what we expect to achieve from the collaboration?
- Have we defined the specific way we intend to collaborate?
- Have we discussed and agreed with the other organization about possible extensions of the scope of our collaboration in future?

**Establish a Framework for Collaboration**

- Have we defined how often we should get in touch with the other organization to review reciprocal roles and responsibilities in the management of crises?
- Have we defined shared activities to improve the common ground among us and the other organization in the management of crises (e.g. common training sessions)?
- Have we developed inside our organizations a documentation to record the status of our collaboration with the other organization?

**Healthcare perspective**

"Establishing networks" could be implemented in the perspective by setting up a strategy for collaboration. For example, a strategy for stakeholder cooperation could be developed in the pre-perspective.

The strategy would include establishing:

- **communication protocol** which initiate communication and following coordination among agencies during incidents that might require agency-coordination;

- **communication channels** for initiating coordination should also be established, as for example if Emergency Dispatch Centre should call to a coordination conference on Tetra radio, phone, email or video conference.

- **Points of Contacts, alarm protocols and general strategies** should be tested and drilled in order to maintain effective communications during incidents. This could be done during coordination exercises in a before-perspective.

**During a crisis**

**Healthcare perspective**

An implementation of the concept card could be the setting up of an operative coordination staff.
In this group predefined roles (Point of Contact - Designated Duty Officer) should be established within each agency in the event of/or threat of crisis or major incident. The staff assesses the scenario if there is a demand for coordination. The agencies identified as key-actors are notified by emergency dispatch center to participate in a telephone conference initiating coordination. During the conference, the need of inviting additional agencies/actors important to manage the specific scenario is assessed. Emergency dispatch will carry out any of such requests.

The actor (Emergency Dispatch Center) has the task to act as:

- a switchboard
- gather all agencies
- as prerequisite for swift initiation of the coordination staff.

This in turn creates necessary conditions for proactive inter-agency coordination.

**After a crisis**

**Healthcare perspective**

The implementation of the concept card could be carried out by:

- having an inter-agency after action review during meetings on coordination scheduled on monthly basis. Incidents that has demanded coordination would be subject for discussions. The purpose of these reviews would:
- identify strengths and weaknesses in the joint management of the incidents.

On these meetings, communication and points of contacts should be debated, whereby uncertainties are clarified and associated protocols revised.

**Relevant material specific to Healthcare**

**Practices, methods and tools**

In the Healthcare domain, several organizations have implemented the concept cards “Establishing networks”. The *Swedish Civil Contingencies Agency’s Common Ground for Command and Coordination* is an example of an all-agency coordination doctrine. Such doctrines should guide actors how to establish networks by sharing common language, communication structures and common networking events.

This will lead to common understanding on terminology, work approaches and management. Implementation and operationalization of this program will create necessary conditions for more inter-agency activities in all phases (before, during, after).

- Before: Workshops, education programs, development of management strategies
- During: Effective inter-agency management with common grounds
- After: Inter-agency after action review based on qualitative indicators for joint incident management.

**References**


Read the full text of this guideline at: http://sintef9013.com/darwin_wiki/index.php?title=Establishing_networks
Ensure that the actors involved in resilience management have a clear understanding of their responsibilities and the responsibilities of other involved actors

Stakeholders need to have sufficient insight into their own responsibilities. This includes knowing what resources, plans, experiences and expertise they have. Furthermore, they need have insight into other actors responsibilities. This is vital in order to identify gaps and cooperate before, during and after a crisis. Stakeholders to know who to contact if actions need to be coordinated or changes to plans need to be made, actors to understand their own and other’s roles so that effective action is taken. This is critical for both team, intra and inter-organisational coordinated action.

Background

Actors

Policy, decision makers, resource managers, front-line operators in organizations, which have agreed to coordinate, exchange information and establish common procedures (even at a high level) with other organizations for the management of specific types of crisis.

Specific to Healthcare

Several levels of actors need to be considered according to the healthcare system organization in each country. Especially policy and decision makers have to be identified with respect to the healthcare main macro area levels (i.e. international, European, national, regional/local).

Illustration in the Healthcare domain

An example of coordination and communication among actors - that is based on the mutual understanding of roles and responsibilities - concerns the Psittacosis infection among the Fiumicino Airport staff and a cargo of live parrots.

Several years ago, two members of the Fiumicino (FCO) airport staff - in Rome (Italy) - were diagnosed with Psittacosis in a nearby hospital. The information was relayed to the local health unit (LHU) and from there to the Lazio Region and to the Ministry of Health (MoH) - Communicable Disease (CD) Office as per the national surveillance system. The Department of Prevention of the LHU investigated the working environment of the patients and found that both had worked at the airport in enclosures dedicated to the care and inspection of live animals and had handled a cargo of live parrots that had since left the airport. The MoH - CD office informed the USMAF (Port, Airport and Ground Crossing Health Offices) Central Coordination Office and the MoH Veterinary services. The USMAF Central Coordination Office communicated with the USMAF FCO (Port, Airport and Ground Crossing Health Office situated in the Fiumicino Airport). The Human contact tracing and surveillance were performed by the Lazio Region in collaboration with the Local Health Units of Rome. Information on the air carrier and exporter/country of origin was collected by the Veterinary Office, according to the rules on the controls of live animals and animal products. The FCO Border Control Post was able to identify the suspected cargo and its final destination thanks to its dedicated database on products received and inspection/control procedures. The USMAF FCO also consulted its
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

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dedicated NSIS (New Sanitary Information System) USMAF database on products received and inspection/control procedures. All findings were communicated to the USMAF Central Coordination Office. After internal communication among the relevant offices in the MoH (Central level), the Region of destination of the parrots was contacted. The Region then alerted the local health unit of the concerned area. The LHU coordinated the inspection of the pet shop that had received the parrots both for aspects concerning animal and human health [1].

The example shows the complexity of roles and responsibilities in multi-organizational crisis. Several actors were involved and operated according to their internal procedures and regulations. The fruitful collaboration among organizations were supported by a mutual awareness of their roles and responsibilities and by means of a central coordination - performed by the USMAF Central Coordination Office - that allowed the information collection and sharing among the actors involved.

**Elements of the Healthcare context**

**Associated challenges**

Some contextual conditions affect the implementation of the resilience principle described in this card:

- **Type of emergency.** The card is adequate to contexts characterised by repeatable, bounded emergency situations, where scenarios typologies are reasonably predictable, and where consequently it is possible to have stable emergency procedures, and identifiable actors. On the other hand, the approach may not work in non-structured situations, in which the intervention has to be prepared on ad-hoc basis.

- **Confidentiality.** Confidentiality may prevent some organisations to disclose internal information about roles, responsibilities’ and contact numbers.

- **Safety culture level.** Different actors from different organisations may have different levels of safety culture; therefore, not all of them may consider periodic meetings valuable to increase mutual awareness of relevant roles, responsibilities and contacts.

- **Competition among the actors.** The competition among the actors - rather than the collaboration - fostered by policies and strengthened by cultural, social and economic factors - do not enhance the resilience perspective.

Furthermore, in some countries healthcare actors’ roles and responsibilities could not be easy identifiable because there is not always a direct correspondence between roles and responsibilities. During the emergencies, for instance, the lower hierarchical roles happen to endorse higher responsibilities but in an informal way and without an institutional acknowledgements due to power issues that are strictly related to the hierarchical structure of the healthcare system. This is a critical issue that severely compromise the possibility to recognize which are the effective and crucial healthcare roles.

**Minimum viable solution**

Implementation costs are scalable: they depend on the involved levels of the healthcare system (regional, national, European, international). The minimum viable solution to assure a common understanding of roles and responsibilities at regional and national levels, consists in clearly identifying, within each organization, contact persons, for shared procedures, who are in charge of arranging updating activities. One minimum activity should concern the regular information sharing by each organization regarding organizational aspects that could impact on the
cooperation activities for the crisis management (e.g. resources availability, changes in internal procedures and regulations). A mailing list or communication platform (see Tools in: Healthcare Practices, Methods and Tools section below) could be used for this purpose.

Interventions proposed

Across phases

Stakeholders involved in resilience management need to have clear idea of roles and responsibilities. Therefore, there is a need to ensure in each organization an adequate level of expertise about the resources, plans, and experiences they have, and what responsibilities other actors may have during a crisis. This is vital in order to identify gaps and cooperate before, during and after a crisis.

What is needed to understand roles and responsibilities:

1. Who needs to be contacted during a crisis
2. Which are the relevant roles for the management of specific crises
3. What should be expected from other organizations during a crisis.

Healthcare perspective

N/A

Before a crisis

If a shared procedure among the different organizations already exists, the procedure should specify which are the involved organizations and which is the one expected to take initiative when a coordination with the other organizations is required. If a shared procedure does not exist yet, one or more organizations should take initiative to coordinate and decide together the group of relevant organizations to involve. For guidance on how to establish from scratch a new network of organizations, see Concept Card Establishing networks.

Actions needed before a crisis:

- Identify organizations with shared responsibilities in the management of a crisis.
- Organize periodic coordination activities to check, discuss, update and revise high-level roles and responsibilities of each organization. The frequency of coordination may vary, depending on time and budget constraints (e.g. from twice a year, until once every two years).
- Ensure that at least one representative per organization participate to the coordination activities and that each organization designates a point of contact (PoC) to take care of such coordination.
- Make sure that the designated PoCs will arrange updating activities internally to their own organization, following each coordination event (the internal updating activities can range from simple notifications to the interested personnel, to real training activities designed on purpose).
- Make sure that major changes affecting emergency procedures in each organizations are assessed for their potential impact on the interaction with other organizations and communicated to them.
- If possible, inside each organization, design and develop a ‘quick reference guide’ format of the procedure, simplified and adapted to the specific needs of the concerned...
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

Triggering questions

Involvement of organizations

- Does a shared procedure exist among different organizations required to manage jointly a specific type of crisis?
- Is there a need to involve new organizations in the coordination activities about shared roles and responsibilities for the management of a crisis?
- Is there a need to create a new network of organizations for the management of a specific type of crisis? (see Concept Card Establishing networks)

Coordination mechanism

- When a shared procedure among different organizations exists, is there one organization clearly appointed to activate and arrange periodic coordination activities with other organizations?
- Within our organization, is a calendar of periodic coordination activities already established, to check roles and responsibilities with other organizations?

Impact on other organizations

- Did we recently experience within our organization changes of roles and responsibilities that could affect emergency procedures shared with other organizations?
- Are these changes sufficiently significant to require a communications to other involved organizations?

Internal dissemination of changes

- Are we providing adequate information and training on relevant changes of roles and responsibilities in other organizations to the personnel potentially involved in the management of crisis?
- Can we develop a ‘quick reference guide’ to help the personnel of our organization to promptly identify shared roles and responsibilities with other organizations during a crisis?
- If we already have a ‘quick reference guide’, do we need to update it to include recent changes of the procedure shared with other organizations?

Healthcare perspective

Example of situations of relevance to healthcare:

In case of serious cross-border threats to health, public health organizations with shared responsibilities in the management of specific crises are identified according to national, European and international regulations and legal frameworks that support a coordinated action on monitoring, early warning and combating threats.

- At international level, each State Party appoints a National Focal Point and the authorities responsible within its respective jurisdiction for the implementation of health measures.
- In order to improve the coordination of the shared actions at European level, an ad-hoc Committee would be established to support the Member States in their efforts to prepare, tackle and mitigate health crises.
Each Member State should regularly provide the Commission with an update on the status of their preparedness and response planning at national level, also including information that they are obliged to report according to the international regulation.

At all levels, the public health organizations involved provide contact details that need to be continuously updated and annually confirmed.

All the levels - international, European, national - need to be interwoven and work on coordination by collecting and sharing data and information.

See in addition Practice 1 in the Healthcare Practices, Methods and Tools section below.

### During a crisis

If the actions put in place before the crisis have been successful, during a crisis the personnel of each organization should be ready to react in an efficient and effective manner, reducing misunderstandings and misinterpretations about roles and responsibilities of other involved organizations.

**Actions needed during a crisis:**

- Operate taking into consideration the information and/or the training received during internal updating activities concerning roles and responsibilities of other organizations involved in the management of the crisis.
- If available, use the quick reference guide version of the procedure shared with other organizations to easily identify the relevant roles and responsibilities.

### Triggering questions

N/A

### Healthcare perspective

Example of situations of relevance to healthcare:

- The involvement of the actors in the crisis management is regulated by the classification of the critical event, that is based on the magnitude of the event.

- During the crisis, all the organizations involved at the regional, national, European, international levels operate according to the established legal frameworks and regulations in which roles and responsibilities are clearly described.

- The coordination of the organizations involved may shift according to the crisis scale (e.g. whether the situation is classified or not as a national emergency) to guarantee an adequate level of access to the available resources and ensure an unified direction.

See in addition Practice 2 in the Healthcare Practices, Methods and Tools section below.

### After a crisis

The outcome of a crisis is obviously an opportunity to revise any kind of procedure shared among different organizations that were jointly involved in its management. Such review include the high-level definition of roles and responsibilities inside each organization.

**Actions needed after a crisis:**
• Organize extraordinary coordination activities (beyond the one normally planned) to revise the common procedure and update the high-level definition of roles and responsibilities in each organization, as needed.

• Consider whether new organizations should be included in the shared procedure and periodic coordination mechanism (or if other organizations should be excluded from that, having lost their relevance in the shared procedure).

**Triggering questions**

**Organizations involved**

• Did the shared procedure and coordination mechanism involved all the organizations relevant for the management of the crisis?
• Considering what happened during the crisis: should new organizations be included in the shared procedure and coordination mechanism?

**Coordination mechanism**

• Was the experienced crisis severe enough to justify extraordinary coordination activities (beyond the one normally planned) to revise the common procedure and the definition of high-level roles and responsibilities in each organization?
• Is the frequency of periodic coordination activities sufficient at the light of the occurred crisis?

**Impact on other organizations**

• Does our organization have ill-defined roles and responsibilities in the shared procedure, which negatively affected the response to a crisis managed in cooperation with other organizations?

**Internal dissemination of changes**

• Did the information and training provided previously to the crisis result to be effective for what concern relevant changes of roles and responsibilities in other organizations?
• If available, did the quick reference guide supported the identification of roles and responsibilities during the crisis?

**Healthcare perspective**

After a crisis, the revision of common procedures is recommended at least after critical events with a large impact (for instance an earthquake crisis). This review aims both at confirming roles and responsibilities, and including new sub-clusters of actors and activities that have been set up for the first time in the field to manage the crisis. When useful, in order to ensure the timely new coordination actions over the time, specific legal measures could be provided.

See in addition Practice 3 in the Healthcare Practices, Methods and Tools section below.

**Relevant material specific to Healthcare**

**Practices, methods and tools**

**Practices**
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**Practice 1.** In Italy, in case of epidemic threats identified by a national surveillance system with impact at international level: Public Health organizations with shared responsibilities are identified according to national ministerial decree/ pandemic plan/ standard operating procedures, the European Decision No 1082/ 2013/ EU [3], and the International Health Regulation (IHR) [4].

- **At international level**, according to the IHR, each State Party establishes a National IHR Focal Point and the authorities responsible for the implementation of health measures. In the IHR, roles and responsibilities of the National IHR Focal Points are clearly described. States Parties provide WHO with contact details of their National IHR Focal Point and WHO provides States Parties with contact details of WHO IHR Contact Points.

- **At European level**, the Decision supports a coordinated Union action on monitoring, early warning and combating serious cross-border threats to health. An important role in the coordination of these actions is played by the Health Security Committee composed of high-level representatives from Member States. In case of communicable diseases, the surveillance at Union level is carried out by the European Centre For Disease Prevention and Control (ECDC). In order to strengthen the preparedness and the response planning, Member States should regularly provide the Commission with an update on the status of their preparedness and response planning at national level, also including information that Member States are obliged to report to the WHO in the context of the IHR.

- **At national and regional levels**, in Italy, roles and responsibilities of organizations involved in the management of the epidemic disease are regulated by the Pandemic preparedness plan [5] provided by the Ministry of Health (MoH). Standard operational procedures (POS) are also released by the USMAF Central Coordination Office in charge for healthcare facilities and services at the Points of Entry (PoE) such as airports and ports (MoH).

**Practice 2.** In the Italian National healthcare system, numerous actors are involved in communicable disease detection and early warning and in outbreak/health emergency response. Their involvement differs whether the situation is classified or not as a national emergency [1]. All the organizations involved at the regional, national, European, international levels operate according to the legal frameworks mentioned in the before phase.

In case of a national emergency, as foreseen in the Pandemic Preparedness Plan [4], the Council of Ministers activates the Department of Civil Protection that in turn activates governmental and non-governmental actors such as the Italian Red Cross, the operational network of the emergency health response (118) and the Police forces.

Coordination shifts from the Ministry of Health to the Civil Protection Department. If the emergency is health related, the Minister of Health will be called to provide technical advice.

As National IHR Focal Point (NFP), the MoH - Directorate General of Prevention is responsible for communicating timely both to WHO at international level, and to ECDC at Union level by means of the Early Warning and Response System (EWRS). This notification of alerts is required only where the scale and severity of the threat are significant and they affect more than one Member State and require a coordinated response at the Union level. Deadline and procedures are regulated by the legal frameworks [3], [4].

**Practice 3.** An example of revision of common procedures after a crisis is provided by the case
of the Abruzzo earthquake emergency occurred in Italy, in 2009. In order to strengthen the local capability to assure an adequate level of health rescue and assistance at local/ regional level in coordination with the National Civil Protection Department - Sanitary Unit, Regional Health Modules (RHM) were established during the emergency, and legal measures to include them in a common procedure were released in 2011, after the crisis. Legal measures take into account what happened in the field, among the already identified actors, during the crisis management. The aim is to describe and specify the general process to activate and manage RHMs that have to operate in the first 72 hours of the crisis, to minimize victims and the avoidable health consequences among the severely injured persons. The procedure details have to be specifically established between the Civil Protection Department and each Region [More information, in Italian, are available at: http://www.protezionecivile.gov.it/jcms/en/view_prov.wp?contentId=LEG28816]

Methods

The Cluster Approach, is generally applied to improve the effectiveness of response capability of the humanitarian response in terms of sufficient global capacity, predictable leadership in the main sectors of response, partnership among actors involved, accountability of partners, strategic coordination and prioritization [5].

Tools

Communication platforms, are useful tools to share information, practices, and to support the coordination among actors with same objectives.

Examples are provided by:


- **EU SHIPSAN ACT Information System (SIS)** [7]. The EU SHIPSAN ACT is a European Joint Action dealing with the impact on maritime transport of health threats due to biological, chemical and radiological agents, including communicable diseases and supports the implementation of IHR [3]. The SIS is a Communication Network platform, an information system and a database.

References


The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

Read the full text of this guideline at:
Enhancing the capacity to adapt to both expected and unexpected situations

When facing crises, organisations need to be able to adapt in a timely manner to potentially unexpected situations. Roles, training, strategies, processes, etc., need to be in place to provide such capacity based on an all-hazards approach, assuming both known and unknown risks.

Background

Actors

Actors directly concerned by this concept card are decision and policy makers, and crisis managers. The guideline is relevant at all administrative and management levels, since adaptive capability also concerns front line operators, and roles who (re-)design response plans.

Specific to Healthcare

The actors, from the HC perspective, is the decisions and policy makers on regional and local level and the Ministry of health and welfare. These are for example regional and hospital disaster preparedness managers as well as Emergency Department Head Nurses and prehospital commanders.

Illustration in the Healthcare domain

Same emergency response procedure is applied to all incidents, regardless of incident scenario. For example a regional major incident medical command is formed by the same core staff in all incidents. This enable the management to be mobilised quickly and to accumulate experienced in staff that are active in wide variety of events. Further specific expertise is added to the management staff if needed in a later stage, and have the specific role as experts in the otherwise standard management team.

Elements of the Healthcare context

All-hazard approach can be applied to all levels of management (national, regional, local, operative). The fundamental ideal is that regardless if you have a surge capacity challenge at the local Emergency Department, a pandemic, or a train crash, the majority of procedures would be the same. Thus, a generic response plan can be applied.

Interventions proposed

Across phases

To enhance their capacity to adapt to all events, expected or unexpected, organisations need to:

• Understand how they adapt in their operational environment. Creating such understanding includes: understanding the nature of the disruptions they face; identifying how they
regularly handle or experience challenges and disruptions in everyday operations; having clear and shared mission and goals; etc.

- **Build mechanisms** (strategies, processes, tools) so that, as much as possible, these are already in place when crises occur, i.e. when they are most needed. Such mechanisms need to be rehearsed, with the understanding that actual events will likely be different from anticipated situations.
- **Implement adaptive actions and strategies** in the challenging context of crises
- **Learn from both failures and successes, and regularly review and revise** the mechanisms that support adaptation.

A central idea is that, while crisis situations differ from challenges and disruptions experienced on a daily basis, the capacity to adapt in crises stems from the same general capacity used in everyday operations.

**Healthcare perspective**

Risk and incident managers are experts in generic management, not in specific issues related to incident scenarios.

**Before a crisis**

Before crises occur, preparedness activities are critical in order to create the conditions for adaptation during crises.

**Understanding adaptation in the operational environment**

Invest resources in capturing / clarifying:

- Strategies
- Resources
- Constraints

**Building mechanisms to support adaptation during crises**

- Contingency plans, checklists
- Appointing roles in advance

There are many differences between actors relating to the development of resilience management (the roles, processes, training, etc). Therefore, it is important that actors will appoint a role who will be in charge of crisis management. This role should be enabled to monitor and assess the complete picture, and together with the organization's managers define the roles and responsibilities of involved actors. Managers should be trained in assessing the situation against prepared-for situations and recognize when coordination with relevant partners outside of established channels is necessary to coordinate response.

- Integrating buffers in plans
- Anticipating demands in resources
- Supporting operations from remote locations

**Triggering questions**
Do we have an actor who will be in charge of, coordinate or synchronize crisis management planning and response?

How are such managers trained to recognise when unexpected events occur that challenge the current organisational structure and processes?

What variables/data are monitored to assess whether there is a crisis? What is the underlying rationale for the monitoring efforts and what limitations does this approach have? What crisis information is difficult to capture in variables/data?

How do we define potential relevant partners to coordinate with in case of expected and unexpected situations? Are lists of “good-to-have” contacts available in case unexpected situations occur that may require contacting actors outside of established communication channels?

Do we (re-)develop response plans based on new experiences?

Do we have response plans as well as training such as exercise and drills?

Do we model protocols to promote a common approach?

How do we create communication channels and networks between partners so that they can adaptively coordinate and cooperate when unexpected situations occur?

Can the adaptive re-allocation and deployment of resources within and between organisations be supported by building in slack in appropriate places in the network to meet unexpected demands?

**Healthcare perspective**

Plans are as generic to the furthest extent. Specific scenarios might be tested. All such results are compared to find common procedures that are then formed into generic guidelines for incident response. However, limitations in these generic guidelines must be made aware in order to adapt the response when needed.

**During a crisis**

---Focusing on mission and primary goals---

- Sacrificing non-essential functions

**Managing buffers**

- Monitoring buffers
- Mobilising extra resources
- Deploying extra resources
- Buying time (to diagnose the situation)

**Collaborating in a network of operations**

- Challenges
- Opportunities

**Triggering questions**

- What uncertainties are there in the situation?
- For which aspects of the situation are we less than well-prepared?
- Are facts, domain knowledge, and experiential knowledge that we need to assess and/or act on the situation available to us?
- How can we communicate with other/new actors in order to understand the complete picture of the event?
- Are the actors familiar with the actions they should take?
• Are organisational plans applicable in this situation or do other mandates need to be renegotiated or actors to be coordinated with, due to unexpected circumstances?
• Are plans available and applicable?
• How can or should elements of plans be combined to meet situational demands?
• How can missing or inappropriate plan elements be added or compensated for (through improvisation)?

Healthcare perspective

Generic guidelines are applied and incident managers respond according to all hazard applicability as long as possible. This approach gives incident managers the ability to quickly initiate the response and focus on where specific adaptation is needed.

After a crisis

...and on learning and revising activities, during normal operations as well as in the aftermath of critical events.

Going back to normal (recovery)

Learning from crises and everyday events

• Implementing review processes
• Revising plans and procedures based on review results

Triggering questions

• Which aspects of the situation were the actors involved in the response familiar with?
• Which were new to them?
• How did they solve unexpected or not-planned-for situations?
• Did the organisation as a whole recognise these unexpected situations when they occurred?
• How can organisational processes be improved to recognise and act upon the unexpected in a better way?
• Was there a proactive action to recognize unexpected circumstances?
• Does the planning process generate relevant, applicable and useful plans?
• Does training have the desired effect?
• How can planning and training processes be improved?

Healthcare perspective

All incidents are reviewed with the purpose to identify limitations in generic guidelines and standardise where possible.

Relevant material specific to Healthcare

Practices, methods and tools

Checklists for initial major medical incident response are applied to all incident types on regional, local and prehospital level. This for example include a common situation report (METHANE) and time set key process indicators such as first report from scene, first formulation of incident strategy and first inter-agency briefing.
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.
Establish the conditions for adapting during crises and other events that challenge normal plans and procedures

Often, crises challenge the plans and procedures in place. As a result, organisations need to support and maintain a clear and legitimate space of manoeuvre relative to normative plans and procedures. Such space is important for actors engaged in crisis response in order to adapt to unusual (unanticipated) circumstances. After training or real events, investigating why these adaptations occur can feed the processes of revision of checklists, procedures and policies.

Background

Actors

Actors The main focal point for this CC is personnel who are responsible for managing Adaptive Capacity (AC) and thus are in the position to oversee and, to some extent, authorize deviations from the normative operational base when possible/applicable. Furthermore, it is assumed that the very same personnel has an influence on preparation and training of AC, and that they are accountable for the merits of AC upwards towards e.g. policy-makers.

Scope The scope is therefore twofold. "Downwards", it is about clarifying the reach and grasp of the normative base, and ensuring that the (managed) AC do not deviate from the normative base in an unduly manner. "Upwards", it is about maintaining trust in the capacity to autonomously judge and decide when and where to deviate in order to ensure resilience according to situational needs. Both these aspects will benefit from a continuous and systematic reconciliation between the normative base and the actual AC, in which both experienced and conceived/exercised AC is used to revise and improve the normative base.

Applicability During a crisis or emergency, it cannot be assumed that the AC can be managed in a detailed manner in terms of strict delegation or managerial approval at every breaking point. The foundation for trust is primarily laid down before in terms of training and rehearsal on the normative base and on different degrees of deviation according to need or severity of the situation, and after in terms of after-action-reviews or other activities of reconstruction in which the reasons for deviations are critically examined. Nevertheless, during a crisis, a capability of keeping track of the breaking points, preserving the essential cues for reviews, is also valuable.

In that sense, this CC is applicable for all types of emergencies and disruptions.

Specific to Healthcare

Ministry of Health, Regulatory Bodies and Scientific-Technical Institutions. Within each of them: Site Director or Manager (could be Director General), Quality Manager, Safety Manager, Regulatory Manager, Human Resources Manager. Then, according to the area --: the Head of the Department (or Service), and the Head of the specific Unit (or, other specific Units according to the specific mission of the institution). Each of these actors have financial and signature authority, according to the legal frame of the body.

Illustration in the Healthcare domain

For many Regions, de novo development of guidelines is very hard because of evidence base, lack of time, expertise, resources. so they make use of high-quality already existing generic
guidelines: this weakens the efficacy and efficiency of the intervention. To avoid the enlisted issues, we outline a systematic, participatory approach for evaluating and adapting available guidelines to a local context of use. Whether evidence comes from a case study/report, informed consent, clinical practice guidelines, end-users must consider if or how the generic guidelines could be adapted to the local context.

Care of ulcers of the leg, the task force collectively assessed the quality of individual guidelines and their recommendations. They developed a protocol that was feasible to implement locally and that was endorsed by stakeholders. The guideline was condensed to a one-page algorithm to enhance use by the clinicians, and documentation forms were created for collection of clinical data. For example, to streamline the process of assessment and facilitate application of evidence-based care, documentation forms were created to collect information about the cause of the ulcer, with venous symptoms and history on one side of the page and arterial symptoms on the other. (Howard M. Kimmel, DPM, MBA, FACFAS; and Angela L. Robin, DPM)

Elements of the Healthcare context

Using the best evidence is a fundamental aspect of quality health care. Valid guidelines for clinical practice are fundamental to inform evidence-based practices. To assess the uptake and adherence to guideline-based care, auditing sessions are implemented in Healthcare. However, often through the evaluation of these functions, an exhaustive and global conformity of practices is still far from expectations. This demonstrates that high-quality guidelines and its dissemination are not sufficient to ensure evidence-based decision-making. This requires a substantive, proactive effort to encourage use at the point of decision-making. (Harrison, M., Legarè, F) The gap between valid guidelines and delivery of evidence-based care is often hampered. For instance, clinicians may not have the required skills to implement a recommended action (e.g., being unfamiliar with implementation of a novel therapy, or the hospital lacking of recommended equipment or the necessary time to deliver a guideline’s recommendation).

Interventions proposed

Across phases

Resilience is positioned in complement to plans and procedures. Plans and procedures often are not fully useful and have to be used as guides to base actions on rather than as comprehensive and accurate descriptions of actions to execute. Flexibility and improvisation compensate for gaps in the procedures, providing solutions needed on the spot.

The interventions described here

Before a crisis

Relevant processes and procedures need to be well documented and well rehearsed. Regarding larger crises lists should be organized indicating who needs to be contacted and when, including, e.g., for technical or political issues. For big crisis, there should be specific infrastructure and facilities, and procedures flexible enough to be adapted to different kind of situations and needs.
[2] AUTHORITY ISSUES
Roles and authorities need to be clarified in advance and organisations need to anticipate situations in which it might be difficult for the usual chain of command to make well-informed and fast decisions in the face of unanticipated challenges. Operators in direct contact with such challenges might, at a given moment, have the best knowledge of the situation and ability to act, while managers remote from the situations supervise operations and coordinate them across larger scales.

[3] CAPABILITY ISSUES (skills, expertise)
Managers should develop a good understanding of the type of adaptations of plans and procedures situations might require, as well as of the capabilities present in their organisation. Such capabilities include the ability to recognise early on that/when procedures or routines are insufficient. All levels in the organisation must understand the need to be prepared and to "release" themselves from planned activities when/if necessary. Regular exercises are a major source of information on potential gaps, which should then be addressed through training programs. Training and preparation should systematically address hypothetical situations that fall outside usual conditions addressed by plans and procedures. Either preplanned or random scenarios of escalation may be used. A baseline approach should be established in which:

- the situation and potential implications are assessed,
- the action alternatives are elaborated,
- a decision is enforced, and
- the implications of the decision (e.g., new areas of attention) are described.

Mechanisms and actions used for expanding skills, expertise and resources within response team/organisation to problem-solving should be tracked and logged, including the strategies and heuristics for combining them. The training should also encompass situations in which plans and procedures are ambiguous or even missing, and innovative ways of operating must be identified on the spot. The adaptive capacity needed should be assessed according to a scale ranging from only minor adjustments of procedure to abandoning procedure.

[4] LEARNING PROCESS (NORMAL OPERATIONS, CRISIES)
Training processes and outcomes should be reviewed by operators and management. A comparison between anticipated issues and actions required by the situations should be assessed. Based on such assessment, training programs should be revised if necessary, and a revision of plans and procedures considered.

Triggering questions

[1] NATURE OF PLANS AND PROCEDURES
- Are plans and procedures in place for all operators?
- Are they rehearsed regularly?
- Is there flexibility for operators to adapt when situations are unexpected?

[2] AUTHORITY ISSUES
- What roles will be in charge of abnormal situations?
- Will they be in a capacity to quickly make informed decisions if such a situation occurs?
- Would other roles be in a better position to make decisions?
Do these roles have the authority to do so?

**[3] CAPABILITY ISSUES (skills, expertise)**

- Are operators trained on unusual situations for which plans and procedures are limited?
- Does training include situations in which they need to solve problems or make trade-offs?
- Do they experience situations in which they need to show initiative, outside of the regular line of command, in order to act quickly?

**[4] LEARNING PROCESS (NORMAL OPERATIONS, CRISES)**

- How regularly are training programs reviewed and revised?

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**During a crisis**

During a crisis, organisations are expected to execute and revise plans continuously. They should keep records of the plans and procedures used, as well as of the breaking points and brittleness that justified deviations from the initial plans and procedures.

**[1] NATURE OF PLANS AND PROCEDURES**

Ideally, a log that keep account of procedures used and not used, and the causes for the latter case, should be maintained (for AFTER use).

**[2] AUTHORITY ISSUES**

When possible, provide relevant and timely mechanisms and interfaces for authorising specific course of action, especially when the action needed exceeds the defined space for manoeuvre.

**[3] CAPABILITY ISSUES (skills, expertise)**

When possible/relevant/timely, track mechanisms and actions used for expanding skills, expertise and resources within response team/organisation to problem solving, including the strategies and heuristics for combining them.

**[4] LEARNING PROCESS (NORMAL OPERATIONS, CRISES)**

Use (simple) techniques to record precariousness, breaches and brittleness that trigger deviation from normative base, and indicate the level of deviation and its justification.

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**After a crisis**

As far as possible, revise crisis management processes, reconstruct adaptive capability process, assess performances, adjust or calibrate normative base, and describe prospects for future resilient performance.

**[1] NATURE OF PLANS AND PROCEDURES**

Revise procedure and plans if the actual experience (DURING) is generalizable.

**[2] AUTHORITY ISSUES**

Consider whether the defined space for manoeuvre was sufficient, and whether authority was conducted in a functional and proper way when decision support was needed, within or beyond the space for manoeuvre.

**[3] CAPABILITY ISSUES (skills, expertise)**

If needed, assess training needs in order to close gaps in capabilities.
[4] LEARNING PROCESS (NORMAL OPERATIONS, CRISSES)
After the crisis phase, it is important to learn lessons in order to match the procedures to the circumstances that emerged in the crisis itself. Reconstruct adaptive behaviour and capacity based on prior training records and notes from past events. To do so, build narratives that capture both coherence and disruptions. Describe deviations according to a useful scale, assess whether they were justifiable, and suggest, if needed, alternative pathways that are retrospectively coherent (but beware of the advantages of hindsight). If possible, define indicators of critical conditions, create lists of lessons learned, or narratives that capture a number of critical issues in a coherent way.

Triggering questions

[1] NATURE OF PLANS AND PROCEDURES
- What were issues with plans and procedures in the situations experienced?
- Have these issues been identified before?
- Can the solutions found be used in other situations?

[2] AUTHORITY ISSUES
- Were people in charge of decisions authorised to make them?
- Did people recognise that they had authority (e.g., when they didn’t exert it)?
- Is there any indication of need to revise the space for manoeuvre?

[3] CAPABILITY ISSUES (skills, expertise)
- Did people have the skills, expertise needed?
- Were they able to exert existing skills, expertise into combined action?

[4] LEARNING PROCESS (NORMAL OPERATIONS, CRISSES)
- Do we have detailed accounts of the events?
- Can we identify deviations from plans and procedures?
- Can we make sense of such deviations?
- Could there have been better alternatives?

Relevant material specific to Healthcare

References

- Howard M. Kimmel, DPM, MBA, FACFAS; and Angela L. Robin, DPM
D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

Read the full text of this guideline at:
4.3.3 Assessing resilience

Identifying sources of resilience: learning from what goes well.

Identifying sources of resilience allows to amplify and make use of them. It consists of investigating the mechanisms (e.g., strategies, processes, tools) by which organisations successfully handle expected and unexpected conditions. Such mechanisms allow them to perform and deliver required services in spite of the variability and complexity they experience in their operations.

Background

Actors

Policy maker, operational management, operational roles

Specific to Healthcare

Actors should be identified in the following areas:

- policy makers and regulatory bodies at different levels: International Organizations (WHO, ECDC); Ministry of Health; Regions/ Counties; NGOs
- operational institutions that operate on the territory (hospitals, local health units, etc.).
- patients (as class and as individuals)

Illustration in the Healthcare domain

Translating tensions into safe practices through dynamic trade-offs: the secret second handover - A specific threat to safety's patient is when the ambulances are queuing in the Emergency Department, losing their ability to respond. In England, to improve this, ad-hoc target times were specified. To achieve these targets, the process to receive handover was redesigned. Work as imagined was done in form of protocols and procedures. During field work such variations of the application of the dedicated handover (Work-as-done) were verified [9]. This example demonstrates that it is possible to optimize the performance of the daily ambulances services by adjusting time-slots and avoiding waste of time.

Elements of the Healthcare context

Associated Challenges

The background and context information in Healthcare is one of the most complex. The mismatch between work-as-imagined and work-as-done constitutes the basis of this complexity (AIHI seminar), as explained below [2]:

Work-as-imagined (WAI), carried out by workers (blunt end) who:

- experience health care indirectly by interpreting and filtering information (indicators, statistics);
- receive delay in feedback;
- represent ideas about practice, (outcomes are the access information easily assessable);
D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

Work-as-done (WAD), carried out by workers (sharp end) who:

- experience health care delivery first-hand;
- receive feedback with little or no delay;
- work in constantly changing and unpredictable conditions.

Minimum Viable Solution

One of the first actions to carry out are the implementation of Problem Based Learning (PBL - see Method 1 in the Healthcare Practices, Methods and Tools section below). This includes at least a 2 day face to face course with at least 2 representatives of the stakeholders involved.

Interventions proposed

Across phases

An important aspect of resilience in dynamic and shifting scenarios is that there are goal trade-offs in all aspects of managing the ongoing situation.

Adaptive capacity is needed to address expected and unexpected events in particular those that fall outside the scope of formal procedure and design. Performance variability means that people and organizations adjust performance and it is necessary to deal with the situation where availability of resources (time, manpower, materials, information, design constraints, etc.) may be limited and uncertain.

Different types of events require different strategies to handle these events. Some events occur regularly, some are more difficult to anticipate and prepare for.

Before a crisis

Define and describe work-as-done, i.e. daily operations: procedures, methods, tools, strategies and practices used to achieve safety and efficiency and other critical goals, how adaptive capacity is built, and how complexity is managed. Analyse the triggering questions for hypothetical scenarios and daily operations.

This can be done in a number of activities, such as dedicated workshops, through interviews, group interviews, and observational studies informing analyses, over-the-shoulder observations, etc. The analyses as such can be part of other safety, security, and change management activities, audits, safety assessments, concept design sessions, etc.

Triggering questions

Organisations to discuss a selection of the following questions in workshops or company meetings. Selection of questions might use the following criteria 1) Close to operations; 2) Possible to perform training; 3) Actionable; 4) Possible to integrate into current way of working; 5) Supportive (these criteria have been used when adapting the guidelines for evaluation during DARWIN Swedish pilot).

Goal trade-offs:
Which goals do various actors at the different stakeholders aim to meet? (consider e.g. safety, security, environmental sustainability, cost effectiveness, capacity, efficiency, flexibility and predictability)

Which goals are potentially conflicting and traded-off against one another? (consider different system groups, for instance, operation managers, individual operators etc.)

Adaptive capacity:

Which performance constraints (resources, time, capacity boundaries, etc.) and margins are defined within the performed functions and externally to these functions?

How are margins managed (anticipated, created, monitored, and applied)?

In which situations does the system behave close to these margins? How do operators detect and handle this?

Which working methods and margins are used to cope with increased demand?

How does the system handle different kinds of cascading effects?

How can the system adapt the use of resources?

What needs to be coordinated with other actors when demands vary?

Are communication channels likely to be available in these demanding situations?

Strategies to cope with various events:

How and to what extent is the organization flexible enough to adapt to complex and new problems or opportunities without disrupting overall functionality?

How and to what extent does the organization pay attention to monitoring of events that are or can become a threat or opportunity in the future?

For which events is there a response ready?

What is the threshold of response?

How are resources allocated to response readiness?

Are personnel exposed to unusual situations in training and exercises?

Coupling and interactions:

What are the critical time-dependencies in the processes going on?

What is the flexibility in how these processes are performed?

Which parts or aspects of the system can be understood well using the questions above, and which cannot? What does high complexity mean for the management of the crisis?

Where do more efforts need to be spent to understand how small variations in the system due to complexity can propagate and amplify through the system?

What do operators (need to) know about the other parts of the system that they are interacting with?

How does the continuous timing, pacing, and synchronization of interdependent units contribute to smooth operations?

To what extent do the organizations that need to cooperate in situations of crisis have integrated agendas? Can common goals and means to achieve these goals be agreed swiftly?

How are formal and informal networks nurtured that are useful in handling crises?

How can cooperating organizations gain and use knowledge about the network of organizations that may become involved?

Healthcare perspective

Monitoring and mapping the ordinary professional practices (for instance in a Emergency Department) during the peacetime is highly recommended to learn on how people (e.g. front-line
staff) navigate the complexity of the healthcare system and adjust their practices to provide safe and high quality care. *Organizational Ethnography* is a recommended methodological approach to know and understand everyday professional practices within the contexts, where and when things happen (see *Method 2* in the Healthcare Practices, Methods and Tools section below).

**Learning from the ordinary** offers opportunities to realign “work-as-imagined” from decision makers and safety managers (e.g. Nurse coordinators), and the “work-as-done” by the operational personnel and frontline employees, providing useful insights also to manage critical events [3], [4].

The main question, guiding this learning process, concerns:

- **How do usually people navigate and adjust to the complexity of their professional practices to provide safe and high quality care?** [2]

The switch between “normal operations” and “serious emergency situations” often occurs in the healthcare domain. Therefore, the responsible actor in charge of taking decisions in everyday operations is in the best position to do this during a crisis situation (See *Practice 1* in the Healthcare Practices, Methods and Tools section below).

**During a crisis**

Observe and document application of procedures, methods etc. and their outcome, i.e. not only when they fail, but also when they succeed. Take a step back and reflect on whether conflicting goals are balanced appropriately, where more adaptive capacity is needed, and whether complexity is handled appropriately.

**Triggering questions**

Questions for the CI manager

- Probe where things are going well, ask “where do we never experience (this problem/good operation)? Why is that?
- Is the organisation flexible, adaptable? To what extent and in what way can the organisation change to adapt to demands?
- Do we support colleagues in case of overload?
- Do we have people available with different competences that can take different roles if required?

**Healthcare perspective**

- The observation and document application of procedures, methods etc. and their outcome (both when they fail and succeed) should concern both specifically the healthcare sector and the healthcare in collaboration with other actors according to a *common ground* perspective (see *Practice 3* in the Healthcare Practices, Methods and Tools section below).

**After a crisis**

Analyze differences between intended use of procedures, methods etc. and the outcomes during the crisis. Identify what elements of surprise, skills, strategies, procedures, methods etc. were successful and describe how and why they were successful, for example using the general questions above. Analyse how adaptive capacity was built and complexity managed, and how these capabilities can be further extended or learnt from.
This can be done in a number of activities, such as dedicated workshops, debriefing sessions, after-action reviews, exercise analyses, interviews, group interviews, incident investigations, etc.

**Triggering questions**

Learning - after actions review: Share case studies between organisations that tell story, from point of view of those involved, to just before revealing what happened, ask: “What would you do? How could this play out? What would you do to avoid...?”

Do After Action Reviews when things go well. Identify elements of surprise and how the organisation managed the operation.

Specifically, the following questions may be asked:

**Goal trade-offs:**

- Which goals did various actors at the different stakeholders aim to meet?
- Were any of these goals conflicting or traded-off against one another?
- What consequences did this have?

**Adaptive capacity:**

- Which performance constraints (resources, time, capacity boundaries, etc.) and margins did the various actors have to cope with?
- How were margins managed?
- How did the system handle increasing demand?
- How did the system adapt the use of resources?
- How did communication and coordination vary? Why?

**Strategies to cope with various events:**

- How did the organization pay attention to monitoring of events that are or can become a threat or opportunity in the future?
- Was response readily available?
- How can personnel be trained in the successful aspects of how this event was handled?

**Coupling and interactions:**

- Where do more efforts need to be spent to understand how small variations in the system due to complexity can propagate and amplify through the system?
- How can operators be trained on the other parts of the system that they interacted with?
- What strategies were used for managing timing, pacing, and synchronization of interdependent units?
- How were formal and informal networks nurtured that are useful in handling crises?

**Healthcare perspective**

Once analyzed the differences between intended use of procedures, methods etc. (WAI) and the outcomes, some systematic reports, administered to all the actors (i.e. questionnaires) and worked out by ad-hoc healthcare analysts, should be created to better feed the official Report-After-Crisis.
Relevant material specific to Healthcare

Practices, methods and tools

Practices

Practice 1. In Sweden in the healthcare sector there are switches between "normal operations" and "serious emergency situations". Other type of actors (no healthcare) stay as much as they can in normal operations according to standard allocation of decision rights. It means that the responsible actor to take decisions in everyday operations is in the best position to do it during a crisis situation.

Practice 2. The following real-life example shows how ED [Emergency Department] staff members employed multiple strategies that increased the resilience of their operations. Recently, at the start of the evening shift (15:00), the ED was boarding 43 patients; 28 of these patients filled the unit reserved for boarders; the remaining 15 were split among the acute care areas and the hallway. The use of the hallway as additional treatment space is an example of resilient adaptation at the departmental, as opposed to the individual, level. This procedure was first used several years earlier. By now, it had become part of normal operations, representing an organizational reconfiguration to establish a new equilibrium [5].

Practice 3. In the Swedish healthcare domain, several organizations have introduced good practices and methods aimed to establish Common Grounds. In the Region Östergötland the implementation of Common Grounds for cooperation and management is made by means of the crisis response system [6]. This implementation includes actor-wide activities in all-phases:

- Before: Proactive development of strategies for how to manage a crisis by e.g. common workshops and/or educations
- During: Effective working procedures for actor-wide management of social disturbances with common approaches.
- After: Actor-based follow-up based on indicators for stakeholder cooperation.

Practice 4. A fieldwork (see Method 2 below) was carried out in an Emergency Department to investigate its properties of resilience and adaptive capacity in the face of uncertainty and limited resources. In particular, the focus of the analysis was on the shift from a routine day, in which the system (ED) operates under usual condition (described by practitioners as "run of the mill"), to a situation in which a key person recognized system degradation (i.e. load and demands increase) and initiates adaptive tactics (i.e. recruiting and reorganizing multiple resources) in order to manage and maintain performance [1].

Methods

Method 1. Problem Based Learning (PBL). The ability to adapt to change and continuously improve performance - capability - is enhanced through feedback on performance, the challenge of unfamiliar contexts, and the use of non-linear methods such as story telling and small group, and in particular the methodology called Problem Based Learning (PBL) that does not focus on problem solving with a defined solution, but it allows for the development of other desirable skills and attributes as knowledge acquisition and increased group collaboration and communication. This methodology was developed for medical education. PBL has been
implemented within numerous undergraduate health curricula but less so in workforce training. Public health practice requires many of the skills that PBL aims to develop and would benefit from some exposure to this type of learning and highlights some of the practical issues [8].

**Method 2. Organizational Ethnography** is a qualitative research approach looking at the social interaction of people in a given organizational environment (e.g. hospital’s emergency department). It provides in-depth and up-close understandings of how the everyday-ness of work is organized and how work organizes people in everyday organizational life. The focus is on practices, communications, shared artefacts/ tools and physical spaces carried out and used by the team work. Ethnography includes the participation of the researcher in the organizational context (fieldwork), the observation of everyday activities, fieldnotes, interviews, video recordings, photography and artefact analysis such as devices that a person uses throughout the day. The length of the studies can vary depending on the research objectives and the organizational availability to host the researcher (see **Practice 4** above).

**References**


Noticing brittleness

To identify sources of brittleness in order to invest in their correction. Brittleness is experienced in situations of goal conflicts and trade-offs, or when there is a competition for resources and a need to establish priorities under time pressure. Other difficulties emerge when an organization struggles to manage functional interdependencies between different parts of the same organization, or when there is insufficient buffer capacity to provide additional resources. Noticing brittleness also means observing operational variability and comparing work-as-done with work-as-imagined, so to reveal how the system might be operating riskier than expected. In addition, brittleness manifests itself when the organization is unable to learn from past events, such as near misses and accidents.

Background

Actors

All - noticing brittleness can occur at all levels and in all phases of crisis management. It actually benefits from the involvement of all perspectives of crisis management.

Specific to Healthcare

Actors should be identified in the following areas:

- scientific experts in the fields;
- policy makers and regulation bodies at different levels: International Organizations (WHO, ECDC); Ministry of Health; Regions/Counties;
- operational institutions that operate on the territory (hospital, local health units, etc.).

Illustration in the Healthcare domain

Lack of overseeing capability as a source of brittleness. A first responder organisation operating in Rome relies on the recruitment of associations of volunteers in crisis periods, whose accreditation is not subject to a proper assessment. During large scale emergencies, this organisation would integrate additional front-line staff, usually provided by externally accredited associations of volunteers. However, the regional institution responsible for releasing such accreditation lacked in control and monitoring capability — in particular check of personnel skills. Therefore, the leaders of the first responder organization were aware that during large scale emergencies they had to deal with the additional burden of managing low competency staff, a condition that can contribute to operational brittleness. The situation highlighted a source of brittleness that is external to the concerned organisation and that, therefore, requires a system-level intervention to be addressed [2].

This example shows how a potential source of resilience becomes a source of brittleness. This because, in case of insufficient buffer capacity of the healthcare organization, additional resources were provided, but not systematically monitored and assessed.

Elements of the Healthcare context

Associated challenges
The healthcare is a complex adaptive system in which the non-linearity, the unpredictability and tensions are inherent. Within this complexity, people are at the same time source of brittleness and of flexibility and resilience for the system [4]. Brittleness is a theoretical concept that is not necessarily part of the vocabulary of healthcare personnel, both at managerial and operative level. Healthcare personnel need to familiarize with this concept and the principles of resilience. However, this process will support the personnel to move beyond the blame and shame cultures that have hampered the open flow of information and learning about vulnerabilities in healthcare [4].

Some other factors - internal to the healthcare domain - could hinder the application of the noticing brittleness principles within the contexts, among them [6]:

- Hierarchical structure of the healthcare system. Hierarchies within professions tend to be rigid and relationships between professions and specialties complicated by issues of power and status;
- Organizational culture and professional groups cultures;
- National culture may be also influential (for example different approach to seniority, hierarchy, etc.);
- Inability of the healthcare system to efficaciously communicate with the generic public in order to reduce sources of brittleness (for instance, an epidemic spreading due to a lack of vaccination).

Furthermore, the implementation of brittleness exercise requires an organisational context - and also the management support - that gives value to a proactive approach to crisis response (for instance by reporting errors and failures). Brittleness assessment requires an organisational context where personnel can express critical aspects [2].

**Minimum viable solution**

- The triggering questions proposed are relevant to be considered during a workshop before and after the crisis, both to increase the awareness of potential sources of brittleness in a preparedness perspective, and to explore the after crisis-phase. In case of crises that develop over longer time, the triggering questions can be also used in operative meetings in order to reflect on the effectiveness of the mitigation measures applied.

**Interventions proposed**

**Across phases**

**What is needed to notice brittleness:**

- Build the necessary skills to understand and notice brittleness at different levels of the organization
- Select methods for the identification of possible sources of brittleness with the involvement of roles and actors at different levels in the organization, making sure to account for an adequate diversity of perspectives. In order to achieve such diversity, combine individual
Interviews and workshop-based techniques, taking into account time constraints and availability of resources.

- Plan the methods around triggering questions to be used as guide for the analysis (see examples of triggering questions below for the phases ‘Before’, ‘During’ and ‘After’ a crisis)
- Use the outcome of your analysis to revise your internal guidelines or to create ad-hoc ones.

**Healthcare perspective**

N/A

**Before a crisis**

The assessment of potential sources of brittleness can be performed in two types of situations: (1) on a periodic basis, as part of established self-assessment activities; (2) In anticipation of specific events, to ensure resilience capabilities are in place. Relevant examples of the latter case include especially:

1. Anticipated surge in demands (e.g., due to seasonal peak of activity, or to the approach of an identified threat)
2. Relevant change brought to the system of interest (e.g., a new technology, a new policy, a new role being introduced).

In all of these cases, the analysis should aim to reveal and discuss potential issues that the system under investigation might experience when handling a crisis. For those organisations which have already identified a list of mitigation measures in case of accidents and crises (e.g., in classic risk management activities), the assessment of brittleness should also focus on understanding what might go wrong when applying the mitigation measures.

**What is needed to notice brittleness Before a Crisis.** For both the situations described above, noticing brittleness can be achieved through the organisation of a short workshop or focus-group for which:

- participants are introduced to principles of resilience,
- a facilitator leads a discussion about anticipated crisis situations and potential pitfalls,
- the discussion is guided by the triggering questions presented below (the full set or a selection of them).

In such workshop or focus group, it is possible to use actual past events or fictional scenarios, to ground and direct discussions (see Practice 1 for an example related to surge in demand and Method 2 for an example associated to a technological change).

**Triggering questions**

*Lack of Resources (human, technical, material)*

- What assumptions have we made about the availability of resources to respond to these challenging events?
- What can we put in place to relieve, lighten, moderate, reduce and decrease stress or load?
- Where could we easily add extra capacity to remove stressors?

*Difficulties to adjust*

- Do we have the capacity to reallocate existing resources if needed. What may prevent us from reallocating them?
• Do we have a policy that allows us to modify normal operations when needed?
• Do we expect that major mismatches between official procedures and actual practices may occur?

Lack of Information

• Can we anticipate situations in which we will lack the necessary information to handle a certain event?
• Can we anticipate situations in which we may experience uncertainty based on the history of our operations?
• Which processes and/or plans are insufficiently defined and may represent a source of uncertainty?

Constraints and Bottlenecks

• What constrains us in our ability to execute?
• What conditions may push our system towards its limits?
• Who will be most heavily loaded/stressed?
• Can we anticipate situations in which our operations will be constrained by other organizations?
• Can we anticipate situations in which our operations act as a constraint for other organizations managing a crisis?

Limits of mitigation plans

• If we have safety/emergency plan, what can go wrong when applying the planned mitigation actions?
• What could prevent us from applying some of the mitigation actions?

Healthcare perspective

Example of situations of relevance to healthcare:

• **Periodic assessment** of potential sources of brittleness can be performed during the regular evaluations of the capability to answer the population health needs.
• **The anticipation of specific critical events** is illustrated by the risks of influenza peaks. Every year influenza virus changes bringing about a crisis to cope with. The virus could be a novel one that needs to be covered by a new vaccine. Healthcare organizations therefore need to ensure that resilience capabilities are in place at all levels, specific prevention measures are taken, to contain the crisis and reduce risks.
• **Relevant changes to the system** may be due to the introduction of a novel technology, for instance a new healthcare device or a new kind of vaccine.

In general, some common actions can be identified to assess potential sources of brittleness in situations that are relevant in a healthcare perspective:

• carrying out a **rapid assessment** for a quick and efficient identification of sources of brittleness;
• selecting **indicators** that could be predictive of a certain type of brittleness;
• measuring the **predictors** identified to improve the preparedness.

See in addition the Healthcare Practices, Methods and Tools below.
During a crisis

During time-critical types of crisis, it may be difficult to use triggering questions as a checklist to be read step-by-step. However, it is important that all the professionals involved in the management of the crisis are fully aware of the topics addressed by the triggering questions and can consider such topics, even without reading them.

For crises that develop over longer time (e.g. Icelandic volcano eruption, or Ebola outbreak) it is possible to organise workshops or operative meetings to reflect with other colleagues on the possible sources of brittleness, and use the triggering questions to support the reflection. The same approach can be used during a drill or a simulation by a facilitator to guide the simulation and stimulate participants to notice brittleness.

Triggering questions

Lack of Resources (materials, information, personnel...)

- Do we need additional resources (human, technical, material) to manage the event?
- Are other part of our organization able to renounce to some of their resources, to support us in managing the event?

Difficulties to Adjust

- Should we reconsider our priorities?
- Can we delay the achievement of some goals, in favor of more urgent ones?
- Should we consider deviations from normal procedures to manage the event?

Lack of information

- Are there additional information available to address the crisis that we are not considering?
- Should we ask the advice of a colleague who is not involved in the crisis, to support us in correctly interpreting the situation?

Constraints and Bottlenecks

- Are our operations during the crisis blocked by member of other organizations?
- Are we hindering the operations of the members of other organizations during the crisis?

Difficulties to learn from the crisis

- Are we able to capture experiences from the crisis, in a format that support the dissemination of “lessons learned” inside the organization?
- Will the format of such “lessons learned” encourage remedial actions by the management?

Difficulties to learn from previous events.

- Are we adequately considering “lesson learned” from the past?

Healthcare perspective

- During time-critical type of crisis, health first responders organizations and local health units working on the territory are fully engaged on managing the emergency in the field. Methods and tools (i.e. triggering questions) to notice brittleness are hardly applicable. However, operational personnel need to be fully aware of them (e.g. by integrating them to their everyday practices at no-crisis time).
For crises developing over longer time, as in the case of infectious diseases, interdisciplinary work groups/ad hoc crisis units are established according to the emergency to analyze the crisis situation, identify criticalities and set-up a response strategy. The generic triggering questions of this card - related to the during phase - could be used within these groups, to evidence possible sources of brittleness during the application of the mitigation actions.

At international level, in case of highly impacting infectious disease (i.e. Ebola), the European Centre for Disease Prevention and Control and WHO regularly perform risk assessments by means of which roadmaps are provided to countries. Roadmaps include indicators with the Countries’ capacity assessment to cope with the crisis.

**After a crisis**

Adverse events usually provide information that helps identify sources of brittleness (similarly to the way accidents and incidents can be used for safety-related purposes). However it should be emphasized that analyses must focus on processes, i.e. how operations were conducted, rather than on outcomes, i.e. what the consequences were.

**What is needed to notice brittleness after a crisis.**

Depending on time of implementation, resources and objectives, organisations can:

- Conduct quick assessments based on methods such as the focus groups described in Practice 1, for instance during debriefing sessions.
- Conduct more in-depth analyses based on methods that focus on understanding operations in context (e.g., CTA - see Method 1). Data used in such analyses can come from data recorded during the crisis experienced, investigation reports or debriefings, whether it was an actual event or an exercise.
- Across longer timeframes, assessments need to be conducted about how the organization has reacted after crisis events, for instance whether it has prioritized and invested resources in the analysis and enhancement of resilience. Failures to do so correspond to forms of brittleness (see Method 3).

**Triggering questions**

**Lack of Resources**

- Were our resources (human, equipment, material) adapted to the scale of the event?
- Which were the missing resources, competences, strategies (if any)?

**Difficulties to adjust**

- Were we able to deploy or mobilize additional resources when needed? If not, what prevented us from doing so?
- Were other parts of the organization able to renounce to some of their resources when needed? If not, what prevented them from doing so?
- Were we able to adjust goals and priorities when needed? If not, what prevented us from doing so?
- Were we able to modify normal operations when needed.
- Did we observer an excessive mismatch between official procedures and actual practices during operations.

**Lack of Information**
• Did we experience cases in which the information we had was insufficient to effectively handle the situation?
• Did the crisis we experienced reveal wrong assumptions we had about the nature of threats we are exposed to, and about our capacity to handle them?
• Did the crisis we experienced challenge the plans we had established?

**Goal Conflicts**

• What goal conflicts and trade-offs did we experience?
• Were the goal conflicts unusual or unexpected?
• Were we able to establish priorities?
• Did we sacrifice any goal in a way that reduced our ability to adapt to certain circumstances?

**Constraints and Bottlenecks**

• What were the bottlenecks?
• Where our operations dependent on others?
• Were the operations of others' dependent on ours?
• Was collaboration with other organizations effective? If not, which were the constraints?

**Limits of mitigation plans**

• If a safety/emergency plan was available, what went wrong when applying the planned mitigation actions?
• Did we miss any mitigation action that would have been necessary?
• What prevented us from applying some of the mitigation actions?
• Did some mitigation actions result insufficient to handle the associated hazards?

**Difficulties to learn from the crisis**

• Were we sufficiently able to capture experiences from the crisis and collect them in a format easy to share inside the organization?
• Were we sufficiently able to use these experiences to promote “after action review” inside the organization?

**Difficulties to learn from previous events**

• Have past, potentially similar, events in our own organization sufficiently helped us being prepared for this crisis?
• Have similar events in other organizations or domains sufficiently helped us being prepared for this crisis?

**Healthcare perspective**

**Case studies** are usually implemented to evaluate what went wrong when applying the mitigation measures.

A differential analysis of brittleness factors needs to be performed to identify: a) temporary factors to take into account in reviewing emergency plans; b) structural factors concerning institutions and policies to be recognized in order to start a change process that needs a wider temporary perspective.
In the case of Ebola, the analysis of data collected during the crisis and its management, allowed the review of the reference legal framework (i.e. International Health Regulation).

Relevant material specific to Healthcare

Practices, methods and tools

Practices

- **Periodic assessment** of potential sources of brittleness: an example is provided by the monitoring activities periodically performed by the Italian Regions to evaluate their capability to answer the population health needs. This assessment system is based on indicators established at national level.

- **Anticipation of specific critical events**: In Italy, the Ministry of Health performs a situation analysis before seasonal epidemic peaks and provides recommendations to all levels of the national health system to set up a response strategy. These recommendations include information on case definitions, analysis of data collected during the previous year, notifications, actions, institutional PoCs, reference laboratories.

- **Relevant changes to the system**: in Italy, every time a new technology is introduced, a Health Technology Assessment (HTA) is performed and a national inquiry is provided for data analysis on existing similar technologies, possible relevant issues, costs and benefits ratio. HTA refers to the systematic evaluation of properties, effects, and/or impacts of health technology (i.e. medicines, medical devices, vaccines, procedures and systems developed to solve a health problem and improve quality of life). The assessment is conducted by interdisciplinary groups using explicit analytical frameworks, drawing on clinical, epidemiological, health economic and other information and methodologies. HTA is used to inform policy and decision-making in healthcare. More information about HTA available at: [1]

- **Pre-drill brittleness assessment**. The brittleness assessments can increase ecological validity of drills if included in their planning phase. The brittleness assessment is an opportunity to really understand the capacities and challenges of responders during a particular scenario. A deep understanding of these factors could provide greater insights about real difficulties and challenges that can arise during an emergency [2].

Methods

- **Business Process Modeling (BPM)** allows to represent processes of an organization, so that they may be analyzed and improved, in order to increase quality and reduce criticalities, also in terms of costs. Often, it supports change management programs [5].

- **Cognitive Work Analysis (CWA)** and its modified form, Team CWA. Typically the CWA was used in healthcare as an approach to understand how people work in complex environments involving technology. It supports people making better and quicker decisions [7].

- **Hazard Vulnerability Assessment (HVA)** consists in: a) recognizing hazards that may affect demand for the health care system and infrastructures; b) identifying assets and resources of the system; c) assigning quantifiable value/ rank order and importance to those resources; d) identifying the vulnerabilities or potential threats to each resource; e) mitigating or
eliminating the most serious vulnerabilities for the most valuable resources to improve the preparedness [1],[3].

References


Read the full text of this guideline at: http://sintef9013.com/darwin_wiki/index.php?title=Noticing_brittleness
Assessing community resilience to understand and develop its capacity to manage crises

No Healthcare adapted content for this concept card.

Sources of resilience for the organization are of utmost importance, yet community resilience is a stand-alone process with minor application to ATM and healthcare domains. The inadaptability of the community resilience assessment stems from the obligation of assessing and strengthening the resiliency of a community is the duty of leadership and governance (practically, local/municipal leadership).

Read the full text of this guideline at: http://sintef9013.com/darwin_wiki/index.php?title=Assessing_community_resilience
4.3.4 Developing and revising procedures and checklists

Systematic management of policies involving policy-makers and operational personnel for dealing with emergencies and disruptions

To define systematic management of policies for dealing with emergencies and disruptions characterized by occurrence of emerging risks and threats. To describe means to achieve adaptive and holistic policy management involving policy makers and operational personnel.

Background

Actors

The actors that are concerned by this concept card are public and private entities with tasks and roles related to dealing with emergencies and disruptions. The concept card relates to the following stakeholders: operational personnel and policy-makers. Operational personnel are those who select, use, apply or follow regulations, procedures and policies during dynamic situations (emergencies and disruptions). Examples of operational personnel are emergency managers, medical coordinators, on-duty engineers and traffic controllers. Policy-makers are those who design, review, validate and sign off regulations, procedures and policies (here in sum called “policy”). Examples of policy-makers are subject-matter experts, policy officers and preparedness managers.

The scope of the concept card is response operations to all types of emergencies and disruptions.

The applicability of the concept card is to all administrative and management levels, all types of actors and to cross-border, cross-organisational and cross-domain settings.

Illustration in the Healthcare domain

There is a need of continuous revision of crisis management protocols. New risks and emerging threats can be identified on operative level at one section of the organization, compiled by policymakers, and then operationalized globally in the organization. For example:

- recent antagonistic attacks in Europe has involved hijacked trucks and resulting injuries on pedestrians. The scenario involves uncertainties of scene security and many casualties dispersed over a sometimes big area.

This example illustrate an emerging challenge to health care organizations. Healthcare organizations has shared operative data on response and challenges for national policymakers to review. Policymakers must review available documentations and evaluate if current response plans need revision or amendments and subsequent swift operationalization.

Interventions proposed

Across phases

The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.
The following generic considerations relate to the assessment of the current state of affairs with respect to how policies are managed today and what degree of change may be necessary to fully achieve the objectives and ambitions of this concept card.
Triggering questions

ANTICIPATED EMERGING RISKS AND THREATS
Identify and describe anticipated emerging risks and threats. Questions to consider when assessing this ability are:

- How are these emergent risks and threats identified and described?
- How are they used in the policy management process?
- How well is the cross-domain, cross-organisational or cross-border perspective included?

EXISTING POLICIES
Identify and evaluate existing policies. Questions to consider when evaluating the existing policies are:

- How many and which policies are operational personnel expected to work by?
- Have conflicts between these policies been analysed?
- Have conflicts between policies of operational personnel of different organisations following different policies been analysed?
- Is operational personnel supported sufficiently by the existing policies?
- Are there situations where they would need support but policies do not apply?
- Are policies easy to understand in various situations?
- Are policies too constraining to deal with actual situations or too general to give concrete guidance?
- Have operational personnel developed alternative ways of working, compensating strategies, or work-arounds? Why?

Before a crisis

Questions to consider regarding systematic policy management in the phase “before the event” are:

Triggering questions

POLICY MANAGEMENT PROCESSES

- Are operational personnel recognized as providing expertise and experience central to policy making?
- Are bottom-up organisational processes provided for policy making and dialogue between policy-makers and operational personnel?
- How do these processes support establishment of common ground, understanding and trust between policy-makers and operational personnel?

POLICY ASSESSMENT

- Have actual use of policy in terms of difficulties of application, alternative ways of working, compensating strategies, or work-arounds been analysed with the purpose to understand them (instead of counting and condemning “violations”)?
- Have gaps between policies and reality been analysed and identified?
- Has the need of support for interpretation of policies, pre-authorizing exceptions, and handling exceptions been identified and addressed?
Has a joint validation of purpose and underlying intent of policies been performed?
Have sets of policies been evaluated together in order to assess their joint applicability, complexity, overlaps, bureaucratization and conflicts?
Have different roles’ and organisations’ perspectives and views on the same policies been included in assessments?
Has the amount of policies and expectations on policy-driven actions versus actions that are not covered by policies been addressed and put into context?
Can policies that have low fitness-for-purpose be redesigned or removed?

**POLICY DESIGN**

Can policies be designed as resource-for-action for operational personnel so that fragments of policies can be used in a flexible way and as an aid in response work?

**POLICY TRAINING AND IMPLEMENTATION SUPPORT**

Is a communication strategy in place on how information on new, modified, redesigned or discontinued policies will be communicated to relevant actors (both policy-makers and operational personnel)?
Is a training strategy developed on when and how operational personnel will be trained on policies?
Are supporting mechanisms put in place to provide support to operational personnel when applying policies during response operations?

**SUPPORTING MECHANISMS**

Are preparations and processes established for how to provide guidance to operational personnel on when to apply policies and when policies are known not to be applicable in some situations?
Are preparations and processes established for making policy-makers available during response operations?
Are preparations and processes established for resolving policy conflicts during response operations?

**Healthcare perspective**

Education, training and exercise on the operationalization of guidelines is needed. Workshops can be employed to review incident reports.

**During a crisis**

Questions to consider regarding systematic policy management in the phase "during the event" are:

**Triggering questions**

**SUPPORTING MECHANISMS**

Is guidance provided to operational personnel on when to apply policies and when policies are known not to be applicable in some situations?
Is guidance provided to resolve policy conflicts during response operations?
When operational personnel need help to resolve a situation when conflicts between policies occur, policy is not fit for purpose, or when policies are missing: do they known how to act or who to contact?
Healthcare perspective

Checklists and routines derived from policy that are well implemented can be applied during and incident. Strategic “back office” management can evaluate if current practices and protocols are suitable for the current operation. National agencies should be involved in parallel to the incident management if conflicting policies are revealed in the crisis.

After a crisis

Questions to consider regarding systematic policy management in the phase “after the event” are:

Triggering questions

POLICY-RELATED LESSONS IDENTIFIED

- Has the use of the sets of policies in the context of work and the situation been analysed, and has the fitness of policies for the event been assessed? (Collect feedback on applied policies from different organisations, domains and levels in order to have a holistic perspective.)
- Could the changes in operational environment leading up to and during the event have led to outdating of policies?
- Could additional policies (as part of suggesting lessons to be learned) lead to increased documentation and bureaucratization of work, increased workload, diminished creativity and innovation, or decreased ability to meet unexpected events?
- What lessons can be learned from the actual use of policies, and are lessons fed back into the policy design process? Are recommendations for policy redesign followed-up in a systematic way?
- What lessons can be learned about the flexibility of use of policies and are lessons fed back into redesign of more flexible policies?

Read the full text of this guideline at:
4.3.5 Involving the public in Resilience Management

Communication strategies for interacting with the public not yet affected by or involved in a crisis

The response of the general public that is potentially affected by a crisis, or can be helpful in resolving a crisis, has an impact on the outcome. Therefore, organisations need to develop communication strategies that facilitate beneficial responses to crises through interactions with the public.

Background

Actors

The actors that are concerned by this concept card are public and private entities with tasks and roles related to dealing with emergencies and disruptions. The concept card relates to 1) crisis managers that see the need to interact with the general public to avoid, affect, or stimulate their involvement in the crisis, and 2) those who design, review, validate and sign off communication strategies/policies in these organisations, such as managers generally or specific information, communication, or media officers/strategists.

Indirectly affected actors: formal and informal leaders and individuals citizens of the general public potentially affected by, or helpful in, crisis (i.e. not yet directly affected or engaged in response).

The scope of the concept card is response operations to all types of emergencies and disruptions.

Specific to Healthcare

Specific actors/ stakeholders can be engaged in the risk communication, according to the different types of crises in public health.

In the Outbreak Risk Communication domain, a new Framework Model was developed within the TELL ME project [6].

The Framework Model emphasizes the interactive nature of outbreak communication among several groups of actors [6] as follows:

- **Government/ policy/ institutional actors (IAs).** Political structures and organizations, competent public authorities, regulatory standards bodies, funding agencies and advisers responsible for design and implementation of communication strategies in the case of major infectious disease outbreak. IAs operate on different levels (see the table below): international (transnational, European), national and local (see: [http://www.tellmeproject.eu/sites/default/files/ST3.2.3-Document-Spreads.pdf](http://www.tellmeproject.eu/sites/default/files/ST3.2.3-Document-Spreads.pdf)).

- **Transnational level:** WHO (World Health Organization); IOM (International Organization for Migration); OIE (World Organisation for Animal Health); UNICEF (United Nations Children's Fund); UNWTO (United Nations World Tourism Organization); WTO (World Trade Organization); World Bank.

- **European level:** ECDC (European Centre for Disease Prevention and Control); EDQM (European Directorate for the Quality of Medicines); EMA (European Medicines...
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

Illustration in the Healthcare domain

Lack of communications strategies and coordination between policy makers and first responders in case of healthcare emergencies. The successful management of health emergencies requires the involvement of the public by means of clear communication strategies between policy makers and local first responders (healthcare Professionals). The importance of such coordination is illustrated by the 2009 H1N1 - flu pandemic. In that occasion, many Italian regions got a poor response due to lack of communication with the public. First, disagreements were reported to occur among the Ministry of Health and some Regional Health Authorities. Then, Local Health Authorities bemoaned the absence of centrally defined guidelines about how to inform the population. Eventually, great uncertainty grew from the people about the social
groups that had to be vaccinated. Also controversial messages by the ministry of health and other
ministries released by media not aligned. The media initially released alerting claims about the
consequences of the disease, while later reassured about possible dangerous effects. Also, the
communication departments of different ministries did not pursue a coordinated responses to the
population, acting on singular basis. On the other hand, a few regions (e.g. Emilia Romagna) with
an established communication plan developed by the Regional Health Authority, supported
coherent communication from the top to the bottom. These regions were effective in countering
misleading messages arriving from the media. However, during this crisis, a new data mining tool
to collect information from the public on its health status was included in the integrated
epidemic surveillance system managed by the Local Health Authorities. It allowed to enhance
data promptness and richness for epidemiological surveys. During H1N1, contradictory messages
were communicated not only at national, regional and local levels, but also among countries and
International agencies. The illustrative case underlines how these differences generated
confusion among citizens about whose advice to follow. Therefore, information and cooperation
among all professionals, institutions and healthcare services on risk management favours
coordinated planning of activities while simplifies the communication process with the public and
allows a responsible and informed communication in the community.

Elements of the Healthcare context

Associated challenges

Some conditions could affect the effectiveness of the communication strategies involving and
addressed to the public:

- **The absence of a communication plan and a strategy shared among the stakeholders**, that
  causes confusion of roles and responsibilities, lack of coordination, inappropriate time to
  communicate, loss of institutional credibility and acknowledgment.

- **The self-reference of the healthcare system**. In this domain *the one to one* communication
  (i.e. healthcare worker to patient) is at the basis of the healthcare culture. In particular
  family physicians “hold the power” to communicate (by deciding how, when and what) with
  patients, by influencing their health beliefs and practices.

- **The unawareness of the institutional actors of the local communities’ approaches to
  healthcare** that have not to be a priori contrasted but understood and integrated in the
  communication strategy addressed to specific groups.

Minimum Viable Solution

The first action to be undertaken is the setup of a communication plan and strategy. It requires a
budget allocation for a minimum number of human resources including a communication expert
in social media/two way communication channels. Their fundamental tasks should be:

- establishing connection with institutional actors, local healthcare agencies research
  organizations, and priority groups in the public (identifying PoCs);
- participating to round tables with the above-mentioned stakeholders (at least to answer to
  the triggering questions related to the before-a-crisis section but also, to discuss the plan
  content and to define roles and responsibilities).

Interventions proposed
Across phases

There are several considerations to explore and investigate in order to achieve the full potential of effective communication with the public that are applicable to all phases of crisis management and everyday operations. These considerations have been formulated in terms of questions that can be consulted and applied to the own organisation, in terms of the types of communication channels used, how the dissemination of information is set up and how efforts are directed to building trust, considering the asking for help and resources, and considering the management of change. These are generic questions independent of the phase of crisis management, which means that they may actually be taken up for consideration, assessment, or evaluation. This may be done in the form of workshops, focus groups, discussion points in meetings, at any time when the organization identifies the need or the opportunity to do so. In fact, the generic questions are of a nature that they will likely lead to different outcomes before a crisis in terms of preparation, during the crisis considering the particularities of the crisis, and afterwards considering the particular crisis with a learning purpose. Also, this may mean that to be prepared to use the questions in the during phase, benefits are reaped from the before phase preparations.

Healthcare perspective

The public engagement and trust to be built on healthcare authorities are long-term actions. Crises in healthcare in the last decade (e.g. disease outbreaks) showed that the public’s noncompliance with the government measures taken to contain crisis (e.g. vaccination campaign), the lack of trust between public and national authorities on one hand, and between public and international organizations on the other hand, are the consequence of a deficit of theoretical and applied knowledge in the area of risk communication and public inclusion through social media [6].

In order to implement an effective communication of risk and to overcome these deficits in case of pandemics, some relevant questions have to be taken into account by institutions in charge of managing the crisis, across the different phases:

- How can the general population be persuaded through public health communication to take effective preventive actions?
- What are the most appropriate communication methods to deal with the complexity, uncertainty, misinformation and fake information?
- What are the best communication strategies to maximize compliance with vaccination, and to assist health professionals and agencies to cope with vaccine-resistant groups? [6]

In the case of pandemic, the stages to implement the communication strategy are identified in the four pandemic phases (Inter-pandemic, alert, pandemic, transition) that correspond with the new approach to the WHO Influenza Threat Index [7].

Before a crisis

When planning for crisis response, keep in mind that the public can be helpful both during the preparation and acute phase, but that they then need to be involved through communication. To be able to benefit from resources and assistance provided by the public there is a need for proper organisation, planning, education and training. The following questions are more specifically meant to stimulate organisations to assess their communication strategies.

Triggering questions

**COMMUNICATION STRATEGIES AND PLANS**

An important part of any crisis communication plan is how to communicate with the public. The
following questions could be addressed in order to achieve this, during the (re-) design, education, dissemination, and training of communication strategies and plans:

- Do we have a communication strategy or crisis communication plan that gives guidance on who and how to communicate? Are relevant roles aware of their responsibilities and opportunities for communication, and trained, educated and exercised using this strategy/plan?
- Is the communication strategy updated to the current state-of-the-art communication channels/tools?
- Have the tools mentioned in the strategy been analyzed and tested for our communication needs and fitness-for-purpose?
- Does our crisis communication plan contain guidance for communicating with stakeholders and using various kinds of media for the benefit of crisis management?
- Are at least the following perspectives to guide the public that are potentially affected by the crisis or that could be helpful in crisis covered?
  - Avoid being affected by the consequences of a crisis
  - Avoid using resources more needed by others or otherwise interfere with the response
  - Contribute resources/capabilities to the response
- Does our communication strategy only apply during crisis or are the public engaged in daily communications, to build trust, engaging in a partnership of sharing information, facilitating fast access to public information, and increasing the awareness of where and how to receive or share information?
- How do we prepare communication strategies that promote acceptance and trust of information from crisis management organisations (see also During, below)?

**COMMUNICATION CHANNELS**

Different groups of people are reached by different communication channels, because of different access to technology, different habits of where to get everyday information and so on. While “passive information reservoirs”, such as websites, can be a great way to collect and structure information they risk having a low penetration level, since people might not know about, not find or not want to visit the website.

- Through what kind of channels are we able to communicate?
- Are people aware of where they can access the information?
- Do we use communication channels that people want to use or already use every day?
- Do we use culturally and demographically appropriate communication channels?
- Are we passive or active in our communication?
- Do our communication channels risk being overloaded?
- Are we proficient at using the available communication channels?
- How do we develop two-sided communication with the public?
- How do we seek feedback from the public?

**ENGAGING AND EMPOWERING THE PUBLIC**

The public represents a potential source of information, resources and volunteers that could support crisis management and response. Engaging the public before actual events, e.g. during planning, is beneficial not only as input to resilience assessments, but also to facilitate improvement of local capabilities of crisis preparedness and response. To ease the burden on the crisis responders a high degree of individual preparedness and buffers of resources are beneficial, since this increases the capacity to reduce the adverse consequences during a crisis. The
following questions could be addressed in order to achieve this, during the (re-) design, education, dissemination, and training of communication strategies and plans:

- How do we communicate the need for people to be self-reliant to a certain degree?
- How do we communicate how to prepare, but also the benefits of being prepared (e.g., avoiding an overreliance on authorities)?
- How do we engage with the public to understand and recognize the diversity of local communities, the local needs, and the available or lacking resources?
- How do we communicate in order to facilitate public participation?
- Do we clearly communicate responsibilities of individuals, as well as of the agencies involved in crisis management?

**INFORMATION ACCURACY AND TRUST**

A major aspect of communication is not only how information is distributed, but also if people are able to understand and trust the information distributed.

- Is our information presented in a way or place that makes it trustworthy?
- How do we integrate information from the public or other sources into our communication?
- What capability do we have to respond to information requests or other interactions with the public?
- How is our communication coordinated with other authorities’ communication?
- What processes or routines do we have to fact-check/quality-assure information before we communicate it?

**Healthcare perspective**

The development of a communication plan and strategy is relevant to every phase of the crisis. It should comply with the specific objectives and target audience during each phase (e.g. inter-pandemic, alert, pandemic, transition). Setting-up a strategic communication means getting a targeted, goal-driven message out the opportune time through the appropriate channel.

When developing the communication plan, some actions are relevant in healthcare:

- **Including Healthcare Professionals (HCPs) in the planning stage.** This can be done by involving HCPs in workshops where they can express their concerns, or by means of e-learning platform providing a two-way channel between HCPs and national and international health organizations. This action allows HCPs to be familiar with the plan and effectively apply it when dealing with patients. Because of their role as ‘trusted translator’ between health agencies and patients, their recommendations are the major influencers for patients’ decisions [6], [8];
- **Public segmentation.** Priority groups need to be identified through profiles in order to enable mutual communication, in terms of understanding risk perceptions and responsiveness. Profiles should be identified by taking into account many variables (e.g. origin, gender, language, age, religion, culture, education, perception, etc.) [6];
- **Identifying specific indicators to assess the communication plan.** Evaluating the strategy helps identify weaker areas which need to be addressed and strengthened.

See in addition Tools 1.1, 1.2, 2, 3, 4 and 5 in the Healthcare Practices, Methods and Tools section below.

**During a crisis**
The following questions can be used to re-evaluate and adjust the communication strategies employed by the crisis management team or communications strategist in order to continually tune communications to the most appropriate form and content during crisis management. These issues of acceptance and trust, collecting and sharing information, and managing misinformation, may typically be assessed regularly by individual roles or in joint meetings with decision makers when the need or opportunity arises.

**Triggering questions**

**INFORMATION ACCURACY AND TRUST**

Organisations should track issues that are being discussed by the public, and engage in interaction to manage rumors by addressing misinformation. While different types of media, and particularly social media, facilitate wide-spread information exchange and sharing between people, it can also efficiently spread rumors and false information. The public needs to have trust in the authorities to accept and act upon the information.

- What do we know about the knowledge of the public (are they well-informed or ill-informed, about different information elements)?
- How do we counter misinformation and rumors and mitigate their effects?
- How can the public be re-directed to official channels for trusted information?
- How are we tracking information exchange and identifying rumor spreading?
- How are we answering questions or adhering to the information needs of the public, to avoid making them look for answers elsewhere?
- How are we checking and communicating the accuracy of our information? Are we open with possible uncertainty in our information?
- How do we work to gain trust from the public, so that they deem our information as trustworthy and relevant?
- Are we aiding other partners in their communication? Can they help us sharing our information?
- How important is it for us to communicate with honesty, candor and be open with information?
- Can access to our communication be used by parties to demonstrate their power or influence those who do not have access?
- Do we avoid allocating blame in our communication, which could be seen as unhelpful or counterproductive scapegoating? Is our communication empowering?

**ENGAGING AND EMPOWERING THE PUBLIC**

Information management is an important activity during the crisis response. The public represents a potential source of information, resources and volunteers that could support crisis management and response. The gathering and sharing of information are also common bottlenecks for the response effort. To achieve effective information sharing, there needs to be an atmosphere of trust among actors and the public and pre-existing information flows between entities need to be in place. Organisations should listen to concerns of people at risk. Collection of information, for example through tracking issues on social media, can contribute to faster response times to ongoing events. There is a need to accept and address that different local communities are diverse and unique.

- How are we addressing the diversity of local communities in our communication? Are we broadcasting or using targeted communications?
- How are we using the public as a partner in crisis?
How are we directing and giving the public means to help to supply information to the response, assist in the sharing/spreading of information, or take actions that reduce the risk of them being affected?

How understandable and accessible is our information to the public?

How do we communicate in order to meet the actual needs of the public/media?

How do we communicate in order to express compassion, concern, and empathy?

How are we able to communicate in a way to lessen the psychological impacts of people involved, to help them retain and hold a sense of connection, and better understand why and how the crisis develops?

How do we ask for help/resources that correspond to actual needs?

How are we communicating our goals, how the situation is affecting people, why people need to adapt or prepare themselves?

How are we communicating to make people want to listen, want to help or behave in a way that lessen the effects of a crisis? Are we communicating the benefits of following our communication or adhering our advice?

How are we communicating so that the public is informed on how to manage their situation, get help or receive help?

How are we reinforcing certain behavior in our communication, for example are we recognizing those that do prepare or help with the crisis?

### Healthcare perspective

During a crisis, it is important that public health authorities communicate in time with the public, in an open and reliable way, addressing their specific needs. In particular, local health authorities play an important role in planning, activating and assessing communication activities.

The main goal is to help people – also including public health workers - by steering their fears and concerns towards acknowledgement of the situation and appropriate level of vigilance (see tools 1.3 and 2 in the Healthcare Practices, Methods and Tools section below).

- A public survey to assess risk perception of the public should be carried out, in case the risk perception is difficult to be estimated. This, for instance, for a new emerging or unknown infectious disease (see tool 1.1). In fact, there is a linear correlation between the epidemic curve and the public’s compliance with the public health authorities recommendations (i.e. higher is the risk perception, higher is the public’s liability to follow recommendations).

- Timing of communication, target groups and manner and scale of communication should be assessed and identified [6]. Specific tools can be used for this purpose (see tools 1.3 and 2 in the Healthcare Practices, Methods and Tools section below). In particular, the use of social media accelerates the speed of communication during public health emergencies or outbreaks (see Practice 2 and Tools 4, 5 in the Healthcare Practices, Methods and Tools section below) [5].

### After a crisis

Communication with the public could continue also after a crisis since participation from the public is needed during post-disaster management and recovery. Conducting post-event learning improves the readiness for future crisis events. This may be done as part of analysis, after-action review, or other types of group assessments such as workshops and focus groups.

### Triggering questions
COMMUNICATION STRATEGIES AND PLANS
Lessons-learned on the communication strategies’ and plans’ fitness-for-purpose in an exercise or actual event should be documented and fed into future communication planning:

- Did the communication strategy or crisis communication plan provide useful guidance on with who and how to communicate? Were relevant roles aware of their responsibilities and opportunities for communication?
- Did the tools mentioned in the strategy provide the intended support? Were they used in new ways not expected?

COMMUNICATION CHANNELS
Lessons-learned on the communication strategies’ and plans’ fitness-for-purpose in an exercise or actual event should be documented and fed into future communication planning:

- Which kind of channels were used to communicate, for what type of information, and when?
- Were people aware of where they can access the information?
- Were culturally and demographically appropriate communication channels used? Was the diversity of local communities addressed, including vulnerable groups?
- Was there an appropriate use of passive, broadcasting and active, directed, and interactive communication?
- Did our communication channels risk being overloaded?
- Were the operators of the various channels and media that were used proficient at using them?
- How can we seek feedback from the public about the event?

INFORMATION ACCURACY AND TRUST
A major aspect of communication is not only how correct information is distributed, but also if people are able to understand and trust the information distributed. Lessons-learned on trust in information in an exercise or actual event should be documented and fed into future communication planning, for example considering the following questions:

- Did we have appropriate fact-checking/quality-assurance of the information before we communicated it?
- Were there indications that people didn’t trust the information that was communicated? Why?
- How did we monitor and counter misinformation and rumors and mitigate their effects?
- Was there sufficient capability to respond to information requests or other interactions with the public?
- How was communication coordinated with other authorities’ communication?

ENGAGING AND EMPOWERING THE PUBLIC
Lessons-learned on how the general public was engaged and empowered in an exercise or actual event should be documented and fed into future communication planning, for example considering the following questions:

- What did the public involvement and interaction lead to?
- How did the public experience the crisis and their involvement in the response/relief efforts?
- Can we learn lessons from the event on the public’s self-reliance and preparedness?
- Were at least the following perspectives on empowerment of the public considered as part of communication?
- Avoid being affected by the consequences of a crisis
D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

- Avoid using resources more needed by others or otherwise interfere with the response
- Contribute resources/capabilities to the response
- Can practices during the event be incorporated in the public’s daily communications in the future, to build trust, engaging in a partnership of sharing information, facilitating fast access to public information, and increasing the awareness of where and how to receive or share information?
- How can these lessons learned be captured into communication strategies/policies (see also the DARWIN concept card on policy management)?

Healthcare perspective

After the crisis, the assessment of the communication plan and strategy is highly recommended to analyze data and information gathered from the public, and to gain inputs for improving the plan. A methodological road map to analyze lessons learnt, should be set-up. An example of methodology used in the healthcare domain is found in the KAP Survey Model (Knowledge, Attitudes, and Practices) (see in addition Method 1 in the Healthcare Practices, Methods and Tools section below).

Relevant material specific to Healthcare

 Practices, methods and tools

Practices

Practice 1. The Norwegian Institute of Public Health (NIPH) started using social media in 2010 and strengthened its social media work considerably in early 2014, after it became evident that the institute needed to reach a larger target audience. During their initial listening and engagement activity, NIPH focused on Facebook and Twitter because they were the most popular channels in Norway for their target audience and therefore offered the greatest engagement opportunity (80% of the population had a Facebook account). Twitter also became an important part of NIPH’s social media strategy because it could be used to communicate with health professionals, the media, policymakers, politicians and stakeholders. NIPH also embraced other platforms such as LinkedIn, YouTube, Vimeo and Instagram [5].

Practice 2. The Facebook page of Public health emergency (PHE.gov) updates on Zika spreading. Public Health Emergency.gov is a web portal held by the US Department of Health and Human Services and its cross-governmental partners to serve as a single point of entry for access to public health risk, and situational awareness information. Declared disasters and emergencies are some of the contents populating the US Public Health Emergency website. Beside the pages dedicated to disaster response and to agents, diseases, and other threats, involving the public is a key feature of the portal, either by social media profiles or by constant information and news updating. An outstanding example is about the fervid activity delivered by the Public Health Emergency.gov in updating its Facebook page with posts, maps, infographics of Zika spreading [2] (see https://www.facebook.com/pg/phegov/about/?ref=page_internal)

Practice 3. In the field of public health, an excellent example of social media management comes from the Centers for Disease Control and Prevention (CDC). Their page dedicated to social and digital tools is a valuable source of information, conceived to encourage people to participate and share information provided by the organisation. CDC has many different Twitter
accounts: three are national profiles, one is dedicated to the emergencies, and other 23 are related to specific health topics like hepatitis or tuberculosis. They also implemented a Twitter account for their Morbidity and Mortality Weekly Report (@CDCMMWR). On the website, a series of guidelines and best practices can be found, through which CDC “encourages the strategic use of Twitter to disseminate CDC health information and engage with individuals and partners”. Something similar is also available for Facebook, in a page dedicated to social media tools, guidelines and best practices. Which also includes two documents of great interest: the Social Media Toolkit and the CDC’s Guide to Writing for Social Media. [...] In 2014, CDC launched the Public Health Nerd online campaign to mobilize people who are passionate about public health, in order to promote awareness about CDC’s work, and to encourage learning and increase knowledge about health topics. The main motto of the campaign was “You are a Public Health Nerd if you…”, and most of the pictures and tweets (with the hashtag #PHNerd) contained questions and sentences aimed to boost conversation, not just to give information in a strict top-down approach [3] (see http://www.asset-scienceinsociety.eu/news/features/public-engagement-and-trust-building-social-media)

Methods

Method 1. The KAP Survey Model (Knowledge, Attitudes, and Practices). It is a quantitative method (standardized questionnaires) that provides access to quantitative and qualitative information. KAP surveys reveal misconceptions or misunderstandings that may represent obstacles to the activities that we would like to implement and potential barriers to behavior change. KAP survey essentially records opinions, what was said, but there may be considerable gaps between what is said and what is done (see http://www.medecinsdumonde.org/fr/node/9575)

Tools

1. The toolbox (ECOM EU project - Effective Communication in Outbreak Management: development of an evidence-based tool for Europe) consists of different products that form an evidence-based behavioral and communication package for health professionals and agencies throughout Europe, in case of major outbreaks of infectious disease (available at: [2]). It includes tools regrouped into three areas:

1.1 Tools to Assess public perception and anticipate behavior:

- **Assessing Disease & Public Characteristics - Checklist Risk Communication**, helps to assess the urgency of risk communication and to decide whom you want to reach, how, and on what scale, for a timely and consistent information that does not cause distress.
- **Assessing risk perception of the public - Standard questionnaire on risk perception of an infectious disease outbreak**, measures public risk perception (i.e. knowledge, perception of severity/ susceptibility, anxiety, self-efficacy and efficacy of preventive measures, intention to carry out these measures, motivating/ hindering factors and information needs).
- **Conducting focus group discussion** is a guideline aiming at facilitating end-users when preparing a focus group to gain insight on public behavior regarding future pandemic outbreaks and vaccination.

1.2 Tools to review the preparedness:

- **Identifying your option - Communication and Persuasion Intervention Mix Tools**, describe some possible types and forms of intervention (by means of an Intervention Matrix) that can
be used to influence the behavior of citizens and professionals prior to, during, and after a pandemic. It should be used in the pre-preparation phase and managed by those responsible for developing communication and behavioral influence programs.

- **The STELa planning framework**, is a guide to the key stages, tasks and activities that are required when planning delivering, managing and evaluating an intervention designed to influence health-related behavior.
- **Specifying the Objectives - Setting SMART Objectives Tool**, helps identifying and addressing behavioral targets in pandemic communication and marketing programs.

1.3 **Tools to communicate with the public:**

- **Recommendations for Communication.** It gives general and country-specific recommendations how to communicate with the public during influenza pandemics.
- **Journey through a flu-pandemic.** It is a poster designed as a printed and interactive version that clarifies the phases of a pandemic and gives basic action directives. This helps health officials to give a better understanding to the public in terms of the progress of a pandemic.
- **The Pila Smartphone App.** It is a prototype of the app ‘Pandemic Information & Life Assistant’ that teaches the public about the pandemic and how to protect themselves. It will help people to assess their personal risk during a pandemic, based on personal and geographical information.
- **ECOM Animation Movies**, include main suggestions for policy makers on Effective Communication in Outbreak Management.

2. **TELL ME Communication Kit (TELL ME EU project - Transparent communication in Epidemics: Learning Lessons from experience, delivering effective Messages, providing Evidence).** It supports public health officials in the development of a communication strategy within the wider framework of a national or international preparedness and response plans for major infectious disease outbreaks. It also address health communicators and healthcare professionals who are required to communicate risk and uncertainties to the general public. The communication kit provides a spectrum of practical recommendations and tools to support the development of evidence-based messages, tailored for different sub-populations and target groups across various cultural contexts with the aim of minimizing deviations between perceived and intended messages in the communication process. It comprises four different guidance documents:

- **New communication strategies for healthcare professionals and agencies**
- **New communication strategies for working with different subpopulations/at-risk group**
- **New communication strategies for institutional actors**
- **New communication strategies for preventing misinformation** (see [http://www.tellmeproject.eu/content/d32-tell-me-communication-kit](http://www.tellmeproject.eu/content/d32-tell-me-communication-kit))

3. **ASSET Tool Box (ASSET EU project - Action Plan on Science in Society Related Issues in Epidemics and Total Pandemics)** [1] consists of eight tools mainly meant for pandemics (but adaptable also to other healthcare domains). They are learning modules (e.g. Reporting health issues by journalists), checklists (e.g. Checklist for patient and public involvement in research along with checklist for basic research considerations), glossaries and guidelines (e.g. How to organize citizen participatory meetings). In general, the tools aim at: increasing awareness in the health workers who have direct contact with patients to assess their knowledge, attitude, and willingness to facilitate their preventive activities; facilitating communication, avoiding linguistic misunderstandings with so many different disciplinary, geographical, and cultural backgrounds;
including citizens in decision making; training journalists in health reporting. Among them, Citizen Participatory Meetings, enhance a participatory governance approach. They aim at including citizens in decision making processes that have implications for their wellbeing, by understanding their point of views and learning from their everyday experiences (The Asset Tool Box is available at: http://www.asset-scienceinsociety.eu/outputs/deliverables/asset-tool-box)

4. ECDC guidelines for a social media strategy development in public health communication (see http://ecdc.europa.eu/en/publications/Publications/social-media-strategy-guide-for-public-health-communication.pdf). The guide provides public health organisations and practitioners with a practical approach to strengthening the integration of social media into their overall communication activities. In particular it focuses on identifying effective ways to use social media in communicable disease prevention and control [5].

5. ECDC guidelines for building trust on communication on immunization (see https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/TER-Immunisation-and-trust.pdf). The guide aims at supporting Member States in planning and implementing communication initiatives on vaccination, by presenting an overview of the main issues that public health institutions need to consider in relation to building and maintaining trust [4].

References

[8] TELL ME (2014). Deliverable D3.2. TELL ME communication kit. Available at: http://www.tellmeproject.eu/content/d32-tell-me-communication-kit

Read the full text of this guideline at: http://sintef9013.com/darwin_wiki/index.php?title=Interacting_with_the_public_not_yet_invol
ved
D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

5 Conclusions

5.1 Main findings

The adaptation of the DARWIN Generic Resilience Management Guidelines (DRMG) and their "building blocks" (Concept Cards) - developed in the Task 2.1 and described in D2.1 - to the healthcare domain. This includes the description of the overall adaptation process consisting of two main phases:

1. the assessment for the adaptability of the generic DRMG/concept cards by means of a quantitative and qualitative SWOT analysis;
2. the adaptation of the generic DRMG/concept cards to healthcare domain, and the release of the adapted guidelines/concept cards.
3. The concept cards have been updated and improved by means of several activities performed from March 2017 until October 2017: e.g. DCoP workshop, implementation of the Pilot Cases and interviews with experts.
4.

5.2 Expected impact of the adapted guidelines within the Healthcare domain

Organizations and institutional bodies involved in the healthcare domain and critical infrastructure should take into account the adapted guidelines when implementing their plans of emergency management.

It should be observed that healthcare, as a domain, exhibits different aspects of resilience. The first aspect is related to the fact that research, surveillance, regulation and control in healthcare rely on the concept of Quality, which serves as a framework for all the scientific activities in this domain (some concept or approaches from resilience engineering in fact derive from this work). The second aspect concerns the individual/team resilience healthcare practitioners display routinely and during unusual circumstances. In this case, however, managing this resilience, i.e. systematically creating the conditions for resilient practice to occur, has shown to be challenging. As a result of these connections with the resilience concept, the guidelines and approaches from healthcare presented here should also be interesting for managers and practitioners outside of this domain. They might find insights and solutions for similar problems they experience in their domains.

The present work confirms the intended readership as: policy makers, first responders resilience engineering managers, healthcare crisis managers, healthcare critical infrastructures managers, methodologists, community of practice in healthcare. In particular, the expected impact of the adapted guidelines will lead the stakeholders and practitioners to:

- Assess the effectiveness of roles and responsibilities during a crisis;
- Revise (if existing) and/or define a common action plan through periodical coordination activities and training
- Increase their knowledge in identifying brittleness in the system and the application of procedures and response to the crisis;
- Assess the gap between work-as-imagined and work-as-done;
- Create a plan for results being adapted to, and later adopted by, practitioners in domains.
- Start to reflect on what went well and not only what went wrong;
- Apply the triggering questions provided in the CC to survey current procedures and guidelines;
- Test and improve their plan of communication with public during emergencies

The impact and the next steps go hand-in-hand with the dissemination, exploitation and external collaboration strategy. In the final period of the project, efforts across areas on collaboration with Decision Makers in Healthcare domain, who can allow changes in the areas of resilience and crisis management.
5.3 Limitations of the adapted guidelines
As specified in the document – and also stated in D2.1 for what concerns the development of the generic guidelines - the adaptation process is an “evolving design objects and process” (D2.1, 2017, p.13) based on an iterative discovery process and progressive learning to reach a satisfying solution.

Two main criticalities arose in the adaptation process:

- The considerable effort required to be synchronized with the T2.1 activities to start the adaptation process. In fact, this task -T2.2 - started in M13, four months after the beginning of T2.1. The process of synchronizing the generic (T2.1) and specific tasks (T2.2 and T2.3) made the adaptation process a challenging activity. In particular, the close link of the adaptation to healthcare and ATM with the development status of the Generic Guidelines (DRMG) and their “building blocks” (i.e. Concept Cards) provided by Task 2.1. became progressively evident. In addition, these delay in longer time and efforts resulted in a further delay of the availability of guidelines content from the beginning of the adaptation process. And finally, some of delivered DRMG were not very mature and required additional improvements before they could be adapted to the specific domains.
- The effort required for the identification of the right level of abstraction in the adaptation of the generic DRMG/concept cards to the Healthcare and ATM domains. This was related to the difficulty to understand what adaptation means in practice. Specifically, through this activity, it was clear that only by doing and revising the outputs a satisfying final product could be obtained. As described in the section 4.1, starting by translating the generic CCs content in domain specific content, gave as a result a partial copy of the generic CC, because the adapted CCs needed to be generic enough to be used in several sectors of the same domain. Later, it was decided to move to another adaptation perspective that increased the content available in the generic guidelines, by providing domain-specific information on specific fields. This is currently the followed approach.

5.4 Lessons learnt
During the so far carried out adaptation process, some strengths and challenges have been identified and are summarized as follows.

- **Strengths**
  - Set up of *ad hoc* methodology for the “adaptability” assessment
  - Collection of inputs also useful for the DRMG improvement
  - Fruitful involvement of domain experts in the adaptation process
  - Cross-fertilization between ATM and healthcare domains

- **Challenges**
  - Involvement of the domain experts
  - Merge of different cultural perspectives (for instance, the Swedish and Italian approaches to healthcare)
  - Coping with different sectors within the healthcare domain
  - Synchronization with T2.1 (Development of generic resilience management guidelines)

5.5 Next steps
The activity of Concept Cards adaptation will not end on the 31st October with the delivery of this document but further effort is foreseen until the end of the project to enrich and harmonize the content of all CCs, including the domain specific fields.
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.
6 References


A Appendix

A.1 Template 1 - Quantitative SWOT analysis: Questionnaire for collecting experts responses

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<th>SWOT Analysis</th>
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<tr>
<td><strong>Objective:</strong> Adaptable of the Concept Card to the HC/ATM domain</td>
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**Concept Card: DR- [number/title]**

**Expert n.**

**Date:**

<table>
<thead>
<tr>
<th>Concept Cards Evaluation for Adaptation</th>
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<tbody>
<tr>
<td><strong>I.01.</strong> The concept card overlaps other Concept Cards</td>
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<tr>
<td>Weakness</td>
</tr>
<tr>
<td>Strength</td>
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| **I.02.** The Concept Card is applicable to local HC/ATM contexts (where the card will be used) |
| Weakness | Very Strongly Agree | Strongly Agree | Somewhat agree | Slightly agree | Disagree |
| Strength | ☐ | ☐ | ☐ | ☐ | ☐ |

| **I.03.** The Concept Card can be complementary to existing local HC/ATM artefacts (i.e. procedures, regulations) |
| Weakness | Very Strongly Agree | Strongly Agree | Somewhat agree | Slightly agree | Disagree |
| Strength | ☐ | ☐ | ☐ | ☐ | ☐ |

| **I.04.** Actors – as they are described in the Concept Cards - are identifiable in HC/ATM domain |
| Weakness | Very Strongly Agree | Strongly Agree | Somewhat agree | Slightly agree | Disagree |
| Strength | ☐ | ☐ | ☐ | ☐ | ☐ |
The research leading to these results has received funding from Horizon 2020, the European Union’s Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

### D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

**I.05.** The roles and responsibilities of the actors – as they are described in the Concept Cards - are clear in HC/ATM domain

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<thead>
<tr>
<th>Strength</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
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**I.06.** It is possible to identify actors, roles and responsibilities – as they are described in the Concept Cards - in case of sudden changes in HC/ATM domain (i.e. regulatory bodies, organization structures, etc.)

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
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**I.07.** It is possible to identify actors, roles and responsibilities – as they are described in the Concept Cards - in case of future changes in HC/ATM domain (i.e. regulatory bodies, organization structures, etc.)

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
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**I.08.** The “Implementation BEFORE” - as it is developed in the Concept Card - is relevant for the HC/ATM domain and adaptable

<table>
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<tr>
<th>Strength</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Weakness</th>
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</table>

**I.09.** This “Implementation DURING” - as it is developed in the Concept Card - is relevant for the HC/ATM domain and adaptable

<table>
<thead>
<tr>
<th>Strength</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Weakness</th>
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</table>
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### I-10. This “Implementation AFTER” - as it is developed in the Concept Card - is relevant for the HC/ATM domain and adaptable

<table>
<thead>
<tr>
<th>Strength</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Weakness</th>
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</table>

### I-11. Internal Factors of HC/ATM domain - facilitating or hindering the implementation of the contents of the Concept Card - can be easily identified and explained

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Threat</th>
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</tbody>
</table>

### I-12. External Factors (cultural, social, economic environment) - facilitating or hindering the implementation of the contents of the Concept Card – can be easily identified and explained

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Threat</th>
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</tbody>
</table>

### I-13. Expected results – that can be inferred from the Concept Card - can be identified and explained within the HC/ATM domain

<table>
<thead>
<tr>
<th>Strength</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Weakness</th>
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</tbody>
</table>

### I-14. Illustrative cases and/or lessons learnt – linked to the contents of the Concept Card - are available in HC/ATM domain

<table>
<thead>
<tr>
<th>Strength</th>
<th>Very Strongly Agree</th>
<th>Strongly Agree</th>
<th>Somewhat agree</th>
<th>Slightly agree</th>
<th>Disagree</th>
<th>Weakness</th>
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## A.2 Template 2: Qualitative SWOT analysis - Template for collecting experts responses

<table>
<thead>
<tr>
<th>Rationale for Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
</tr>
<tr>
<td><em>I-01: ...</em></td>
</tr>
<tr>
<td><strong>Weakness</strong></td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td><strong>Threats</strong></td>
</tr>
<tr>
<td>...</td>
</tr>
</tbody>
</table>
A.3 Template 3: Interview guide for the development of adapted concept cards

Darwin T2.2 – 2.3

Interview guide for the development of adapted concept cards

**Aim of the interview**: collecting data from HC/ATM experts to develop concept cards adapted to the domain.

**STEP 1: Before the interview**

Provide HC/ATM experts with:
- concept card to be adapted,
- short introduction about:
  a) concept card as prototype of DRMG;
  b) the process of adaptation of the generic DRMG in HC/ATM domain specific guideline;
  c) aim of the interview.

**Step 2: During the interview**

**Block 1 – Illustrative case**

*Introduction*: in order to think in a concrete and realistic way about how to adapt the contents of the generic concept card in a specific domain, it could be useful to start from the description of an illustrative case that is close to your professional experience and relevant to the specific resilience concept/principle developed by the card.

**Q1.1** Please describe an illustrative case that you consider relevant to the issue of the CC.

**Block 2 – Actor(s) of crisis management**

**Q2.1** Having in mind the illustrative case, who were the main actors involved? Particularly among:
- policy and decision makers, which roles and responsibilities?
- resource managers, which roles and responsibilities?
- first responders, which roles and responsibilities?

**Q2.2** Which other HC actors were involved (role and responsibilities)?

**Block 3 – Implementation BEFORE**

*Before the crisis,*

**Q3.1** which kind of actions/practices were undertaken to enhance the preparedness and the ability to respond?

**Q3.2** which kind of interventions should be undertaken to improve this phase?

*Note: the interviewer has to take into account the aspects of the implementation BEFORE THE CRISIS*
identified and described in the specific CC field.

Block 4 – Implementation DURING

During the crisis,

Q4.1 which kind of actions/practices were undertaken to manage the emergency and cope with it?
Q4.2 which kind of actions/practices should be undertaken to improve this phase?

Note: the interviewer has to take into account the aspects of the implementation DURING THE CRISIS identified and described in the specific CC field.

Block 5 – Implementation AFTER

After the crisis,

Q5.1 which kind of actions/practices were undertaken to learn and evolve from the emergency?
Q5.2 which kind of actions/practices should be undertaken to improve this phase?

Note: the interviewer has to take into account the aspects of the implementation AFTER THE CRISIS identified and described in the specific CC field.

Block 6 – Illustrative cases/lesson learned

Q6.1 Have you other illustrative cases/lessons learned to share regarding the specific issue of this CC?

Block 7 – Context/Challenges

Q7.1 Which internal factors of the HC/ATM domain could facilitate the application of the concept/principle of the CC?
Q7.2 Otherwise, which internal factors could hinder the application of the concept/principle of the CC?
[when answering, taking into account also what happened in the illustrative case described]
[OR: In what kind of circumstances would the principle/concept of the CC work well, and in what kind of circumstances would it not work?]

Block 8 – Expected Benefits/Results

Q8.1 What kind of benefits and results would the application of the principle/concept of the CC help to bring about?
Q8.1.1 Particularly, which outputs, outcomes and impact could be achieved?

Block 9 – Relevant practices, methods and tools

Q9.1 Have you got any resource (also available on line) or reference as examples of practices that could
help HC/ATM personnel to apply the concept/principle of the CC? [OR: According to your experience, can you suggest any practice that could help HC/ATM personnel to apply the concept/principle of the CC?]

**Q9.2** Have you got any resource (also available online) or reference as example of methods that could help HC/ATM personnel to apply the concept/principle of the CC? [OR: According to your experience, can you suggest any methods that could help HC/ATM personnel to apply the concept/principle of the CC?]

**Q9.3** Have you got any resource (also available online) or reference as example of tools that could help HC/ATM personnel to apply the concept/principle of the CC? [OR: According to your experience, can you suggest any tools that could help HC/ATM personnel to apply the concept/principle of the CC?]

---

**Block 10 - General information about the expert interviewed**

Take note of the role, responsibilities of the expert within the organization.

---

**STEP 3: After the interview**

After the interview, share the adapted concept card with the interviewed HC/ATM experts in order to verify contents and to collect additional details.
## A.4 Level of achievement of requirements for the development of the DRMG

<table>
<thead>
<tr>
<th>DReq-ID</th>
<th>Req-ID</th>
<th>Requirement</th>
<th>Importance</th>
<th>WP2 Means of compliance</th>
<th>WP2 status</th>
<th>WP2-current status</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-005</td>
<td>GRF-05</td>
<td>The DRMG should be presented in a way that takes the target users' context into account</td>
<td>Main</td>
<td>The stakeholder analysis aims to identify stakeholders influence and interest in favour or hinder the success of the intervention in the achievement of the desired outcome.</td>
<td>Partially achieved, should be tested by WP4</td>
<td>Partially achieved, should be tested by means of pilot cases - WP4</td>
</tr>
<tr>
<td>DR-007</td>
<td>GRF-07</td>
<td>The DRMG should incorporate innovative uses of social media techniques in real-time management of emergencies</td>
<td>Main</td>
<td>Ongoing - Reflection not concluded on how to include social media in DRMG. Social media guidance is mentioned in some Concept Cards.</td>
<td>Partially achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-011</td>
<td>GRQ-04</td>
<td>The DRMG should specify the strength of recommendation</td>
<td>Main</td>
<td>The requirement needs to be clarified.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-012</td>
<td>GRQ-05</td>
<td>The DRMG should include references to additional sources of information</td>
<td>Main</td>
<td>Not done structurally. Reference to be included in each concept card systematically. One of the objectives of the Wiki is to simplify referencing.</td>
<td>Partially achieved</td>
<td>Partially achieved – currently improved by task 2.2 and task 2.3 by the adapted CCs provided</td>
</tr>
<tr>
<td>DR-013</td>
<td>GRQ-06</td>
<td>The DRMG should specify its relation to the EU Risk Assessment and Mapping Guidelines for Disaster Management</td>
<td>Main</td>
<td>Relation to the EU document addressed in the introductory part of the DRMG. Moreover, relation to risk management is contained as a field in the DRMG concept card template.</td>
<td>TO BE Achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-016</td>
<td>GRQ-09</td>
<td>The DRMG TMP should contain a plan how the DRMG should be updated</td>
<td>Main</td>
<td>Not covered yet, will be part of final guidelines.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-019</td>
<td>GRT-02</td>
<td>The DRMG should include use of social media by emergency authorities, first responders and the public as part of resilience management.</td>
<td>Main</td>
<td>Cf. DR-007</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
</tbody>
</table>
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| DR-021 | GRT-04 | The DRMG target users are policy-making (European, national, regional, organisational), managerial, and operational roles, at infrastructure operators, service providers and related stakeholders, who have responsibility for critical infrastructures that might be affected by a crisis, as well as the public (community members, municipalities, voluntary services, and other recognised services and legal entities that can act by mandate) and media (regarding communication to general public during response, use of social media, and mass communication) | Main | An initial identification of stakeholders has been performed and documented in DARWIN D3.1. The stakeholder analysis needs to consider the dynamic nature of stakeholders that need to be capture through the duration of the project and beyond (Reed et al, 2009). Therefore, the stakeholders analysis needs to cover identification of stakeholders as an iterative process. | Partially achieved | Partially achieved |
| DR-022 | GRT-05 | The DRMG should be adapted to specific domains (health care and ATM), including guidelines for its application | Main | Not applicable for preliminary delivery of DRMG | Not achieved, pending T2.2/T2.3 | Partially achieved |
| DR-025 | GRP-02 | The DRMG should contain a description of the DRMG’s evaluation process | Main | cf. DR-016 | Not achieved | Partially achieved. In the scope of T2.2 and T2.3 the evaluation is internal and concerns the “adaptability” of DRMG. |
| DR-026 | GRP-03 | The DRMG should facilitate implementation activities towards adherence to the DRMG | Main | On-going. In part, implementation is discussed in concept cards. A specific sections will be provided in final guidelines, building on lessons learned from T2.2/T2.3. | Partially achieved | Partially achieved |
| DR-028 | GRC-02 | The DRMG should address the impact of interdependencies and interaction between stakeholders on resilience management | Important | Concept Card in progress | Partially achieved | Partially achieved |
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<th>WP2 current status</th>
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<tbody>
<tr>
<td>DR-030</td>
<td>GRC-04</td>
<td>The DRMG should support the establishment of coordinated networks of stakeholders to ensure close cooperation between stakeholders</td>
<td>Important</td>
<td>Identified as topic for Concept Card</td>
<td>Not achieved</td>
<td>Not achieved</td>
</tr>
<tr>
<td>DR-031</td>
<td>GRC-05</td>
<td>The DRMG should support that stakeholders that need to collaborate have a mutual understanding of each other’s goals</td>
<td>Important</td>
<td>Dual meaning. Partially consolidated with DR-027, partially consolidated with DR-077.</td>
<td>Partially achieved</td>
<td>Partially achieved – improved by task 2.2 by the adapted CCs provided</td>
</tr>
<tr>
<td>DR-032</td>
<td>GRC-06</td>
<td>The DRMG should support coordination and synchronization of systems to ensure efficient collaboration</td>
<td>Important</td>
<td>High level goal, not Concept Card but one of the main themes for DRMG.</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-033</td>
<td>GRC-07</td>
<td>The DRMG should support national collaboration in resilience management</td>
<td>Important</td>
<td>Appears as sub-topic (child Concept Card) of DR-030 - needs to be clarified</td>
<td>Not achieved</td>
<td>Not achieved</td>
</tr>
<tr>
<td>DR-034</td>
<td>GRC-08</td>
<td>The DRMG should support a comprehensive response to increase trust between responders and populations</td>
<td>Important</td>
<td>Appears as sub-topic of a Concept Card related to Establishing Trust - needs to be clarified</td>
<td>Not achieved</td>
<td>Not achieved</td>
</tr>
<tr>
<td>DR-036</td>
<td>GRC-10</td>
<td>The DRMG should address potential interdependencies between the different stakeholders and systems</td>
<td>Important</td>
<td>Consolidated with DR-028</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-037</td>
<td>GRC-11</td>
<td>The DRMG should support international collaboration in resilience management</td>
<td>Important</td>
<td>Appears as sub-topic (child Concept Card) of DR-030 - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-039</td>
<td>GRC-13</td>
<td>The DRMG should address development of plans for immediate response as part of resilience management</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to planning - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-040</td>
<td>GRC-14</td>
<td>The DRMG should address the public’s key needs, especially of vulnerable groups, to achieve resilience management</td>
<td>Important</td>
<td>Identified as topic for Concept Card, partially addressed by DR-083 (specific sub-card about community resilience assessment)</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-041</td>
<td>GRC-15</td>
<td>The DRMG should address planning for resilience management based on routine practices</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to planning - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
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<tbody>
<tr>
<td>DR-042</td>
<td>GRC-16</td>
<td>The DRMG should support maintenance of national operational contingency plans that describe the responsibilities of the involved stakeholders</td>
<td>Important</td>
<td>Covered by other requirements / Concept Cards (DR-027, DR-033, DR-039)</td>
<td>Partially achieved</td>
<td>Partially achieved – improved by task 2.2 by the adapted CCs provided</td>
</tr>
<tr>
<td>DR-043</td>
<td>GRC-17</td>
<td>The DRMG should address trust in leaders and authorities</td>
<td>Important</td>
<td>Appears as sub-topic of a Concept Card related to Establishing Trust, partially covered by DR-084 - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-044</td>
<td>GRC-18</td>
<td>The DRMG should support taking unique characteristics of the community into account in resilience management</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to understanding operational environment</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-045</td>
<td>GRC-19</td>
<td>The DRMG should support the use of resilience management support systems as a part of everyday practices</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to incorporating advanced technology</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-047</td>
<td>GRC-21</td>
<td>The DRMG should support the users to adjust procedures during crises to the changing reality</td>
<td>Essential</td>
<td>Concept Card in progress</td>
<td>Partially achieved</td>
<td>Partially achieved – improved by task 2.2 and task 2.3 by the adapted CCs provided</td>
</tr>
<tr>
<td>DR-048</td>
<td>GRC-22</td>
<td>The DRMG should support flexibility in resilience management beyond adherence to procedures</td>
<td>Essential</td>
<td>Consolidated with DR-047</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-049</td>
<td>GRC-23</td>
<td>The DRMG should support compliance with rules and regulations in resilience management</td>
<td>Important</td>
<td>Consolidated with DR-047</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-050</td>
<td>GRC-24</td>
<td>The DRMG should support evaluating and revising procedures and checklists continuously</td>
<td>Important</td>
<td>High level goal, not Concept Card but one of the main themes for DRMG.</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-051</td>
<td>GRC-25</td>
<td>The DRMG should support design of procedures that address various magnitudes and complexities of events</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to developing procedures - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-052</td>
<td>GRC-26</td>
<td>The DRMG should be clear and non-judgmental</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to developing procedures - needs to be clarified</td>
<td>Not achieved</td>
<td>Still needs to be clarified</td>
</tr>
</tbody>
</table>
### Generic Resilience Management Guidelines Adapted to Healthcare

#### Importance and WP2 Means of compliance

<table>
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<th>DReq-ID</th>
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</tr>
</thead>
<tbody>
<tr>
<td>DR-053</td>
<td>GRC-27</td>
<td>The DRMG should support development of checklists that define how work should be performed during a degraded mode of operation</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to managing system failures</td>
<td>Not achieved</td>
<td>Still not achieved – needs to be clarified</td>
</tr>
<tr>
<td>DR-054</td>
<td>GRC-28</td>
<td>The DRMG should specify the need to conduct joint training exercises to ensure efficient collaboration</td>
<td>Important</td>
<td>Covered by other Concept Cards on collaboration (DR-027) and training</td>
<td>Partially achieved</td>
<td>Partially achieved – improved by task 2.2 by the adapted CCs provided</td>
</tr>
<tr>
<td>DR-055</td>
<td>GRC-29</td>
<td>The DRMG should specify the need to train for resilience management routinely</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to training - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-056</td>
<td>GRC-30</td>
<td>The DRMG should specify the need to define training and exercises in a manner that enables personnel to improvise during the handling of situations when required</td>
<td>Important</td>
<td>Covered by other Concept Cards on adaptation (DR-047) and training</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-057</td>
<td>GRC-31</td>
<td>The DRMG should address different magnitudes of emergencies, disasters and crises in training programs</td>
<td>Important</td>
<td>Covered by other Concept Cards on adaptation (DR-046) and training</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-058</td>
<td>GRC-32</td>
<td>The DRMG should support design of scenario-based exercises to prepare for worst-case scenarios</td>
<td>Important</td>
<td>Covered by other Concept Cards on adaptation (DR-046) and training</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-059</td>
<td>GRC-33</td>
<td>The DRMG should support development of education programs that focus on resilience management</td>
<td>Important</td>
<td>Part of general content about DRMG approach, principles and objectives - needs to be clarified</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-061</td>
<td>GRC-35</td>
<td>The DRMG should support development and maintenance of alternative working methods in case of system failures</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to managing system failures - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-062</td>
<td>GRC-36</td>
<td>The DRMG should advocate the use of standards to ensure secure and reliable information systems</td>
<td>Important</td>
<td>Unsure how to address this specifically, appears out of scope - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
</tbody>
</table>

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D2.2 – Generic Resilience Management Guidelines Adapted to Healthcare

<table>
<thead>
<tr>
<th>DR req-ID</th>
<th>Req-ID</th>
<th>Requirement</th>
<th>Importance</th>
<th>WP2 Means of compliance</th>
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</tr>
</thead>
<tbody>
<tr>
<td>DR-063</td>
<td>GRC-37</td>
<td>The DRMG should specify the need to develop and maintain alternative technological back-up systems in case of system failures</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to managing system failures - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-064</td>
<td>GRC-38</td>
<td>The DRMG should support the incorporation of advanced technologies into resilience management</td>
<td>Important</td>
<td>High level goal, not Concept Card but one of the main themes for DRMG.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-065</td>
<td>GRC-39</td>
<td>The DRMG should specify the need to inform the public of emergency procedures so that citizens can react appropriately</td>
<td>Important</td>
<td>Consolidated with DR-084</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-066</td>
<td>GRC-40</td>
<td>The DRMG should support development of proactive procedures through transparency (open dialogue) and risk communication</td>
<td>Important</td>
<td>Unsure how to address this specifically - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-067</td>
<td>GRC-41</td>
<td>The DRMG should address the need for supplementary communication tools and methods as part of resilience management</td>
<td>Important</td>
<td>Addressed within Concept Card template throughout DRMG</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-069</td>
<td>GRC-43</td>
<td>The DRMG should support balancing resilience management between local and centralized governance</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to managing adaptive capacity</td>
<td>Not achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-070</td>
<td>GRC-44</td>
<td>The DRMG should support centralizing and managing assistance in order to provide services to a large as possible portion of the population</td>
<td>Somewhat Important</td>
<td>Consolidated with DR-069</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-071</td>
<td>GRC-45</td>
<td>The DRMG should specify the need to conduct resilience assessments prior to, during and after emergencies, disasters and crises</td>
<td>Important</td>
<td>Consolidated with DR-083</td>
<td>Partially achieved</td>
<td>Partially achieved – improved by task 2.2 and task 2.3 by the adapted CCs provided</td>
</tr>
<tr>
<td>DR-072</td>
<td>GRC-46</td>
<td>The DRMG should support design of tools and methods to monitor readiness to cope with crises</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to assessing resilience - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
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<tr>
<td>DR-074</td>
<td>GRC-48</td>
<td>The DRMG should support building resilience by applying organizational learning techniques (e.g. log-books, debriefings, after-action reviews)</td>
<td>Important</td>
<td>High level goal, not Concept Card but one of the main themes for DRMG.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-075</td>
<td>GRC-49</td>
<td>The DRMG should support planning for reinforcement of resources in resilience management</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to managing adaptive capacity - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-076</td>
<td>GRC-50</td>
<td>The DRMG should address the best use of available manpower</td>
<td>Important</td>
<td>Consolidated with DR-076</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-077</td>
<td>GRC-51</td>
<td>The DRMG should support development of an overall situation understanding to ensure efficient collaboration</td>
<td>Important</td>
<td>Identified as topic for Concept Card related to distributed operations - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-078</td>
<td>GRC-52</td>
<td>The DRMG should aim to reduce the impact of crises and disasters</td>
<td>Main</td>
<td>Part of general content about DRMG approach, principles and objectives</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-079</td>
<td>GRC-53</td>
<td>The DRMG should aim to positively impact social and economic stability and sustainability</td>
<td>Main</td>
<td>Part of general content about DRMG approach, principles and objectives</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-080</td>
<td>GRC-54</td>
<td>The DRMG should aim to increase the adaptive capability in service providers and stakeholders of critical infrastructures</td>
<td>Main</td>
<td>Addressed within Concept Card template throughout DRMG</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-081</td>
<td>GRC-55</td>
<td>The DRMG should aim to improve the efficiency and effectiveness of the response of service providers and stakeholders of critical infrastructures to expected and unexpected crises</td>
<td>Main</td>
<td>Part of general content about DRMG approach, principles and objectives</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-082</td>
<td>GRC-56</td>
<td>The DRMG should address the following activities: Anticipate, Monitor, Respond and Adapt, Learn and Evolve</td>
<td>Main</td>
<td>Addressed within Concept Card template throughout DRMG</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-083</td>
<td>GRC-57</td>
<td>The DRMG should address methods and concepts to assess resilience</td>
<td>Main</td>
<td>High level goal, not Concept Card but one of the main themes for DRMG.</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
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<tr>
<td>DR-084</td>
<td>The DRMG should include solutions for appropriate interactions with rescuers and the public</td>
<td>Main</td>
<td>Identified as topic for Concept Card related to public involvement</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
<td></td>
</tr>
<tr>
<td>DR-086</td>
<td>The DRMG should support the ability to design case-specific resilience into risk management operation and procedures</td>
<td>Main</td>
<td>Unsure how to address this specifically - needs to be clarified</td>
<td>Not achieved</td>
<td>Still not achieved</td>
<td></td>
</tr>
<tr>
<td>DR-088</td>
<td>The DRMG should facilitate the coordination of interdependent organisations</td>
<td>Main</td>
<td>Issue address by Concept Cards</td>
<td>Partially achieved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DR-089</td>
<td>The DRMG should specify the relationship to other related guidelines</td>
<td>Main</td>
<td>Reference to relevant standards and recommendation to added specific domain practices to be added in a systematic manner in the final version of the DRMG</td>
<td>Not achieved</td>
<td>Still not achieved</td>
<td></td>
</tr>
<tr>
<td>DR-092</td>
<td>The DRMG should be compatible with relevant laws and regulations</td>
<td>Main</td>
<td>The current version of the DRMG builds on consortium knowledge on relevant regulations in health care and aviation. Further analysis on aviation, health care and other domains need to be documented and included. It could be in form of including a section in the concept card called &quot;Cross reference documents&quot; linking information to other relevant manuals or SOPs as applicable (as ICAO propose in their SMS manual)</td>
<td>Not achieved</td>
<td>Partially achieved</td>
<td></td>
</tr>
<tr>
<td>DR-096</td>
<td>The development of the DRMG should aim for TRL 6 (defined as «Representative resilience concepts are tested in a relevant environment. Represents a major step up in a concept demonstration»)</td>
<td>Main</td>
<td>The concepts described in the DRMG includes implementation guide and are assessed by the WP4 in relevant environment and TRL advances. Initial TRL discussions have been performed during evaluation workshop in 2016. Further developments and evaluation need to be conducted while adaptation to specific domains as part of T2.3 and T2.4.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
<td></td>
</tr>
<tr>
<td>DR-098</td>
<td>The development of the DRMG should include a stakeholder analysis</td>
<td>Main</td>
<td>The stakeholder analysis generate information on relevant stakeholders, needs (e.g. in resilience management and training), interests and agendas as well as their influence in the implementation of the guidelines.</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
<td></td>
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<tr>
<td>DR-102</td>
<td>DRT-06</td>
<td>The development of the DRMG should consider event classifications used in the targeted domains</td>
<td>Main</td>
<td>The DRMG have currently been written for a general type of crisis, for general types of actors, so that event classifications can be used in specific instantiations of the concept cards considering domain-specifics</td>
<td>Not achieved, pending T2.2/T2.3</td>
<td>Still not achieved, pending T2.2 and 2.3</td>
</tr>
<tr>
<td>DR-103</td>
<td>DRT-07</td>
<td>The development of the DRMG should consider defining characteristics of the ATM and HC sectors along dimensions that enable the comparison of these sectors to other target sectors, so that generalization of guidelines to other sectors can be addressed</td>
<td>Main</td>
<td>This requirement needs to be covered during adaptation to ATM and HC sectors</td>
<td>Not achieved</td>
<td>Still not achieved - needs to be clarified</td>
</tr>
<tr>
<td>DR-104</td>
<td>DRT-08</td>
<td>The development of the DRMG should consider gender-based differences between people (as reflected in their social roles and interactions, in the distribution of power and the access to resources)</td>
<td>Main</td>
<td>Not covered yet, will be part of final guidelines.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-106</td>
<td>DRP-02</td>
<td>The development of the DRMG should involve appropriate stakeholders</td>
<td>Main</td>
<td>The concept cards describe the stakeholders and personal involved. The relevance needs to be assessed during evaluation exercises as part of WP4</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-109</td>
<td>DRP-05</td>
<td>The development of the DRMG should take into consideration the issue of trust between stakeholders</td>
<td>Main</td>
<td>Trust is addressed as Context factor that can facilitate the Implementation of the concept cards, where appropriate. The issue of DRMG addressing sufficiently the issue of trust need to be further analysed.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-110</td>
<td>DRP-06</td>
<td>The development of the DRMG should consider the stakeholders’ needs of training for crisis management</td>
<td>Main</td>
<td>Rather than performing separate stakeholder analysis work across WPs aims to cover a stakeholder analysis that can evolve addressing needs (including training) of resilience management guidelines.</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-111</td>
<td>DRP-07</td>
<td>The development of the DRMG should consider the use of the modified CCRAM tool to assess the actual needs, capacities and perceptions that characterise different European communities</td>
<td>Main</td>
<td>CCRAM is part of the Tools or Methods referenced, especially in Concept Card on community resilience assessment</td>
<td>Partially achieved</td>
<td>Partially achieved</td>
</tr>
</tbody>
</table>
The research leading to these results has received funding from Horizon 2020, the European Union's Framework Programme for Research and Innovation (H2020/2014-2020) under grant agreement n° 653289.

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<tr>
<td>DR-112</td>
<td>DRX-01</td>
<td>The development of the DRMG should consider target domain-specific rules and guidance</td>
<td>Main</td>
<td>The current version of the DRMG builds on consortium knowledge on relevant regulations in health care and aviation. The DRMG have currently been written for a general type of crisis, for general types of actors, so that domain-specific rules and guidance can be used in specific instantiations of the concept cards</td>
<td>Not achieved</td>
<td>Partially achieved</td>
</tr>
<tr>
<td>DR-113</td>
<td>DRX-02</td>
<td>The development of the DRMG should consider the context of the users</td>
<td>Main</td>
<td>Pending stakeholder analysis!! Context is taken into account through DRMG authors' knowledge of domain and roles, and the Context field of the concept card template explains which contextual conditions may favour or hinder the success of the intervention in the achievement of the desired outcome. See also DR-005</td>
<td>Partially achieved, should be tested by WP4</td>
<td>Partially achieved – improved by tasks 2.2/ 2.3</td>
</tr>
<tr>
<td>DR-115</td>
<td>DRX-04</td>
<td>The development of the DRMG should consider ethical and equity issues</td>
<td>Main</td>
<td>Not covered in the current DRMG</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-116</td>
<td>DRX-05</td>
<td>The development of the DRMG should consider stakeholder risks related to the application of the DRMG</td>
<td>Main</td>
<td>Not covered in the current DRMG</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-117</td>
<td>DRX-06</td>
<td>The development of the DRMG should consider the users’ need to prioritise interventions</td>
<td>Main</td>
<td>Not fully covered in the current DRMG. The management of trade-off and conflicting objectives are past of the scope.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
</tr>
<tr>
<td>DR-118</td>
<td>DRX-07</td>
<td>The development of the DRMG should consider the users’ logistics needs</td>
<td>Main</td>
<td>Not fully covered in the current DRMG. The management of resources, proper staffing, maintenance of proper response are past of the scope.</td>
<td>Not achieved</td>
<td>Still not achieved</td>
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