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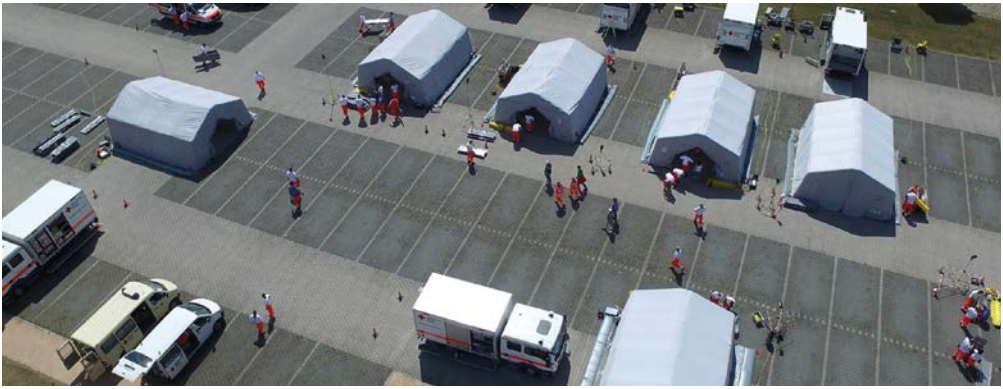

Recommendations for strengthening healthcare in crises and disaster situations

Resilient hospital infrastructures

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12
Resilience
Research Writings

Research Writings
The publications of the Team Risk Management, Security Research and Innovation Transfer contain the results of scientific studies of the German Red Cross.

The Team Risk Management, Security Research and Innovation Transfer launched an investigation of research requirements in 2012 spanning the entire organisation and involving all branches. During this process, three essential topic areas were identified as desirable research focuses: Resilience, societal development, and resource management. Since 2019, documentation of operational situations has been published in Volume 7.1.[1]

The Research Writings address these topics and offer impetuses for the continued strategic development of the organisation.

[1] The colours are reflected in the respective cover picture.

Series Volume 12 – Resilient hospital infrastructures

Volume 12 of the series ‘Schriften der Forschung’ looks at the medical and nursing care of hospital patients in the event of a flood disaster. The focus is on the evacuation and decentralised care of patients in a temporary facility that is set up under extreme conditions.

The findings presented originate from the research project “Resilience and evacuation planning for socio-economic infrastructures in a medico-social context” (RESIK). The RESIK anthology “Resilient hospital infrastructures – Strengthening risk and crisis management in inpatient care” provides a general overview of the RESIK research project and the work of the individual partners. This publication describes the practical recommendations developed by the GRC research. It focuses on the planning and execution of hospital evacuations as well as the construction and operation of temporary facilities for evacuated patients.

Resilient hospital infrastructures

Recommendations for strengthening healthcare in crises and disaster situations

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Table of contents

1 Introduction

Crises and disasters in recent years, such as the floods in the Ahr valley in Germany or the coronavirus pandemic, have highlighted the need for civil protection to adapt to a changing society. Only in this way can civil protection support the supply structures that are fundamental to the provision of public services to society. This is particularly true with regard to health care. The joint project RESIK (Resilience and evacuation planning for socio-economic infrastructures in a medico-social context), funded by the Federal Ministry of Education and Research (BMBF), addresses these challenges. The solutions developed in this project and the findings of the various project partners have been compiled in the anthology "Resilient hospital infrastructures – Strengthening risk and crisis management in inpatient care".

This publication presents recommendations for action to improve the resilience of health systems, based on the project's findings. In particular, it focuses on the role of aid organisations in the context of hospital evacuation and subsequent decentralised care. Attention is also given to the close networking of civil protection and hospital structures, which is essential for evacuation and alternative care. To present the proposed solutions and RESIK, this volume proceeds as follows:

In the first step, previous GRC research projects relevant to the present research are presented, and in the second step, the theoretical-conceptual foundations are presented. The final step presents recommendations for action, developed in close collaboration with all network partners.

2 Findings from previous GRC research projects

RESIK follows up on previous research projects carried out by the **Team Risk Management, Security Research and Innovation Transfer** of the German Red Cross (GRC). These have developed various approaches to strengthen society's resilience regarding challenges imposed by crises and disasters. In particular, the earlier research projects INVOLVE, KOPHIS, ResOrt, BuildERS and the research project AUPIK, which was completed in parallel with RESIK, have provided important foundations for the research work of RESIK. Detailed information on the research projects are described below, the different parts of the GRC research papers can be downloaded from the link in the adjacent QR code. They present the results of the individual research projects in detail.

Figure 1: Download link for the GRC research papers (source: Own illustration)

The research project KOPHIS (Strengthening the contexts of people in need of care and assistance) was the first project to investigate how the support of care givers can specifically increase the resilience of outpatient care structures. The basis for this was the networking of care givers with their social environment and civil protection (Deutsches Rotes Kreuz e. V., 2018a, 2018b). This networking approach also represents an important theoretical basis for RESIK.

Another research project that targeted to investigate on how to increase social resilience was the INVOLVE project (Reducing social vulnerability through volunteering). At the heart of the project are recommendations on how the GRC's specialist care service can increase the resilience of people affected by crises and disasters. Key prerequisites for this are knowledge of the needs of those affected and close socio-spatial networking between care service professionals and local actors (German Red Cross e.V. 2017, 2018a). The focus on the importance of adequate prior knowledge and close local networking is also reflected in the RESIK research project.

Finally, the ResOrt project (Resilience through social cohesion – The role of Organisations) has developed how establishing socio-spatial civil protection, as mentioned in INVOLVE, could be designed. Dealing with disasters and the need for crisis management resulting from such events is not seen as a task for civil protection alone. Rather, it should also involve all relevant local actors in a community in order to create "resilient neighbourhoods" (Deutsches Rotes Kreuz e. V., 2020a, 2020b). This approach to create a local

social environment was also taken up in RESIK in the pursuit of implementing a network between healthcare actors and civil protection before the occurrence of an extreme event.

The concepts developed in ResOrt also provided an important basis for the BuildERS (**Build**ing **E**uropean Communities' **R**esilience and **S**ocial Capital) research project. As a European research project, BuildERS aimed to strengthen the resilience of populations that are most likely to find themselves in vulnerable situations during crises and disasters. Based on the project's findings, it was recommended that planning should consider the diversity of individual life situations of affected people and emergency responders in order to address situational vulnerability as effectively as possible. Overall, the BuildERS study demonstrates the importance of a broad, participatory approach to civil protection planning, which has also been taken up in the recommendations developed in RESIK (Deutsches Rotes Kreuz e. V., 2022).

A final relevant research project is AUPIK (Maintaining outpatient care infrastructures in crisis situations), the twin project of RESIK. Building on KOPHIS, it addresses the issue of strengthening the resilience of people receiving outpatient care. An important finding is that continuous cooperation between civil protection structures and experts in everyday care is essential in order to maintain needs-based care for care-dependent people during crises and disasters. This kind of strengthening and integration of everyday health care structures to maintain their efficiency during extreme events is also being implemented in RESIK.

Building on these research findings, RESIK now complements the resilience research conducted by the GRC with another important sub-aspect. Specifically, the resilience of critical healthcare infrastructure in crisis situations is highlighted. Using hospitals as an example, the project investigates how these can be strengthened in extreme and large-scale flooding situations. The aim is to ensure the resilience of healthcare in disasters and crises to improve the protection of the population. The models of socio-spatial civil protection and the AVDASA phase model of a civil protection operation each provided an important theoretical basis. For this reason, we will briefly present both models in the following section.

3 Central Models

3.1 The AVDASA model

A civil protection operation is usually divided into several phases. The corresponding requirements for the respective civil protection actors in each of these phases are sometimes very different. For this reason, the objectives and recommendations for civil protection actions also must differ between the different phases. The AVDASA model was developed by the Disaster Research Unit (DRU) at the Free University of Berlin in order to consider the different phases of an operation systematically and to be able to structure its investigation (Voss, Dittmer, et al., 2022; Voss, Rüger, et al., 2022, pp. 3–15). In contrast to the frequently used *"Disaster Management Cycle"* [2] (vgl. Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, 2022), the AVDASA model considers the non-simultaneous and different perceptions of different actors over the course of a disaster event. In addition, the model does not assume a fixed chronological sequence of the different phases of a response and takes into account that these phases overlap and often have fuzzy transitions. For this reason, the model was used to structure the recommendations developed in RESIK.

Specifically, the AVDASA model consists of the phases 'Everyday Life 1', 'Preparation', 'Definition', 'Action', 'Stabilisation' and 'Everyday Life 2'. During the first phase of the model, the **Everyday Life phase**, society goes about its normal, routine activities **before the extreme event occurs**. However, it is during this phase that the basis for responding to a specific disaster situation needs to be established. To this end, previous crises and disaster experiences should be critically reviewed and a positive risk and disaster culture should be developed among all relevant stakeholders. In addition, ongoing risk analysis and risk communication should be undertaken during this phase, taking into account the perspectives of every actor. This can help to ensure that the protection objectives defined for a disaster are appropriate and shared by all stakeholders.

The second phase of the model, the **Preparatory Phase**, unfolds when the first signs of a dangerous situation become apparent. In this phase, it is crucial that the responsible actors promptly recognise the developing situation and assess it appropriately in terms of its likely impact. It is particularly important that the relevant actors have already practised and learned in advance which information can be used to identify a potentially threatening situation. In order to obtain a complete picture of the situation, constant contact between the relevant actors and decision-making levels is also essential. Ideally,

[2] This represents the conventional model for a structured view of the timeline of a disaster.

the first crisis teams are formed at this stage and the emergency services, as well as the public are informed.

The third phase is the **Definition of the situation phase**. This phase is ideally entered as early as possible, thanks to a good preparation in the previous two phases. In this phase, the situation at hand needs to be examined, defined and interpreted. Based on that, informed decisions can then be made, for example, to classify the hazardousness of a situation. It is also at this stage that the first concrete measures should be taken, and existing resources mobilised.

The fourth phase of an operation, the **Action Phase**, represents the core of an operation. Based on the previously defined situation and established action routines, the focus is on active mitigation. At the start of this phase, there should be a clear allocation of responsibilities, a correct definition of the situation, and robust and redundant communication channels to deal with any challenges that arise.

In the fifth phase, the **Stabilisation Phase,** the situation relaxes again and there is a smooth transition to a new everyday world. During this phase, damage limitation measures are gradually scaled back, and the first routines of everyday life are resumed. In addition, the most serious consequences of the extreme event are dealt with, and, for example, damaged critical infrastructure is restored. This phase also marks the beginning of a process of reflection and coming to terms with what has happened.

Finally, the AVDASA model is complemented by the final phase, the transition to a new everyday routine. When this phase is reached, most of the actors involved should have successfully overcome the disaster event and arrived at a new normality. However, due to ongoing changes in societies and the lessons learned from the extreme event, this everyday life is never identical to the one described in the first phase. Ideally, the overall resilience of society to future crises has also improved based on the gained experience.

The AVDASA model was a key guideline for the GRC's research contribution to the RESIK project. Based on this model, the recommendations for the evacuation of a hospital and the subsequent sheltering of patients in a decentralised care facility, presented in the following two sections, were developed.

3.2 Networking and cooperation in civil protection

In order to ensure that the population can be supplied according to its needs in the event of a disaster, current civil protection measures need to be adapted in the context

of an ever-changing society (Max & Schulze 2022). Socio-spatial civil protection marks a strategic rethinking of disaster control, as it represents a departure from the traditional view of civil protection as an independent actor, and instead emphasises the importance of collaboration and cooperation with other stakeholders. Instead, civil protection acts in close coordination and in a division of labour with organisations from the local community in the area of operations in order to successfully manage crises and disasters (Deutsches Rotes Kreuz e. V., 2018a, 2020b). To this end, the core aspect of early and preventive networking is presented first in the following section, before national and international concepts based on social space-oriented civil protection are outlined.

3.3 The importance of networked social environment

One of the most important principles for coping with crises and disasters is the networking of actors from different areas of civil protection, healthcare, welfare, business, suppliers, and civil society before crises and disasters. The respective competencies and different areas of responsibility of the various actors involved can already be identified by establishing contact and networking in "non-crisis times" (Deutsches Rotes Kreuz e. V., 2018a, p. 10). From the point of view of the German Red Cross, the term "networking" is to be defined as follows:

> Networking refers to the *"exchange of knowledge, experience, human and material resources with network partners (non-professional persons, institutions, organisations and organisational units) in order to open up joint possibilities for finding solutions"* (Deutsches Rotes Kreuz e. V., 2014).

This networking idea is not only reflected in earlier research projects conducted by the GRC, but is now also anchored in political and legal protection standards for European CRITIS operators (Bundesregierung, 2022). This includes operators of hospital facilities. Networking seems particularly recommendable for the following reasons (Salzmann-Zöbeley et al., 2006).

Changed conditions and limited resources can lead to organisations and actors no longer being able to adequately meet the needs of the population. Therefore, new alternatives need to be found to fill the resulting gaps.

The increase in resilience can only be achieved by closer cooperation between the various measures, or it can allow the problem to be solved in the first place. Networking is particularly useful when inter-agency interface problems need to be solved. The net-

working points listed can also be found in the RESIK project and, when transferred to the research project, mean that the challenges that arise in the event of crises and disasters could be addressed with more than just the capabilities provided by the relief forces from the public authorities and organisations with security tasks. The reasons for this are manifold: on the one hand, the potential impact on the individual has a massive influence on the operational deployment. On the other hand, potential requirements which were not utilised in the past as well as other actors in the entire social environment need to be identified and mobilised. The implementation of a socio-spatial network therefore also includes the integration of external actors[3] who were originally outside the structures of civil protection. Only through networking, based on the needs identified prior to a disaster, can measures be formulated to increase the resilience of the actors in order to ensure the provision of care to vulnerable patients. Against this background, structured cooperation between civil protection and hospital structures can then be used to solve inter-agency interface problems. The role aid organisations play in the evacuation process and the subsequent placement and care of patients in the temporary facility can be focused upon through this. A 'round table'[4] can be used as an instrument to create established structures of cooperation, which offers the participating actors the chance to define common goals for the strategic management of emerging challenges before the advent of a disaster.

To summarise: the aim of networking is to ensure reliable access to the requisite resources such as manpower, skills and materials. It is an exchange process that includes cooperation with external partners in preparation for imminent times of crisis (Deutsches Rotes Kreuz e. V., 2018b; Max & Schulze, 2022).

The networking idea already described above represents an important core aspect of socio-spatial civil protection and thus of the RESIK project as well. The **networking** of public authorities and organisations with security tasks, hospital structures and external actors creates the **precondition** for **determining local needs, resources and challenges**.

The local social environment can be understood primarily as a political-administrative space (village, city, district), and secondly as a space for engagement and care, which people actively shape in different areas of life (school, initiatives, neighbourhood support, organisations, etc.) (Max & Schulze, 2022, p. 151). In addition, the local social environment offers enormous potential for social capital that can be deployed for crisis management. This can be used to supplement the resources available for civil protection oper-

[3] These include public and private actors.

[4] This is a moderated planning meeting during which key actors run through an operational scenario together in order to identify challenges and needs that may arise in the event of an emergency.

ations and improve the quality of support and care for those affected. To achieve this goal, it is crucial to examine the demographic composition, socio-economic data and infrastructural conditions within the respective social spaces. This enables the identification of local actors and their involvement in crisis management measures for public authorities and security organisations. Conversely, this also means that the social environment differs from place to place and that the results of a social environment analysis cannot be generalised, even if basic parallels can be found.

As far as Krefeld as the model region is concerned, the **RESIK** scenario relies heavily on closer cooperation with aid organisations. Their skills and experience are needed, especially after an evacuation decision has been made to transport patients in need of care and to set up a decentralised care facility. Established structures for cooperation between relief organisations and other actors involved are therefore irreplaceable. In addition, the mapping of social the environment in Krefeld in Figure 1 shows that the skills of actors outside the established disaster and civil protection structures can make a valuable contribution to a robust aid system.

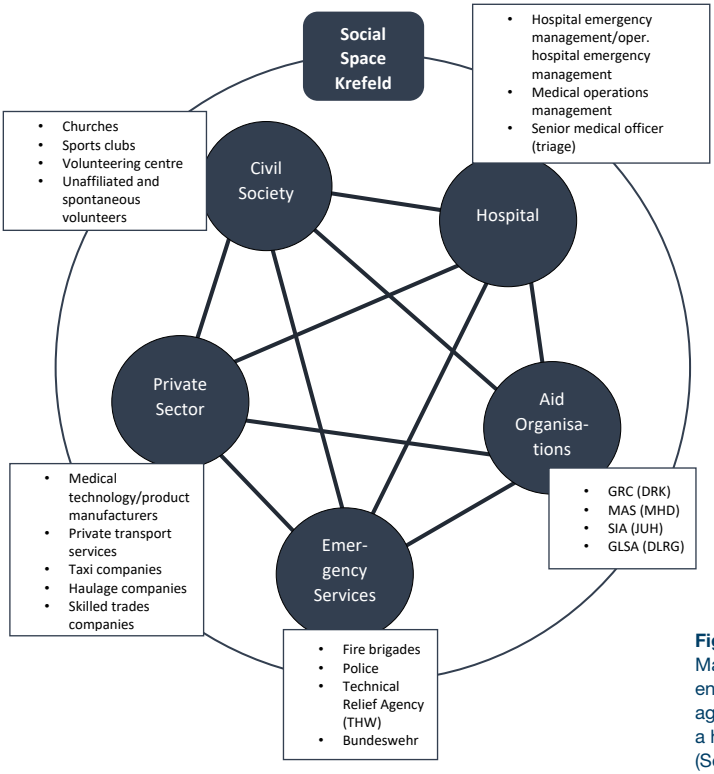

Figure 2:
Mapping of the social environment in Krefeld against the background of a hospital evacuation (Source: Own illustration)

4 Recommendations

The central research objective of RESIK – increasing resilience – has been contextualised in the first sections for *safeguarding inpatient health* care in exceptional situations. In this context, reference has been made to previous research projects, underlining the relevance of the research idea to practical implementation. Subsequently, the AVDA-SA model of the DRU, and the approach developed by the German Red Cross for *socio-spatial civil protection* concretise the need to increase the resilience of disaster and civil protection structures.

The recommendations presented in the following two subsections are based primarily on two guidelines developed by the GRC for the RESIK research project. These were developed based on input from semi-structured expert interviews, the results of a planning meeting and a command post field exercise conducted as part of the project as well as ongoing participation and feedback from members of the consortium.

The development of guidelines from the perspective of the GRC also followed the approach of socio-spatial civil protection. These include the evacuation **process chain**, which provides recommendations for the successful implementation of the various phases of patient evacuation. The other is a **pilot guideline for decentralised care and shelter**, which provides recommendations for the successful establishment and operation of facilities for patients who have already been evacuated. The recommendations contained in the guidelines, which are suitable for wider knowledge transfer, are presented in detail in the following section according to the different interrelated phases of a hospital evacuation.

4.1 Recommendations for hospital evacuation

4.1.1 Preparation prior to starting the evacuation

First of all, it should be noted that an obligation to act and prepare for potential disaster scenarios already exists for the property owner and the hospital staff. This is particularly the case if a risk analysis carried out beforehand calls for the implementation of explicit measures. The aim of these measures is to ensure that all relevant actors, in particular the aid organisations, are as well prepared as possible before the alarm chain is triggered.

For example, it has been shown that communication and coordination between different receiving facilities (hospitals) before an evacuation is considered extremely important (Yazdani et al., 2021). The results of the command post exercise during RESIK under-

line the need to optimise the transfer of information both before the start of an evacuation and in the further course.

Find a common language: The first step involves finding a common language between the different actors, which is essential for the success of an evacuation and subsequent decentralised care. This is particularly important if a RESIK-like scenario is expected to escalate as the disaster progresses. This can increase the density of information that must be managed by civil protection actors, resulting in a potential overload, especially for the leadership. It is therefore important to practise appropriate disaster scenarios by defining a common language across institutions to minimise the potential for excessive pressure and miscommunication.

The focus of an assumed similar disaster scenario is the evacuation of the patients in the hospital. The following section therefore lists, in chronological order, other precautions that should be taken:

Discharge patients who are not in need of care early on: First, it is important to assess the current number of patients and their care status to have sufficient time to take action when the actual decision to evacuate is made. Based on this information, aid organisations and emergency services can take the first preventive measures in the event of an imminent evacuation, thus reducing the potential for overloading. This includes the planning and ordering of transport capacity and applies, in particular, to patient groups whose care status requires the use of specialised vehicles. This includes, for example, premature babies in neonatology and severely obese patients. Patients who do not require inpatient treatment should then be discharged and elective procedures cancelled. This has the advantage of freeing up staff for other tasks. Moreover, it allows priority for patients who cannot be discharged and, in the event of an actual evacuation, allows that more staff is available to support other neighbouring wards while the alarm is sounded. In addition, staff protection can be maintained through these measures. As part of the preparations, patient records should be backed up to ensure appropriate continuity of care during and after the evacuation.

Disseminate information effectively: In addition to all the preparatory measures listed, early dissemination of information to staff, the public, the press, patients and their family members is a top priority. This can be carried out by appointed specialist public information and media officers (SpiMo). This role should work in close collaboration with the central information centre for patient and public enquiries once it is up and running. In addition to staff work, the role of the SpiMo is specifically responsible for the external dissemination of information related to public relations, marketing, and press work, and takes a leading role, especially during the evacuation process.

The decision to erect a temporary facility and the options for transporting patients are discussed with a pre-established emergency management team consisting of the Hospital Incident Command System (HICS), the fire brigade, the rescue service, the police and the control centre. This is also the result of a legal obligation to coordinate. It is furthermore recommended to involve other actors in the planning process, which has already been identified in the social environment analysis.

These include:
- Fire safety officer at the facility
- Public authorities and organisations
- Psychosocial crisis management

Both the consultation between public authorities and organisations and the communication channels, as well as the preparations for the appropriate alarm chain, are described in more detail in the next section and throughout the recommendations.

4.1.2 (Pre-)alarm phase

As the evacuation progresses, the (pre-)alarm phase is triggered. The declaration of a disaster situation is governed by the relevant national law, which also regulates the consequences of this act. In accordance with the legal framework, alarm routes and responsibilities must be clearly described before the start of an evacuation.

The alarm chain then begins with the convening of the city's crisis management team, which must be ready to act as quickly as possible. This means that the relief forced must be activated within a few minutes of the first report of an approaching extreme event. However, it can be assumed that the use of available relief forces will be influenced by both the geographical location and the extent to which the city itself is affected. It is therefore likely that the 20-minute arrival time of the relief force, as defined under ideal conditions, will be difficult to achieve.

It is also advisable to define thresholds based on established qualitative indicators describing the development of the extreme event[5]. These should be based on risk analyses and serve to ensure that civil protection is informed as soon as possible about the development of the impending danger. If a certain threshold is exceeded, the city's crisis management team warns all the relevant actors. To do this, existing cooperation structures between relief organisations and the fire brigade should be used. In this way, the information intended for the relief organisations can be coordinated and transmitted by

[5] For example, the flood level at an upstream measuring point.

the fire brigade control room. It is also advantageous to integrate expert advisers directly into the respective crisis team. They work in the fire brigade and can act as intermediaries for the officers at the scene of the emergency. This includes, for example, (flood) water protection staff who supports the fire brigade's work by assessing the dynamics of the spread. It should be noted that the implementation of the model requires early coordination between the public authorities and security organisations and the hospital.

The following recommendations can be derived from the (pre-)alarm phase in the framework of an imminent hospital evacuation:

Clear lines of communication and responsibility: Clear lines of communication are important so that everyone in the hospital can be informed quickly and effectively. There should also be a clear hierarchy of responsibility so that all actions can be coordinated.

Pre-defined teams and roles: A team should be identified in advance to take responsibility in the event of an emergency. This team should consist of a medical officer, a nursing officer and a technical officer. The role of a senior medical officer for triage (SMOT) should also be determined in advance.

Internal and external communication: The operational-tactical and administrative-organisational leader should act as an interface both for internal communication within the hospital and for cooperation with external support actors. Various channels are recommended for external or public communication. These include the installation of a public hotline, the dissemination of information via the local radio station or the use of digital applications on personal devices provided by the public authorities and security organisations.

Events should be assigned to pre-defined numbers in order to communicate internal hospital information to emergency staff. The transfer of information should be automated by means of a reporting system or manually forwarded to the relevant persons via an emergency telephone. This includes, in particular, the management functions on the respective wards.

Responsibilities during the (pre-)alarm phase: The operational Hospital Incident Management Team (opHIMT) is responsible for the ongoing evacuation until the HICS meets. Once the HICS has convened, responsibility for the hospital area is transferred to it. However, it is possible for the opHIMT to remain active and implement the decisions of the HICS operationally. In addition, the fire brigade's emergency operations centre (EOC) takes over the communication with other actors for external cooperation purposes and, once it arrives on the scene, has overall responsibility for the evacuation operation as the local representative of civil protection. It works in close coordination with the HICS, which provides it with internal hospital information. This includes, for example, the number of people to be evacuated.

Adaptation to the local conditions: Every hospital is different and has different resources at its disposal. Therefore, the planning and execution of an evacuation should always be adapted to the respective local conditions. For example, it may be necessary to integrate the opHIMT into the HICS if the hospital only has a small number of staff.

4.1.3 Resource Requirements

As the hospital's ability to evacuate patients will be limited, it will have to rely on external support. Apart from the need for effective communication, the most important requirement is transport capacity. The hospital will therefore need to inform the EOC of its transport requirements, depending on the number of people to be evacuated. The rescue and transport service will also be involved. From the GRC's point of view, the following arrangements should be made:

Provision of vehicles and staff: The main role of the rescue and transport services is to support the evacuation of the hospital by providing technical and human resources. In some cases, aid workers may be able to relieve the nursing staff in caring for those affected. However, this should only take place under supervision.

If there is not enough regular staff available due to being affected personally or a shortage of skilled workers, recourse should be taken to officially maintained lists containing information on health professionals who are no longer practising the profession for which they were trained. However, the involvement of such persons requires their voluntary consent.

In addition, groups of unaffiliated volunteers should be considered as an additional resource when planning further staffing levels. While it is important to acknowledge the desire to help in times of crisis, individuals without appropriate qualifications (e.g., unaffiliated volunteers) should limit their involvement to basic relief activities. Engaging in activities similar to those of emergency services staff should only be undertaken after careful consideration of one's qualifications and capabilities. This is because their training may not only take time away from the ongoing evacuation and result in tasks not being completed. It may also lead to dissatisfaction on their part. For these reasons, it is currently not envisaged to include unaffiliated volunteers in existing evacuation and operational plans. However, they can make a valuable contribution to the management of crisis situations.

Similarly, the legislator grants the authority responsible for civil protection the right, under Sec. 28 Federal Civil Protection and Disaster Relief Act (ZDKG), "to oblige men and women between the ages of 18 and 60 to provide assistance if the existing forces are insufficient in the instance of an operation". The disaster control laws of the federal states also provide for similar compulsory measures to call for assistance. However, this form of assistance can only rarely be used. In RESIK-like flood scenarios, it is more likely that

the obligation to provide assistance will be used for damage limitation, including land or technical means (Sec. 44 (2), (3), (4) Act on Fire Protection, Assistance and Disaster Control – BHKG).

Coordination of the required resources between the actors: The request for and coordination of specifically required technical and human resources is to be handled by the fire brigade operations control centre (FBOCC), which is responsible for the overall management of the operation. The specific request for support services is made by the unified control centre within the fire brigade based on the BHKG. On site, the requested resources are coordinated by the EOC. As a mediator, the EOC therefore involves numerous actors from blue-light organisations, aid organisations and the hospital, so that it makes sense to involve the EOC in the pre-planning phase.

It has become clear that the forthcoming phases – *Pre-evacuation preparation, (pre-) alarm phase, resource requests* – of evacuation and transport can only be organised and carried out if the measures presented are considered during each phase. In particular, the aid organisations will have to be called in for the latter, even if some unaffiliated volunteers can help to compensate for the increased workforce requirements, the personal impact on the relief forces and the shortage of skilled workers. However, as mentioned above, this will require careful assessment of their individual qualifications. The evacuation phase can then begin.

4.1.4 Evacuation

If, in the context of counteracting a disaster scenario, it becomes impossible to maintain the original daily routine of the clinic despite the measures taken and there is no prospect of restoring the safety of vulnerable people, effective evacuation measures must be initiated. Although there is a constant risk of further escalation in this phase, the use of standardised approaches has the advantage of ensuring objectivity, certainty of application, comprehensibility, clarity, and easy communication of decisions.

Establish a prioritisation concept: In anticipation of an evacuation, a priority order for patients is established, depending on the scenario. This order is then used to decide who should be evacuated first and by which means, so that the hospital can be fully or partially evacuated as quickly as possible. In the prioritisation approaches used to determine this, it is also extremely important to ensure that the categories chosen for this purpose are appropriate to the context to be managed and that it is clear to all parties involved how each category is defined. The concept from the Federal Office of Civil Protection and Disaster Assistance (BBK) is not based on any legal foundation, but on a standard that has been established among experts over the years and has gained additional importance through the recommendation of the Triage Consensus Conference in

2019 (Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, 2019) While the four standard categories are used in day-to-day hospital care, the prioritisation process is no different to that of an evacuation. These are the following categories:

	Category 1 ”Red“: Life-threatening injuries/illnesses, requiring immediate treatment
	Category 2 ”Yellow“: Severe injuries/illnesses, urgent need for treatment
	Category 3 ”Green“: Slight injuries and illnesses, non-urgent need for treatment
	Category 4 ”Blue“: Patients whose condition is so bad that they need palliative care

Figure 3: Triage categories in clinical selection (Kowalzik et al., 2020)

Prioritising patients for care and transport is called categorisation or triage and begins when the evacuation alarm is sounded.

In line with the triage categories already presented by the Federal Office of Civil Protection and Disaster Assistance (BBK), similar classification patterns can be used for patients in need of special treatment, as is the case at the Helios St. Josef hospital in Uerdingen. There, categories 1-5 are used to prevent additional risks to their health.

Categorisation:
1. Intensive care required
2. Monitoring required
3. Oxygen required
4. Newly operated on
5. (All other groups)

Select a suitable location: The first recommendation in this process is to select a suitable location, ideally close to the treatment sites and not prone to sudden deterioration. If necessary, the installation of additional triage sites is recommended if the number of patients is very high. The triage process may be repeated several times to adjust the outcome to the urgency of the situation, based on which treatment capacity and resources are allocated.

Appoint a person in charge: It is recommended that a senior medical officer (SMOT) be appointed to be responsible for the whole screening process. However, given the staffing situation, it may not always be possible for a doctor to take the lead. Alternatively, non-medical but medically trained staff should be used to meet the need and avoid staff shortages. Information on the status of the patients should be passed on to the HICS or EOC. It is then recommended that the previously categorised groups of patients are identified using colour markings.

Pass on information: Once the relevant patients have been categorised, the information should be passed on to the control centre, which is responsible for organising the necessary intensive care transfers. Evacuation can then take place according to the established sequence.

Transfer patients in need of special care: When a decentralised care facility is erected, special attention needs to be paid to the first group of patients. It is important to transfer these patients as quickly as possible to surrounding hospitals, as the decentralised care facility is only intended to bridge a short period of time and the scenario may not allow for transfers at a later date. However, operational experience shows that it can be difficult to find free treatment capacity for patients requiring intensive care. Free capacity is likely to be available in other parts of the country. In addition, nationwide helicopter transfer should be considered. From the hospital's point of view, it is also advisable to use the DIVI[6] intensive care bed register to find out in advance where patients requiring intensive care can be treated.

Time and materials management: The time required for evacuation is also influenced largely by the structural conditions (floors, room layout, available lifts). It is therefore advisable to make an approximate estimate in the evacuation plan of how much space is available in the lifts for beds and able-bodied patients. In addition, an approximate time estimate should be calculated. This will help to determine how many patients can be evacuated using the lifts and in what time frame. If the lifts are not available, a calculation should be made of how long an evacuation would take using other aids (e.g. evacuation sheets) respectively with patients evacuating themselves via the stairwell. On this basis, the assistance of external emergency services can be requested at an early stage. This is particularly recommended if the transport of obese patients requires the use of stairs in the event of lift failure due to the high additional load.

[6] The DIVI Intensive Care Bed Register is a system that shows the free and occupied intensive care bed capacity of more than 1,200 hospitals in Germany on a daily basis. This tool allows regional intensive care bottlenecks to be identified and compared over time. This provides an important basis for rapid response and data-based management (vgl. RKI & DIVI (2023).

4.1.5 Handover for transportation

In order for the hospital evacuation and transfer to the decentralised care facility to take place, all patients must be transported out in order of priority. This marks the start of the final phase of a hospital evacuation, which brings together all the previous preparations. In particular, the needs mentioned in the section on resource requirements underline the importance of the rescue and transport service (aid organisations), especially in this phase.

Staff involvement: If capacity allows, it is often useful to have medical and nursing staff accompany the patient transfers. Auxiliaries can also be integrated into the operational structures. Last but not least, the skills of the rescue and transport services are extremely important, both during the transport phase,[7] because of their experience in a national context, and for the subsequent decentralised care. With their help, patients requiring intensive care, including medical equipment, can be transported.

Use of different vehicles: Patients are allocated to vehicles for transport mainly on the basis of the prioritisation established during triage, but also on the basis of the availability and capacity of the transport vehicles. Based on the mapping of the social environment, the use of different types of vehicles that can be provided by the actors identified should be considered. These include buses, construction vehicles, trucks and boats. However, this form of transport is intended for patients who are not in need of care and is only a temporary solution.

Provision of information: When transferring patients for transport, it is also important to provide information about the patients to be evacuated with a view to decentralised care. As a minimum, it is recommended that the patient's name, date of birth and ward be recorded on the patient wristbands. Other information, such as medication requirements, diagnosis or findings should also be provided in the form of an analogue patient record, ideally in the form of an emergency folder. In addition, the identity of each patient can be documented using an ID wristband.

It can be concluded that the need for well-prepared and, at the same time, intensified cooperation for the successful implementation of a hospital evacuation is omnipresent. Against this background, an attempt has been made to meet the requirements of the changed conditions for disaster management and civil protection by compiling practical recommendations for a hospital evacuation that have been developed based on RESIK.

[7] One example is the national pilot project „Emergency Shelter Capacity", which consists of several care modules and is a largely self-sufficient mobile shelter and care facility for up to 5,000 injured people in an emergency situation. The suitability of the materials required for this, and appropriate training, deployment and staffing concepts is being developed in the pilot. The integration of relief organisations is essential in all concepts (vgl. Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (2023).

This provides the basis for subsequent decentralised care. The following section also presents the recommendations for action developed based on RESIK for this phase.

4.2 Recommendations for setting up and operating a decentralised care facility

Following on from the recommendations for evacuating a hospital described in the previous section, the *Decentralised care and shelter pilot guideline* also developed several recommendations for setting up and operating a decentralised temporary facility to care for evacuated hospital patients.

The following section presents the most important of these recommendations. It is structured according to the different phases involved in setting up and operating a temporary facility and the resources required to do so. The first step is to outline the steps that need to be taken in the day-to-day phase, before the disaster scenario for which the emergency response is being prepared takes place. This is the only way to ensure that the actual establishment of a decentralised care facility in the event of an emergency goes as smoothly as possible.

4.2.1 Principles for setting up a decentralised care facility

Preparatory mapping of the social environment: The first step involves preparing the set-up of a decentralised care facility for sheltering evacuated patients at an early stage through thorough planning. Mapping the social environment described in Section 4.2 represents an important step in this process. This method helps to identify the actors active in the fields of civil protection, health, the private sector and the social environment in a given region. Aid organisations, in particular, can play an important role here, as they are firmly anchored in the social environment. This is an important prerequisite for taking the identified actors into account and involving them in the further planning of the intervention. This approach can also be used to gain an overview of the human and material resources available locally and to adapt any plans accordingly. For mapping of the social environment to provide the most meaningful and reliable results, it is important to consider a wide range of sources and relevant actors when carrying it out.

Establishment of a network of actors: once the social environment has been mapped, a network of relevant local actors should be established based on the results, so that planning for different disaster scenarios can be accelerated before an extreme event occurs. The establishment of such network also facilitates exchange, communication and personal relations between the actors involved in the event of a disaster. This objective

can be achieved through the establishment of common routines and joint training. This will help to optimise the exchange of information and cooperation between the various actors during the operation. It also makes it possible to significantly speed up the necessary activation and mobilisation processes of the relief forces. When establishing such a local network of actors, consideration should always be given to involving aid organisations, as their expertise in both civil protection and health care makes them valuable planning partners. In addition, aid organisations have the capacity to mobilise significant material and human resources.

4.2.2 Planning the set-up and operation of a decentralised care facility

Once the social environment has been mapped and a network of relevant local actors has been established, the next step involves developing concrete plans for setting up and operating the temporary care facility within the framework of the network of actors.

Early planning: Plans should be made in close cooperation with the network of actors before an extreme event occurs. In addition, they should be accompanied by all possible day-to-day preparatory measures and consider existing recommendations for action. Developing plans for the establishment and operation of a decentralised care system at such an early stage is of enormous importance to be able to react quickly and act effectively in the event of an emergency. The existence of detailed plans for various disaster scenarios makes it possible to identify emerging risks and threats at an early stage during the preparation and definition phase and to react quickly according to predefined response schemes.

Establishment of a common culture of communication and a clear division of labour: The planning phase should be used to establish an open culture of communication between the actors involved and to define a clear division of labour and roles in the event of an emergency. This will help to avoid conflict in an emergency and promote effective cooperation. Figure 4 at the end of this section provides an overview of what such a division of labour could look like.

Establishment of a coordination team: A team structure should also be established in the day-to-day phase to coordinate the operation effectively. This team should include representatives of the key actors involved in the operation. These could include, for example, the aid organisations involved, the hospital to be evacuated and the local emergency services in the form of the fire brigade. The team should also develop mechanisms to involve unaffiliated volunteers in order to utilise their potentially valuable skills during an operation. Once the appropriate personnel have been identified for the local context, the team should meet regularly for coordination, training and exercises.

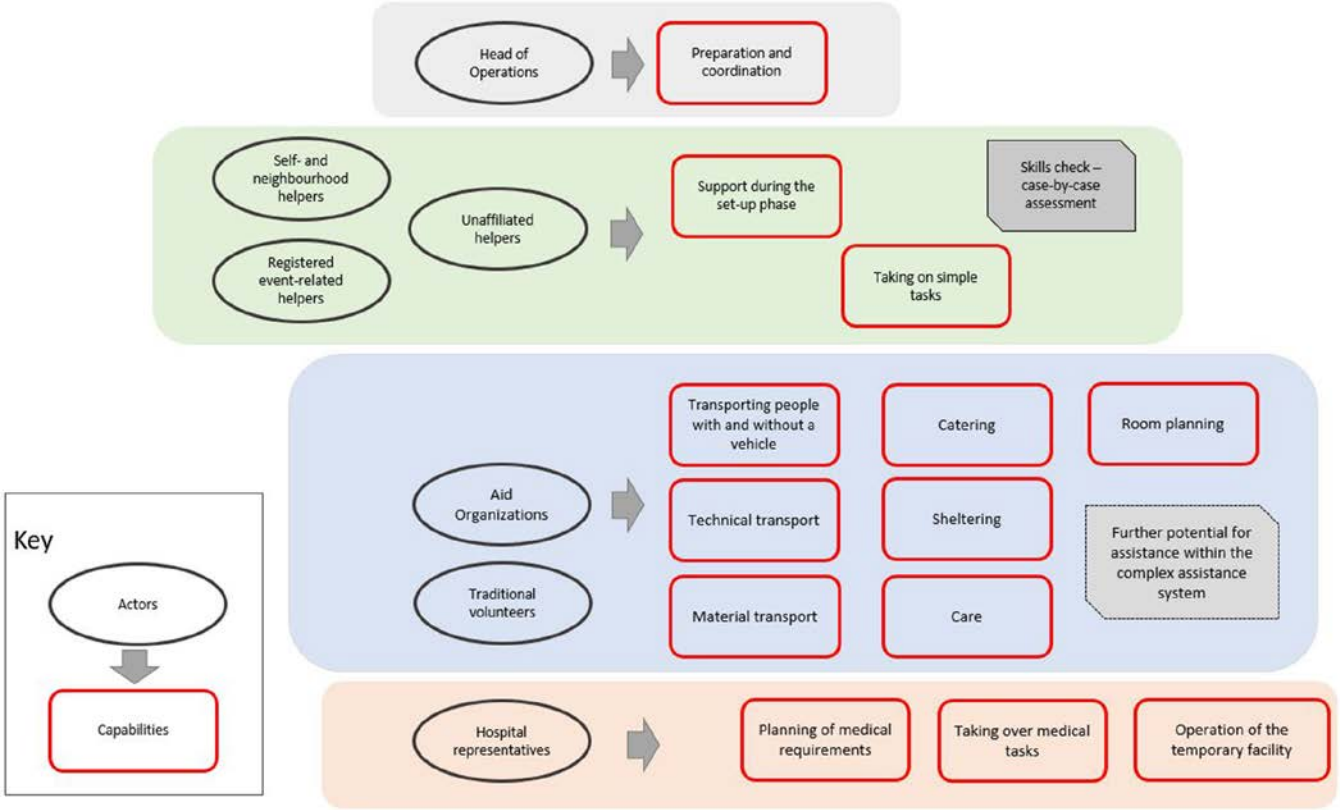

Figure 4: Illustration depicting the actors required and their relevant skills for setting up and operating a decentralised care system (Source: Own illustration)

Regular further training: This type of training, for example in the form of map exercises and simulations, can help to ensure that all those involved are familiar with the relevant recommendations for action and service regulations, such as the Disaster Protection Service Regulation 100. In addition, a clear division of labour and regular communication within the team can help to ensure that, in an emergency, responsibilities are clearly allocated, and redundant communication channels are known and practised. This can reduce the time between the decision to convene the team and the team being operational

4.2.3 Selecting a suitable location for the decentralised care facility

Another important task in the preparation of a decentralised care facility involves the selection of a suitable location. Several structural and logistical requirements need to be considered here. These have been described in the conceptual model for a temporary facility for hospital patients[8] developed by Krefeld's fire brigade. The following section lists only the most important recommendations regarding the basic requirements for the location of the care facility. It is important to take these into account during the preliminary planning stage, as it is not easy to revise the choice of location once the operation has begun.

Provision of good access to the care facility: Accessibility is an important factor in choosing the location of the facility. For example, it should be well connected to efficient access routes designed for large vehicles to ensure that the transport of materials and people remain as unproblematic as possible. Ideally, it should also be connected to the local public transport network to facilitate the arrival of relatives and volunteers. It should also have a sufficiently wide unloading area for transport vehicles, allowing for a 'roundabout' approach so that arriving vehicles can be unloaded one after the other directly in front of the building. It should also be located as close as possible to a hospital that is still in operation, so that the temporary facility can benefit from the hospital's infrastructure.

Securing the location of the care facility: In addition to transport links and the distance to a still operational hospital, the property location should also ensure that it is not itself at risk in the event of a further deterioration in the disaster situation. For example, in the context of a flood scenario considered in RESIK, this means that the location itself will not be inundated in the event of a further rise in flood levels.

Requirements for the facilities on-site: In principle, a vacant static building should be given preference to over a vacant site where a temporary facility is set up using tents and containers. This is because a building is usually superior to a mobile facility in terms of

[8] For more information, see the guest article written by Krefeld Fire Brigade in Volume 1 of this series.

comfort, dryness, temperature management and existing infrastructure. In addition, it is often difficult to obtain enough mobile shelters in a short period of time.

General requirements for the shelter: The structural fabric of the building intended for the care facility is of particular importance. Also, the typical legal requirements imposed on a building for sheltering people need to be taken into account. It is particularly important that the fire regulations are met. As the building will be used to shelter evacuated hospital patients, the staircases, and doors, for example, must be wide enough to facilitate the transport of non-ambulatory patients.

Special requirements for a decentralised temporary facility: The premises should also be suitable for meeting the special requirements of a decentralised temporary facility. The following facilities are required: several treatment rooms; a room for simple surgical procedures; rooms for isolating individual patients; sanitary facilities; recreation rooms for auxiliaries; administrative offices; (refrigerated) storage rooms; a kitchen; a spacious hall where patients can be easily sheltered and cared for.

Accessibility: The facilities also need to be as accessible as possible in order to make sure that people who are lying down can be transported easily. If possible, existing buildings in use should therefore be equipped with entrances that are accessible to people with disabilities and sufficiently wide corridors. In addition, the different floors should be accessible via a lift adapted for transporting people lying down.

Ensuring privacy: During the planning process, it is also important to bear in mind that when setting up decentralised care, there is a tension between the need to provide shelter quickly and the legitimate need of patients for as much privacy as possible. Given the short length of stay and the exceptional nature of the situation, certain compromises need to b**e made in terms of privacy.**

Infrastructure requirements: The presence of a sufficient number of sanitary facilities is also important in terms of infrastructure at the location of the decentralised temporary facilities. If necessary, this can be supplemented at short notice by portable toilets. It is also important to have an efficient and resilient (based on redundancies) power and water supply, as well as wastewater disposal. During the planning phase, consideration should also be given to how waste can be disposed of efficiently at the proposed site. Internet connectivity should also be provided, if possible, to enable online communication and access to clinical systems at hospitals involved in the operation of the facility. For reasons of reliability, redundant systems should be available for the online communication structures used.

With regard to the water supply to the site, it is also important to note that water supply and sanitation often represent a particular challenge when setting up a decentral-

ised supply system. It is also important to consider whether the existing pipework can be used to provide fire water in the event of a fire. Standard water pipes are often not designed for this purpose, so separate water tanks are required.

Consulting the owners as early as possible: Once a potentially suitable property has been identified, the owners should be contacted as early as possible to reach agreement on the use of the building. Any local authorities, such as the town and/or county council, and the fire brigade should be involved in the planning process at an early stage. This is the only way to ensure that the preparation and actual set-up of the shelter is as free from complications as possible. An inspection of the site should also be carried out with the owner to clarify the legal framework and any outstanding issues.

4.2.4 Setting up of a decentralised care facility

Once the planning and reconnaissance work has been completed, the actual set-up and stabilisation of the system needs to be organised. This should begin as early as possible in the disaster timeline, preferably as soon as a hazardous extreme event has been identified in the definition phase.

Personnel to set up the care facility: Representatives of the local emergency services, usually the local fire brigade, should take the lead in setting up the care facility. In addition to the local emergency services, external actors should also be involved in the set-up process, such as companies that can supply essential equipment or provide transport. It is also recommended that people who want to help and helpers from the neighbourhood, unaffiliated volunteers, registered event helpers and other volunteers be involved in the set-up phase. They could, for example, help to build beds, providing much-needed workforce for a rapid set-up.[9] Trained medical personnel should also be involved in the set-up phase, for example to set up medical equipment and supply structures.

The role of aid organisations: Aid organisations also play an important role in the set-up process. For one thing, they have extensive experience, especially when it comes to providing care and aid services. Secondly, aid organisations also possess distinct expertise and skills in other areas, which are of great value for successfully setting up and operating a decentralised care facility. This includes, among other, the transportation of people and material, taking over simple technical support tasks and extensive experience in setting up decentralised care facilities in an international as well as a national context.

[9] For detailed information on the involvement of unaffiliated volunteers, see the relevant recommendation in Sec. 5.1.5.

Level of care provided by the decentralised care facility: In addition to the human resources required to set up the care facility, there is also a significant material requirement. The exact requirements will depend heavily on the planned level of care within the care facility. A level of pre-clinical emergency medical care below the normal hospital standard seems appropriate. The medical equipment in the care facility should be selected accordingly, while maintaining the usual standards of hygiene.

Material requirements at the decentralised care facility: As a matter of course, the materials required at the temporary facility should be taken from the hospital when it is evacuated, if possible. The reason for this is that the evacuated staff can be provided with appropriate materials that they are already familiar with. Examples of equipment that can be taken are ultrasound scanners, mobile x-ray machines[10] or blood pressure monitors. In addition, more basic medical equipment should be transferred to the temporary facility. Another potential source of medical equipment is the temporary storage facilities operated by medical equipment manufacturers. Appropriate arrangements should be made with them at an early stage of the disaster.

In addition to bringing medical supplies, non-medical areas should also be adequately equipped. This includes the kitchen, reception areas and workstations for administrative staff. There should also be a reception area with a suitable examination room and the necessary diagnostic capacity. Mobile Medical Care units (MMCUs), such as those operated by the German Red Cross, could be used as a model and as a source of the necessary resources.

Transportation of supplies: Volunteer and aid agency vehicles can be used to transport medical supplies. This can significantly increase transport capacity within the expecting short window of opportunity. However, the transport of more complex medical equipment requires the expertise of medical technicians. Volunteers can only play a supporting role.

4.2.5 Operating a decentralised care facility

Once the decentralised care facility has been set up, it is important to keep it running during the emergency phase. This will probably need to be sustained for two to three days, until the patients cared for can be transferred to a hospital that is still able to function. In extreme circumstances, four to seven days of shelter may be realistic. Ideally, management of the decentralised care facility should be handed over to health professionals no later than when the first patients arrive. Ideally, therefore, hospital management structures should be used. Alternatively, the management of the decentralised care facility could be taken over by an aid organisation such as the German Red Cross. However,

[10] Compliant with the requirements of the X-Ray Ordinance (RöV) for the protection of employees and patients

due to the high risk of liability, a local authority representative may also need to be appointed as the actor in charge.

Constant need for supplies during operations: The continuous supply of medicines and medical consumables is particularly important for the decentralised care of hospital patients. Experience has shown that shortages can occur, particularly in the supply of medicines. The emergency services are obliged to aid in the procurement of medicine and medical products[11]. However, there are no such reserves for disaster situations in Germany outside the Federal Armed Forces. It is also not always possible to evacuate the entire stock of medicines from the hospital. For this reason, and in order to ensure a continuous supply of the necessary medication, consideration should also be given to obtaining them from the nearest central warehouse of larger (private) hospital chains or from pharmacies as well as the central drug warehouses of wholesalers. Arrangements for this should already have been made during the day-to-day phase.

It is also recommended that procurement agreements are concluded with manufacturers and wholesalers for the procurement of medical consumables. For the procurement of medical gases and propellants, contracts should be concluded with several easily accessible suppliers of the hospital.

The provision of food and drinks presents another logistical challenge. Particularly in the early stages it is advisable to make use of resources on site and in the hospital that is about to be evacuated. Over time, food can be provided by field kitchens ran by aid organisations or by meal delivery services. Three meals per patient and emergency worker per day are required.

Generally, several redundant sources of critical supplies in the local social environment should be identified during the planning phase, as well as alternative strategies for obtaining these supplies. In the event of an emergency, it is important to note that civil protection has the right to compel anyone to provide the supplies needed to deal with the emergency, including the supplies needed during a hospital evacuation.

Staffing requirements during operation: In addition to the continuous supply of consumables to the decentralised care facility, adequate staffing is essential for its operation. In order to maintain an overview of the currently available and deployed staff, their rostering and availability should be displayed centrally and visibly at all times. In general, it should be noted that volunteers, in particular, have a limited amount of time available and should normally be rotated out after a maximum of two days, provided that they live in the vicinity of the area of operations. There should also be regular rest periods during

[11] In accordance with Sec. 2 (2) Ordnance on Stockpiling Medicinal Products (ABV) of August 30, 2000.

the operation. However, a longer stay in the area of operation is also conceivable in the case of personnel travelling from more distant regions.

In addition, the deployment of doctors and nurses must take account of their workload limits. Ideally, they should be able to rest for twelve hours after a twelve-hour shift. In addition, suitable rest facilities should be provided for those who are unable to return home during their rest period due to the respective disaster.

It is essential for the operation of a care facility to plan for a sufficient number of medical staff. Especially for doctors it is important to know that in the event of a disaster, they are called up for mandatory duty and training under the disaster laws issued by the federal states.

It is recommended that doctors from the evacuated hospital continue to be employed in the decentralised care facility, supported by off-duty staff if necessary. In addition, if the decentralised care facility is linked to a hospital that is still functioning, specialist registrars from that hospital could also be employed in the decentralised care facility. It is also conceivable that practising specialist registrars could be integrated. In addition, the lists of retired health professionals maintained by local authorities can be another valuable source of volunteers for the temporary facility.

The integration of health workers, nurses and nursing assistants is also very important. If possible, nurses should be recruited from the evacuated hospital.

Administrative tasks can largely be carried out by volunteers from the emergency services. Shift planning, however, should be carried out by qualified staff, ideally from the evacuated hospital. Co-operation with local laboratories is possible for the analysis of medical samples. More complex tasks in the evacuation facility should, if possible, be carried out by qualified staff who are already familiar with these tasks from the hospital. If necessary, they can also be supported by aid workers under expert guidance. It is also advisable to draw up a list of foreign-speaking staff in the hospital and in aid organisations to overcome language barriers. Finally, staff should be designated to deal with enquiries from the public and family members.

The role of aid organisations: With appropriate training (e.g., according to the Nursing Guidelines issued by the Federal State of North Rhine-Westphalia), staff from aid organisations can carry out simple activities that support care. This includes, for example, assistance with going to the toilet and light mobilisation support. Emergency workers from the GRC medical service can also deal with minor injuries and illnesses. However, the focus of their assistance should be on transport and security, to reduce the workload on qualified staff. The GRC care service can also provide catering for patients and staff.

It can also reduce the administrative burden by performing simple tasks, answering enquiries from the public and registering patients.

In addition, members of the support service can provide initial psychosocial emergency care (PSEC) to patients and auxiliaries, as most of their emergency personnel have received basic PSEC training.

The role of unaffiliated volunteers: As mentioned above, unaffiliated volunteers can reduce the damage potential of the disaster by being readily available. They do this by relieving the professional emergency services of simple but labour-intensive tasks.

The skills of unaffiliated volunteers should be identified at an early stage. It may be possible to find among them professionals whose skills are needed. For tasks involving direct patient contact, it is advisable not to engange unaffiliated volunteers. Alternatively, they can be used for protective measures such as sandbagging.

Unaffiliated volunteers should, as far as possible, be integrated into civil protection structures for coordination purposes. The actual management of unaffiliated volunteers is likely to be a key area of activity for the GRC support service in the future.

4.3 Summary Graphic

As the previous recommendations have made clear, many actors are involved in the planning, set-up and operation of a decentralised care facility. To summarise, the actors involved in these different phases and the key activities they undertake are summarised in the diagram below.[12]

[12] Figure 5 depicts aid organisations separately from other public authorities and security organisations because of the specific tasks they carry out.

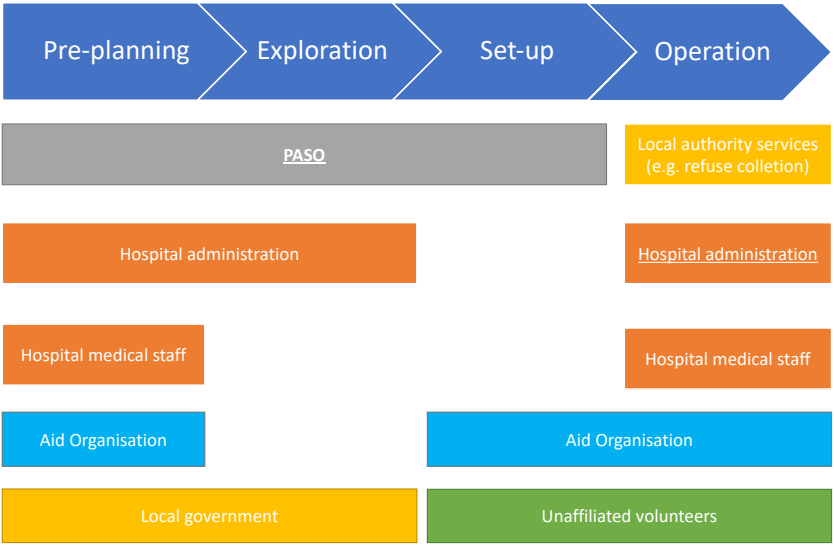

Figure 5: Illustration depicting the actors required and their necessary skills for setting up and operating a decentralised care system (Source: Own illustration)

Key activities

PASO:
- Leading function in the planning of the decentralised supply facility
- Identification of suitable properties
- Management of the construction of the facility

Municipality:
- Possibly owner of the property used for the alternative facility.
- Involvement in planning → Information on potential personnel
- Involvement in the exploration and selection of the property
- Potentially operation of the temporary facility if no member of the health infrastructure can be found for this purpose

Healthcare infrastructure:
- Identification of medical needs during the planning phase
- Selection of a suitable property from a medical point of view
- Provision of medical staff
- If possible, operation of the temporary facility

Unaffiliated volunteers:
- Consideration in planning
- Assumption of non-safety-critical tasks
- Assistance during set-up
- Simple support tasks in the operation of the temporary facility

Aid organisations:
- Support planning with expert advisors
- Transport of people, materials and consumables
- Provision of staff for the set-up
- Assumption of administrative & support tasks, as well as simple medical tasks during operational phase
- Operation of the evacuation facility, if no member of the health infrastructure can be found for this purpose

Figure 6: Overview of the actors involved in the different phases of the decentralised care facility and their central tasks. (Source: Own illustration)

5 Summary & Outlook

In cooperation with partners from industry, academia and health care, RESIK has developed practical recommendations to support the emergency services in evacuating hospitals and setting up operational decentralised care facilities. Both the theoretical AVDASA models developed by the DRU, and the model of socio-spatial civil protection formed an important basis. The early identification of needs and the activation of capacities in the respective social environment are important here. Based on these findings, the continuous networking of all crisis management-relevant actors is then required to cover needs with existing capacities. It follows that the cooperation between the project and network partners necessarily has to be complemented by the actors identified in the social environment. For this purpose, a joint planning meeting in the form of a round table can be one of many valuable format. During this meeting crisis scenarios and related challenges, such as the coordination and communication of resource requirements, can be discussed and joint planning developed.

These recommendations can be used to increase the resilience of care structures in different crises scenarios. Personal contacts and greater trust facilitate the allocation of responsibilities, the exchange of information and the joint planning of operations. In this way, potential risks can be reduced in advance of damage events. This has a positive impact on the management of crises and disasters, especially when these recommendations are implemented in close cooperation with aid organisations.

Aid organisations can contribute their expertise directly in their role as expert advisers within the emergency management during an evacuation. They also play a leading role in the transport of patients in need of care as well as technical supplies. Furthermore, their knowledge and assessments are crucial for planning a decentralised care facility.

As a result, it would be almost impossible to manage the flood scenario studied in RESIK without the help of aid organisations. Their commitment is invaluable in ensuring that the affected patients receive the care they need. Building on RESIK, it will therefore be possible to ensure that structures essential to society continue to function in crisis situations.

Planning authorities can now use the recommendations set out in this publication to develop hospital alert and response plans adapted to local conditions. However, the need for research into resilient infrastructures is far from exhausted. Future research projects should examine how the recommendations developed can be transferred to other critical infrastructure sectors.

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7 List of Figures

8 For the fast reader

This part of our publication series presents the key findings of the research project RESIK. The focus is on recommendations for the evacuation of hospitals and the set-up and operation of decentralised care facilities in the event of crises and disasters. These were developed based on semi-structured interviews with experts, a command post exercise, and the regular participation of the project partners.

At the beginning of publication, relevant GRC research projects are briefly presented to illustrate the previous research on which RESIK is based on. The central theoretical models used in the development of RESIK are then presented. These include the AVDASA model and the socio-spatial civil protection model. In preparation for the main part of this publication series, a brief overview of the methodology used in RESIK follows. This serves as the basis for the practical recommendations presented here, including recommendations for the evacuation of a hospital as well as the set-up and operation of a decentralised care facility:

- Early identification of relevant actors in the social environment
- Networking with relevant actors
- Joint elaboration of operational plans taking local conditions into account
- Development of shared communication for sharing critical information
- Clear definition of the tasks and responsibilities of all parties involved
- Formation of a coordination team before the event occurs
- Holding of regular exercises involving all the relevant actors
- Early relief for the hospital to be evacuated
- Provision of adequate transport volumes
- Prioritisation of the patients according to previously established criteria
- Transfer of patients to hospitals that are still functional or to a decentralised care facility based on the prioritisation
- Selection of a safe location for the decentralised care facility with suitable infrastructure
- Ensuring standards for preclinical emergency medical care
- If possible, medical supplies should be taken from the evacuated hospital
- Ensuring a continuous supply of consumables (especially medical supplies)
- Ensuring adequate staffing levels during operations, especially medical staff
- Involvement of aid organisations in all phases of the operation and use of their human and material resources
- Inclusion and, where possible, involvement of unaffiliated volunteers

Also available in English:

The Vulnerable Group “the Elderly and those Needing Care” during Crises, Largescale Emergencies, and Disasters
Findings and Possible Solutions – Moving toward a Socio-spatial Approach to Civil Protection

Strengthening of Community Resilience – The German Red Cross Disaster Services
Recommendations for Action Based on Research Results

Cooperation with civil society actors
Findings from the GRC-refugee assistance 2015/16 in Germany

Networking and cooperation in times of crises
Good Practices and Lessons Learned from the GRC-refugee assistance 2015/16

Identifying situational vulnerability and strengthening societal resilience
Flood disasters and COVID-19 pandemic in the greater Dresden area
Maintaining outpatient care infrastructures in crisis situations (AUPIK)
Findings from security research

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