This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 832981

Deliverable D2.3

Report on the survey and benchmarking results

Due date of deliverable: 30/09/2020

Actual submission date: 15/03/2021

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Project details

Project acronym	PROACTIVE
Project full title	**PR**eparedness against CBRNE threats through c**O**mmon **A**pproaches between security pra**CTI**tioners and the **V**uleranbl**E** civil society
Grant Agreement no.	832981
Call ID and Topic	H2020-SU-SEC-2018, Topic SU-FCT01-2018
Project Timeframe	01/05/2019 – 30/04/2022
Duration	36 Months
Coordinator	UIC – Grigore Havarneanu (havarneanu@uic.org)

Document details

Title	Report on the survey and benchmarking results
Work Package	WP2
Date of the document	15/03/2021
Version of the document	06
Responsible Partner	DHPOL
Reviewing Partner	PHE, WMP, UIC
Status of the document	Final
Dissemination level	Public

Document history

Revision	Date	Description
01	02/08/2020	First draft
02	09/09/2020	Revision
03	16/09/2020	First draft reviewed by UIC
04	25/09/2020	Final review
05	30/09/2020	Final version
06	15/03/2021	Update following mid-term periodic review

Consortium – List of partners

Partner no.	Short name	Name	Country
1	UIC	UNION INTERNATIONALE DES CHEMINS DE FER (COORDINATOR)	France
2	CBRNE	CBRNE LTD	UK
3	PPI	POPULATION PROTECTION INSTITUTE (MINISTRY OF THE INTERIOR OF THE CZECH REPUBLIC)	Czech Republic
4	DB	DEUTSCHE BAHN AG	Germany
6	UMU	UMEA UNIVERSITET	Sweden
7	DHPOL	DEUTSCHE HOCHSCHULE DER POLIZEI	Germany
8	RINISOFT	RINISOFT LTD	Bulgaria
9	WMP	WEST MIDLANDS POLICE AND CRIME COMMISSIONER	UK
10	ETICAS	ETICAS RESEARCH AND CONSULTING SL	Spain
11	SESU	STATE EMERGENCY SERVICE OF UKRAINE	Ukraine
12	PHE	DEPARTMENT OF HEALTH	UK
13	SPL	STATE POLICE OF LATVIA	Latvia
14	AGS	AN GARDA SÍOCHÁNA – NATIONAL POLICE FORCE IRELAND	Ireland
15	FFI	FORSVARETS FORSKNINGSINSTITUTT	Norway
16	NPH	KOMENDA GŁÓWNA POLICJI	Poland

Acronyms

Acronym	Definition
EU	European Union
CBRNe	Chemical, Biological, Radiological, Nuclear, and explosive
T	Task
M	Month
D	Deliverable
WP	Work Package
WS	Workshop
PM	Progress Meeting
SAB	Security Advisory Board
CSAB	Civil Society Advisory Board
PSAB	Practitioner Stakeholder Advisory Board
LEA	Law Enforcement Agency
CSO	Civil Society Organisation
SOP	Standard Operating Procedure
GDPR	General Data Protection Regulation
PRACTICE	Preparedness and Resilience Against CBRN Terrorism using Integrated Concepts and Equipment
PPE	Personal Protective Equipment
RPE	Respiratory Protective Equipment

Executive summary

The following deliverable 2.3 is part of the second Work Package of PROACTIVE that focuses on the *Engagement of Law Enforcement Agencies and other Practitioners*. Based on an update of D2.1, the creation of the Practitioner Stakeholder Advisory Board (PSAB), this deliverable presents the findings from a two-part research with European practitioners.

The report is dedicated to the first project objective: To identify behavioural issues associated with responding to a CBRNe incident and potential shortcomings in existing practitioner procedures and tools with respect to vulnerable groups.

The first part comprises a quantitative standardised survey among European Law Enforcement Agencies (LEAs) and First Responders. The deliverable outlines (i) key tasks, procedures and resources related to CBRNe preparedness and response across Europe. The results present an up-to-date picture of the state of CBRNe preparation and readiness to respond across Europe. The complementary qualitative study that includes a benchmarking approach is the second part of this research. It focuses on LEAs in European countries. The deliverable outlines (ii) the threat assessment by LEAs with regard to CBRNe incidents, (iii) security measures in cases of an assumed elevated risk of a CBRNe incident, and (iv) communication with the public, including the media.

The report presents commonalities and differences in preparing for and responding to CBRNe incidents between different categories of practitioners and between countries. Both parts of the research put special emphasis on the consideration of vulnerable citizens in preparedness for and response to CBRNe incidents.

In general, the results have shown that most respondents perceive their organisation as well or very well prepared for a CBRNe incident. In this context, however, differences between the professional groups surveyed (LEAs, firefighters, emergency medical services) became apparent. In particular, firefighters rated their equipment to respond to a CBRNe incident as sufficient; whereas such an assessment was less common among LEAs. There were also differences between countries, especially with regard to Germany and the UK.

With regard to the consideration of needs of vulnerable groups (e.g. older persons, children, those with mental health conditions), the interviews and the online study showed that organisations rarely consider the needs of these groups in CBRNe preparedness or response measures. The needs of children, older persons and those with mobility restrictions are the most likely to be considered. However, the needs of those who have mental health conditions, visual or hearing impairment, and those from ethnic minorities are less likely to be taken into account. Differences between countries in addressing the needs of vulnerable groups in CBRNe situations have been particularly evident between the UK and Germany. Respondents from the UK stated more frequently that their organisation considers the needs of vulnerable groups.

In general, as mentioned above, the level of consideration is low, therefore a greater awareness of the needs of vulnerable groups in CBRNe situations needs to be achieved in the future. In this context, this deliverable provides 9 recommendations for European practitioners.

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1. INTRODUCTION

CBRNe incidents, whether accidental or caused by terrorists, can have a major impact on society. Evidence suggests that the way in which practitioners are trained and subsequently manage a CBRNe incident will affect the way in which citizens behave, in terms of their compliance and cooperation with recommended actions (e.g. Carter et al., 2014). The European research project PROACTIVE aims to increase practitioner effectiveness in managing large and diverse groups of people in a CBRNe environment. The project aims to provide in-depth research to facilitate the interaction between European LEAs, First Responders and the vulnerable civil society.

The following deliverable is part of the second WP of PROACTIVE that focuses on the "Engagement of LEAs and other Practitioners". The WP provides insight into the perspective and methods of CBRNe practitioners especially in regard to their awareness of the needs of vulnerable citizens in measures of preparedness and response in the context of CBRNe situations. The deliverable is preceded by the creation of a PSAB that aims to bring the expertise of various LEAs and First Responders from across Europe to the project's tasks and outcomes. Furthermore, a workshop with PSAB members was held. In this context, a Delphi study among all participating practitioners showed that there was broad consensus on previous WP1 outcomes that stressed the need for further examination of current CBRNe management, which was taken into account in the development of the research described in this report.

This deliverable presents the outcomes of research conducted by DHPol among LEAs and First Responders. This research comprises two separate but complementary parts: a quantitative standardised survey and a qualitative study. The quantitative standardised survey among LEAs and First Responders in European countries touched upon key tasks and phases of CBRNe preparedness and response as well as related procedures, resources and equipment. Special emphasis was put on the consideration of vulnerable citizens in preparedness for and response to CBRNe incidents. The survey was then analysed for commonalities and differences in preparing for, and responding to, CBRNe incidents between different categories of practitioners, and between European countries. The qualitative study among LEAs in European countries supplemented the quantitative survey approach. The study touched upon key aspects of CBRNe incidents. It focused on threat assessment by LEAs with regard to CBRNe incidents, on security measures in case of an assumed elevated risk of a CBRNe incident, and on communication with the public, including the media. The interview study results were analysed for LEAs' awareness and consideration of the needs of vulnerable citizens.

This report gives an update of Deliverable 2.1 (the formation of the PSAB) and describes the results and recommendations of both the quantitative survey and the qualitative study. It provides an up-to-date picture of the state of CBRNe preparedness and readiness to respond to a CBRNe situation and the consideration and awareness regarding the needs of vulnerable citizens across European countries. On the basis of the outcomes, the deliverable provides 9 recommendations that entail certain needs for action on part of practitioners. These provisional recommendations of D2.3 will be further elaborated in D3.4 in which the (perceived) needs and expectations of the vulnerable civil society will be examined. In the process, the observed shortcomings on part of the practitioners are analysed in regards to the concrete needs of the vulnerable civil society in order to identify gaps between the measures undertaken by practitioners and the actual needs of the vulnerable civil

society. This process allows necessary adaptation strategies to be developed that aim to close those gaps. Moreover, the outcomes of D2.3 will inform the development of the toolkit for LEAs and security policy makers in WP4 as well as the development of the joint exercises in WP6. The App will pay particular attention to providing support for the identified shortcomings. This support will then be evaluated in the exercises to determine its effectiveness in improving the interaction between practitioners and the vulnerable civil society.

2. KEY TERMS

To ensure a coherent understanding of the terms used, the report defines the following key terms which are used in both parts of the study.

The term **CBRNe incidents** refers to incidents that occur in the context of terrorist attacks (being the main focus of PROACTIVE), natural hazards, accidents/technical emergencies or warfare. The term further refers to operations that require the specific use of CBRNe-related SOPs (see below). The survey is only concerned with CBRNe incidents with a medium to high extent of damage. Those include, for example, accidents in a factory that affect a large number of people inside and/or outside of the factory, and terrorist attacks with CBRNe substances that affect a large number of people. Minor damage cases, such as an oil spill or a household accident involving chemical substances are classed as a CBRNe incident.

The term **Vulnerable Citizens** refers to members of the public with needs that differ from those of the average population when being affected by a CBRNe incident. This may include children, pregnant women, persons with physical or psychological impairments, chronic or acute medical health conditions or addictions, older persons with functional limitations and health restrictions, institutionalised individuals as well as their caregivers and companions. Vulnerable citizens also include persons with limited proficiency of the respective national languages or with restrictions regarding use of transportation, as well as individuals who are not willing to undress for decontamination due to religious reasons.

Special needs include but are not limited to restrictions in communication (sign language, interpreting, plain language, etc.) and restrictions in mobility (wheelchair, cane for the blind, acoustic signals, etc.).

Practitioners comprise of LEAs (typically police organisations), First Responders (e.g. civil protection agencies, fire brigades, ambulance) and related stakeholders (e.g. private and public bodies, transport and logistic operators) who may be involved in a response in support of the official responders. Furthermore the term refers to international, national and municipal authorities and civil society organisations such as those that help persons with disabilities and crisis management (see PROACTIVE Grant Agreement page 11).

The term **SOPs** comprises official instructions set up by an organisation or institution to facilitate their forces to operate in a standardised manner during complex tasks and responsibilities. Their aim is to assure that the performance represents quality, efficiency and uniformity to reduce misconceptions and failures. SOPs include for example fire service regulations, rescue service guidelines, official training policies and briefing information.

The term **area of responsibility** refers to both the geographical region as well as the thematic area to which the interviewee/his institution/his organisation is assigned. Thematic areas encompass all tasks related to CBRNe protection and recovery.

Measures are adapted to the specific requirements of each phase of CBRNe management. **Measures of prevention** or respectively of mitigation of CBRNe effects focus on risk analyses, the research on CBRNe agents, identity checks, sales restrictions, data networks and the like. **Measures of preparedness** for a CBRNe incident are amongst others the training of certain rules of conduct

for First Responders in danger areas, the implementation of corresponding guidelines, and population education. **Measures of response** include tasks like the detection and identification of the CBRNe agents, first aid, crisis communication with the public, quarantine and PPE. **Measures of recovery** comprise of the re-evaluation of the incident, the revision of the CBRNe SOPs and the opening of restricted areas.

The term **Communication channels** refers to all aspects of communication in the phase of prevention and response to CBRNe-related incidents. With regard to the internal communication amongst practitioners, this includes verbal and radio communication system based communication. On the other hand, media communication between practitioners and affected people on site includes social media such as Twitter, Facebook, WhatsApp and homepages as well as radio, television, newspapers and press conferences.

CBRNe Threat Assessment refers to the assessment of the credibility and seriousness of a potential CBRNe threat, as well as the probability that the threat will eventually cause a CBRNe incident.

3. METHODOLOGICAL APPROACH

The following part describes the methodological approaches of both parts of the study, the quantitative survey and the qualitative study, among LEAs and First Responders across Europe.

3.1. Research objectives

CBRNe preparedness and response are two phases of CBRNe management. The latter describes an ongoing process that enables practitioners to protect and recover with regard to CBRNe incidents. The key tasks comprise measures to prevent or respectively mitigate the effects (e.g. via guidelines), to prepare for an incident (e.g. via training), to respond during an incident (e.g. via communication) and to recover afterwards (e.g. by means of re-evaluation). Each phase includes a variety of procedures, resources and equipment, which are suitable for the objectives of this particular phase. Altogether, CBRNe management can be divided into four phases. Figure 1 presents the (CBRNe) disaster management cycle:

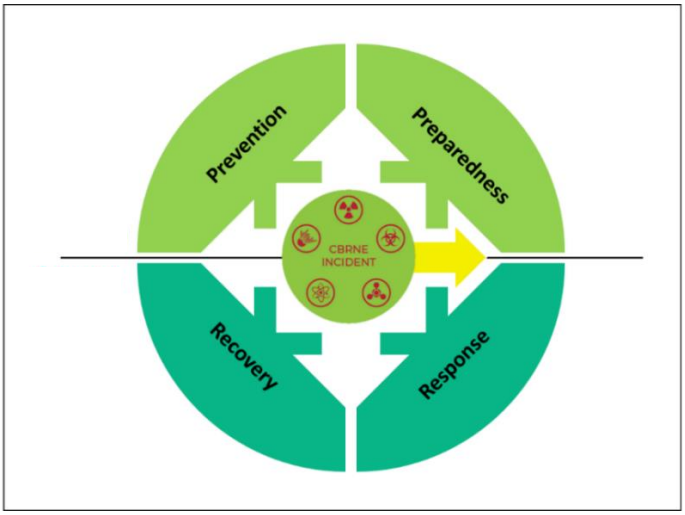

Figure 1: Disaster Management Cycle (adapted figure based on A.S.I/ON 2011)

The **quantitative survey** aims to identify commonalities and differences in CBRNe management between different CBRNe involved practitioners in different European countries. Depending on the organisations' and countries' allocation of responsibilities, SOPs, resources and equipment, the measures during each phase may differ. The survey pays special attention to the phases of CBRNe preparedness and response. Thus, the survey aims to answer the following research question:

> **Research question 1:** *To what extent do measures of preparedness and response differ among CBRNe practitioners across Europe?*

Furthermore, the survey aimed to provide an up-to-date picture of the state of CBRNe preparedness and response across European countries in regard to the awareness of the needs of vulnerable citizens in CBRNe management. Vulnerable citizens have specific needs and expectations in regard to their vulnerabilities during a CBRNe incident. Therefore, the measures undertaken by CBRNe

practitioners may cause unforeseen challenges during the engagement in the different phases. Therefore, the survey aims to provide answers to the following additional research question:

> **Research question 2:** *To what extent do European CBRNe practitioners consider the special needs of vulnerable citizens in measures of preparedness and response?*[1]

The **qualitative study** aims to understand the threat assessment by European LEAs with regard to CBRNe incidents, security measures in cases of an assumed elevated risk of a CBRNe incident, and the communication with the public, including the media. Depending on the country, the risk assessment, the security measures and the communication strategy with the public may differ. As in the quantitative standardised survey, the phases of CBRNe preparedness and response were the focus. The interview study aims to answer the following research questions:

> **Research question 3:** *To what extent does threat assessment by CBRNe practitioners differ between European countries?*

Furthermore, the interview study aims to provide an up-to-date picture of LEAs' awareness and consideration of the needs of vulnerable citizens across European countries. Similar to the second research question, the interview study aimed to clarify to what extent especially European LEAs consider the needs of vulnerable citizens in CBRNe--related preparedness and response. The results of the interview study are used to describe the data of the online survey in more detail. Within this framework, anonymous quotations are included, which provide information about specifies of CBRNe management in the respective country.

A complementary benchmarking approach further aims to compare certain aspects of the interview study that couldn't be measured quantitatively such as CBRNe threat assessment. Thus, the report focuses on differences and similarities between the countries with regards to the assessment of the topics '(joint) threat assessment', 'legal and policy framework for inter-agency collaboration', '(joint) training', 'evaluation and capacity building', 'security measures', and 'communication with the public'.

3.2. Sample design

The **quantitative standardised** survey among LEAs and First Responders (especially from the fire brigade and healthcare sectors) in European countries focused upon countries represented in the PROACTIVE consortium and the Practitioner Stakeholder Advisory Board (PSAB).

Inclusion criteria
The survey focused on **LEAs** with management responsibility. The term **fire fighter** referred to participants who are firefighters (as volunteers or professionals) with a management responsibility.

[1] On the same topic in the USA, see for example Hoffman (2009), Sullivan & Häkkinen (2006) as well as Engelmann et al. (2013) and Ivey et al. (2014), who focus on the needs of deaf and hearing impaired people.

Inclusion criteria
Health professionals primarily referred to First Responders and their management and training level. This included paramedics, emergency physicians and doctors in the outpatient emergency department, as well as nurses, psychological first-aiders, trainers and comparable emergency personnel. The survey focused on health professionals in leading positions. This included for example leading emergency physicians and chiefs of emergency response on site and the like. Additionally, CBRNe response and prevention instructors and certified rescue service training centre instructors were considered. **First responders** included members active in civil protection agencies like the German Technical Relief Agency (THW) or emergency psychosocial services like Crisis Intervention Teams. **CBRNe specialists** and **CBRNe instructors/trainers** further included practitioners involved in CBRNe planning, education and training activities.

Exclusion criteria
Sectors that are not actively involved in emergency situations have not been taken into account. These included e.g. nursing care for older persons, rehabilitation and GP surgeries.

The **qualitative study** among LEAs in European countries focused upon countries represented in the PROACTIVE consortium and the PSAB.

Inclusion criteria
The survey focused on **LEA practitioners** with management responsibility. Participants had to work in European countries. There was a preference for participants who worked in countries represented in the consortium. The survey focused on **LEAs** with management responsibility. Active strategic, operational and tactical unit leaders were taken into account. Additionally, CBRNe response and prevention instructors were considered. For countries where a LEA was unavailable for an interview, a **firefighter** with management responsibility for CBRNe incidents was interviewed in their stead.

3.3. Format

The **quantitative survey** collected data using an electronic survey format. This online-based survey approach facilitated the access to a broad range of practitioners across European countries. The target groups filled out the questionnaire online. The questionnaire was designed to take an estimated processing time of maximum 15 minutes (see Chapter 3.3.1).

The **qualitative study** collected data by using a guideline-based semi-structured interview format between one interviewer and one interviewee. The interviews were designed to be conducted online with a maximum interview time of 45 minutes (see Chapter 3.3.2). Participants were mainly interviewed by using an online telecommunication platform. Additionally, some interviews were conducted via telephone. The interview format (e.g. telephone, video conferencing system) and the

time were individually adapted to the needs of the interviewee. Most interviews were conducted by the research team of DHPol. Additionally, the PROACTIVE partners UMU and SESU conducted interviews in their countries, Sweden and Ukraine.

To minimise language differences in the research design and answering, both parts of the study took place in the official project language English. Following the description of the DoA, the questionnaire was not translated into other languages as the survey was aimed at CBRNe practitioners at management level and above. It could be assumed that this group of people would have at least basic knowledge of English through exchanges with CBRNe experts from other countries. During Covid-19 in particular, it became apparent that a large number of pandemic-related seminars for interested experts were offered in English in order to address a wide range of stakeholders across Europe and beyond. For the more intensive interview study, in one case an interpreter was involved, in another case a partner from the same country conducted the interview and translated the transcript. Additionally, two interviews with German LEAs were conducted in German by DHPol. In all other cases, English proved to be suitable.

3.3.1. Questionnaire

In order to include consortium partners' perceptions, the different WP leaders were given the opportunity to actively participate in the design of the **quantitative survey**. Therefore, DHPol organised various online review meetings and presented the results during the progress meetings. The questionnaire thus reflected the interests of the entire consortium.

Initially, the questionnaire (Appendix D - Questionnaire of quantitative survey) surveyed the practitioners' professional background and experience with CBRNe in general. Based on this, the questionnaire comprised a range of questions about CBRNe-related procedures, resources and equipment in the phases of preparedness and response. Consideration and awareness of the needs of vulnerable citizens were addressed in each of the following core themes that related to the participant's institution / organisation. The first thematic block was dedicated to the phase of preparedness. The questions related to the perception of the overall preparedness in the respective organisation; SOPs that lay the foundation for any structured CBRNe management; the provision of further information resources for the emergency personnel; and the testing and evaluation of the SOPs during simulation exercises. The second thematic block comprised questions related to CBRNe response. Participants were asked to describe the internal communication during a CBRNe incident that clearly divides areas of responsibility and enhances the courses of action; the cooperation with other institutions /organisations that participate in CBRNe operations; the communication strategy with the public; and the information resources that are made available to the public.

The questionnaire included single answer and multiple answer questions. The form of scales was further used to put certain aspects in relation to each other. In addition, some of the questions offered the possibility to provide additional answers in free text form. Furthermore, filter questions allowed to look at further aspects with certain participants. An example is the adaptation of the questions to the previously indicated experience with CBRNe incidents (question regarding experienced operations vs question regarding assumed operational situation).

3.3.2. Interview guideline

In order to include the consortium partners' views, WP leaders were given the opportunity to actively participate in the design of the **qualitative study**. DHPol organised various online review meetings and presented the results during the progress meetings. The interview questions thus reflected the interests of the entire consortium.

In the head section of the guideline (Appendix F - Interview guideline of qualitative study), the names of interviewer and interviewee, the interview date and the interview format (e.g. telephone interview, interview via video conferencing) were recorded. The guideline itself was structured according to the key points of the study: The first thematic block considered the personal background of the interviewee. Risk assessment procedures regarding CBRNe incidents and measures to prepare for a CBRNe incident were focused in the second thematic block. The questions comprised the likelihood of a CBRNe incident. The third thematic block was concerned with response measures in case of an assumed elevated risk of a CBRNe incident and measures during a CBRNe incident. Furthermore, CBRNe response technologies and procedures were questioned. The following fourth thematic block asked for the cooperation with other organisations in case of a CBRNe incident. The last thematic block dealt with communication strategies with the public in the phase of CBRNe response. Similar to the quantitative approach, all thematic blocks included questions that were related to the awareness and consideration of the needs of vulnerable people.

As a follow-up to the interviews, a benchmarking questionnaire was developed (see Chapter 3.1.), which focused on functional areas of CBRNe management that couldn't be measured quantitatively such as CBRNe threat assessment. Research provides a broad range of different benchmarking methods depending on the research objectives. Tall et. al. 2013, among others, provide qualitative indicators to compare disaster management. Some of those indicators were used in combination with the five-level assessment tool of disaster risks and implementation for the Hyogo Framework for Action (UNISDR 2008, 10): (1) Achievements are minor and there are few signs of planning or forward action to improve the situation; (2) Achievements have been made but are relatively small or incomplete, and while improvements are planned, the commitment and capacities are limited; (3) There is some commitment and capacities to achieving disaster risk reduction but progress is not substantial; (4) Substantial achievement has been attained but with some recognised deficiencies in commitment, financial resources or operational capacities; (5) Comprehensive achievement has been attained, with the commitment and capacities to sustain efforts at all levels. The benchmarking questionnaire covered a classification of the topics '(joint) threat assessment', 'legal and policy framework for inter-agency collaboration', '(joint) training', 'evaluation and capacity building', 'security measures', and 'communication with the public' (see Appendix G – Benchmarking Matrix). Following the above five-level assessment, participants could rate each of the six topics on a level between 1 and 5, ranging from absent/minimal, to developing, moderate, significant and optimal.

4. DATA COLLECTION

The following part describes how both parts of the study were conducted.

4.1. Recruiting survey participants

The target group of the **quantitative survey** was composed of LEAs and First Responders, mainly from the fire brigade and health services. The aim of the survey was to include at least one participant from countries that are represented in the consortium and the PSAB. DHPol provided the following documents, which were passed on to relevant practitioners across Europe via email (Appendix C - Invitation letter of quantitative survey):

- An information letter that extensively informed about all aspects of the survey (e.g. content, ethics and safety aspects, contact details etc.);
- An explanation of the key terms used in the questionnaire.

The documents ensured that all participants were informed extensively about the project, the survey itself and the data handling.

The survey was distributed using the following approaches:

- All PROACTIVE partners were asked to distribute the survey documents to relevant contacts within and beyond their countries. Some partners also shared the survey request within their business and private social media networks. In addition, a website search by DHPol was used to identify further candidates across Europe focusing especially upon countries that were not represented in the project consortium. Overall, candidates of all 47 countries of the Council of Europe and beyond were informed about the survey. To further promote the survey, large mailing lists and networks were employed. Due to the different sizes of the networks, it is difficult to indicate exact numbers of potential participants contacted (see. Table 1). In total, records suggest, that the PROACTIVE consortium reached out directly via email to at least 565 potential candidates[2]. Additionally, the consortium promoted the survey via more than 90.000 connections. In this context, forwarding to suitable contacts within the network was always requested.
- UIC continuously promoted the survey on PROACTIVE's social media channels (e.g. Twitter and LinkedIn); at this time, the PROACTIVE twitter account had 499 followers, the LinkedIn account had 86 connections (see Table 1).

[2] Not all PROACTIVE partners were able to indicate the approx. number of contacted candidates. Therefore the number is expected to be higher as recruitment lasted for several months and it was not originally planned to record the exact number.

Table 1: Overview of recruitment of survey participants using an email, social media and network approach

Country	Contacted candidates (approx.)	Medium	Responsible partner
Austria	45	email	DHPol
Bulgaria	8	email	RINISOFT
Czech Republic	10	email	PPI
Germany	250	email	DHPol
Ireland	unknown	email	AGS
Latvia	2	email	SPL
Norway	10	email	FFI/DHPol
Poland	unknown	email	NPH
Spain	14	email	ETICAS
Sweden	6	email	UMU
Switzerland	25	email	DHPol
Ukraine	unknown	email	SESU
United Kingdom	134	email	WMP
United Kingdom	61	email	CBRNE
Not specified	100	PROACTIVE-LinkedIn-Account	PROACTIVE
Czech Republic	unknown	LinkedIn	PPI
France	713	Private-LinkedIn-Account	UIC
France	2400	Private-LinkedIn-Account	UIC
Not specified	514	PROACTIVE-Twitter-Account	PROACTIVE
Sweden	338	Twitter-Account Umea University	UMU
France	841	Private-Twitter-Account	UIC
France	1500	Private-Twitter-Account	UIC
Not specified	unknown	Re-Tweet through eNOTICE Project-Account	WMP
United Kingdom	16.000	The National Council for Voluntary Organisations website	CBRNE
United Kingdom	200	Internal-Article	WMP
United Kingdom	50	Internal-Presentation	WMP
United Kingdom	1000	UK Counter Terrorism Newsletter	WMP
United Kingdom	70.000	UK National Resilience website	WMP

- The PSAB was made aware of the survey during the PSAB WS on 19th March 2020 (see Hall et. al. 2020b, Chapter 3.1. Table 2 & 5.2.). The 18 attending PSAB members came from Canada, Estonia, France, Germany, Greece, Italy, Lithuania, the Netherlands, Poland, Spain and the UK. CBRNe Ltd. later forwarded the survey to all 79 PSAB members (as of August 2020) with a request to forward the survey within their networks. On inquiry, it was confirmed that at least a couple of PSAB members had shared the request internally within their organisations.

- UIC shared the provided documents with all partnering projects; eNOTICE, BULLSEYE, Healthy Gateways, NO-FEAR, PERSONA, TRANSTUN, SHOTPROS.

If possible, inquiries were sent in personal form. Generic mail addresses and anonymous mail distribution lists were avoided as far as possible. However, the majority of publicly available contacts were generic. Depending on the country and the number of personal contacts there, the number of candidates that were actually reached therefore varies greatly.

In addition, there were some barriers regarding the authorisation of those contacted to participate in the survey or the interviews. The example of Germany shows that LEAs are not always authorised to release information about their work to researchers without approval from certain official bodies. This includes both the online survey and interview. Therefore, DHPol had to go through a time consuming approval process that eventually took several months in order to be allowed to interview LEAs in Germany. As soon as approval was granted, DHPol had access to a large number of potential candidates. However, such a process was not feasible in every country and for every partner (e.g. time resources, former contacts to such institutions, etc.).

Due to Covid-19 and the summer holidays, the data collection phase of the quantitative survey was extended twice and several reminders were implemented to increase the number of participants. Within this framework, all participants already contacted by DHPol and the PROACTIVE partners, including the PSAB, were reminded of the ongoing study three times. Data collection eventually lasted two months.

The target group of the **qualitative study** was composed of European LEAs. The aim of the interview study was to include at least one participant from each country represented in the consortium. Similar to the survey approach, DHPol provided a comprehensive information letter, which was forwarded to relevant LEAs across Europe via e- mail (Appendix E - Invitation letter of qualitative study). Potential interviewees also received a consent form which had to be signed prior to the interview. In addition, the interview guideline was shared prior to the interviews to help participants to prepare. The documents ensured that all prospect participants were informed extensively about the project, the interview itself and the data handling.

Potential interviewees were approached using the following approaches:

Similar to the survey approach, LEAs within the PSAB were made aware of the interview study during the PSAB WS on 19th March 2020. Three weeks prior to the start of the interviews, CBRNe shared the provided documents with all LEAs in the PSAB. All PROACTIVE partners, especially those working in Law Enforcement Agencies, were asked to identify potential candidates/colleagues, who were willing to participate in the interview study. As soon as candidates expressed their interest and signed the consent form, DHPol arranged the dates. UMU and SESU supported DHPol by conducting interviews within their countries.

Similar to the quantitative survey, due to Covid-19 and the summer holidays, the data collection period of the interview study was extended. Additionally, the consortium network repeatedly searched for potential participants in countries that were still underrepresented at the respective time of the data collection. The recruitment eventually lasted 6 weeks. During June until mid-August, the interviews were conducted. Overall, the interview period lasted two month.

4.2. Promotion of PSAB

The online survey and the interview study were used to inform all potential participants about the PROACTIVE PSAB. In this regard, all research related documents including the emails as well as the survey website referred to the PSAB and offered relevant contact details.

4.3. Interview training

Prior to the data collection, an interviewer training for the **qualitative study** was conducted on the 27th of April 2020 during an online web meeting session. Danielle Carbon and Andreas Arnold were the facilitators of the training. The training was primarily intended for all PROACTIVE partners who expressed interest in conducting interviews on behalf of DHPol. The following partners participated in the web meeting: UIC, CBRNE, PPI, UMU, RINISOFT, WMP, ETICAS and AGS. The aim of the training was to ensure that the interviews were conducted in a consistent manner by the different interviewers.

5. ETHICS AND SAFETY

The **quantitative survey** received the Project Ethics Officer Approval Reference:

PROACTIVE/PEO/4/05/05/2020

The quantitative survey was conducted by DHPol whose research activities are carried out within the framework of national and European data protection guidelines for security research. Therefore, all data was handled securely in line with German national data protection legislation and the General Data Protection Regulation (GDPR) of the European Union.

Prior to accessing the online questionnaire, all candidates electronically agreed to an informed consent form that comprised all aspects of data handling, ethics and safety. At the end of the questionnaire, all participants electronically agreed to officially submit their responses to the research team. Contact details of the research team and DHPol's ethical and data officer were provided for any queries in all provided documents and at the end of the survey.

The questionnaire only collected anonymous data. It is therefore not possible to assign the questionnaire data to a specific person. Participants were free to cancel the survey at any time without giving a reason. In addition, there was the possibility to abstain with regard to individual questions. Participants were given the option of not answering individual questions in terms of content by using the options "I don't know" and "I'd rather skip this question".

Given the cross-national character of the questionnaire, the survey was developed with an eye toward comparability across languages and cultures. Therefore, information about the study was designed in an appropriate form and in easily understandable, non-offending language.

The **interview study** received the Project Ethics Officer Approval Reference:

PROACTIVE/PEO/3/08/04/2020

Regarding the data protection and the ethical development of the qualitative study, the approach was similar in both parts of the study. All interviews were conducted and recorded in line with the data protection and ethical criteria of the GDPR. Unlike the survey, the interviews collected sensitive data of the interviewee: In advance, an email address was requested for setting the interview arrangements. Furthermore, the interview captured personal information on the interviewee (name/institution/organisation/country; Appendix F - Interview guideline of qualitative study). Therefore, as a requirement, a provided consent form had to be signed by the potential interviewee and returned to DHPol prior to the interview (see Chapter 4.1.).

The records were transcribed by an external company which abided by data protection standards.

6. UPDATE OF THE PSAB

Both parts of the report are based on the extensive network of the PSAB members to reach out to European experts (see Chapter 4.1). Therefore, the PROACTIVE Grant Agreement wished for an update of the Deliverable as part of this report. The following chapter describes the update of the PSAB.

6.1. PSAB profile

Over the course of the project, the PSAB has continuously expanded. As of August 31, 2020, it comprises 79 organisations that engage in the project's tasks and outcomes. Currently, all countries that are represented in the consortium provide practitioners to the PSAB. Figure 2 presents numbers and percentages of PSAB members by country of origin. It reveals that the project receives input from 21 different countries. Besides the USA, Canada and Israel the PSAB mainly consists of European practitioners. The highest number of members is recorded in Germany, Belgium, Italy, Spain and the UK.

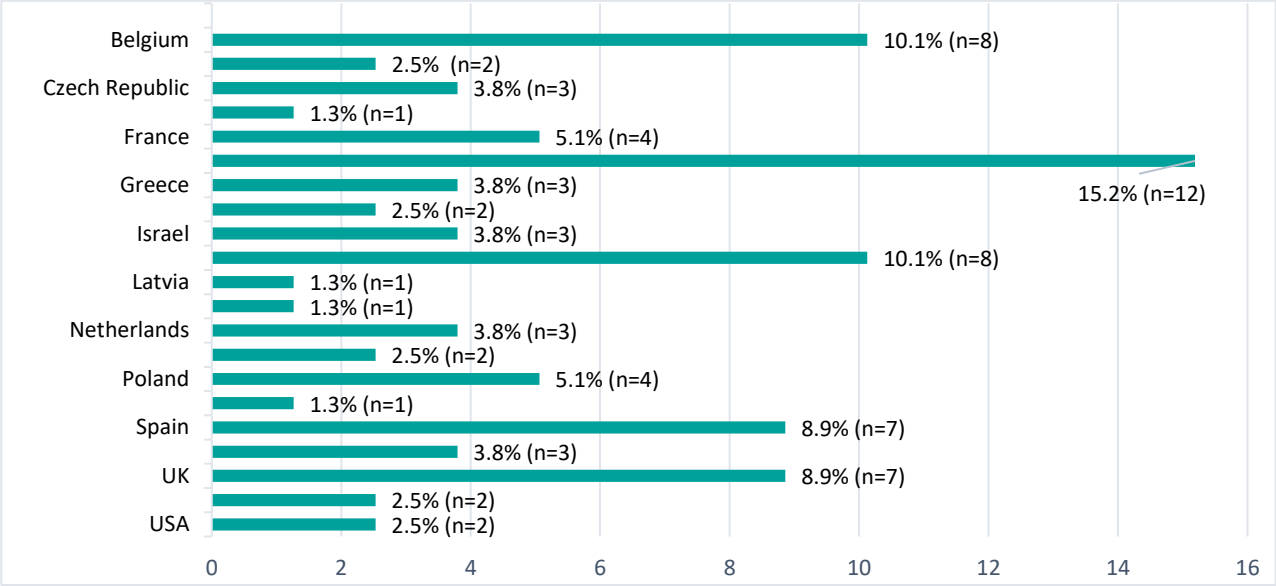

Figure 2: Distribution of PSAB members by country (n=79)

The former 7 PSAB categories comprised ‘Law Enforcement Agencies’, ‘Firefighters’, ‘Rail Experts’, ‘CBRNe Experts’, ‘Medical Responders’ and ‘Miscellaneous’. During the project, it appeared that some categories were not clearly distinguishable. This was particularly true for the category of 'CBRNe Experts', which included firefighters, emergency medical services and civil protection organisations that were specialised in CBRNe. Therefore, a new system with 11 categories was created to describe the character of the PSAB more accurately. The new term ‘Law Enforcement Agency (LEA) (specialist)’ refers to departments that are specially trained in dealing with CBRNe scenarios. In contrast, the term ‘Law Enforcement Agency (LEA) (non-specialist)’ comprises all departments that are not specially trained in this respect. The distribution by area of expertise is as follows:

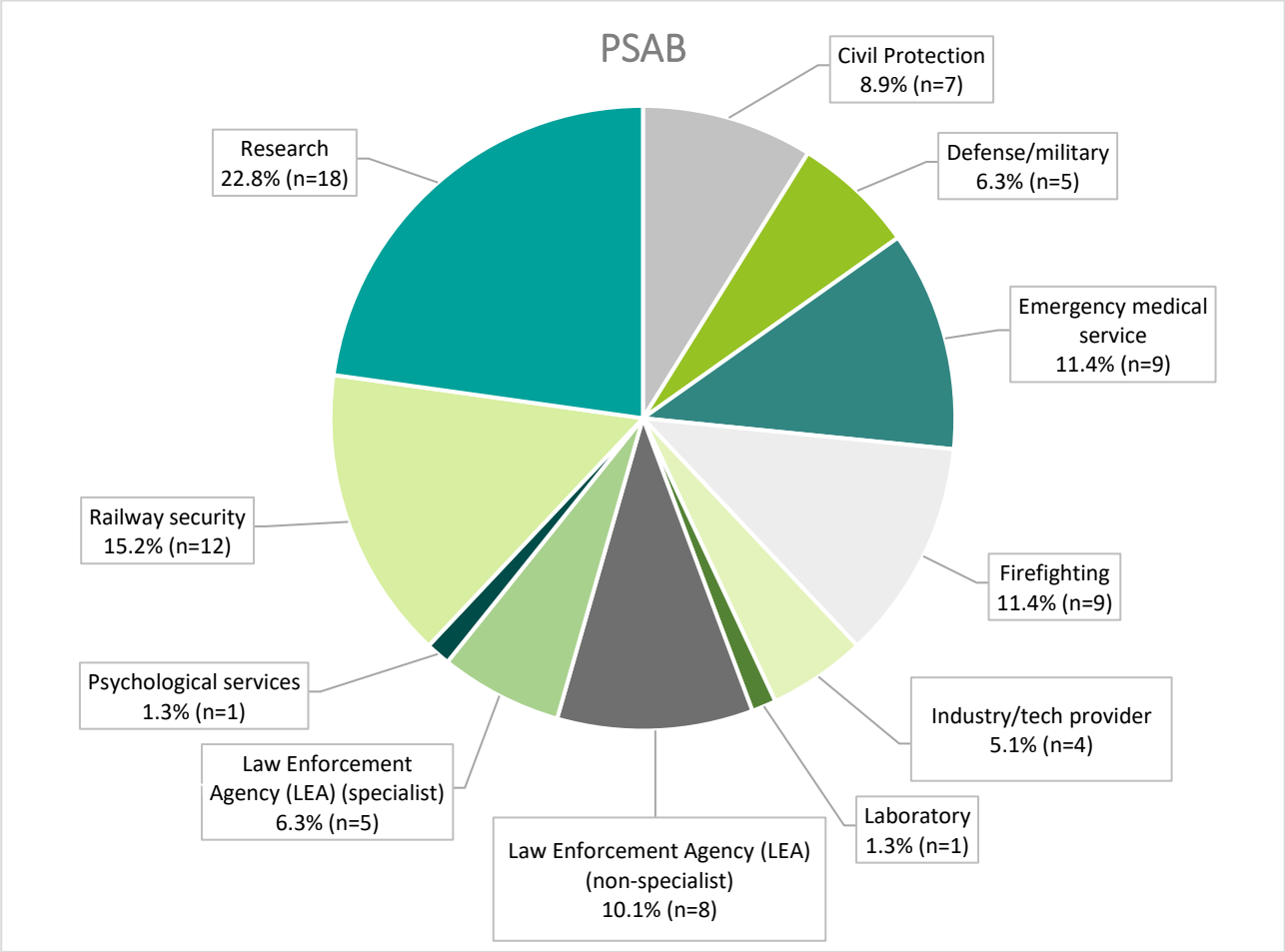

Figure 3: Distribution of PSAB members by area of expertise (n=79)

The largest percentage of the advisory board is composed of practitioners that are engaged in research areas that are related to PROACTIVE. Furthermore, railway security, firefighting, emergency medical service and civil protection represent an equally remarkable proportion of the PSAB. These groups all together thus represent 70% of all participants.

6.2. SAB profile

The members of the SAB as part of the PSAB have not changed since D2.1 (see Swain & Kelly 2019).

6.3. (P)SAB meetings

The PSAB was formally invited to the 4th PM that involved a PSAB WS on March 19, 2020. The deliverable D2.2 describes the objectives and results of the workshop.

Besides the recent online progress meetings in March and June 2020 (4th PM), the latest SAB meeting was held online on 11 May 2020 (Appendix B – SAB minutes). The next meetings will be organised as part of the upcoming Mid-term conference to be held on 28th October 2020 (online due to Covid-19) and the 5th progress meeting on 26th October 2020. Additionally, since all SAB members are invited to participate in the Rieti exercise, a SAB meeting is likely to be organised in this frame.

7. SAMPLE DESCRIPTION

The following chapter describes the sample of the quantitative standardised survey and the qualitative interview study.

7.1. Sample of quantitative standardised survey

In total, 223 First Responders and LEAs participated in the online survey. Figure 4 highlights that the UK (30.3%) and Germany (27.5%) provided the largest percentages of participants. The remaining countries show comparatively low percentages of participants that range between 0.5% (1 participant) and 5.0% (11 participants) per country. For this reason, country comparisons focus on Germany and the UK as well as countries with more than seven respondents. Those include Austria, Belgium, the Czech Republic, Germany, Ireland, Italy, the Netherlands, Norway, Spain and the UK.

All twelve countries represented in the consortium have at least one participant in the survey. In total, practitioners from 23 different countries engaged in the online survey.

The professions held by participants that took part in the quantitative standardised survey can be found in Figure 5. Particularly representatives of law enforcement agencies took part in the survey, followed by representatives of emergency medical services and fire brigades. The group of civil protection representatives is less strongly represented. However, it must be taken into account that representatives of the fire brigade and rescue service also partially belong to this category. In the comparison by profession, the report therefore focuses on LEAs, firefighters and emergency medical services.

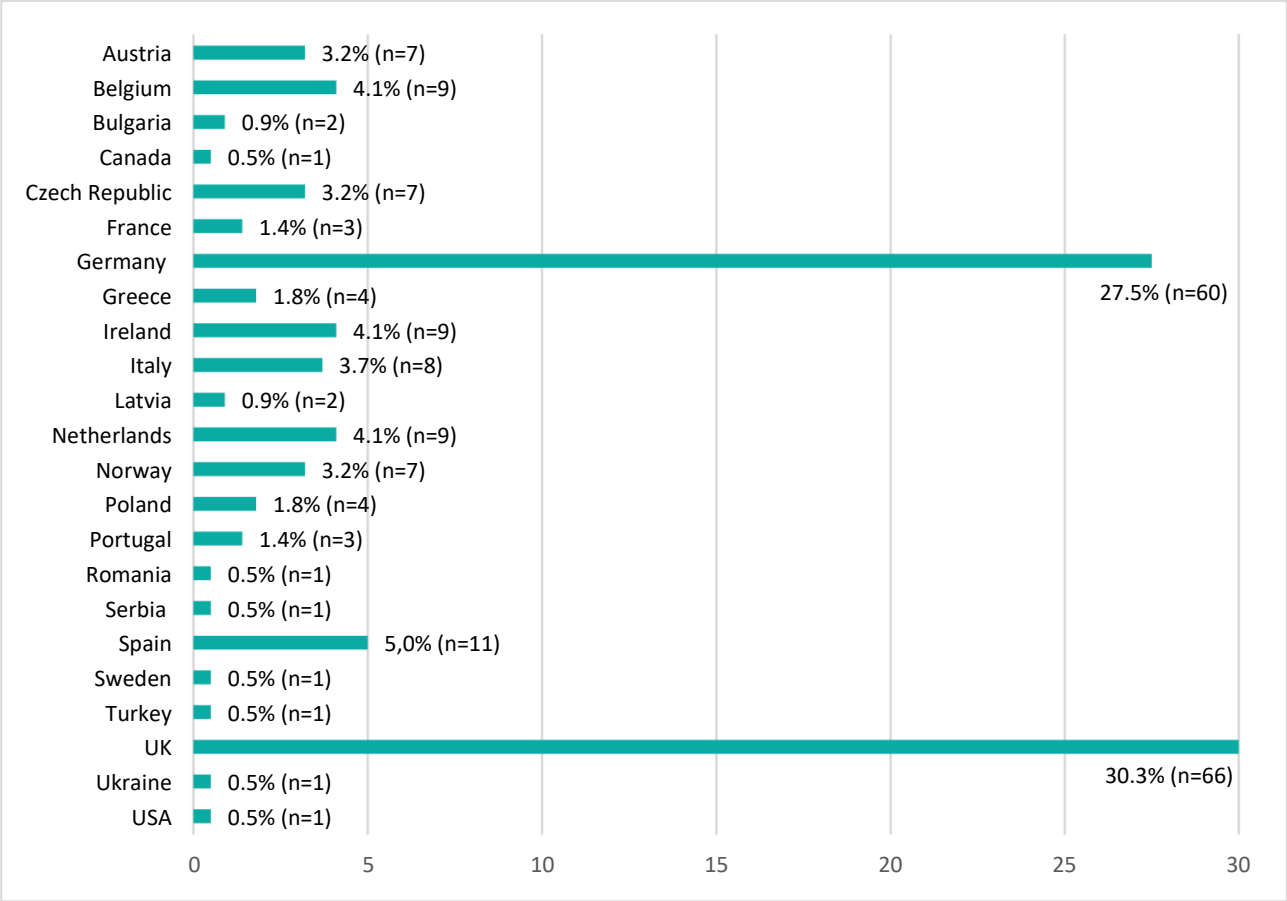

Figure 4: Participants in quantitative standardised survey by country of origin (n=223)

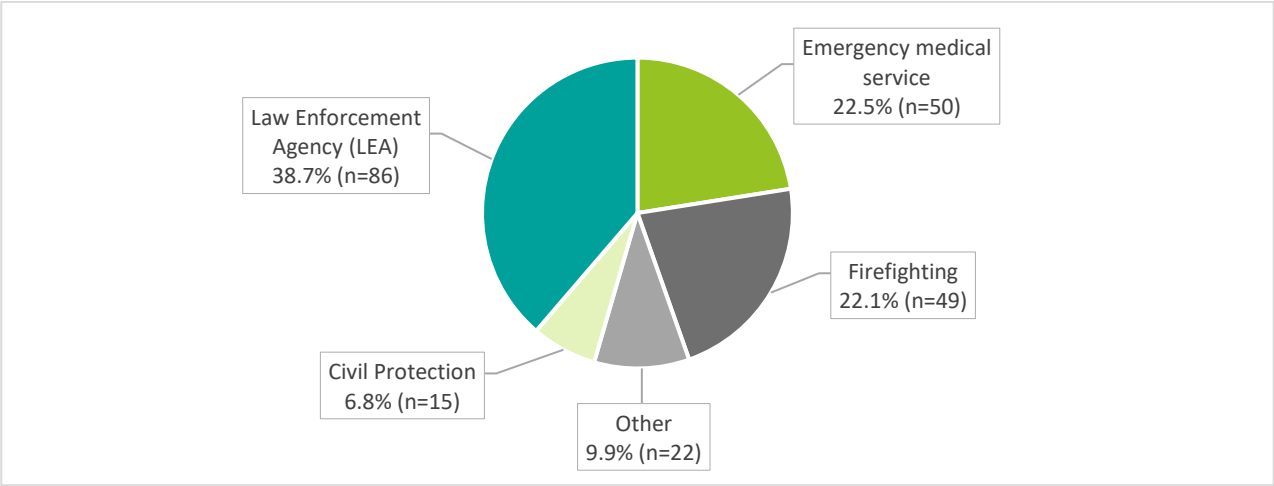

Figure 5: Participants in quantitative standardised survey by profession (n=222)

Regarding the length of their experience in the field of disaster response and preparedness, more than half of all participants indicate that they had been working in this professional field for between 16 and 30 years. Less than 10% indicate they had been professionally involved in this field for even longer than that (see Figure 6). Due to the fact that the majority of respondents have long

professional experience, a conditional evaluation by years of experience is not carried out within Chapter 81.2.

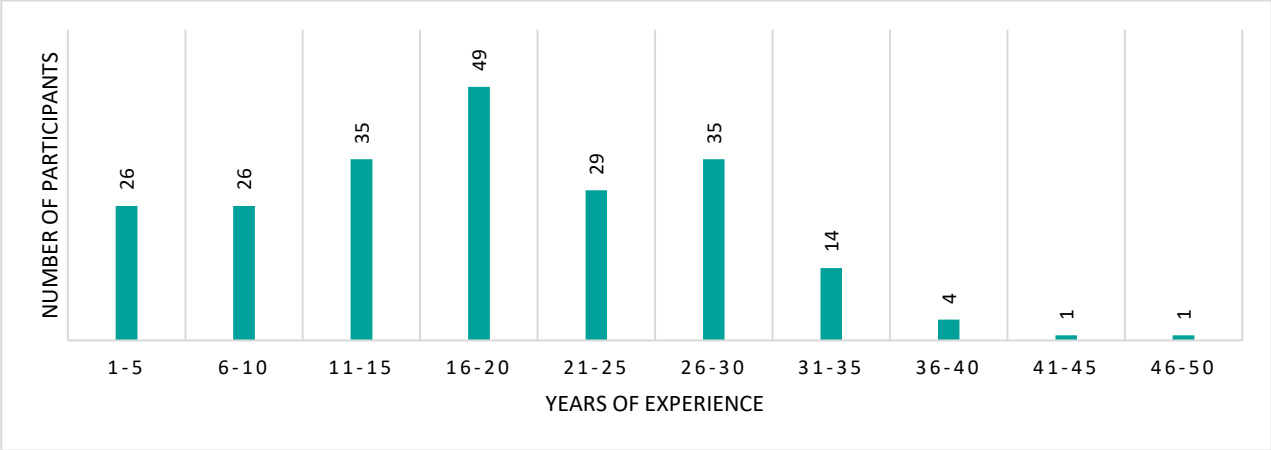

Figure 6: Years of professional experience of participants in quantitative standardised survey (n=220)

According to Figure 7, the sample reflects all three levels of CBRNe management responsibility. 75.8% of the respondents indicate that they are active at the "operational level". 58.7% are professionally working at the “tactical level” and 48.4% at the “strategical level”. Overall, respondents are active at multiple strategical levels and present the full range of CBRNe preparedness and response.

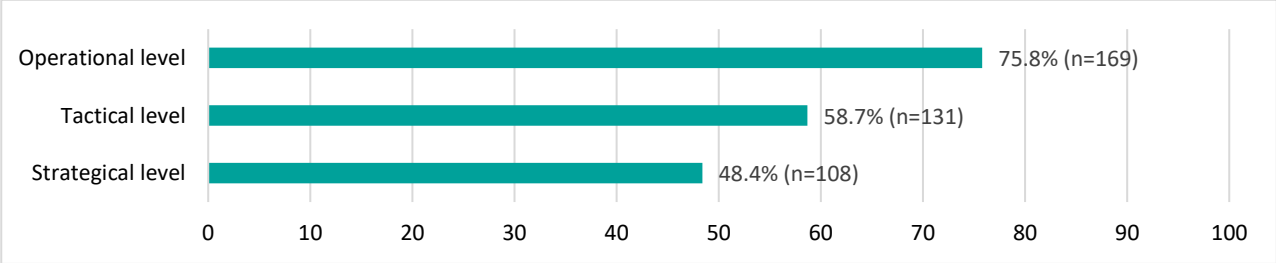

Figure 7: Participants by type of management responsibility; multiple selection option (n=223)

Participants engage at multiple levels whereby they are mainly active at regional (64.4%) level, followed by the national (59.0%) and local level (48.6%). In comparison, a smaller number of respondents indicate their engagement in the international field (32.9%) (see Figure 8). Thus, CBRNe management should be further intensified at the European level.

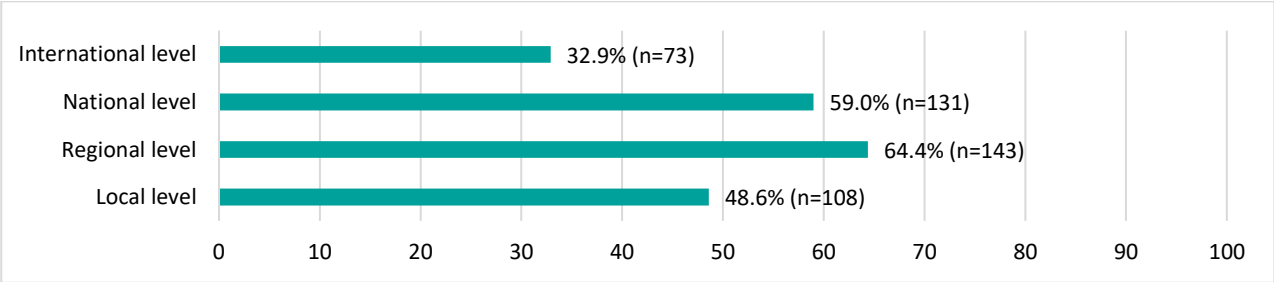

Figure 8: Participants by organisational level of action; multiple selection option (n=222)

As part of the project PROACTIVE, the standardised comparative survey aims to pay attention to include the perception of women working in emergency management (fire brigades, civil protection, Red Cross, Red Crescent, etc.) (see PROACTIVE Grant Agreement page 9). Overall, 11.3% of participants are female. The majority consists of male practitioners (87.4%) (see Figure 9). Furthermore, one participant prefers to be identified as diverse.

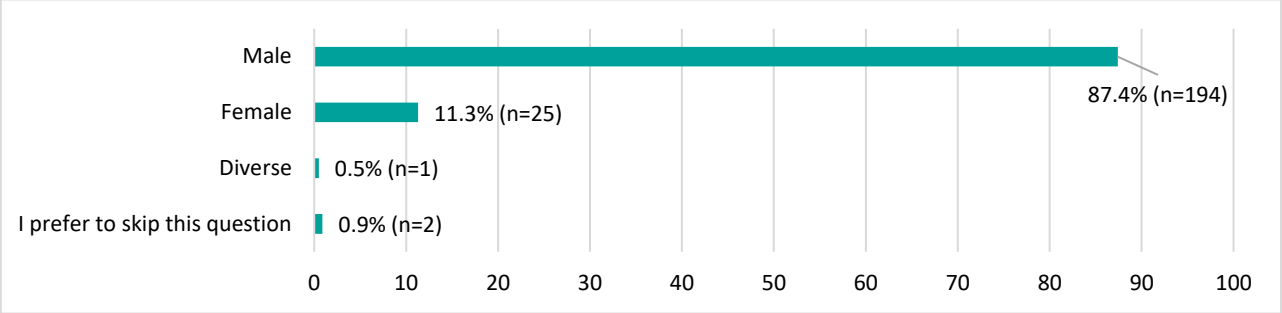

Figure 9: Gender of participants in quantitative standardised survey (n=222)

7.2. Sample of qualitative study

18 interviewees from all across Europe participated in the interviews. With the exception of Bulgaria, all countries represented in the consortium were involved with at least one participant. In total, practitioners from 13 different countries took part in the interview study (see Figure 10).

Table 2: Profile of interviewees by country in qualitative study (n=18)

Interview number	Country	Category	Professional background	Years of experience[3]
#1	Belgium	Emergency medical service	Crisis manager for military emergency; specialised in disaster medicine/ CBRNe unit	9 years
#2	Czech Republic	Firefighting	Operational deputy chief of fire and rescue service; fire officer	unknown
#3	France	Firefighting	Operational unit commander of regional fire station; specialised in radiological hazards/ hazmat unit commander	17 years
#4	Germany	LEA	Explosives expert at State Criminal Police Office	23 years
#5	Germany	LEA	Ministry official for dangerous goods legislation	unknown
#6	Greece	LEA	Ministry official for National Defense	20 years
#7	Ireland	LEA	Ordnance officer of Defense Forces	17 years
#8	Ireland	LEA	Sergeant for crime scene investigation	11 years
#9	Latvia	LEA	Operational chief inspector for state police; major	none
#10	Norway	LEA	Ministry official for Civil Protection and industrial accidents	34 years
#11	Poland	LEA	Deputy team leader	5 years
#12	Spain	LEA	Deputy commissar of local police	unknown
#13	Sweden	LEA	Regional crisis preparedness coordinator; representative of national CBRNe coordination unit	10 years
#14	UK	LEA	Interdisciplinary CBRNe instructor and tactical advisor	22 years
#15	UK	LEA	Interdisciplinary CBRNe instructor for civilian based response	19 years
#16	UK	LEA	Interdisciplinary CBRNe instructor for civilian based response	unknown
#17	Ukraine	LEA	Lieutenant Colonel for Radiation, Chemical and Biological Protection	7,5 years
#18	Ukraine	LEA	Chief Specialist for Radiation, Chemical Protection and Evacuation	15 years

[3] Unlike in the quantitative survey, the years of experience in the qualitative interview study refer particularly to CBRNe incidents.

Table 2 presents the profile of the interviewees. The majority consists of European LEAs since they were the focus of the interview study. Additionally, two fire fighters and one practitioner from a special task force trained in military related emergency medical services participated.

The interviewees from Latvia #9, Ukraine #18 and Greece #6 further participated in the complementary benchmarking categorisation of the interview study. Participants from Germany, the UK and Ireland had to decline due to security regulations.

8. RESULTS

The following chapter presents the statistical results of the quantitative standardised survey. Those results are complemented by the assessments by the interviewed participants of the qualitative study and relevant scientific research.

8.1. Threat assessment of European CBRNe practitioners

Since a key feature of CBRNe threats is that they are uncertain in their nature, severity, imminence, frequency, duration and likelihood (see Meloy et. al. 2014, 3) the assessment of the credibility and seriousness of a potential CBRNe threat, as well as the probability that the threat will eventually cause a CBRNe incident, requires professional judgment by relevant experts. Thus, CBRNe threat assessment relies on the expertise from those “who are the focus of the assessment” (Meloy et. al. 2014, 4). As part of a proactive CBRNe management, this section is dedicated to the threat assessment of European LEAs that consider the specific circumstances of CBRNe incidents for their respective countries.

CBRNe incidents can be caused by natural outbreaks, industrial accidents or terrorist attacks. An example of a natural outbreak is the current Covid-19 pandemic, whereas accidents include leakage at oil platforms and nuclear power plants like the accidents that took place in Fukushima and Chernobyl. As part of PROACTIVE, special attention is given to terrorist attacks. Increased geographic spread requires a joint threat assessment to effectively combat terrorism. Furthermore, CBRNe incidents reveal to be particularly challenging for threat assessment because they are hard to detect and their consequences are often unpredictable, including possible delayed effects from contamination. Thereby, the causes of CBRNe incidents are manifold. A distinction is made between scenarios involving chemical, biological, radioactive, nuclear and explosive agents. CBRNe incidents can further occur in many different locations (e.g. train stations, airports, public places, schools). Each agent offers different availability and impact in the respective location making all CBRNe operations unique. A joint threat assessment appears to be the most appropriate approach to understand the multiplicity of CBRNe incidents and to facilitate a joint combat. As the subject proves to be very diverse, there is a broad range of CBRNe-related experiences and knowledge among European CBRNe practitioners. It can be assumed that the experience and knowledge greatly influences the threat assessment and the subsequent CBRNe management. For this reason, the report examines the extent to which prior experience and knowledge of CBRNe incidents affect the

reported CBRNe management[4]. By drawing together the diverse experiences and perspectives of CBRNe incidents of different European practitioners, the following chapter provides a better understanding of the current experience of European responders, their familiarity with the topic and their subsequent threat assessment.

8.1.1. Experience with CBRNe incidents

Addressing CBRNe incidents that have occurred to date plays a crucial role in the European threat assessment. The following section provides a brief overview of CBRNe-related terrorism across Europe to draw the broader picture in which European CBRNe responders operate and gain experience. Subsequently, the results of both parts of the study are examined in more detail with regard to CBRNe-related experience.

Various cities in Europe have fallen victim to several terrorist attacks in recent years. Koehler & Popella (2020), identified alone 31 far-right CBRN incidents in Western countries since 1970. Examples are the Madrid (2004) and London (2005) bombings, that involved improvised explosives (Colliard, 2015; Turégano-Fuentes et. al. 2008a & 2008b; Chukwu-Lobeln et. al. 2017); the poisoning of Alexander Litvinenko in the UK 2006, with the highly toxic and radioactive polonium-210 (Harrison et. al. 2017) and the ricin-based biological attack in Salisbury 2018 (Stone 2018; Vale et. al. 2018; DW, 2021; LJDD, 2021).

Following the various CBRNe-related operations in Europe, more than three-quarters of the surveyed participants (79%) indicate that they have been involved in at least one CBRNe incident during their professional life (see Figure 56Att.). Of all 223 respondents, 44.4% report having been involved more than five times. In contrast, only 15.7% of respondents indicate that they have never been involved in a CBRNe incident so far. Looking at the participants that experienced more than five times or no incident by country, participants from Austria, Belgium, the Czech Republic, Germany, Norway, Spain, the Netherlands and the UK confirm that they are more likely to have experienced more than five CBRNe incidents than none at all (see Figure 10). Only for the participants from Ireland and Italy this does not apply.

Looking at the involved professional groups in regard to the categories “more than five times” “once” and “never”, the same trend emerges (see Figure 11). Firefighters, in particular, state proportionately more often that they have been involved in a CBRNe incident more than five times, while LEAs state this somewhat less frequently. The distribution partially reflects the different responsibilities within such incidents. For example, firefighters more regularly deal with incidents involving CBRNe agents (e.g. an overturned hazardous material transporter) and emergency medical services deal with the respective casualties. The range of tasks performed by LEAs (see Chapter 8.2.1.) determines that not all LEAs are involved in such operations.

When asked about the context of the CBRNe incidents, the majority of respondents refer to accidents and technical emergencies (76.6%) (see Figure 57Att.). Non-terrorist crimes (45.7%) are indicated

[4] In this context the report analyses whether the consideration of vulnerable people differs markedly between CBRNe responders with or without experience in CBRNe incidents.

by around half of the respondents. In respectively about a third of the cases natural hazards (34.9%) and in a quarter of cases terrorist attacks (25.1%) are mentioned. Very rarely the respondents refer to warfare (4%) as the context of a CBRNe incident. In the category "Other" (7.4%), pandemics such as Covid-19 are mentioned.

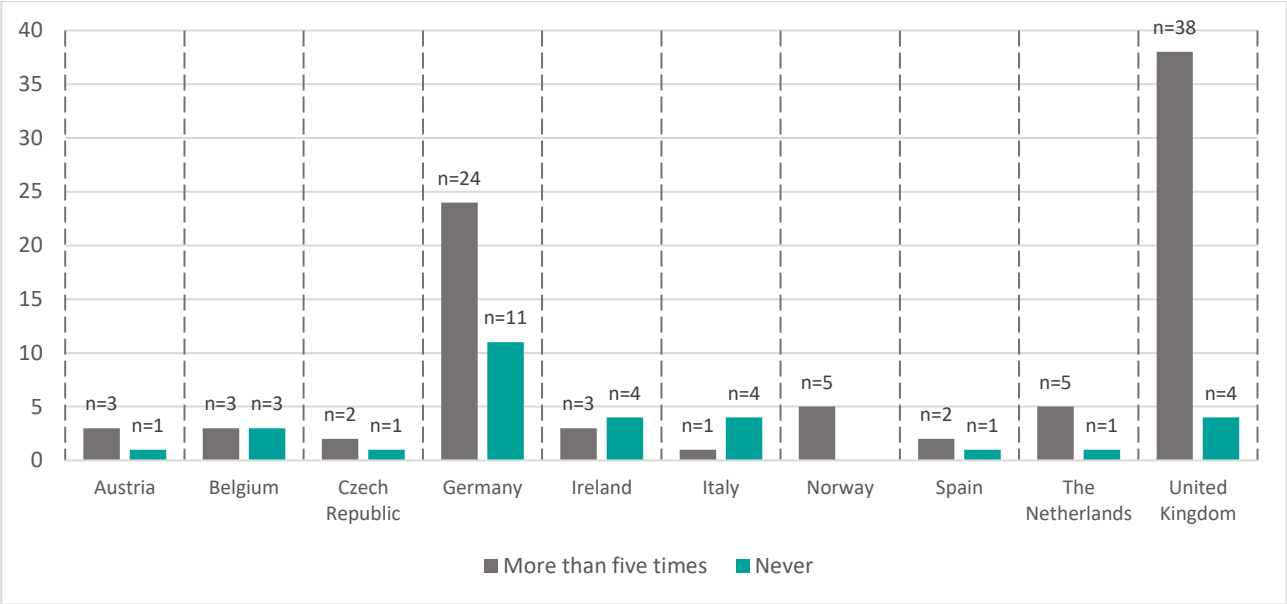

Figure 10: Involvement of participants in a CBRNe incident during their professional life by country (Austria: n=7; Belgium: n=9; Czech Republic: n=7; Germany: n=60; Ireland: n=9; Italy: n= 8; Norway: n=8; Spain: n=11; The Netherlands: n=9; United Kingdom: n=66)

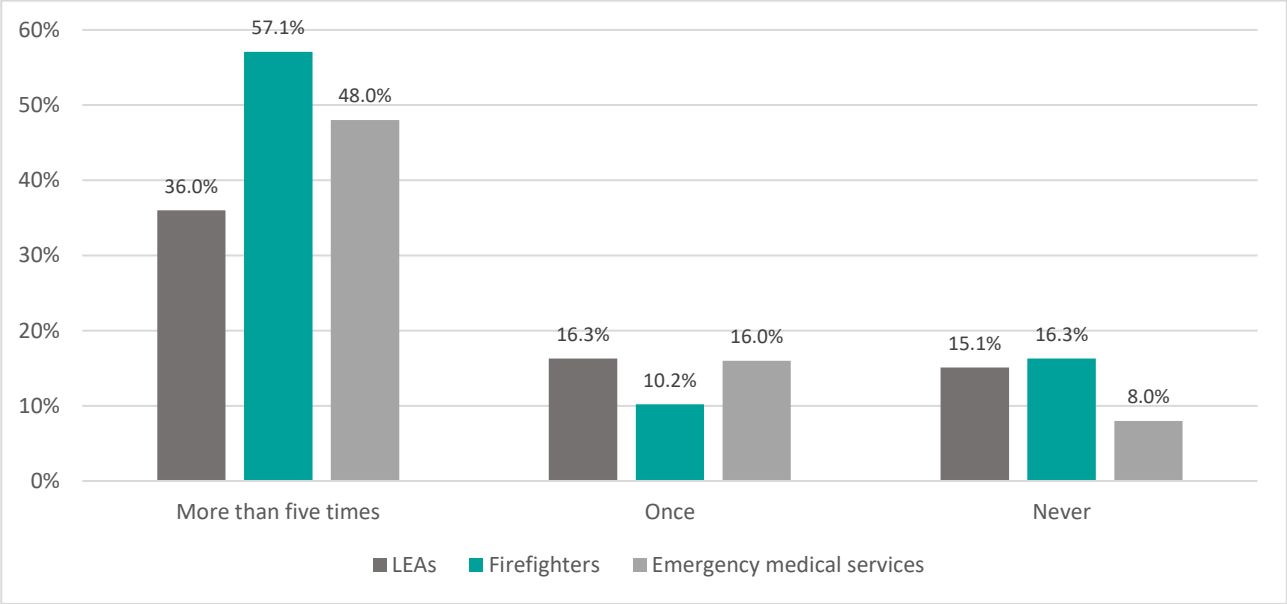

Figure 11: Involvement of participants in a CBRNe incident during their professional by profession (LEAs: n=86; Firefighters: n=49; Emergency medical services: n=50)

CBRNe response is characterised by features such as non-plannability, immense coordination and communication need and high knowledge intensity. Operational experience can only be acquired through operations. This is one of the reasons why the acquisition, preservation and targeted exchange of relevant practice-knowledge and experience are of great importance for CBRNe management (see Müller et al. 2020). Therefore, an exchange between the group of already experienced CBRNe responders and those without previous practical experience is important.

8.1.2. Familiarity with the topic of CBRNe incident

The current familiarity with CBRNe incidents of CBRNe practitioners builds upon prior experience with such events. The incidents offer specific operational knowledge that can only be acquired in non-routine settings. Consequently, the exchange of knowledge is important to ensure that European CBRNe responders are prepared in the best possible way and to enhance overall familiarity with the topic among all involved organisations (and countries) (see Müller et al. 2020). However, the gained knowledge through operations is only tangible to a limited extent and not equally transferable to all types of operations since the individual circumstances must always be reconsidered and considered (e.g. involved agent, locations, trigger etc.). Also, not all CBRNe responders require the same knowledge. As a result, the degree of familiarity with the topic among European CBRNe responders varies to a certain extent.

Overall 87.9% of the respondents feel that that they are “very familiar” or “rather familiar” with the topic (see Figure 58Att.). Further 6.7% indicate to be “neither unfamiliar nor familiar” and only 4.9% of all respondents feel “rather unfamiliar” or “very unfamiliar”. Regarding the familiarity with the topic of CBRNe incidents on an individual level, especially those that already experienced a CBRNe incident throughout their career indicate a high familiarity. In this group even more than 90% indicate to be "very or rather familiar" with the topic (see Figure 12). In contrast, only 3.4% in this group state that they are "rather or very unfamiliar" with the topic. Even CBRNe responders who have not yet experienced a CBRNe incident can feel familiar with the topic through adequate preparation. Of the respondents in this category, 74.3% indicate to be “very or rather familiar” with the topic, whereas 11.5% perceive their familiarity as “rather or very unfamiliar”. The comparison illustrates how important practical experience is in terms of familiarity with the topic.

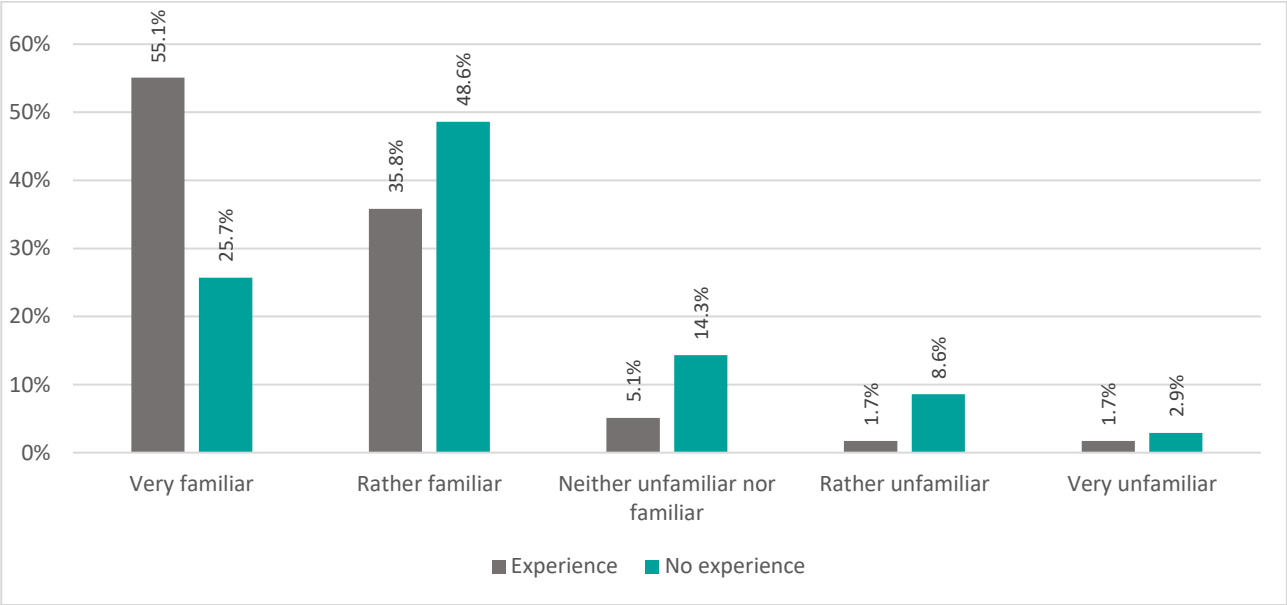

Figure 12: Familiarity with the topic CBRNe by experience with CBRNe incidents (experienced n=176; unexperienced n=35)

A closer look at the categories “very familiar” or “rather familiar” shows, that the proportion of participants that indicate one of those categories is quite high compared to the overall number of participants in each country (see Figure 4). In Austria, Belgium, Norway and the UK, all respondents

referred to one of the two categories. Overall, 70% to 100% of participants from all countries indicate one of these categories (see Figure 13).

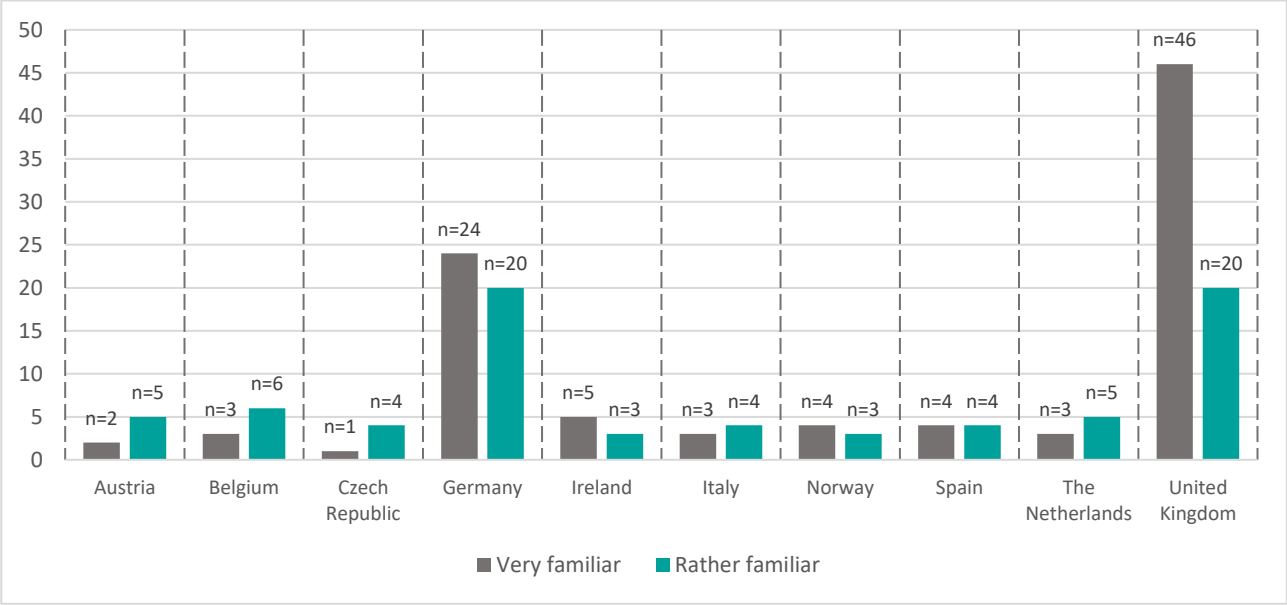

Figure 13: Familiarity with the topic CBRNe by country (Austria: n=7; Belgium: n=9; Czech Republic: n=7; Germany: n=60; Ireland: n=9; Italy: n= 8; Norway: n=8; Spain: n=11; The Netherlands: n=9; United Kingdom: n=66)

This trend is also observed to apply across all professional groups involved in CBRNe incidents (see Figure 14). 78 of 86 LEAs indicate to be "very or rather familiar" with the topic. Of the 49 firefighters, 44 refer to the same two categories. The same applies to 44 out of 50 emergency medical services.

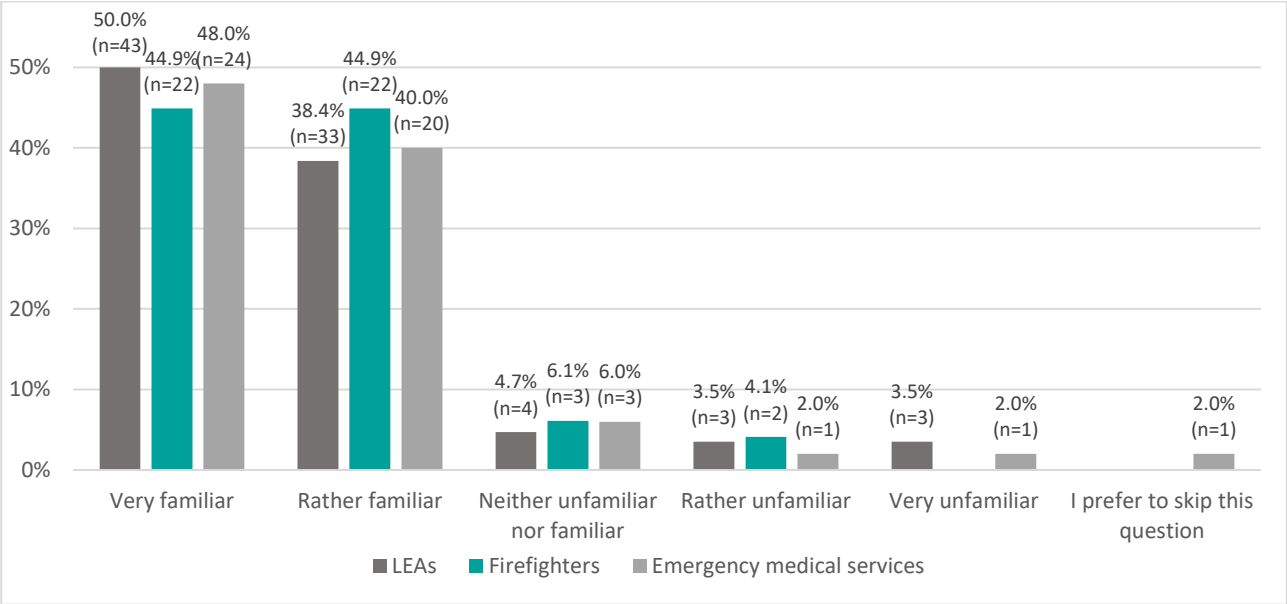

Figure 14: Familiarity with the topic CBRNe by profession (LEAs: n=86; Firefighters: n=49; Emergency medical services: n=50)

It should be noted that familiarity can continuously develop and improve through continuous exchange of knowledge and adequate education. In the interview study several interviewees stress that their organisation exchanges relevant knowledge and experience with other organisations to

prepare for CBRNe incidents. For example, the Norwegian interviewee refers to an annual national CBRNe conference during which CBRNe responders exchange important knowledge to prepare for CBRNe incidents (Interviewee #10, Norway). One of the two Ukrainian interviewees stress, in addition to the national exchange, the importance of exchanging information with CBRNe units from other countries. Furthermore, one of the interviewees from the UK referred to an online database that can be used by emergency services to learn from past CBRNe operations.

"We have an online database. Joint operational learning system, it is called, JOLS. And if something happens, we can put it on there and interested parties can read from that and learn from that." (Interviewee #14, UK)

"There is an exchange of experience with departmental educational institutions on increasing the readiness to respond to CBRN incidents […] exchange of experience between CBRN units with foreign countries." (Interviewee #17, Ukraine)

The exchange of knowledge between relevant organisations therefore plays an important role in preparing for and responding to CBRNe incidents.

8.1.3. Assessment of prospective CBRNe incidents within Europe

It can be assumed that threat assessment will depend heavily on the occurrence of previous CBRNe operations in the country and the region, the relevant experience of the assessing experts and their general familiarity with the topic. It is also important to know which points of attack the respective country offers, such as critical infrastructures. With regard to possible CBRNe incidents in the future the interview study with CBRNe practitioners provides an up to date picture of the current threat assessment of prospective CBRNe incidents within Europe.

The interviews reveal a mixed picture[5]. Based on their experience and familiarity, some interviewees consider the probability of a CBRNe incident within their country and area of responsibility to be **rather low**. This applies to Ireland, Poland and Latvia.

"We assess it as being low, the possibility of a CBRNE event here in Ireland and especially, let's say with a chemical payload." (Interviewee #7, Ireland)

For Spain, an interviewee assesses the likelihood of a CBRNe incident to be very low until the outbreak of Covid-19.

"I think that until the Covid-19 outbreak, it was very low." (Interviewee #12, Spain)

Some interviewees consider the probability to be **medium**. However, these statements are made in relation to regional conditions like in the case of the Czech Republic:

"If I look to the current likelihood of a CBRNe incident, it is somewhere in the middle. This means, we have some chemical factories, some chemical storages and we have two highways and railway transport ways, which are used for transport of CBRNe. It means, we are somewhere in the middle or in first five or six regions with the specific danger of CBRNe in Czech Republic." (Interviewee #2, Czech Republic)

[5] In this context, it should be noted that some of the respondents could not indicate the probability of a CBRNe incident in their area of responsibility, or could not give an exact level of probability (see for example Interview #10, Norway & Interview #14, UK).

Another group of interviewees judge the threat level as **high**. This applies to Sweden and the Ukraine. It is noticeable that the Covid-19 outbreak has again changed the assessment of the probability of a CBRNe incident, even though the threat level was also previously considered high.

"Right now, it's at 100% due to the Covid-19 situation, but if you look at the national CBRNe-preparedness hotline, it typically averages around 3 calls per week. So, the likelihood is fairly high even during non-corona times." (Interviewee #13, Sweden)

"The current likelihood of CBRN incident is characterised as high due to the fact that 4 nuclear power plants […] and 622 chemically hazardous facilities are operating in the industrial complex of Ukraine. In addition, a large amount of radioactive and hazardous substances is transported daily by rail and road." (Interviewee #18, Ukraine)

While the Ukraine interviewee stresses a threat in form of a nuclear and radiological substances, in other countries a hazard from biological and chemical substances is considered to be more likely (e.g. Germany, Ireland, Spain and Ukraine). For Germany, the interviewee assumes that incidents will involve chemical substances since it is easier to get into the possession of chemical substances than into the possession of radiation material. He also stresses that chemical substances have become safer to handle than in the past (Interviewee #4, Germany). For Spain, the interviewee also emphasises the danger from chemical or biological substances such as Covid-19 (Interviewee #12, Spain). In contrast to the assessment for the Ukraine, he assesses that there is no risk of a radiological incident or nuclear incident in his region.

In this context, it is interesting to note that most interviewees consider a CBRNe incident due to terrorist activities (e.g. Czech Republic, Spain and Latvia). The Latvian interviewee emphasises that in Latvia in the past and still today, the level for a terrorist attack was and is very low (Interviewee #9, Latvia).

"But if I compare the probability of a terrorist attack and the probability of accidents by the transports or accidents by the dealing with the chemicals in the storages or in the factories, they are much higher, compared to terrorist attacks." (Interviewee #2, Czech Republic)

"We weren't thinking about a terrorist attack. […] Nearby is a Seveso chemic industry that works with chlorine. We are more concerned about an accident in this factory for example." (Interviewee #12, Spain)

Seveso is an Italian town near which a chemical accident occurred in a factory in 1976. As a result of the accident, the area near the factory was contaminated with highly dangerous dioxin (Eskenazi et al. 2018, 71). To prevent such accidents, a legislation in the European Economic Community was adapted afterwards. The Seveso Directive is intended to help to prevent such accidents or, if such an event occurs, to ensure better control of accidents (European Commission 2020, 1). Despite preventive framework conditions like the Seveso Directive, which are intended to mitigate the likelihood of an accident, the experts nevertheless see an existing potential risk. In contrast, only one interviewee indicates that he considers a terrorist attack with CBRNe substances to be more likely than an accident that involves CBRNe substances (Interviewee #11, Poland). In the interview study, it appears that the firefighter interviewees from the Czech Republic and France report that their organisations carry out inspections in factories / companies working with CBRNe substances to check whether the companies and factories comply with the regulations in force for CBRNe substances (Interviewee #2, Czech Republic; #3, France). Furthermore, the interviewee from France stresses that his organisation carries out risk analyses of accident scenarios.

"We monitor closely the industrial framework in our area of operation, and we carry out what we call in French, a danger assessment, if there is an incident or accident, what could happen; on which area, and impacting how many people."
(Interviewee #3, France)

In conclusion, there is a very uneven picture of threat assessment between the different European countries in terms of probability of occurrence and most likely cause. The results show that the country's experience with CBRNe operations in the past (e.g. terrorist attacks) and the present (e.g.Covid-19 pandemic), the consequent familiarity with the topic and the country-specific conditions (e.g. Seveso plants) determine the different threat assessments. The treat assessment impacts the subsequent CBRNe management. It is to be expected that operations in which practitioners have already had experience with vulnerable people are more likely to take them into account in their management. Therefore, the report will take into account the participants' previous experience in their statements at given points.

8.2. CBRNe preparedness across Europe

The following section is dedicated to the assessment of CBRNe preparedness of European practitioners. CBRNe preparedness aims to reduce the impact of an incident by establishing necessary organisational structures, by setting up a qualification standard of CBRNe responders, by setting up cooperation agreements with other involved stakeholders and by preparing a communication strategy to engage with the public. The experience, familiarity and threat assessment in relation to CBRNe incidents are incorporated into standardised guidelines that provide CBRNe practitioners with relevant know-how. Due to the different approaches to CBRNe incidents described in the previous chapter, there is a large number of SOPs across Europe. They comprise fire service regulations, rescue service guidelines, official training policies and briefing information. Overall, more than three-quarters (76.6%) of the online survey respondents indicate that their organisation has specific SOPs for CBRNe incidents (see Figure 15). Of the 176 respondents involved in CBRNe incidents, 81.7% have CBRNe-related SOPs in their organisation and only 14.9% do not have such specific strategies in place. It is noteworthy that of those 35 respondents that have not experienced any incidents so far, 17.1% are unaware if such SOPs exist in their organisation. Nevertheless, 60.0% say they are aware of such documents. 22.9% denied the existence of such SOPs.

During the interview study, it became apparent that besides dedicated SOPs for CBRNe incidents, CBRNe practitioners also use SOPs for crisis and major emergency situations that are partially applied to CBRNe incidents. A British interviewee refers to the Civil Contingencies Act (2004), which provides general guidance for CBRNe responders on what to do in the event of a major emergency (Interviewee #15, UK). In this context, the interviewee stresses that CBRNe management thus is based on a variety of SOPs that more or less provide guidance especially for CBRNe incidents. The interview partner from Poland made a similar statement in regard to the national plan for crisis management (Interviewee #11, Poland).

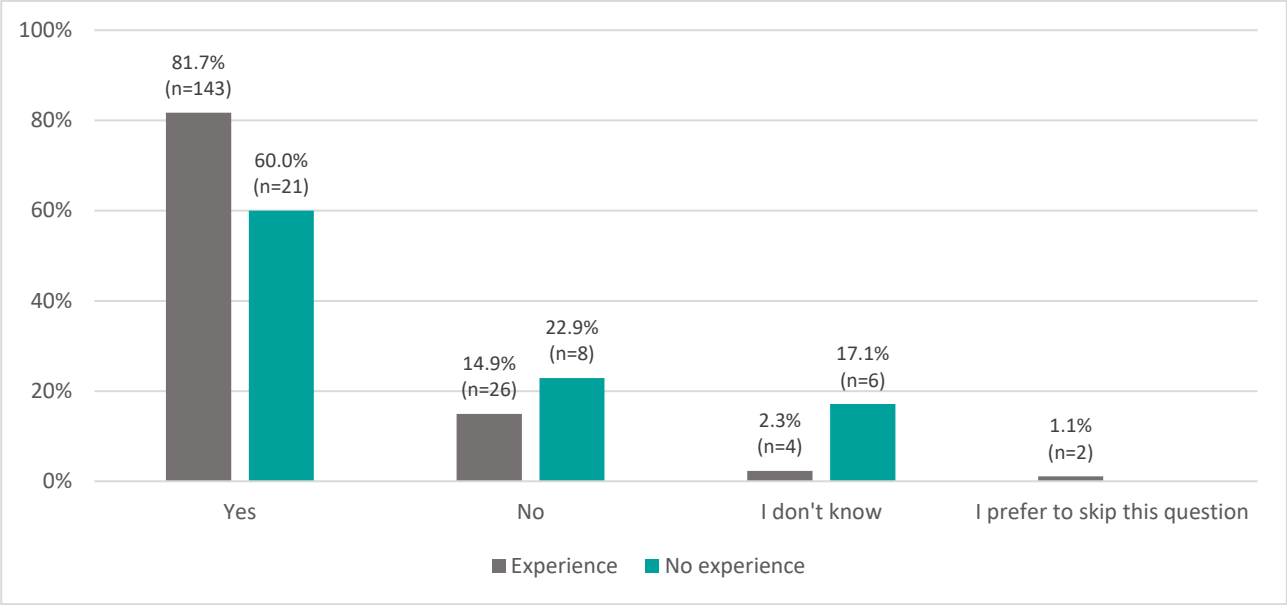

Figure 15: Availability of CBRNe-related SOPs of respective organisation by experience with CBRNe incidents (experienced n=176; unexperienced n=35)

8.2.1. Allocation of responsibilities

In order to facilitate the CBRNe management during an event, SOPs define the allocation of tasks among all responders within an organisation as well as their relationship to other involved CBRNe practitioners. Clear communication among all involved responders during an incident ensures the adequate implementation of the SOPs.

The clarity of responsibilities refers to the clear allocation of key tasks, procedures and resources to specific CBRNe stakeholders within a country. Depending on the country, different organisations are involved in CBRNe management. In most European countries, a variety of CBRNe-related organisations can be found at national, regional and local level. These organisations include professional, voluntary and industrial fire brigades, a broad range of law enforcement agencies (e.g. border patrol, criminal investigation, military police, etc.), medical service providers (e.g. the German Red Cross, St John Ambulance, the Order of Malta Ambulance Corps, etc.) and civil protection organisations (e.g. Federal Agency for Technical Relief/THW). In some countries, the military also plays a prominent role in national civil protection. In some cases overlaps among these groups can occur. For example, some of the professional fire brigades in Germany have their own medical rescue services. Within the individual groups, there are several separate groups that participate more or less actively in CBRNe management. For example, some fire brigades in Germany have special units in addition to the general operational forces that are specially trained for certain CBRNe missions. The interview study with 15 LEAs further revealed large differences in the perception of their areas of responsibility in regard to CBRNe incidents. In the context of personal responsibilities, this ranges from standard operational activities to training activities and the development of CBRNe-related SOPs. With regard to the allocation of CBRNe-related tasks to their organisation, a much more complex picture emerges. Interviewees report, that LEAs in their countries perform the leading coordination, the containment and evacuation of affected civilians, the detection of CBRNe agents, the criminal investigation, the crime scene investigation and the insuring of public order and the safety. Additionally, the medical treatment of civilians is indicated as a further task undertaken by

LEAs in some European regions as part of a special unit (Interviewee #1, Belgium). This diversion underlines the variety of responsibilities by CBRNe practitioners within and across European countries. Due to this diversity, it is difficult to identify a detailed allocation of responsibility within Europe for each of these categories.

However, it is possible to identify the clarity with which the allocation of these tasks is assessed by respondents of the respective countries. When looking at the assessment in terms of clarity within an organisation, it becomes apparent that overall 113.7% indicate a “very high level of clarity” whereas 43.4% state to experience a “rather high level” (see Figure 59Att.). Further 31.4% refer to a medium level. In contrast, only 5.1% indicate a “rather low” and 2.9% a “very low level of clarity”. This assessment is reflected in the group of those respondents who have experienced at least one CBRNe incident. 57.0% of respondents in this group state that during these incidents there was a "very high" or a "rather high level of clarity" of the allocation of responsibilities (see Figure 16). Only 8.0% of the respondents perceive the clarity as "rather" or "very low”. Among respondents who have never been involved in a CBRNe incident throughout their professional life, none indicate a “rather low” or “very low level of clarity”. 29.8% of the respondents expect the level of clarity to be "medium" and the percentage of those who expect a "rather high" or "very high level of clarity" is equal to the case of experienced respondents (57.4%). The findings imply that among non-experienced responders there is increased confidence about the clarity of responsibilities.

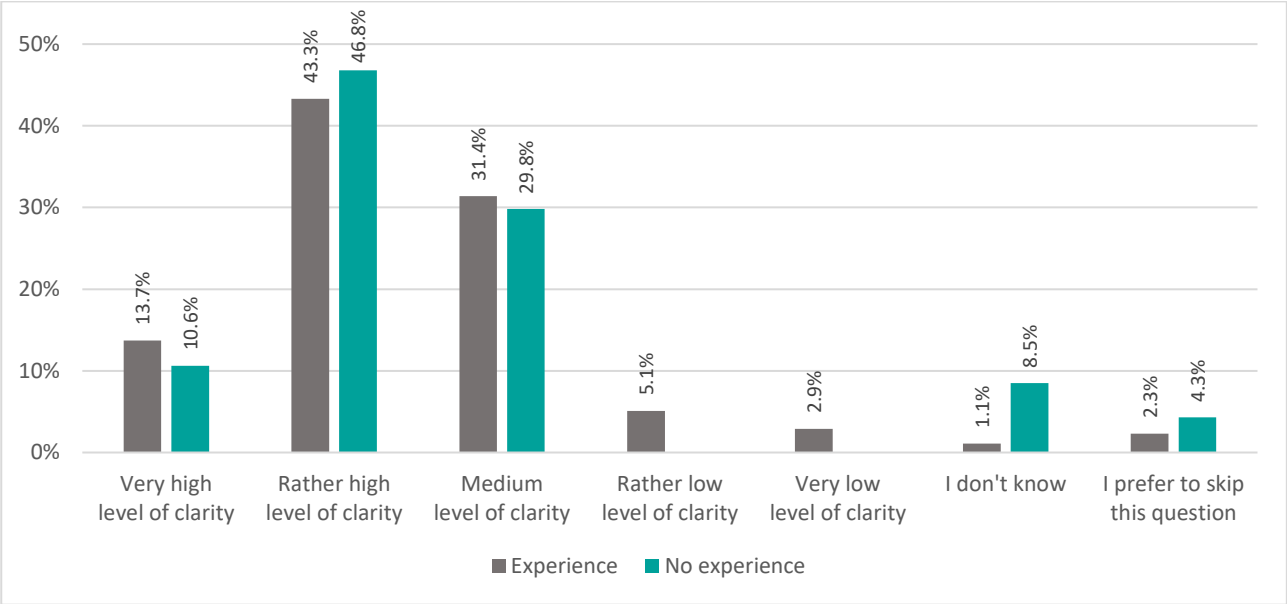

Figure 16: Clarity of internal responsibilities by experience with CBRNe incidents (experienced n=175; unexperienced n= 47)

The trend that a very high / rather high level of clarity or medium level of clarity of responsibilities is primarily indicated when assessing the clarity of responsibilities during a CBRNe incident is also evident when comparing countries (see Figure 17). It is to be expected that in those countries with a smaller sample, the same pattern as in the case of Germany, Spain, the Netherlands and the UK will be seen.

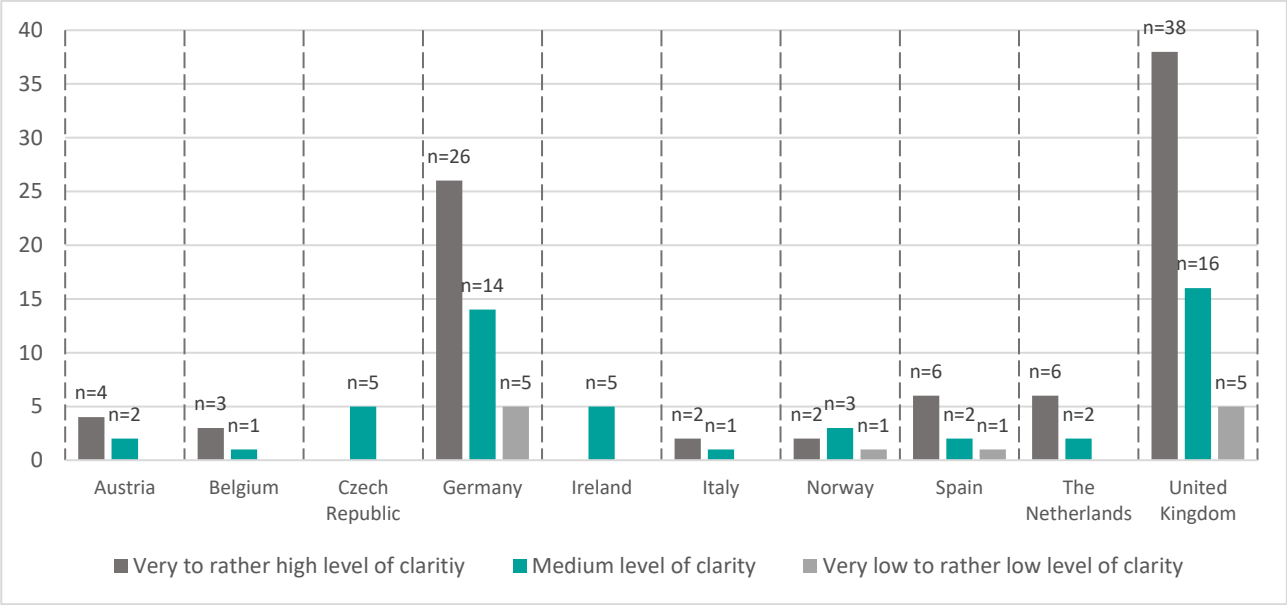

Figure 17: Clarity of internal responsibilities by country (Austria: n=6; Belgium: n=5; Czech Republic: n=5; Germany: n=46; Ireland: n=5; Italy: n=3; Norway: n=7; Spain: n=9; The Netherlands: n=8; United Kingdom: n=60)

Of those who were involved in a CBRNe incident during their professional life, especially firefighters (76.9%) rate the level of clarity of responsibilities within their organisation during CBRNe incidents as "very high" or "rather high" (see Figure 18). In this regard, it is noticeable that none of the firefighters surveyed state that the level of clarity of responsibilities was "rather low" or "very low". Of the surveyed LEAs, 59.4% classify the level of clarity as "very high" or "rather high" and only 42.2% of the emergency medical responders refer to those categories. Further 11.1% of respondents in this category perceive the clarity of responsibilities during former incidents to be "rather or very low".

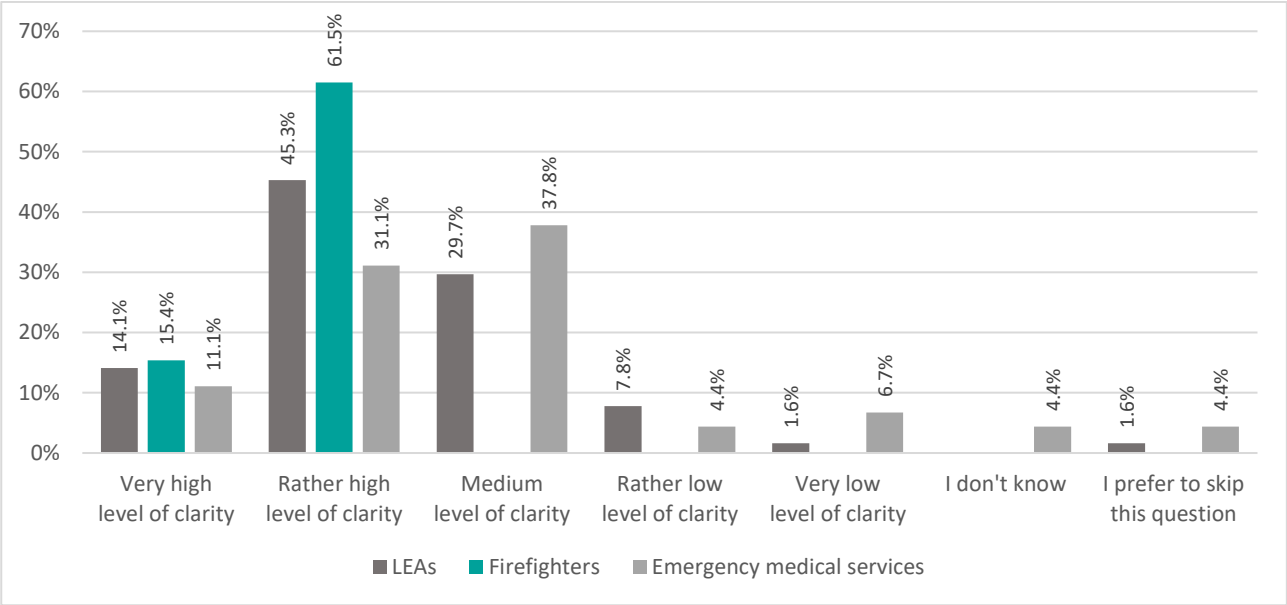

Figure 18: Clarity of internal responsibilities by proffesion (LEAs: n=64; Firefighters: n=39; Emergency medical services: n= 45)

The practitioners who have been involved in a CBRNe incident in their professional life should also evaluate the quality of the internal communication within their organisation during these past incidents. Fortunately, more than half of the respondents (57.8%) state that the communication was

"very efficient" or "rather efficient". 25.1% indicate that the communication was "neither efficient nor inefficient" and only 13.2% of the respondents classify the communication as "rather inefficient" or "very inefficient" (see Figure 19). Similar results apply to those respondents who have not been professionally involved in a CBRNe incident so far and who should assess the efficiency of communication within their organisation during an expected CBRNe incident. 51% of the respondents state that they would expect the communication to be "very efficient" or "rather efficient". 17% expect the communication to be "neither efficient nor inefficient" and only 14.9% of the respondents expect that the communication will be "rather inefficient" or "very inefficient".

The overall success of the operation does not only rely on the internal allocation of responsibilities and the adequate communication but furthermore on the cooperation between all the CBRNe responders involved. A Spanish interviewee points out the benefits of joint-communication approaches, supported by modern technology:

"We have a coordination agreement with the fire fighters. When they need us […] we have the same technology communication. […] In real time they know about our works and the possible situation also." (Interviewee #12, Spain)

In addition to a communication-based coordination of key tasks during a CBRNe incident, SOPs are used to clearly define the basic distribution of responsibilities amongst all involved stakeholders prior to an incident. A Polish interviewee emphasises the value of SOPs to define the leading roles.

"We have a national plan of crisis management […] it's directly pointed in this document, who is responsible for what […] who is leading the accident." (Interviewee #11, Poland)

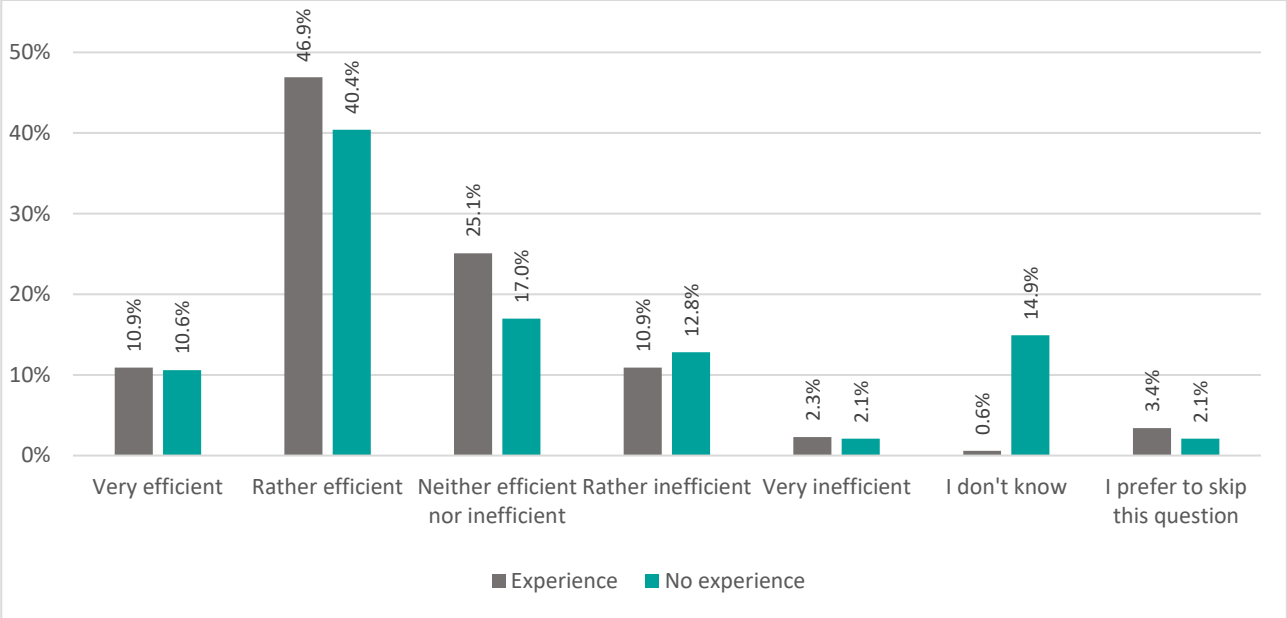

Figure 19: Efficiency of internal communication during a CBRNe incident by experience with CBRNe incidents (experienced n=175; unexperienced n= 47)

Regarding the clarity of responsibilities between the different organisations involved, more than two-thirds (67.0%) of those who were involved in a CBRNe incident in their professional life state that there was a "very high level of clarity" or "rather high level of clarity" of responsibilities (see Figure 20). Further 31.4% of respondents refer to a 'medium level of clarity'. Fortunately, only 8.0% of the respondents indicate a "rather low" or "very low" level.

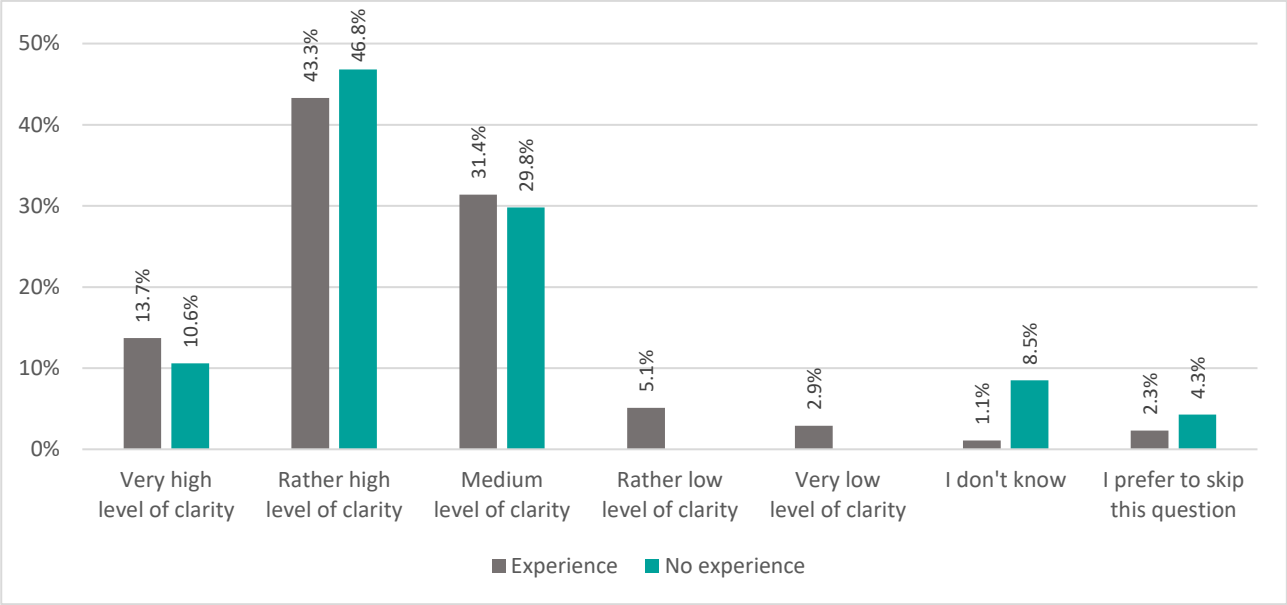

Figure 20: Clarity of responsibilities between operational forces during a CBRNe incident by experience with CBRNe incidents (experienced n=175; unexperienced n= 47)

Different results emerge for those respondents who have not been involved in a CBRNe incident so far. None of these respondents expect a "very low level of clarity" or a "rather low level of clarity" of responsibilities between operational forces in the event of a CBRNe incident. 29.8% expect a "medium level" and 57.4% of the respondents a "rather high level" or "very high level".

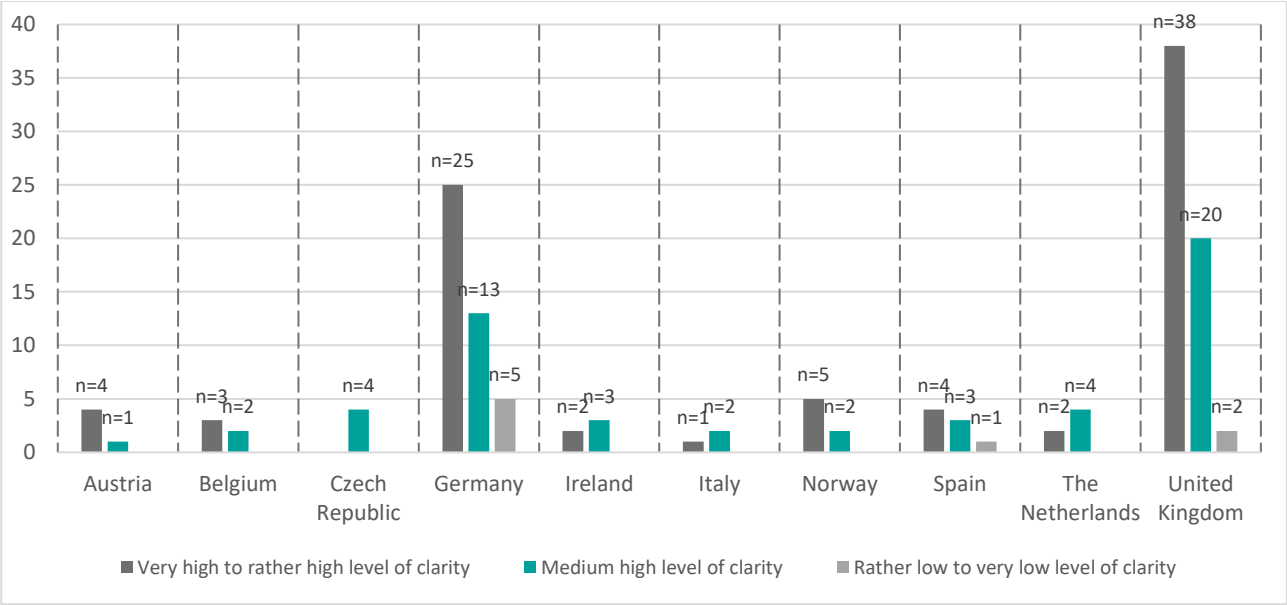

Figure 21: Clarity of responsibilities between operational forces during a CBRNe incident by country (Austria: n=6; Belgium: n=5; Czech Republic: n=5; Germany: n=46; Ireland: n=5; Italy: n= 3; Norway: n=7; Spain: n=9; The Netherlands: n=8; United Kingdom: n=60)

The country comparison also reveals that the participants mainly indicate a very high to rather high level of clarity (see Figure 21). This is especially true for Germany and the UK, but also for Austria, Belgium, Norway and Spain. The second most common level of clarity was medium high. In the case of the Czech Republic, Ireland, Italy and the Netherlands, this category is the strongest. On a positive note, none of the countries predominantly indicate a rather low to very low level.

Further differences appear in the benchmarking categorisation. For Latvia, legislation is in place that clarifies the roles and responsibilities of all CBRNe practitioners to ensure a nationally consistent approach (Interviewee #9). However, this allocation is not embedded into the national emergency management governance and therefore varies across the country. In contrast, interviewees from Greece (#6) and the Ukraine (#18), perceive their inter-agency collaboration approach as optimal. Inter-agency collaboration protocols are in place at all levels where needed. There is a clear understanding and distinction of roles and responsibilities for CBRNe preparedness and response. Functioning coordination mechanisms and routines for information sharing are established.

A comparison of Figure 16 and Figure 20 reveals that respondents see little difference in the clarity of responsibilities within their organisation and between operational forces during the CBRNe incidents they experienced.

8.2.2. Education and training of CBRNe practitioners

SOPs describe the necessary key tasks, procedures and resources of all CBRNe management phases by the responsible CBRNe responders. The SOPs therefore not only specify which CBRNe responders are responsible for which tasks, but also how these tasks should be carried out and what qualifications are required. The education and training of responders is therefore a crucial component for an effective CBRNe response.

8.2.2.1. Internal education and training

The education of CBRNe responders is based on the transfer of necessary CBRNe-related information to raise the level of expertise to the desired qualification level. When asking the survey participants about the way in which their organisations educate their personnel to prepare for a CBRNe incident, it appears that a large proportion of organisations (83%) use exercising and training sessions (see Figure 60Att.). Furthermore, organisations considerably refer to briefing notes (56.0%) and online learning platforms (45.9%). At least, TV material (12.8%) and audio material (8.3%) are used as an education medium. Fortunately, only 4.1% of respondents indicate that their personnel does not have access to information resources that especially prepare them for a CBRNe incident.

An examination of the topics covered in the education resources reveals that there is a focus on accidents and technical emergencies in 90.8% of cases (see Figure 61Att.). For terrorist attacks, the proportion is slightly lower (85.6%). More than half of the respondents state that information resources focus on natural hazards (62.1%) and non-terrorist crime (61%). The topic of warfare (22.1%) is relatively rarely addressed. This corresponds thematically with the experienced CBRNe incidents and the experts' assessment of future events (see Chapter 8.1).

Figure 22 reveals that natural hazards, accidents and technical emergencies, terrorist attacks and non-terrorist crimes are taken into account to a greater or lesser extent in at least about half of the information resources, depending on their importance for the respective responsibilities of the individual professional groups. Consequently, LEAs are mainly trained for terrorist attacks, accidents and non-terrorism crime. Less often, training focuses on natural hazards. Firefighters receive similar training on the first two topics. However, natural hazards play a stronger role in the education. Emergency medical services receive slightly less training in terrorist attacks and natural hazards. However, they are trained more than all others in accidents and technical emergencies. Non-terrorist

crimes are the least common subject of training. For all groups, only 19.4% refer to warfare situations.

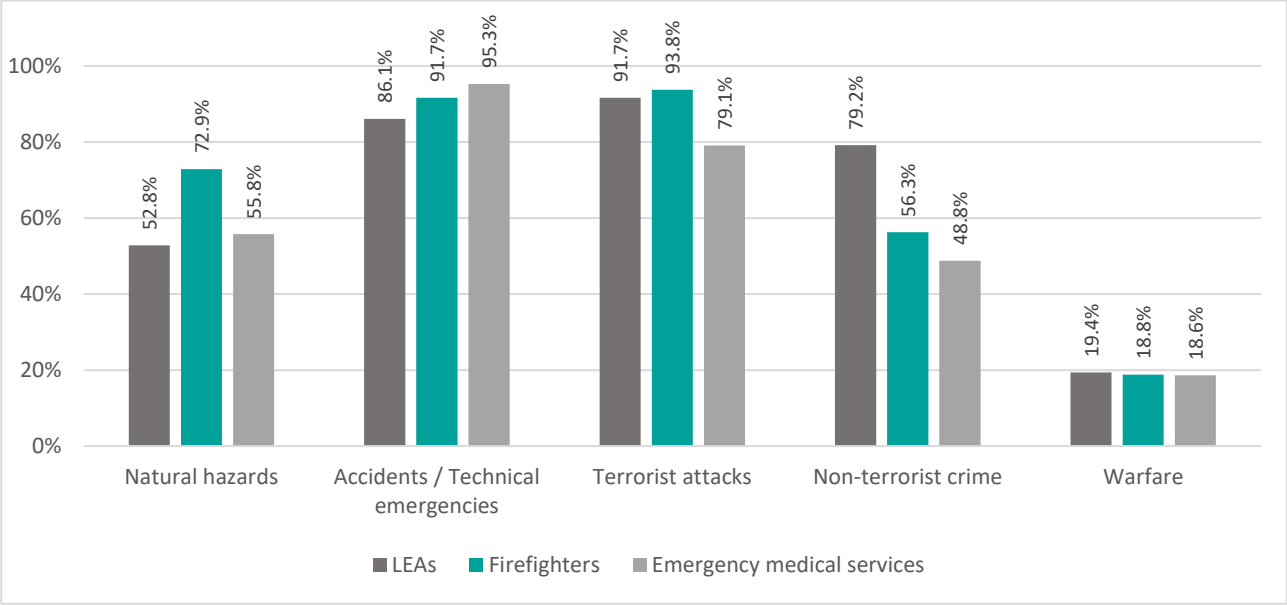

Figure 22: Topics of the information resources organisations provide for their personnel to prepare for a CBRNe incident by profession; multiple selection option (LEAs: n=72; Firefighters: n=48; Emergency medical sercives: n=43)

With regard to CBRNe, it is also of interest which aspects of CBRNe are covered by the information resources. Almost all respondents indicate that the information resources deal with chemical substances (96.4%) and biological substances (90.3%) (see Figure 62Att.). This is also in line with the findings of the previous chapter and the current developments related to Covid-19. Furthermore, radiological substances (85.1%), nuclear substances (70.8%) and explosive substances (71.8%) are often considered in the information resources.

Fortunately, most of the respondents (68.4%) consider the information resources to be "extremely relevant" or "very relevant" in preparing their organisation for a CBRNe incident (see Figure 63Att.). Only 4.6% of the respondents perceive the information resources to be only “slightly relevant” or “not relevant at all”. Of those respondents that already experienced at least one incident, 72.2% assess the material to be in fact “extremely” and “very relevant to prepare CBRNe responders for such events (see Figure 23). Accordingly, only 23.5% of the respondents indicate a medium relevance. Of those who have not been involved in a CBRNe incident so far, 48.1% perceive the information resources as “extremely” and “very relevant”. Further 44.4% at least assess their relevance as “somewhat relevant” to be prepared for a CBRNe incident. This indicates that the operation inexperienced cannot sufficiently assess how valuable the mediated knowledge will prove to be in an emergency. In order to generate greater self-confidence, an exchange between the two groups would be advisable.

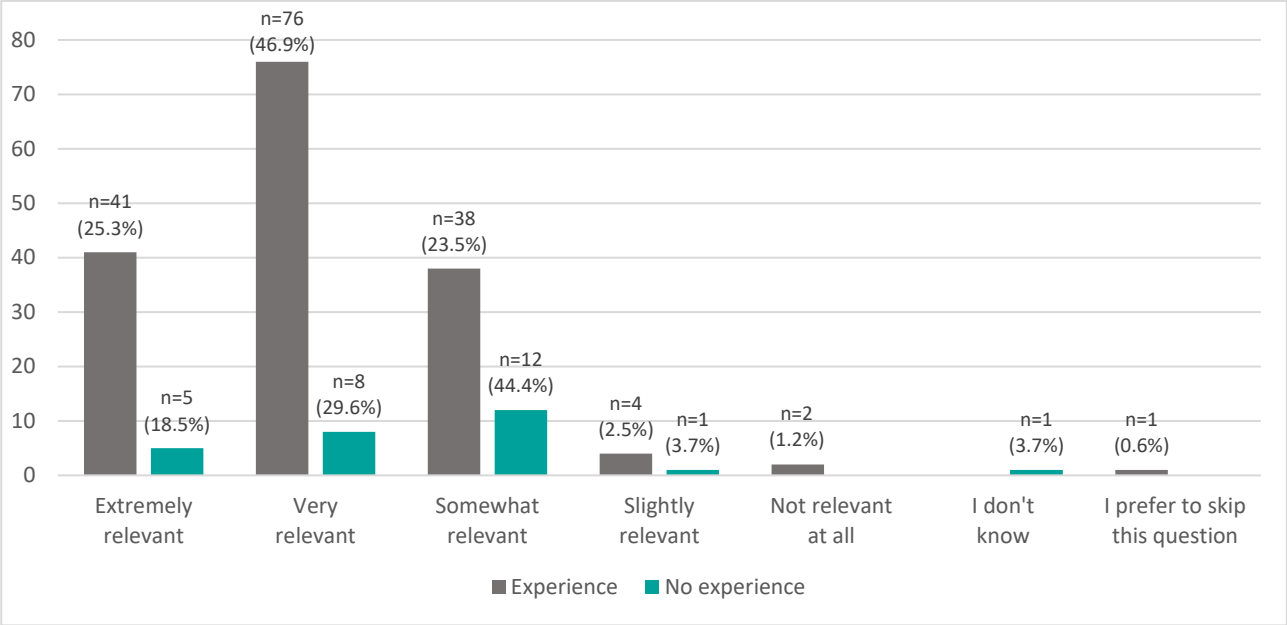

Figure 23: Relevance of the information resources organisations provide for their personnel to prepare for a CBRNe incident by experience with CBRNe incidents (experienced n=176; unexperienced n= 27)

A separate evaluation of the provision of certain CBRNe-related information material by experience with CBRNe incidents revealed no proportionate differences. Therefore, for both groups, exercises play a key role in the training of CBRNe responders. Exercises seem to have proven their worth in both training inexperienced personnel and continuing to train already experienced personnel. Regular exercises and simulations are used to practice the educational content. They ensure that the level of training is examined and, if necessary, adjusted. As mentioned above, 83% of the organisations conduct exercises to prepare their staff for a CBRNe incident.

A comparison by experience reveals that the percentage of participants who confirm that their organisation is involved in CBRNe exercises is twice as high for those participants that have already been involved in a CBRNe incident (see Figure 24). On the other hand, almost twice as often no training is available for those without former operational experience. This also affects the familiarity with the topic CBRNe as seen in Chapter 8.1.2. It would therefore be important to provide exercising opportunities for the rather inexperienced CBRNe responders to familiarise themselves with the topic.

It is not only important whether trainings are carried out, but also how often certain CBRNe aspects are addressed in the exercises. Figure 25 reveals that 78.3% of the exercises “always” and "frequently" focus on decontamination. In addition, the exercises similar often address the training aspects of medical care (68.3%) and building of a safety zone (64.6%). In more than half of the cases (52.7%) the area of evacuation is trained to the same extend. In contrast, contact with the public is less frequently trained. Only 13.5% of respondents indicate that this contact is “always” trained while 8.8% negate any training in this regard. In only 8.8% of cases the contact with vulnerable groups is “always” or “frequently” included in CBRNe exercises. Although, such contact is sometimes considered (20.4%), 57.9% of respondents indicate to only “rarely” or “never” address this topic.

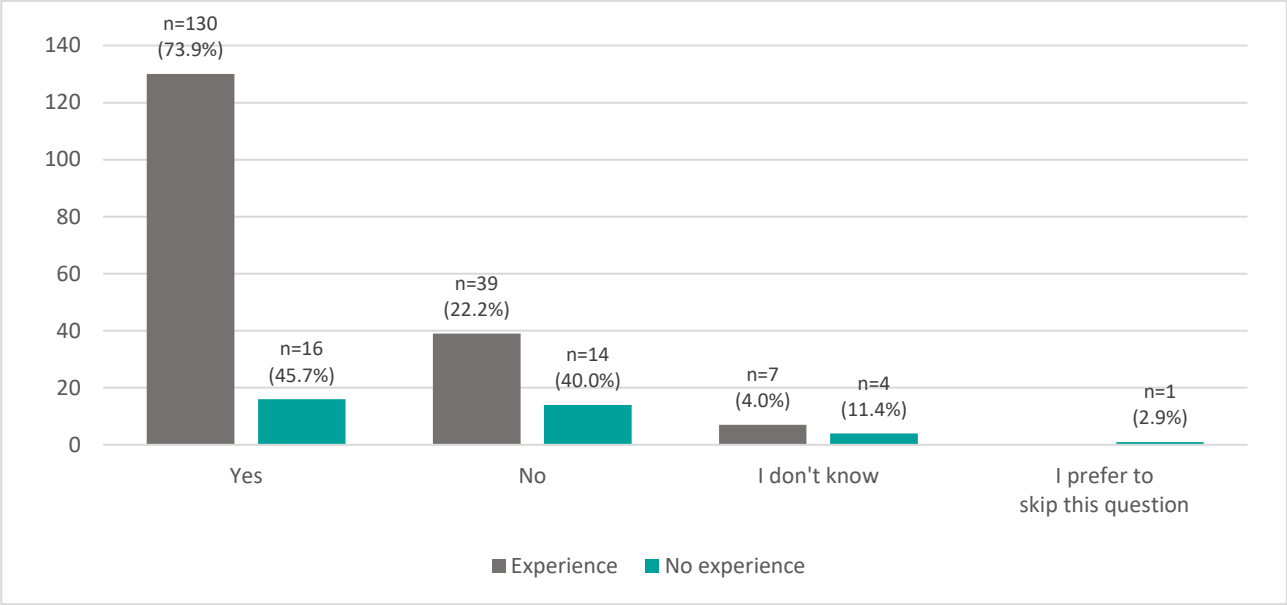

Figure 24: Involvement in CBRNe exercises of organisation by experience with CBRNe incidents (experienced n=176; unexperienced n= 35)

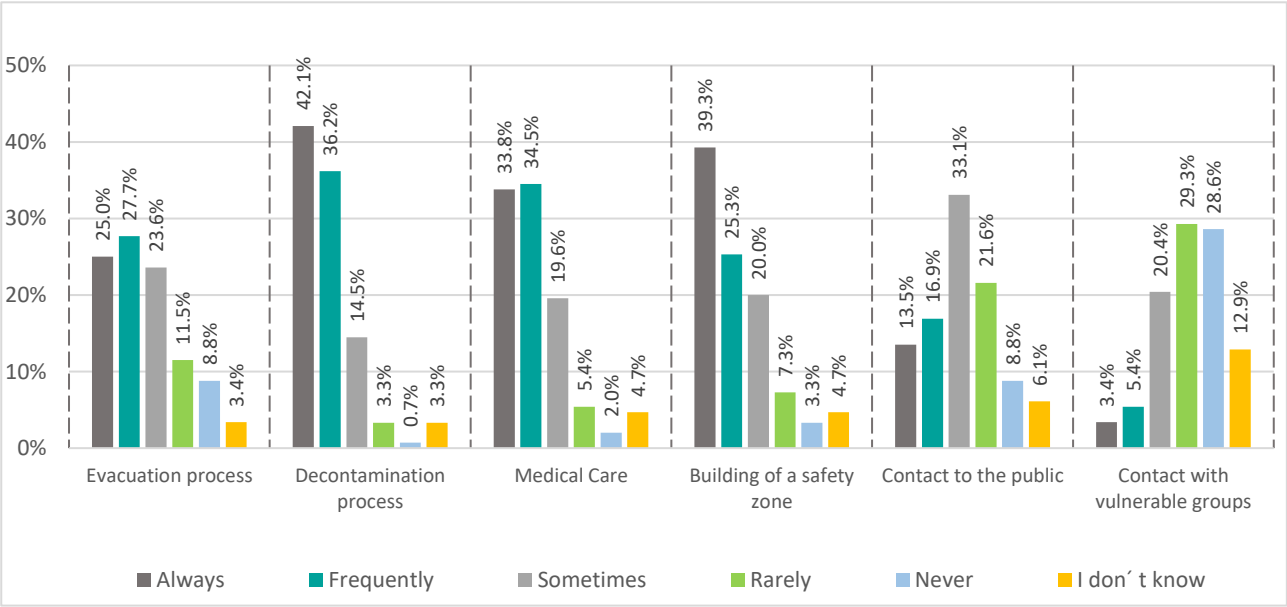

Figure 25: Topics (frequency) addressed during CBRNe exercises in the last ten years in which the own organisation was involved (Evacuation process: n=148; Decontamination process: n=152; Medical Care: n=148; Building of a safety zone: n=150; Contact to the public: n=148; Contact with vulnerable groups: n=147).

The interview study additionally reveals that organisations use exercises to educate their personnel in self-protection measures. In this context, a French interviewee explains that not only emergency services specialised in CBRNe receive CBRNe training (Interviewee #3, France). CBRNe-related exercises are mandatory for all firefighters within the district. As part of this, participants receive a basic education for CBRNe hazards, self-decontamination and the handling of their PPE. Advanced courses further address specialised responders.

A similar stage training structure is found in other countries. A Belgian participant, among others, explains in more detail that every team member passes a level one and a level two training (Interviewee #1, Belgium). The level one training conveys the most important CBRNe aspects within a day. This includes theoretical background, the PPE and a final exercise. The second course builds on this as a higher level training session that goes deeper into the theoretical topics surrounding CBRNe and focuses on specific aspects such as the medical treatment. This training session also ends with an exercise. Training is therefore used both as a stand-alone educational unit and as part of a theory-based education block. Depending on the focus group and the interviewed practitioner, the extent of these exercises ranges from one day to one week.

With regard to the frequency of CBRNe exercises, of all 223 survey participants, 68.6% indicate that their organisation at least once the year took part in exercises simulating a CBRNe incident during the last ten years. However, on the other hand, 25.1% of the respondents state that their organisation does not regularly conduct such exercises. A comparison of the professional groups examined reveals that of 49 firefighters surveyed, 79.6% state that their organisation is at least once a year or more regularly involved in CBRNe exercises (see Figure 26). This also applies to 74.4% of the 86 LEAs surveyed and to 92.0% of the 50 healthcare workers.

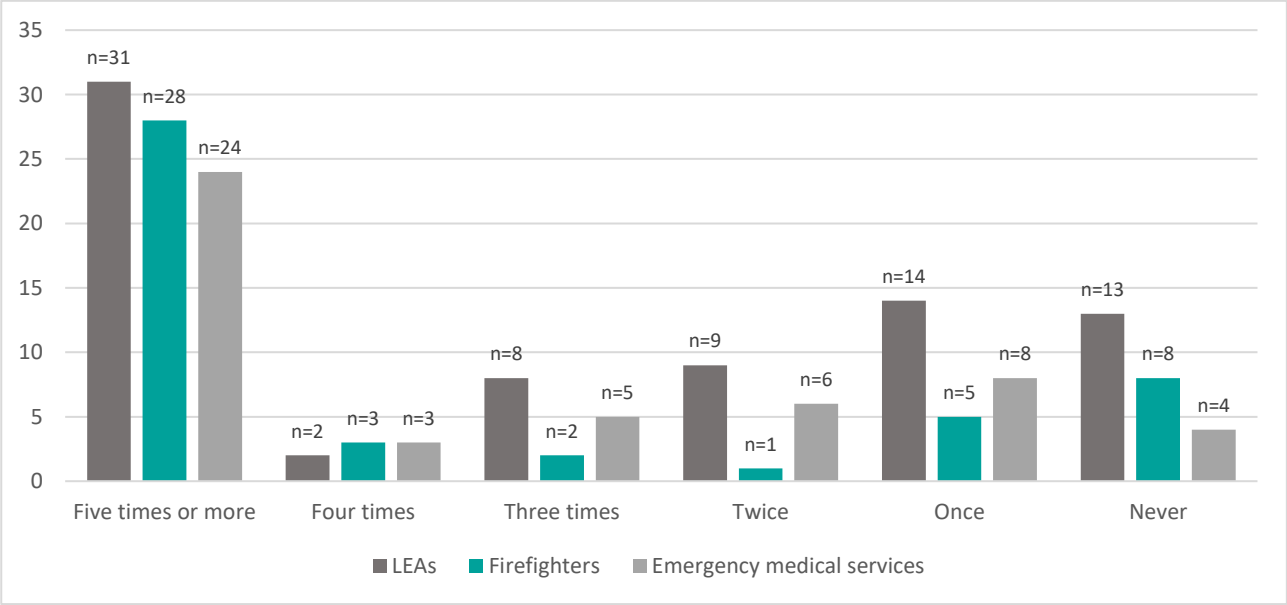

Figure 26: Involvement in CBRNe exercises by profession (LEAs: n=86; Firefighters: n=49; Emergency medical services: n=50)

The frequency of CBRNe exercises is often clearly defined in SOPs and part of the necessary qualification of CBRNe responders. One of the Irish interviewees goes into more detail and explains that the basic CBRNe training in his organisation has to be repeated every three years (Interviewee #8, Ireland). The Swedish interviewee reports a similar time frame for training courses. However, he also emphasised that in regions with a higher risk of CBRNe incidents, training for police forces is offered more regularly:

"All police officers do have a basic CBRNE training for 2 days. This should be repeated every 3 years, this is at least the case in the major cities / regions. The officers working in areas or in units with higher probability to manage a CBRNe incident get more training." (Interviewee #13, Sweden)

Consequently, there is currently no uniform framework for CBRNe-related education and the implementation of exercises that define the necessary content, scope and regularity for all European CBRNe practitioners.

8.2.2.2. Joint education and training among CBRNe practitioners

Besides their own organisation, the online study reveals that organisations often rely on joint exercises to prepare their staff for a CBRNe incident. Of the respondents whose organisations regularly engages in exercises, a large number confirms that besides their organisation especially LEAs, fire brigades and medical staff further participates (see Figure 27). More than half of the respondents (53.3%) state that LEAs have "frequently" or "always" participated in the exercises alongside their organisation. The respective proportion for firefighters and emergency medical services is even higher with 76.3% and 64.5%. 41.3% of the respondents indicate that civil protection personnel participates to the same extend. In contrast, the same assessment is true for members of the public in only 13.9% of cases. The proportion is even lower for persons who are considered to be part of a vulnerable group (3.6%). In almost half of the cases (45.3%), it is indicated that vulnerable persons are never involved in joint exercises. For other members of the public, this is only true in 30.6% of the cases.

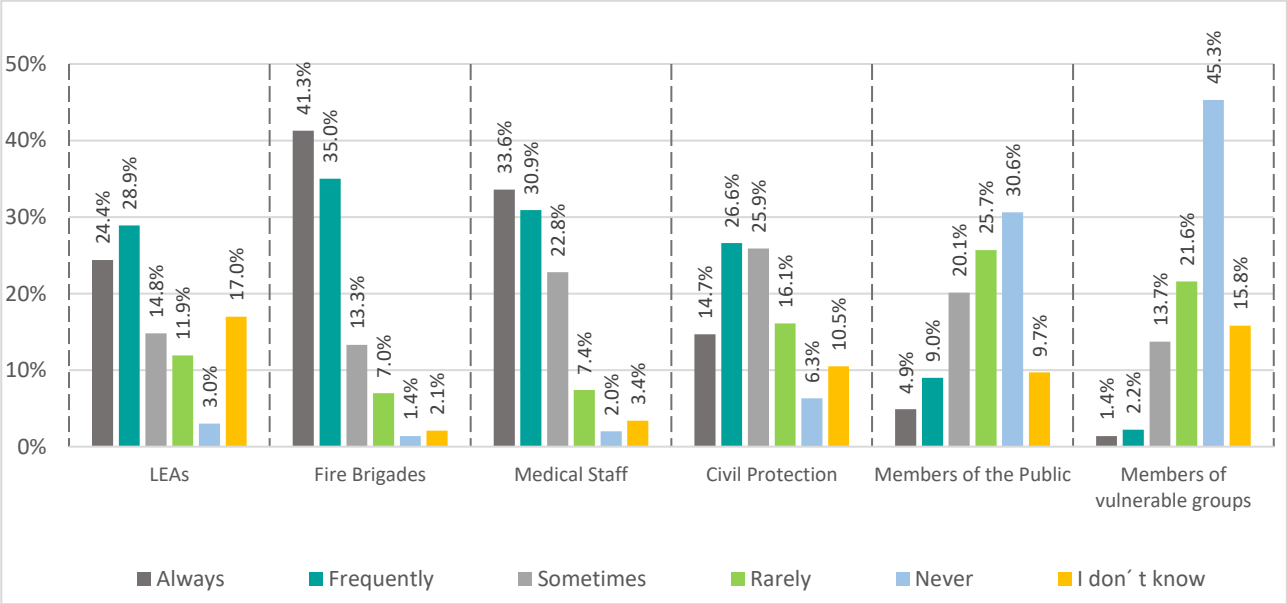

Figure 27: Involvement (frequency) of different actors in CBRNe exercises in the last ten years besides the own organisation (LEAs: n= 135; Fire Brigades: n=143: Medical Staff: n=149; Civil Protection: n=143; Members of the public: n=144; Members of vulnerable groups: n=139)

Similarly, the interviewees indicate that education and training takes place along other CBRNe practitioners. One Irish interviewee explains that his organisation conducts trainings with health authorities, fire brigades and the military (Interviewee #8, Ireland). The importance of joint exercises is also stressed by several other interviewees. They point out that joint exercises and trainings enable mutual acquaintance with different skills and equipment of operational units (Interviewee #8,

Ireland)[6]. Furthermore, it is emphasised that joint exercises contribute to coordination between different operational units. In a study of preparedness exercises in the health sector, Skryabina et al. (2017, 274) confirm that exercises have contributed to a better understanding of one's own role during emergencies as well as a better understanding of the role of others during emergency operations (see Chapter 8.2.1.).

"The meaning of this simulation, it was to test our capacity. To coordinate between fire fighters and sanitaria's and police persons, to test if we are able to fight this attack or not." (Interviewee #12, Spain)

There are large differences between countries concerning the quality of these joint exercises. In the following, Latvia, Greece and Ukraine are compared. The Latvian interviewee #9 identifies a developing to moderate level of inter-agency training. Partially, exercises are performed ad hoc, with some examples of CBRNe management and in some parts, cooperation is rarely initiated. Overall, training and exercising protocols are implemented. Relevant CBRNe practitioners participate in the exercises and CBRNe incidents are trained more frequently. However those trainings are not included in the regular training schedule. For Greece, a more significant level is indicated (Interviewee #6). Additional actors are occasionally engaged in exercises (e.g., civilians, media etc.) and CBRNe management is an integrated part of the common education practice. Furthermore, it is partially standardised. The Ukrainian interviewee #18 finally indicates an optimal (joint) training in his country: a nationally consistent CBRNe training is conducted periodically by all relevant CBRNe practitioners to train existing SOPs and to evaluate "Best Practice". Additional stakeholders are regularly involved in exercises where relevant.

Regarding the frequency of such exercises, the wish was expressed to have an indoor exercise and an outdoor exercise at least once a year (Interviewee #8, Ireland). Besides Latvia, Greece and the Ukraine, interviewees from Poland (#11) and the Czech Republic (#2) point out that joint exercises at least once a year are already common practice in their organisation and country. In addition, the Polish interviewee stressed that smaller exercises that only concern the own organisation or local units are carried out more often.

"Yes, each year we provide the one or two exercises or field exercises with the fire fighter, medical service, police men and owners of the factory. And we train, how to solve different problems." (Interviewee #2, Czech Republic)

"The bigger exercises for example, to coordinate the fire fighters, police services, medical services, we can say one in a year. Small exercises for example for our unit or for local units there is maybe three or four times in a year." (Interviewee #11, Poland)

In the UK, cross-institutional exercises are also carried out several times a year that probably reflects the threat assessment for this region:

"Regular exercises: It depends on the region and the force. It is not been mandated, so some regions have a joint exercise […] four, five times a year." (Interviewee #14, UK)

Beyond that, none of the interviewees mentioned that vulnerable groups are involved such joint activities.

[6] See also Kristiansen et al. (2019, 72), who point out that joint exercises appear to improve inter-agency cooperation by enabling first responders to get to know each other.

When asked about the overall value of the exercises in preparing their organisation for a CBRNe incident, three quarters of the responders indicate that the exercises are perceived to be "extremely valuable" or "very valuable" (see Figure 64Att.). Only 4.7% assess the exercises to be "slightly“ or "not valuable at all" in preparing their organisation for a CBRNe incident. Comparing the experienced with the inexperienced group, no significant differences in the evaluation become apparent (see Figure 65Att.). A comparison between European countries shows that the participants predominantly indicate an extreme or great value of CBRNe exercises (see Figure 28). About half of the participants in all countries consider the exercises to be extremely or very valuable.

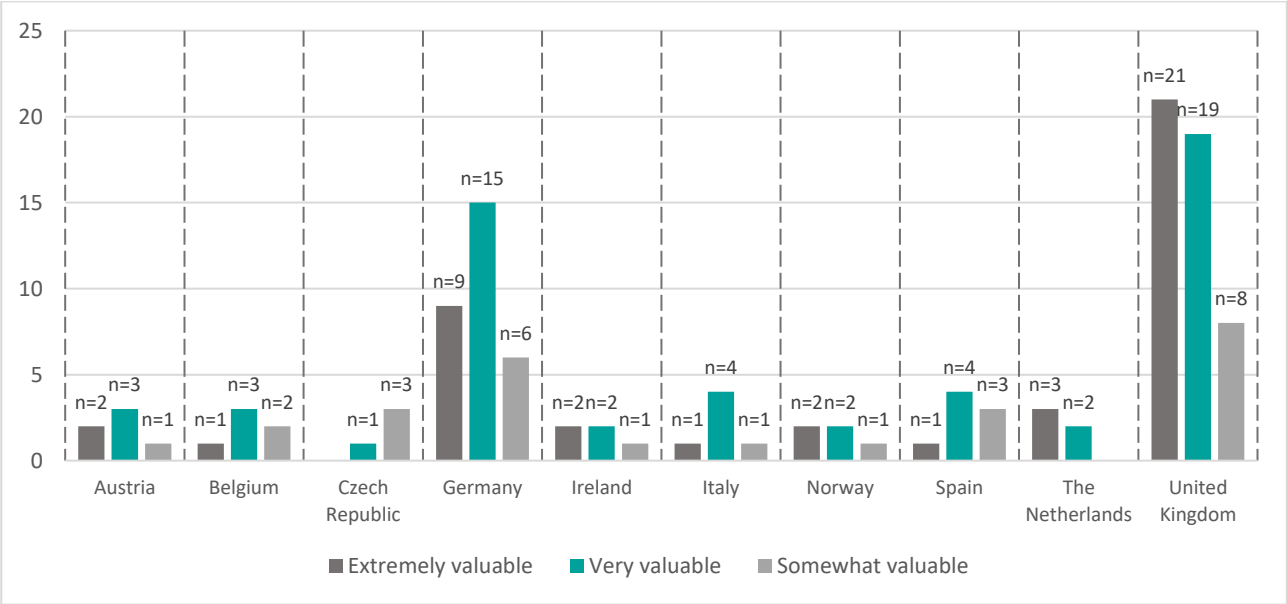

Figure 28: Value of CBRNe exercises in which the own organisation has participated over the last ten years to prepare the organisation for a CBRNe incident by country (Austria: n=6; Belgium: n=6; Czech Republic: n=4; Germany: n=35; Ireland: n=5; Italy: n=6; Norway: n=5; Spain: n=8; The Netherlands: n=5; United Kingdom: n=50)

It appears that the education and training is very suitable to prepare the CBRNe practitioners for such future incidents and there are only minor differences between the countries and the professional categories.

8.2.3. Organisational equipment for a CBRNe incident

The equipment for CBRNe responders varies greatly depending on the professional category (LEA, firefighter, emergency medical responder), the type of operation (underlying CBRNe agent), the location (e.g. railway station) and the object of operation (e.g. explosives, aerosol etc.). Therefore, the equipment includes the personal clothing of the CBRNe responders, the medical equipment, detection robots and much more.

Figure 66Att. illustrates how sufficient the participants believe their organisations equipment is in the context of a CBRNe incident. 56.0% of the respondents perceive their equipment to be “completely” or “rather sufficient”. Further 17.9% indicate a medium sufficiency. However, 21.9% assess the equipment to be “rather insufficient” or even “completely insufficient”. Taking into account previous experience with CBRNe incidents, it becomes obvious that none of those responders without operational experience considers the equipment to be "completely sufficient" although the proportion is similar for the other ratings (see Figure 29). The findings imply that overall the responders'

confidence in the equipment should be strengthened and, if necessary, the equipment should be adapted.

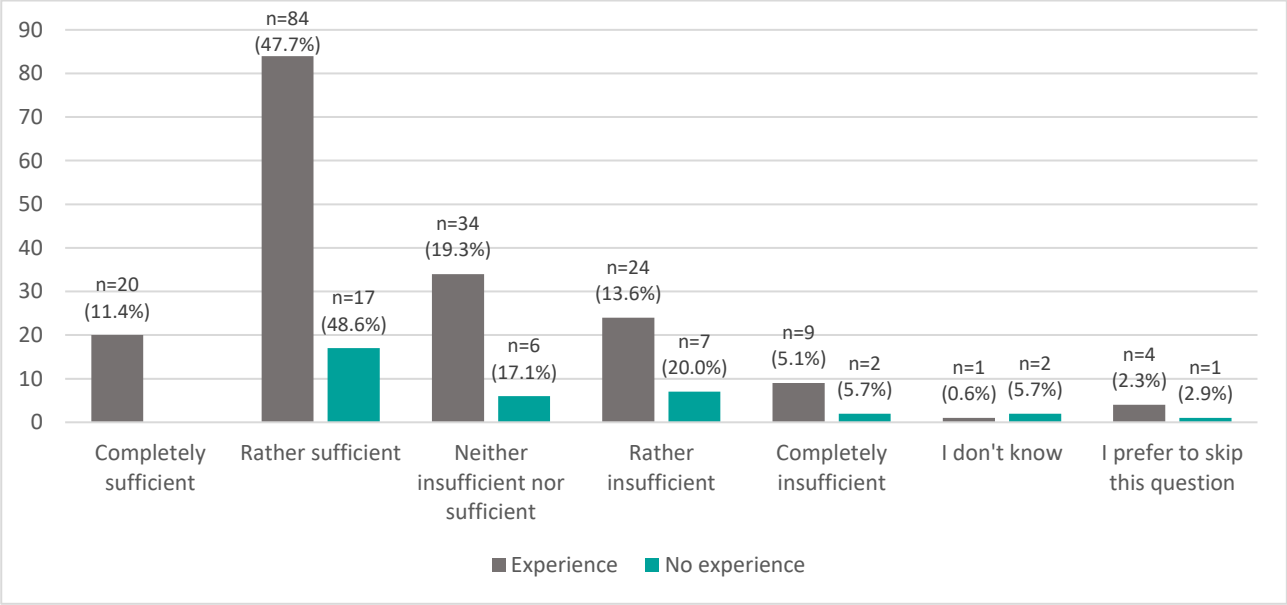

Figure 29: Assessment of the organisational equipment for a CBRNe incident by experience with CBRNe incidents (experienced: n=176; unexperienced: n=35)

A comparison of the professional groups reveals clear differences regarding the equipment. More than three quarters (75.5%) of the fire fighters surveyed rate their organisations' equipment for a CBRNe incident as "completely" or "rather sufficient" (see Figure 30). In contrast, only 4.1% of those respondents classify the equipment as "rather insufficient" and none of the fire fighters considers the equipment to be a total failure with regard to CBRNe incidents. 60.0% of emergency medical responders consider the equipment to be "completely" or "rather sufficient", whereas 26.0% of respondents assess their equipment to be "rather" and "completely insufficient" to adequately respond to CBRNe incidents. For LEAs, 36.5% referred to the higher rankings, whereas 30.2% state that the equipment to be "rather" or "completely insufficient". Emergency medical responders and fire fighters appear to be the most unsatisfied groups in terms of organisational equipment.

Similar assessments appear in the interview study. The interviewee from Latvia reports that the equipment for the police is considered to be "very bad", whereas the fire brigade has "very good" equipment (Interviewee #9, Latvia). The Polish interviewee also indicates that the fire brigade is considerably better equipped than the police.

"We have some cooperation and good practices, exercises with the firefighters […] but they have a lot of equipment, much more than us." (Interviewee #11, Poland)

However, different equipment does not have to be something that is necessarily negative. One of the Irish interviewees (#8) points out that not all agencies need to have the same equipment standard, because sometimes equipment could actually be shared if necessary. For such a sharing routine, cooperation approaches among CBRNe practitioners are necessary.

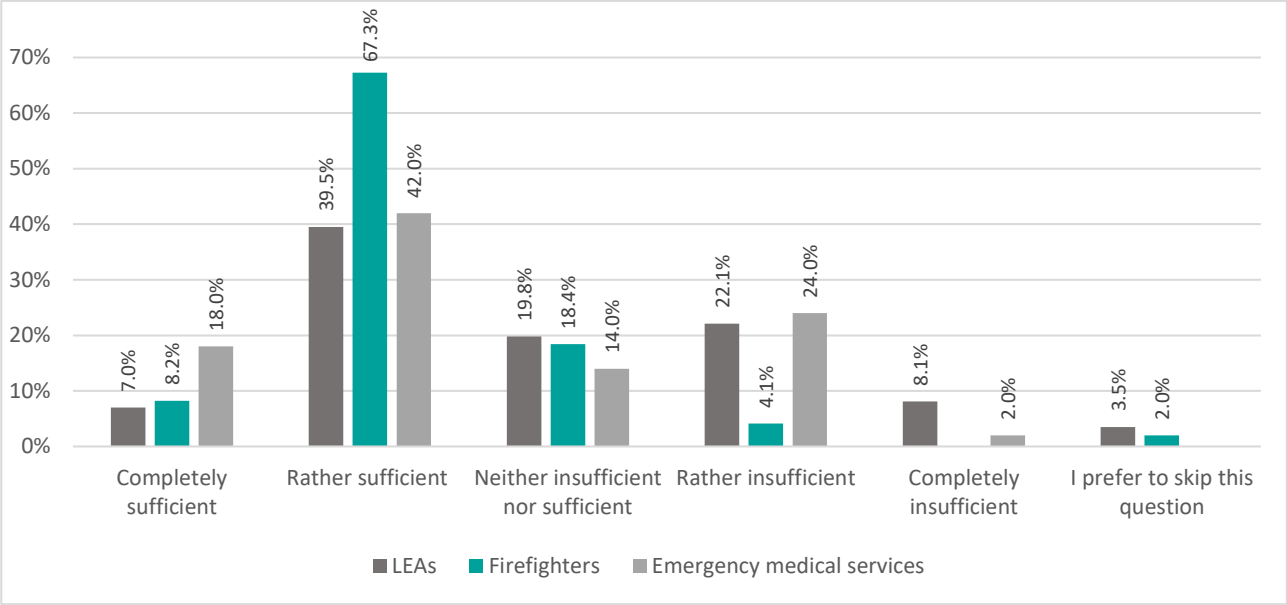

Figure 30: Assessment of the organisational equipment for a CBRNe incident by proffession (LEAs: n=86; Firefighters: n= 49; Emergency medical services: n=50)

8.2.4. Cooperation approaches of CBRNe practitioners

As already seen in the report, an effective CBRNe response relies on a multi-agency cooperation approach. The interview study reveals that cooperation with other organisations is often sought to address the challenges of CBRNe incidents. All interviewees emphasise that the cooperation with other involved practitioners like fire fighters and other medical emergency services is therefore a defining aspect of their work in CBRNe response.

In general, *"all the investigations are led by the police, but we may ask for assistance from other agencies to help us achieve that".* (Interviewee #15, UK)

Another interviewee described a rather open approach to cooperation.

"*As police, we will just fit in where and how we can."* (Interviewee #14, UK)

This tendency of cooperation is also revealed within the quantitative study. Of 223 survey participants 78.8% state that there are written cooperation agreements between their organisation and other organisations (e.g. LEAs and fire brigades) for major emergencies, which specify the distribution of tasks and the cooperation during these incidents. In contrast, only 9.9% of the respondents negate this and 11.3% of the responders indicate that they are unaware of such cooperation approaches or don't want to indicate this. It is noteworthy that of the respondents who have already been involved in a CBRNe incident, significantly more respondents indicate that their organisation is seeking cooperation with other organisations (14.3% to 2.9%) (see Figure 31). In this group, the respondents also state less frequently that they have no knowledge of such cooperation (28.0% to 45.7%). The findings imply that cooperation plays a very important role, based on the experiences gained in previous CBRNe incidents.

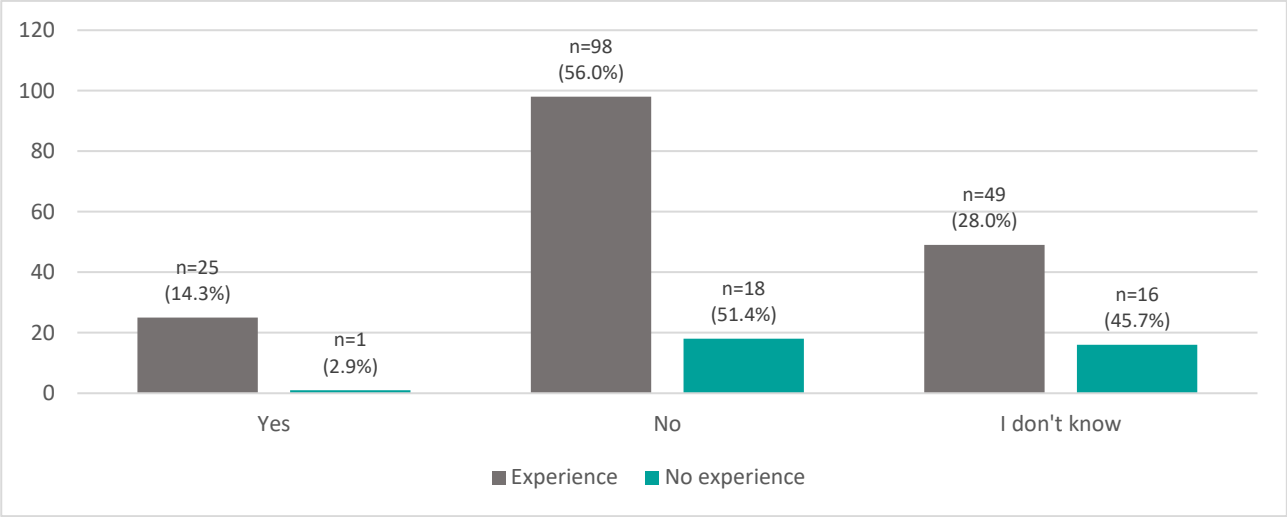

Figure 31: Collaboration approaches of organisation by experience with CBRNe incidents (experienced n=175; unexperienced n=35)

In fact, those respondents that already experienced a CBRNe incident and that confirm such cooperation agreements emphasise a great benefit from these agreements for the cooperation during former major emergencies. More than two thirds of the respondents (67.4%) state that the agreements were "extremely helpful" or "very helpful" for the cooperation during those past events (see Figure 67Att.). Whereas only 2.9% of the respondents perceive the agreements to be "slightly helpful" or "not at all helpful".

When looking at the countries individually, there is an uneven ratio in the perceived helpfulness of cooperation agreements (see Figure 32). For the UK, 51 respondents state that the cooperation was “extremely or very helpful”. In Germany, on the other hand, this ratio is only 24 out of 60 in the survey.

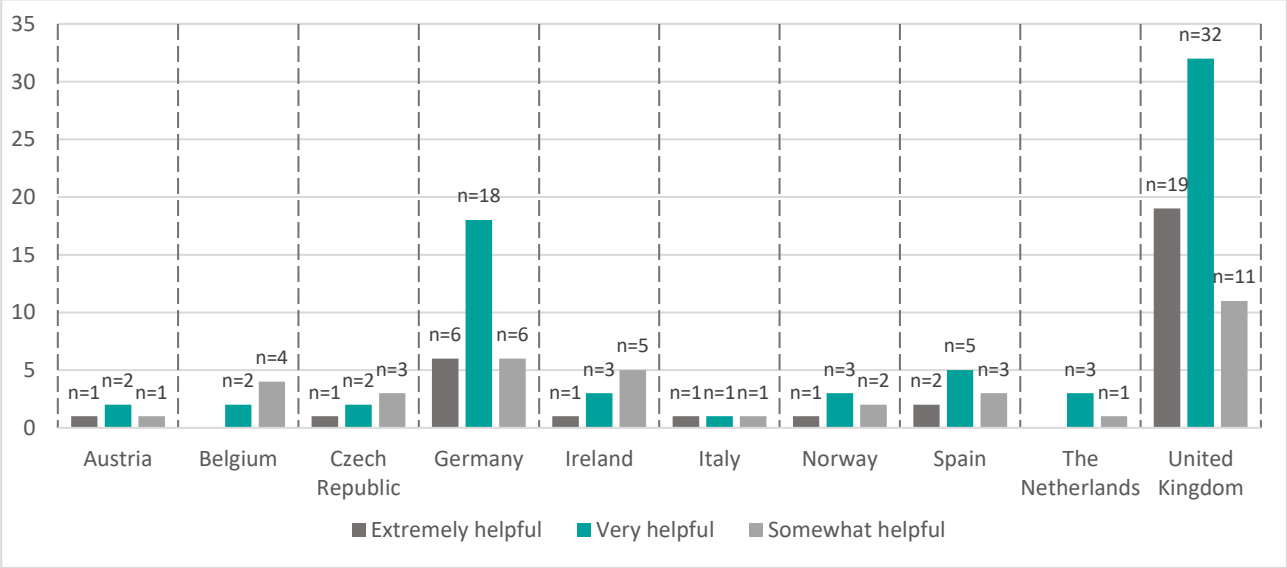

Figure 32: Helpfulness of cooperation agreements for major emergencies or the cooperation during these incidents by country (Austria: n=4; Belgium: n=6; Czech Republic: n=7; Germany: n=36; Ireland: n=9; Italy: n=4; Norway: n=6; Spain: n=10; The Netherlands: n=6; United Kingdom: n=63)

In general, only a few responders perceive join cooperation to be of no support. Due to the predominantly positive experience with cooperation, these are to be intensified.

8.2.5. Organisational level of preparedness for a CBRNe incident

The following section summarises the previous findings and outlines the overall CBRNe preparedness in Europe. It has become apparent that the allocation of responsibilities within and between CBRNe organisations is overall very clear. Furthermore, the education addresses all threats identified in regard to CBRNe incidents. The CBRNe-related information material is overall considered to adequately prepare CBRNe responders for their work. The same applies to exercises. Differences appeared for the trust in the CBRNe equipment. Here, differences between the groups become apparent. However, none of the groups seem to feel generally inadequately equipped. Furthermore, almost 80% of the organisations have written agreements with other organisations to support each other. The majority consider this to be very helpful in dealing with large-scale operations such as a CBRNe incident.

When asked about their organisation's overall level of preparedness for a CBRNe incident, almost half of the survey participants (48.9%) consequently indicate a "very high level" or "rather high level" (see Figure 68Att.). Further 30.5% of participants assess a medium preparation for a CBRNe incident in their organisation. Only 19.2% of all respondents consider the level of preparedness to be "very low" or "rather low".

Of those practitioner that already experienced a CBRNe incident during their career, more than half indicate a "very high" or "rather high level" of preparedness (see Figure 33). Further 30.7% feel themselves to be at least moderately prepared. Only 15.3% seem to express a strong wish for improvement. Great differences appear in regard to those respondents that have no yet been involved in an incident. Only 28.6% feel "very or rather" highly prepared to adequately respond to such an incident. Whereas further 28.6% perceive the level of preparedness to be "medium", 37.1% feel rather unprepared. A similar relationship has also been found with regard to familiarity with the topic and the perceived use of education material and related trainings.

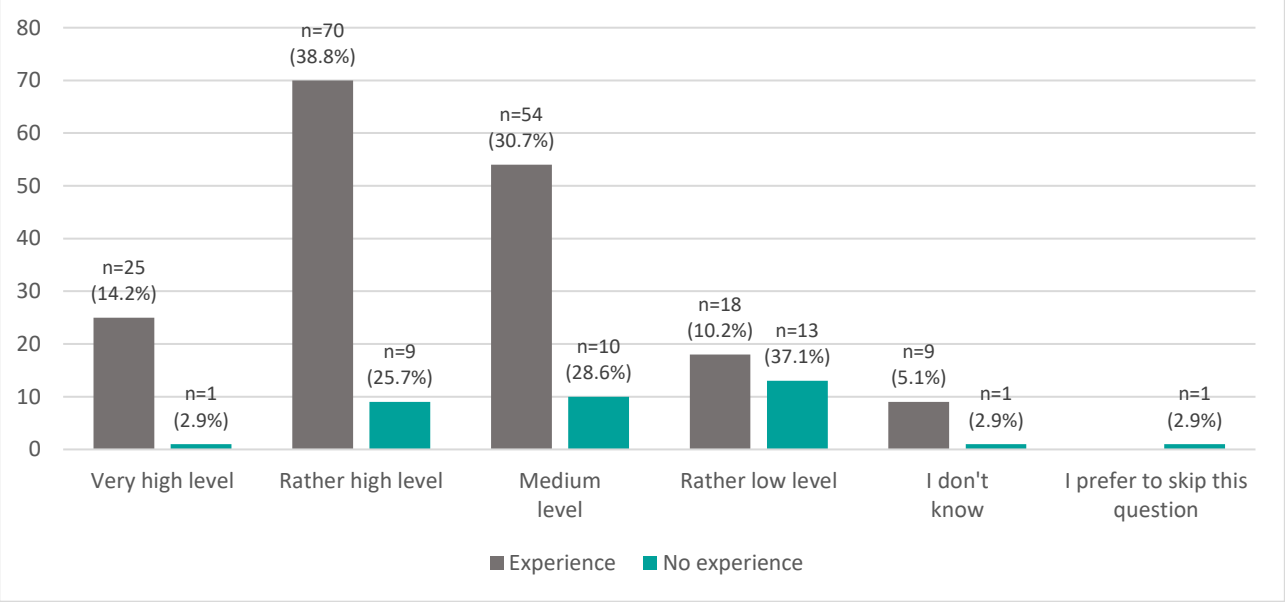

Figure 33: Level of preparedness for a CBRNe incident by experienced CBRNe incident (experienced n=176; unexperienced n= 35)

Similarities emerge in the comparison of European countries. For Germany and the UK it appears that the respondents clearly identify the level of preparedness for a CBRNe incident within their organisation as “very high to rather high”. This trend also emerges in the smaller samples representing Austria, Spain and the Netherlands. In Belgium, the Czech Republic and Italy, this assessment is on par with a medium level of preparedness. In Ireland, the mean assessment is even ahead of the higher category. It should also be noted that in Italy and Spain, respondents were most likely to state a rather low or low level of preparedness in second place. Due to the size of the samples, however, these statements should be viewed with reservation. However, the differences also reflect the identified differences in the threat assessment in Chapter 8.1. and therefore cannot be completely ignored.

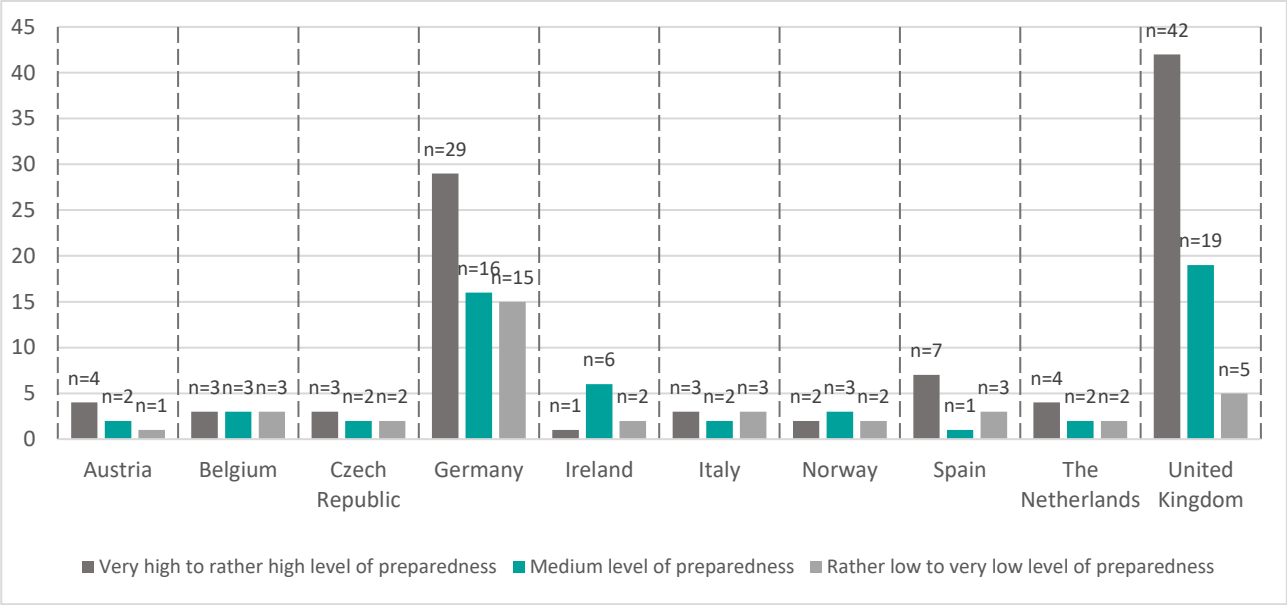

Figure 34: Level of preparedness for a CBRNe incident by country (Austria: n=7; Belgium: n=9; Czech Republic: n=7; Germany: n=60; Ireland: n=9; Italy: n=8; Norway: n=7; Spain: n=11; The Netherlands: n=9; United Kingdom: n=66)

Looking at the level of preparedness by profession, 45.3% of LEAs indicate a "very high or rather high level" (see Figure 35). Another 34.9% see a "medium level of preparedness" and only 17.4% a "rather low or very low level". In comparison, the assessment for the last two ratings is 26.0% for emergency medical responders and 36.8% for firefighters. In general, firefighters seem to feel rather unprepared. None of the respondents indicated a "very high level", and only 16.3% rated their preparedness as "rather high". A full 46.9% therefore rate their preparedness as "medium". This puts them far ahead of the other two professional groups. This is very interesting because firefighters report a much higher level of suitability of their equipment for CBRNe incidents than all other groups (see Chapter 8.2.3.). Nor do they seem to receive noticeably less extensive education and training than the other two professional categories (see Chapter 8.2.2.). The clarity of internal and external responsibility is also not noticeably different from the other groups (see Chapter 8.1.2.). However, it is noticeable that firefighters come into contact with CBRNe operations more frequently (see Chapter 8.1.1.). With regard to familiarity, however, there are no strong group differences either (see Chapter 8.1.2.).

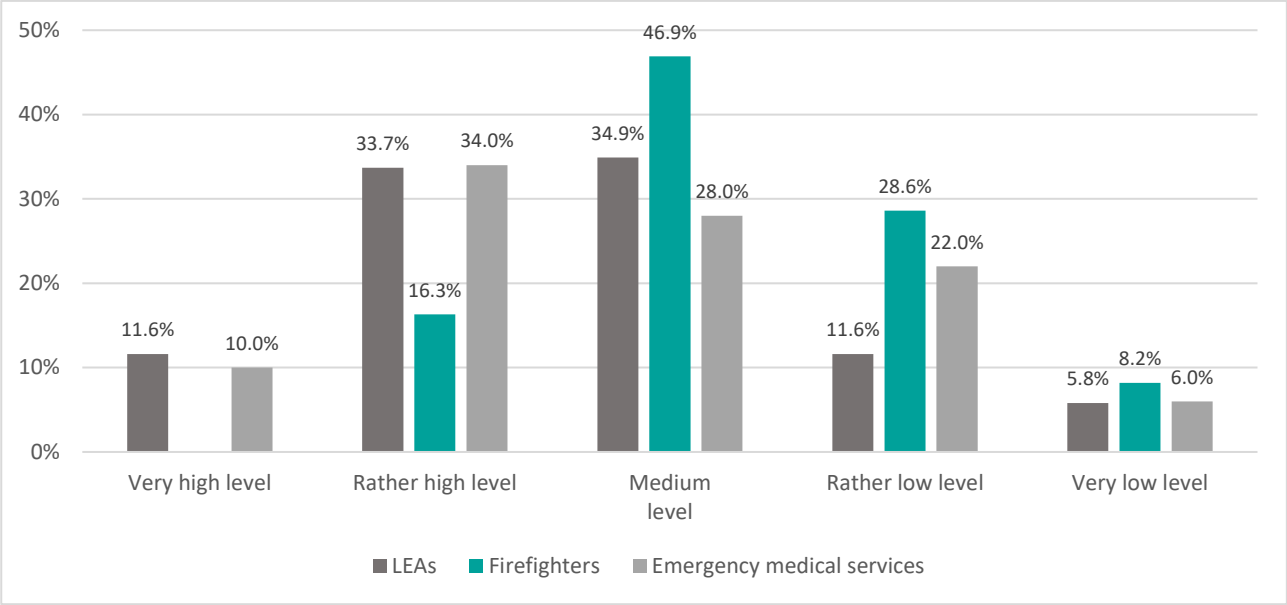

Figure 35: Level of preparedness for a CBRNe incident by profession (LEAs: n=86; Firefighters: n=49; Emergency medical services: n=50)

The level of perceived preparedness is not static and will continuously evolve. To strengthen the evaluation and capacity building, those interviewees that participated in the benchmarking categorisation provided a mixed picture of efforts across Europe in regard to institutional learning in the preparedness phase. For Greece, interviewee #6 refers to a developing approach in this regard in his country. There is evidence of debriefing protocols following a significant CBRNe incident to identify weaknesses and strengths of CBRNe management. However, no inter-agency debriefing processes can be identified. In contrast, the Ukrainian interviewee #18 indicates an optimal capacity building of CBRNe responders. An evaluation routine is implemented to promote institutional learning at short intervals and following emergency events. Mechanisms are in place to facilitate knowledge exchange, sharing of experiences, and best practices. The CBRNe preparedness and emergency management plans and SOPs are regularly updated. The local capacities (e.g. essential services, human resource capabilities) are continuously updated and maintained. The Latvian interviewee #9 is unable to make such a classification. He admits that the SFRS is evaluating incidents and identifies best practices, in regard to the highest category but the police will not engage in the evaluation process e after a CBRN incident.

8.2.6. The recognition of vulnerable civilians in CBRNe preparedness

The following chapter examines the awareness for vulnerable groups in CBRNe incidents in regard to their respective consideration in CBRNe preparedness.

8.2.6.1. Vulnerable civilians in CBRNe-related SOPs

Figure 36 illustrates that nearly one-third (31.4%) of those respondents that indicate to have CBRNe-related SOPs note that the SOPs do not take into account vulnerable groups. For those SOPs that recognise vulnerable groups, 30.8%.of respondents indicate that they focus on people with mobility restrictions. Other vulnerable groups, such as children (29%) and older persons (25.4%) are considered to a similar extent. Medium consideration is given to people with insufficient language skills (20.7%), visually impaired people (168.9%) and pregnant women (17.2%). Ethnic minorities

(16%), hearing impaired people (16%) and people with mental health conditions (16%) are least likely to be included in the SOPs.

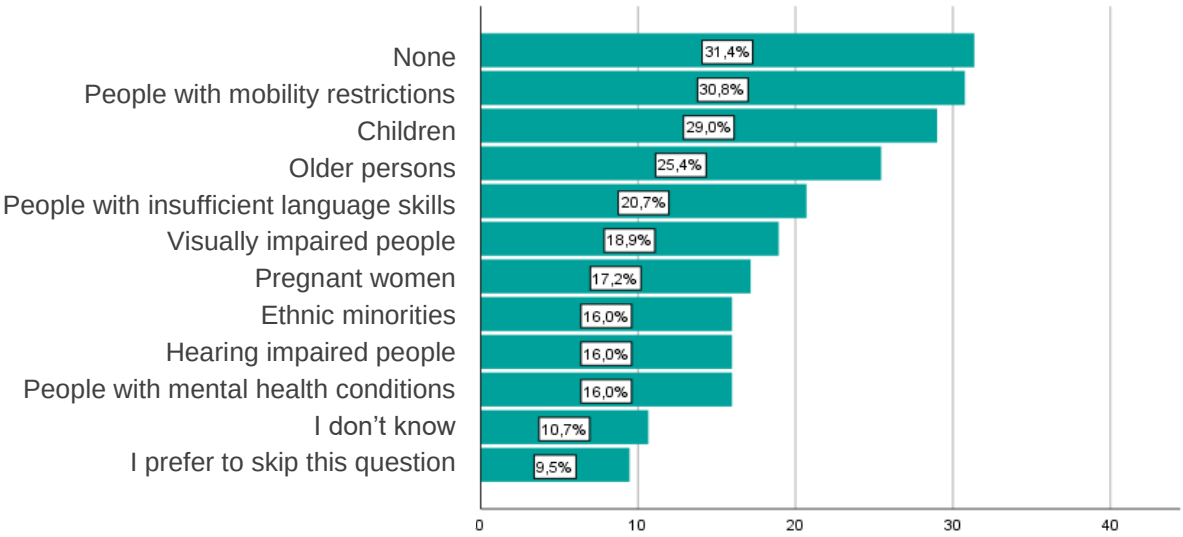

Figure 36: Vulnerable groups represented by the respective organisation through CBRNe SOPs; multiple selection option (n=169)

A country comparison also shows an unbalanced ratio in the consideration of certain vulnerable groups. In the UK, primarily persons with mobility impairments and children are taken into account, followed by older persons (see Figure 69Att.). However, a large proportion of respondents from the UK also state that their SOPs do not consider vulnerable persons at all. However, this ratio is more pronounced in Germany and Austria, where more respondents indicate that no consideration is given to vulnerable groups than to individual groups. In Italy, on the other hand, the individual vulnerable groups are almost all indicated more frequently than overall negated. Percentage wise, 45.9% of the respondents in the UK reported that the SOPs consider persons with mobility restrictions whereas this is true for only 8.3% of German respondents (see Figure 37). A similar picture emerges for the group of children (UK: 39.3% / Germany: 13.9%) and older persons (UK: 37.7% / Germany: 11.1%). Overall, it is remarkable that the percentage distribution extrapolated to the countries sample are always higher for the UK than for Germany.

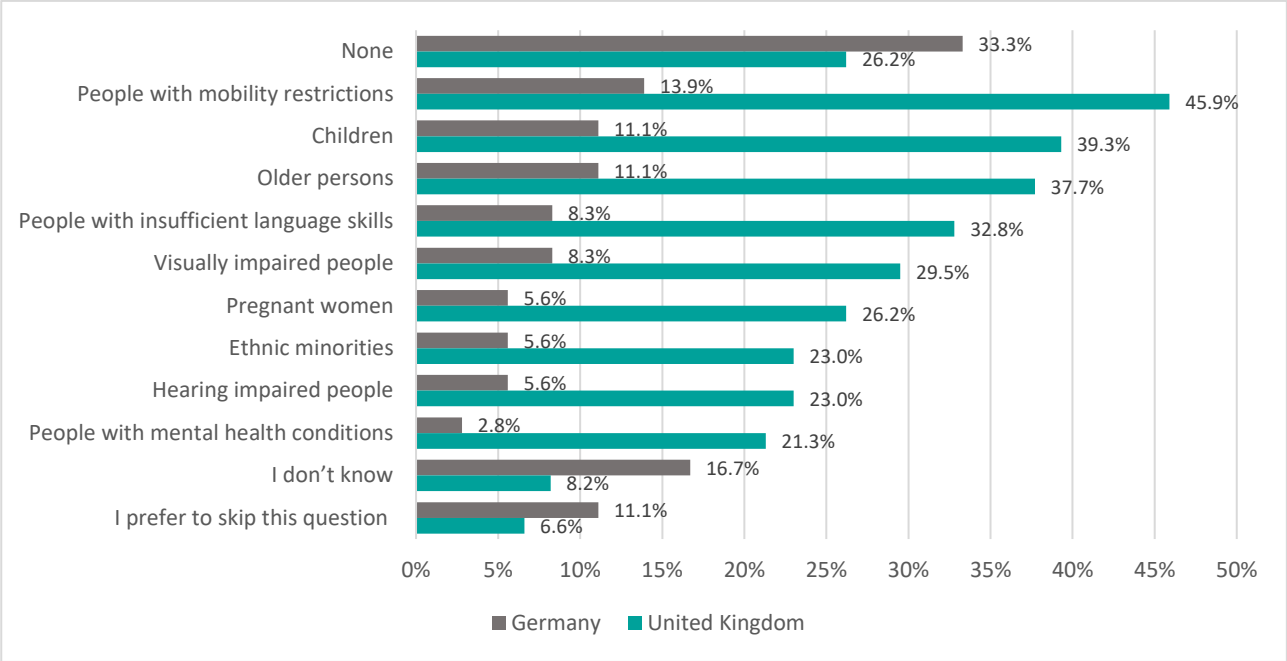

Figure 37: Vulnerable groups represented by the respective organisation through CBRNe SOPs by country; multiple selection option (Germany: n=36; United Kningdom: n=61)

The benchmarking categorisation further reveals that in Latvia, SOPs that consider vulnerable groups are absent or only marginal (Interviewee #9). Basic security measures are in place to respond to a CBRNe event but there is no specific plan for engaging with a vulnerable public. The interviewee notes that such a consideration, if present, is part of wider plans. In contrast, the interviewee from Greece (#6) and the Ukraine (#18) confirm, that at a national level, SOPs recognise certain vulnerabilities. Furthermore, dedicated SOPs further elaborate the needs of greater vulnerable groups. However, none of the interviewees could confirm the consideration of smaller vulnerable groups in CBRNe-related SOPs.

The fact that vulnerable groups are rarely taken into account in organisations' preparedness measures for a CBRNe incident has been further revealed in the interviews study. The interviewees from Norway (#10), Spain (#12), Poland (#11) and Sweden (#13) point out that vulnerable groups are not or very rarely taken into account in preparedness measures.

"No, not very much, or at all. I would say it's an issue that has not been considered." (Interviewee #13, Sweden)

"In most of the situations there is no focus on those group of people." (Interviewee #11, Poland)

However, the Swedish interviewee stresses that the experience with the Covid-19 pandemic has contributed to a greater focus on the vulnerabilities of certain groups (e.g. older people and people who do not speak the national language).

"[Because of Covid-19] We see just how vulnerable the communities of elderly, and those who don't speak Swedish, for example, really are." (Interviewee #13, Sweden)

In the interviews only in very rare cases the participants mention that the needs of vulnerable groups are considerably taken into account. Once, the link between mobility impairment and evacuation processes is mentioned.

"Great attention is paid to the protection of the most vulnerable citizen groups; planning is underway to evacuate vulnerable citizens and others with limited mobility." (Interviewee #18, Ukraine)

Moreover, the French interviewee explains that his organisation is dealing with issues surrounding the decontamination of ethnic minorities:

"Especially women from […] particular religions who really don't like appearing naked in front of men […]. We started this kind of operational reflection […] a few years before." (Interviewee #3, France)

In regard to the different professional groups, especially LEAs indicate that they lack SOPs that consider vulnerable groups. This applies less often to firefighters (26.8%) and emergency medical responders (17.1%). A similar distribution appears when looking at those responders who are unaware of any such inclusive SOPs. Emergency medical responders mostly consider children and people with mobility restrictions (both 42.9%). Those groups are followed by older persons in 34.3% of cases. Least likely, the SOPs of emergency medical responders recognise hearing impaired people. A similar trend emerges for firefighters, although the percentages are smaller. Additionally, their organisations consider people with no or insufficient language skills to the same extend as older persons. For this group, pregnant women are least likely indicated to be addressed in CBRNe-related SOPs. Overall, LEAs state considerably less often to consider vulnerable groups. People with mobility impairments are most frequently indicated in 24.2% of cases. LEAs are least likely to report that SOPs consider people with mental health conditions and ethnic minorities (both 9.1%). Likewise, hearing impaired people (12.1%) and visually impaired people (12.1%) are rarely taken into account. In this regard, there is a need for improvement among all professional groups.

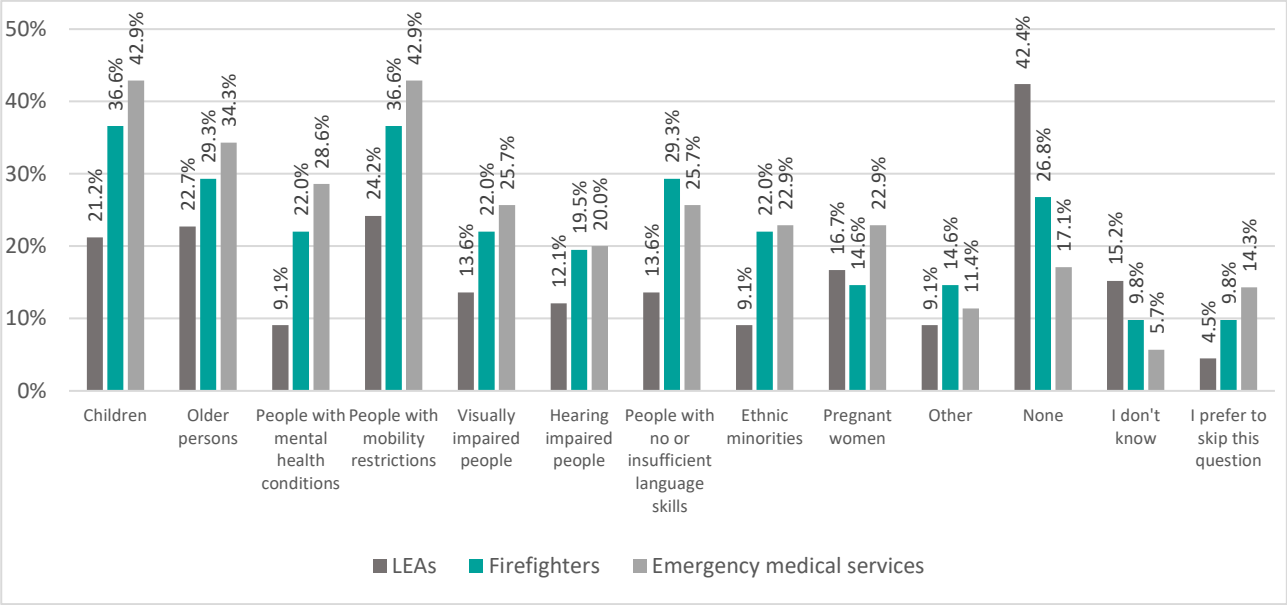

Figure 38: Vulnerable groups represented by the respective organisation through CBRNe SOPs by profession; multiple selection option (LEAs: n=66; Firefighters: n= 41; Emergency medical services: n=35)

In general, vulnerable persons do not seem to be given sufficient attention in the planning of preparedness and response measures. The first step should therefore be to raise awareness for the vulnerable part of the civil society in CBRNe-related SOPs. Moreover, awareness can be raised as part of the education and training of CBRNe responders.

8.2.6.2. Education and training in regard to vulnerable groups

Similar to the question of whether the organisations' SOPs take vulnerable groups into account, it appears that in about a third of the cases (34.2%), the information resources do not consider vulnerable groups at all (see Figure 39). The groups that are most frequently taken into account are again people with mobility restrictions (25%), children (24%) and the elderly (21.9%). However, the percentage for these groups is even lower compared to their consideration in SOPs. The groups that are least focused are hearing impaired people (14.8%), pregnant women (12.8%) and ethnic minorities (10.7%).

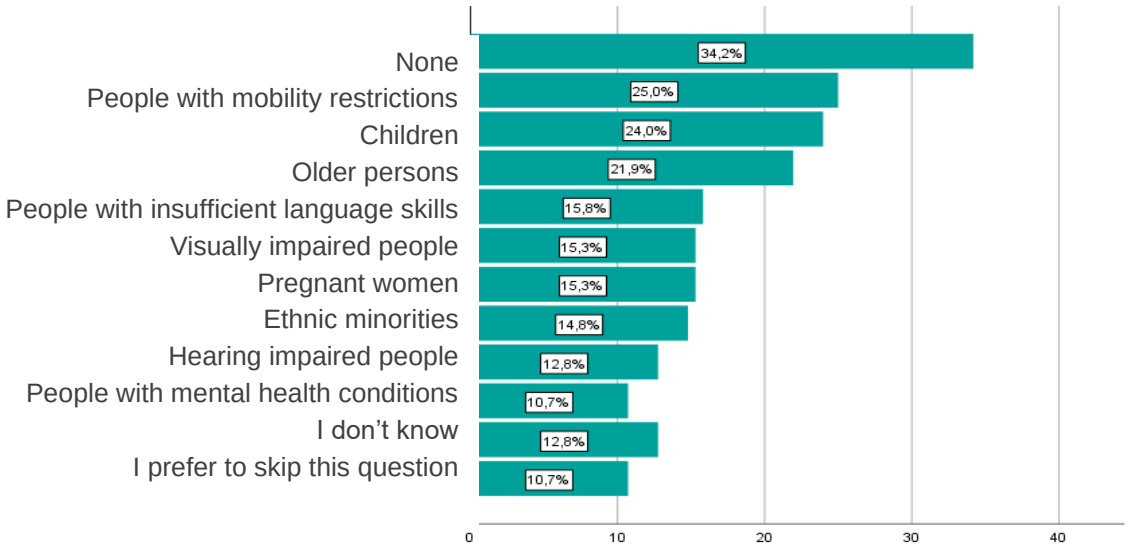

Figure 39: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident; multiple selection option (n=196)

With regard to all countries, it can be seen that the participants more often state that the information material does not consider vulnerable groups at all (see Figure 70Att.). Only in Norway do the participants state equally often that their organisation takes children into account in the materials. In the UK, the general trend described above is observed, with people with mobility impairments, children and older people being the main focus of the materials. A similar trend can be seen in Germany and the Czech Republic. No trends can be identified for the other countries, also due to the sample size.

The low consideration of vulnerable persons in information materials is also reflected in all professional groups (see Figure 40). Especially LEAs seem to lack adequate information material. When recognising vulnerable groups, the information material of firefighters and emergency medical responders reflects the general trend already described that focuses on children, older people and people with mobility impairments. This is also true for LEAs, although there is a less pronounced consideration of certain vulnerable groups in particular. In comparison, only persons with insufficient language skills and ethnic minorities are less likely to be part of their information material. Considering that overall, across all professional groups, the consideration of certain vulnerable groups is indicated in about a maximum of 30%, the respective offer should be significantly expanded.

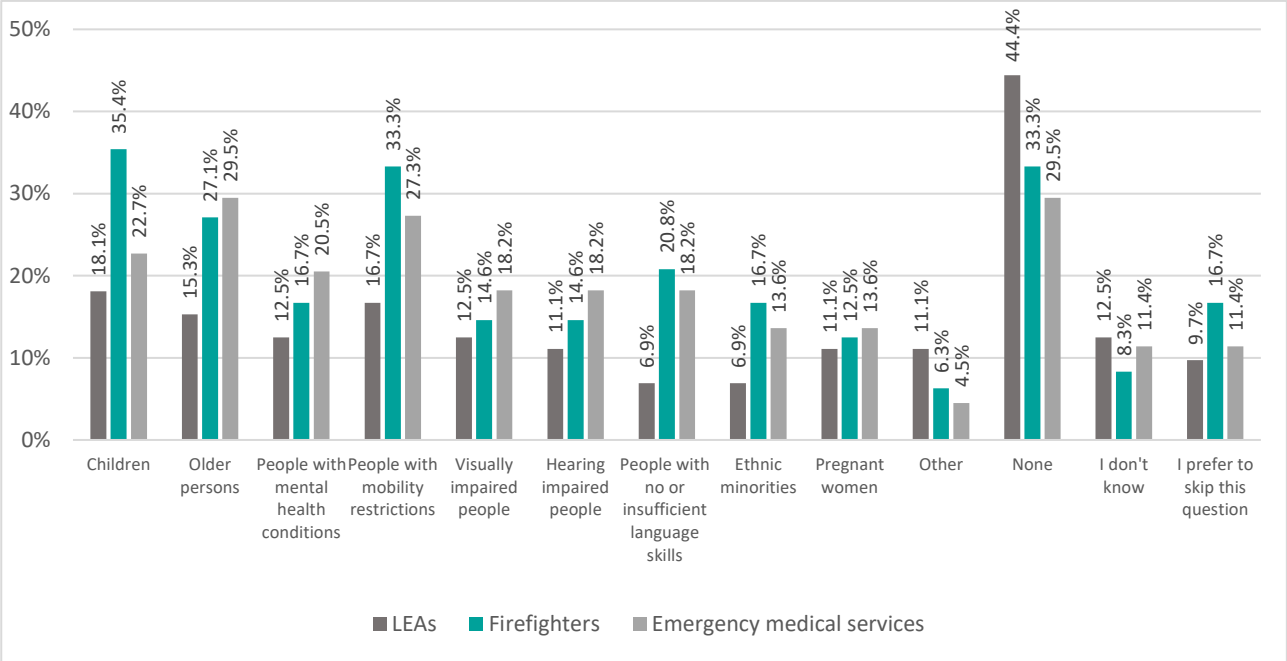

Figure 40: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident by profession; multiple selection option (LEAs: n=72; Firefighters: n= 48; Emergency medical services: n=44)

Consequently, the information material offered should be revised and expanded. Furthermore, a broader range of vulnerable groups should be taken into account.

8.2.6.3. Exercises that focus on vulnerable groups

Apart from adequate information material, awareness can also develop through training exercises. Chapter 8.2.2. already showed that contact with members of the public and especially with vulnerable persons is rarely addressed in exercises: Contact with the public as a regular part of the education is indicated in only 13.5% while 8.8% of respondents further negate any training in this regard. Even less frequently, vulnerable groups are particularly considered in exercises. Only 8.8% of respondents confirm regular training although 57.9% negate such efforts. However, when looking specifically at the individual countries and how they consider the contact with the public in CBRNe exercises, a different trend emerges. Especially in the UK, general contact with civilians seems to be an integral part of CBRNe exercises (see Figure 71Att.). About one third of the respondents state that this is a regular part of the training of CBRNe responders and almost another third state that this topic is taught at least from time to time. In Germany, only five of the total of sixty respondents state that they regularly train the contact with the public. Another 17 train this topic at least from time to time. However, nine participants state that the contact is never addressed. A similar frequency distribution is also found for Austria, although as for the other countries, the samples here are too small to make specific statements. Overall, there is no consistent trend for Europe. A country comparison regarding the particular contact with members of the vulnerable society reveals that this topic is only very rarely considered in CBRNe exercises (see Figure 41). The extent of this varies from country to country. 7 of the 66 participants from the UK state that they regularly train CBRNe responders in dealing with vulnerable persons, and another 27 at least argue that their organisation sometimes addresses this topic in CBRNe exercises. In Germany, on the other hand, regular training in this area is almost never reported. However, occasional training is indicated to a certain extent. The same applies to Austria, Belgium, Czech Republic, Ireland, Italy, Norway and the Netherlands.

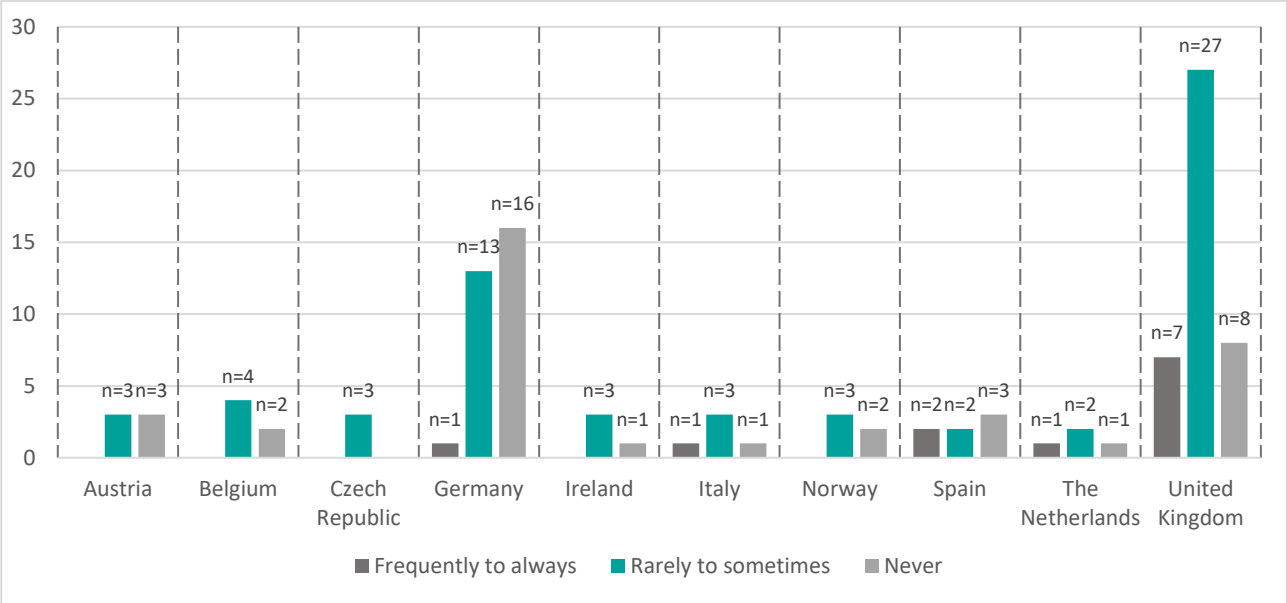

Figure 41: Contact with vulnerable groups addressed during CBRNe exercises in the last ten years in which the own organisation was involved (see Figure 25) by country (Austria: n=6; Belgium: n=6; Czech Republic: n=3; Germany: n=33; Ireland: n=5; Italy: n=6; Norway: n=5; Spain: n=8; The Netherlands: n=5; United Kingdom: n=50)

A look at the individual professional groups also shows that contact with civilians generally takes place rather irregularly (see Figure 72Att.). Between 50-60% of the participants state that they train on this topic at least sporadically. Emergency medical responders are least likely to include this topic in CBRNe exercises (20.0%). Only 20.0% say that it is a regular part of their exercises. The percentage of LEAs (35.1%) and first responders (32.5%) is higher.

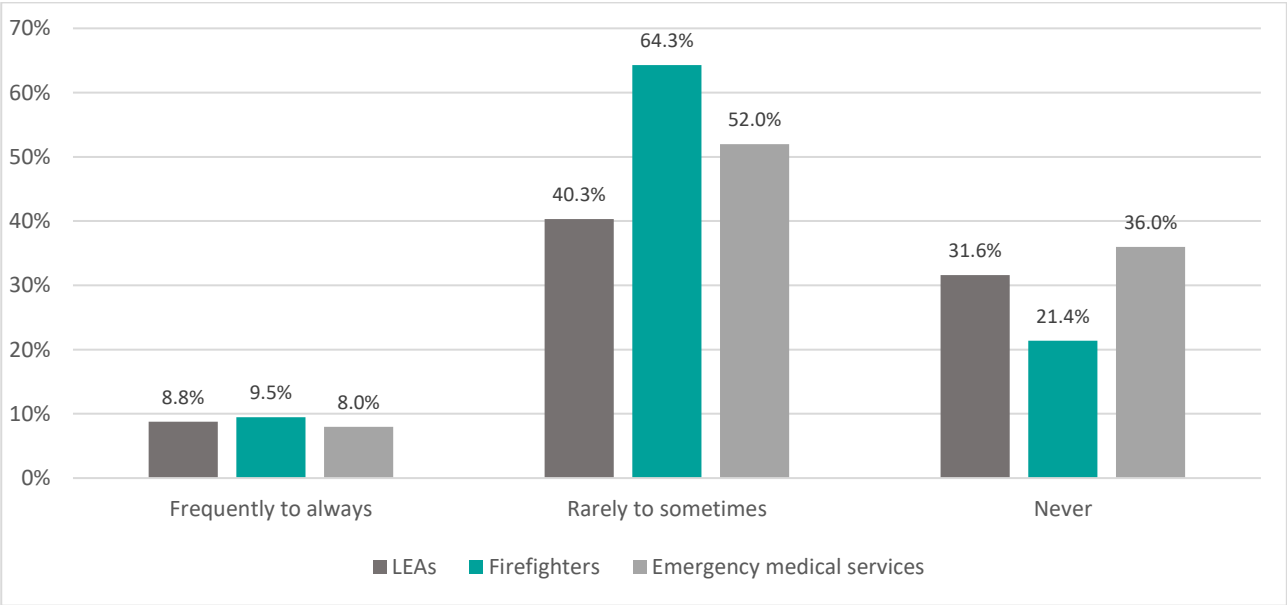

Figure 42: Contact with vulnerable groups addressed during CBRNe exercises in the last ten years in which the own organisation was involved by profession (LEAs: n=57; Firefighters: n= 42; Emergency medical services: n=25)

The proportion of those who deny such exercises is correspondingly low. This is 7.0% for LEAs and 4.7% for firefighters. The proportion of participants who deny the consideration in CBRNe exercises is much higher with regard to specifically vulnerable persons (see Figure 42). Accordingly,

participants from all professional groups rarely state that this is a permanent component of their exercises. However, 64.3% of the firefighters state that they train contact with vulnerable persons from time to time. This also applies to 52.0% of emergency medical responders and to as many as 40.3% of LEAs.

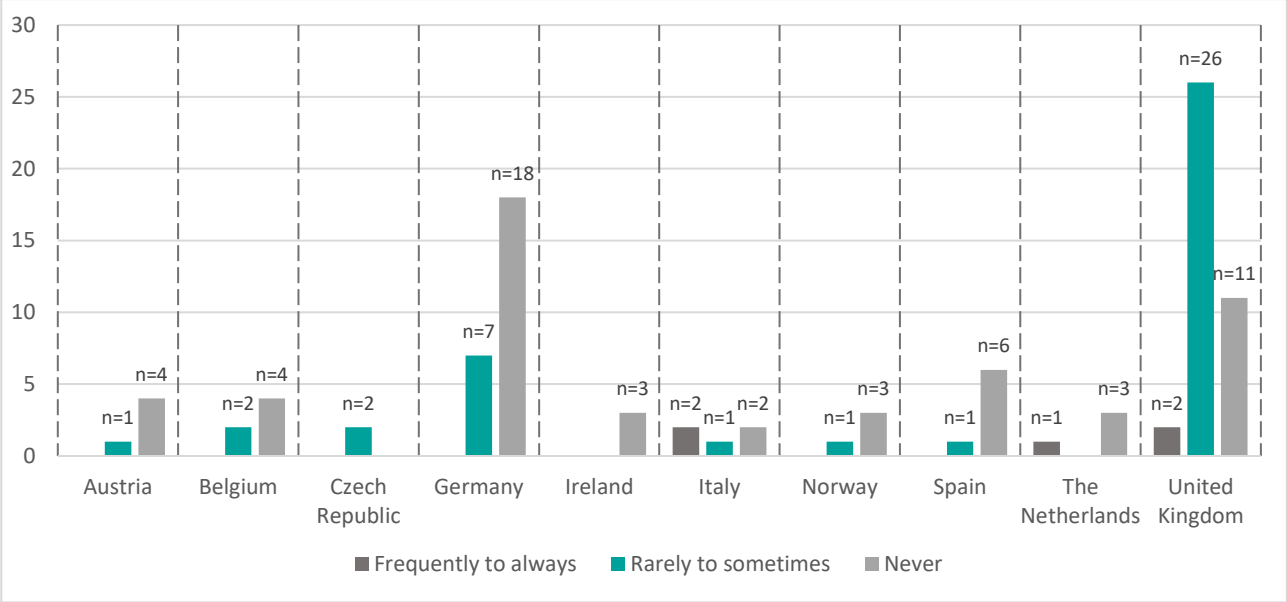

Figure 43: Involvement of vulnerable groups in CBRNe exercises by country (Austria: n=6; Belgium: n=6; Czech Republic: n=2; Germany: n=32; Ireland: n=4; Italy: n=6; Norway: n=5; Spain: n=7; The Netherlands: n=5; United Kingdom: n=46)

Of all respondents, 11% indicate that their organisation provides training sessions for the public to prepare for a CBRNe incident (see Figure 77Att.). Whereas this is already true for 61.8% of respondents without former experience with CBRNe incidents, the number is even higher for those with experience (89.0%) (see Figure 47). Overall, the numbers by professional group are somewhat lower. Emergency medical responder still state most frequently to offer CBRNe-related information via training sessions in 14.3% of cases (see Figure 48). In general, the number of participants who were able and willing to comment on the involvement of members of the public and vulnerable persons decreased compared to the other topics addressed in CBRNe exercises (see Figure 25). The number of participants also slightly more declined with regard to vulnerable persons. Looking at the involvement of the public and in particular the vulnerable civil society in CBRNe exercises, in only 13.9% of cases respondents indicate to regularly include civilians. The proportion is even lower for especially vulnerable civilians in 3.6%. Whereas the public is excluded from CBRNe exercises in 30.6% of cases, 45.3% of respondents indicate this in regard to vulnerable groups. Whereas the trend in Germany is similar to that for information resources, the percentage of those who advocate regular involvement of civilians in CBRNe exercises is lower (see Figure 73Att.). Only 13 of the 66 participants from the UK confirm that they always or frequently involve civilians. In comparison to the information materials, nine participants state that they never have an involvement of civilians in CBRNe exercises within their organisation. Also for the other countries only very rarely participants confirm that their organisation regularly offers such inclusive exercises. Even lower numbers are found for the inclusion of vulnerable persons (see Figure 43). Apart from the UK and the Czech Republic, there is a low involvement of vulnerable civilians among all countries. The fact that vulnerable groups are rarely involved in CBRNe-related training is also evident in the interviews. Only in the cases of UK and Czech Republic the interviewees report that school children are involved

in exercises. In addition, the interviewee from the Czech Republic confirms a respective programme for older people focusing on behaviour during a CBRNe incident.

"And we have the programme for the children in the school, when we teach them what they need to do, if they smell something or if something happens in that factory. And we have […] too the programme for the elderly people, what they need to do in case of an emergency." (Interviewee #2, Czech Republic)

"We used to get […] the college kids involved." (Interviewee #14, UK)

A comparison between the CBRNe practitioner categories shows, as with the countries, the sharp decline in responses. Out of 86 LEAs, only 19 give a response in relation to vulnerable persons in CBRNe exercises (see Figure 44). Low numbers are also seen in relation to the general involvement of members of the public (see Figure 74Att.).

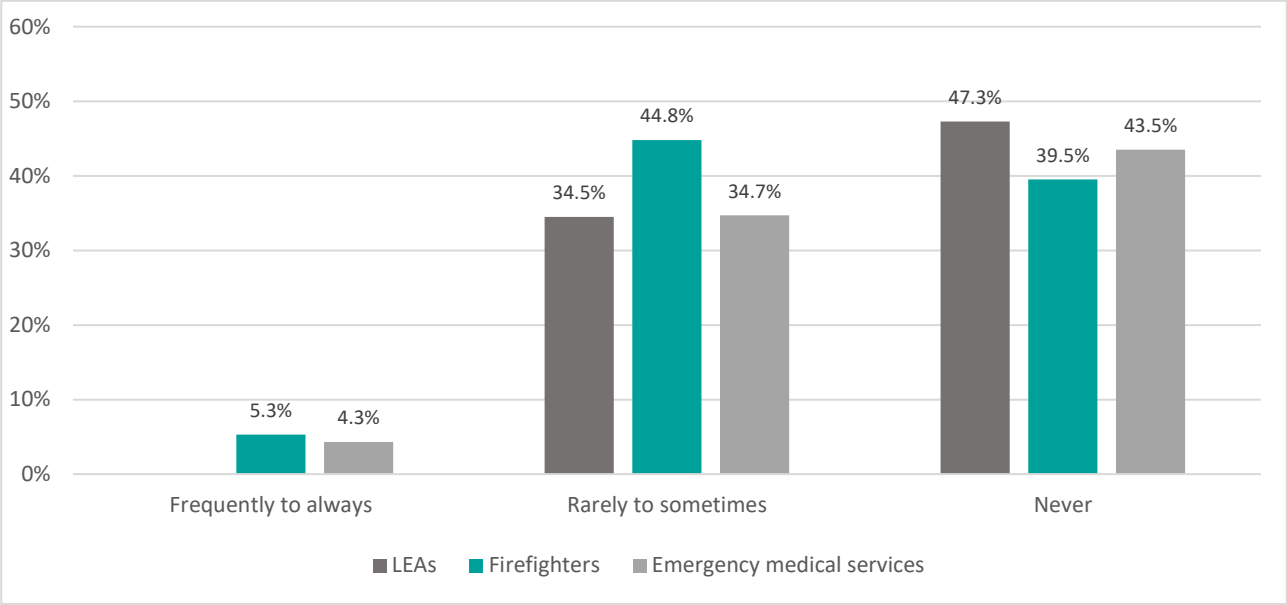

Figure 44: Involvement of vulnerable groups in CBRNe exercises by profession (LEAs: n=19; Firefighters: n= 17; Emergency medical services: n=18)

Overall, the proportion of CBRNe responders who report a regular involvement of civilians in their exercises is low across all groups (see Figure 74Att.). Firefighters are the most likely to report this (19.5%), LEAs the least (12.5%). All groups indicate a predominantly sporadic involvement. Here too, firefighters are in the lead with 53.7%, followed by the other two groups with about 40.0%. LEAs are the most likely group to never involve civilians in their CBRNe exercises (37.5%), while firefighters are the least likely (19.5%). Considering the involvement of vulnerable groups in particular, the relationship shifts strongly towards infrequent or no involvement (see Figure 44). Only 5.3% of firefighters indicate to frequently or always involve members of the vulnerable civil society in their CBRNe exercises. Whereas this is true for further 4.3% of emergency medical services, none of the LEAs make similar statements. Consequently, the group of LEAs most frequently reports to never involve vulnerable civilians in 47.3% of cases. But it should be noted that similarly high percentages are also found for the other two groups. Overall, firefighters seem to be the most likely to promote the inclusion of vulnerable people in CBRNe exercises.

8.2.6.4. *Cooperation with civil society organisations representing vulnerable groups*

Besides cooperation among practitioners such as LEAs, firefighters, state authorities, and other organisations, cooperation can also be established with organisations representing vulnerable groups (e.g. associations of deaf people, public entities protecting children). However, out of 222 respondents, only 12.2% indicate that their organisation has established cooperation with such organisations to address CBRNe incidents. The majority of the respondents (55%) state that no such cooperation has been initiated in the past. Furthermore, nearly one-third of the respondents (30.6%) note that they are unaware whether their organisation has established such a cooperation in the past.

Similar to the results of the quantitative survey, the interviews reflect that cooperation with vulnerable groups is rarely, if ever, sought. Only two interviewees are able to comment positively on this. An Irish interviewee explains that expertise is incorporated via a set of advisors: Besides specialists in epidemiology and infectious diseases CBRNe responders can rely on the knowledge of a range of smaller subgroups. One of these subgroups consists of experts on vulnerable people (Interviewee #7, Ireland). Another interviewee from the Czech Republic made the following remarks:

> *"Yes. It is the part of the preparedness, because we have like clubs or communities with people with these disabilities and we try to connect them like a part of the prevention. Because this is the nice opportunity, how to teach our fire fighters or rescuers to communicate with these people. And on the other hand, this is a good opportunity to teach the people with disabilities, how do fire fighters look and how can we run the rescue operation."*
> (Interviewee #2, Czech Republic)

Overall, efforts should be made to establish more intensive cooperation with relevant CSOs. Especially with regard to the observed helpfulness for major emergences, this cooperation can facilitate the engagement with affected members of the vulnerable civil society.

8.3. CBRNe response across Europe

The following chapter examines the CBRNe response from the implementation of security measures in case of an assumed elevated risk to the performance of key tasks of CBRNe response and the parallel communication with the public.

8.3.1. Security measures in case of an assumed elevated risk of a CBRNe incident

In case of an assumed elevated risk of a CBRNe incident, there are defined security measures that facilitate the subsequent response management. The following section focuses on the security measures of First Responders in regard to an expected CBRNe incident.

8.3.1.1. *Joint-alert system and coordination approaches*

The benchmarking categorisation as part of the interview study with three selected participants revealed very similar approaches to threat assessment: Interviewees from Greece (Interviewee #6) and the Ukraine (Interviewee #18) indicate that in their countries an optimal threat assessment approach. A nationally uniform generic threat assessment is implemented to facilitate early warning and surveillance of CBRNe incidents. A protocol for inter-agency collaboration is in place that facilitates a CBRNe threat assessment that incorporates the subnational and national perspectives

of the different agencies. For Latvia, the interviewee #9 can't indicate a benchmarking category and explains that the police, would provide support in the process of liquidating the consequences of a CBRNE incident. However, not the police is responsible for assessing the threat but the SFRS as part of their risk monitoring of objects that could be a threat. A set of critical infrastructures, are further surveyed as potential CBRN threats by the National Security Service which forwards the findings to the police. Depending on the initial situation for the threat (critical infrastructure vs. terrorist cell), other stakeholders assess the threat. Consequently, the assessment of a CBRNe threat in each country is carried out by a broad range of different cooperating stakeholders who are more or less involved in the process. At this point, it is therefore not possible to provide a more detailed overview of each stakeholder involved.

Following the detection of an assumed elevated risk of a CBRNe incident, the relevant authorities are informed. The alarming system slightly varies between the countries in regard to the profile of the dispatch system. In general, all emergency calls in Europe are received via the Emergency (Medical) Services under a public known number (e.g. 112 for Germany). Additionally, in some countries, the police has its own emergency centre like the coordination centre of national policing in Spain (Interviewee #12, Spain). In other countries, dedicated CBRNe dispatchers are situated alongside the general emergency dispatcher (Interviewee #8, Ireland). Some interviewees also mentioned dedicated headquarters for CBRNe incidents. For example, in the UK, a national CBRNe Centre provides advice and guidance to all emergency services when necessary and are available for 24 hours a day, 365 days a year (Interviewee #15, UK).

To respond accordingly to a CBRNe-related emergency call, the dispatch services initially revert to different systems that characterise the assumed security threat level and that provide certain corresponding security measures. The interviewee from the Czech Republic explains that they use a system for the predetermination of fire brigades for the CBRNe events. This three-stage system divides assumed threats into the categories basic, moderate and advanced. According to the respective stage, the equipment and level of actions of the fire brigade can be adjusted (Interviewee #2, Czech Republic). This three-stage categorisation is also mentioned for Germany (Interviewee #5, Germany) and the UK (Interviewee #14, Interviewee #15). If the threat level changes, the preparedness level is adapted accordingly.

As soon as all related authorities are informed, an organisational response structure is implemented to define the further key tasks and procedures to be undertaken. One interviewee describes this process as getting all the agencies around a big table to define a rigorous approach on how to deal with the expected situation (Interviewee #15, UK). In this context, an Irish interviewee stresses the need for (joint) coordination from the very beginning:

> *"There are so many actors and then depending on the type of emergency, one organisation or one government department will become the lead in that response."* (Interviewee #7, Ireland)

One participant mentions raised tempers, egos and politics between agencies, which made it necessary to have a coordination, which regulates all responsibilities on a higher level (Interviewee #15, UK). Especially the interviewees from Norway, Bulgaria and the UK stress the coordinating role of the police in CBRNe incidents. Respondents from other countries also mention coordinating measures as one of the key tasks of European LEAs (Interviewee #8, Ireland, #9, Latvia; #10, Norway and #18, Ukraine).

Chapter 8.2.1. analysed the clarity of fundamental allocation of tasks within organisations and between other organisations involved in CBRNe response. Based on this allocation, the interviews reveal a variety of different SOPs that facilitate the further CBRNe response. In Ireland, the Irish interviewee explains, CBRNe dispatcher have dedicated procedures and policies in place that comprise, inter alia, a major emergency plan. The major emergency plan covers any type of incident including CBRNe and is therefore feasible for many different scenarios. It comprises a set of check lists that the emergency services have to implement during certain time frames (Interviewee #8, Ireland). Similar plans are mentioned for the UK (the counter-terrorism menu of options) (Interviewee #15, UK) and for the Ukraine (relevant response and evacuation plans) (Interviewee #18, Ukraine). The interviewee from Lavia #9 explains that the Cabinet of Ministers provides an instruction of responsibilities that involves certain algorithms that an institution must implement. Besides, some organisations have own instructions. A German interviewee #5 introduces dedicated flowcharts, which were created according to the expected security level and threat category (medium, small, and large) of a CBRNE incident. The flowcharts provide supplementing appendices for certain scenarios like the detection of powders. These appendices contain concrete reaction measures, which primarily serve the purpose of self-protection. Since these response plans reflect the very diverse organisational structures involved in the respective country, there are no uniform SOPs throughout Europe. Therefore, the PROACTIVE Deliverable 2.4 will explore ways to harmonise these SOPs on a European level.

As soon as the first CBRNe responders reach the area of an assumed CBRNe incident, the threat will be confirmed (Interviewee #4, Germany). In cooperation, different agencies undertake different subsequent security measures. Depending on the identification of the cause of the danger, the main responsibilities may change again in this pre-response phase (Interviewee #12, Spain). In this context, a German interviewee notes, that all security measures have to be constantly adapted to the actual level of knowledge and confines: If the exploration by robot is insufficient, a different approach might be necessary (Interviewee #4, Germany) that involves other CBRNe responders trained in this respect.

8.3.1.2. (Joint) Mobilisation approaches

Another aspect of early response is the reinforcement of the emergency services for the CBRNe response. The number and quality of the responders (see chapters 8.1.1, 8.1.2. and 8.2.2) are crucial to the success of the operation.

"We rely heavily on human resources. [...] We make sure that we have the sufficient human resource in our operational unit." (Interviewee #3, France)

Some interviewees stress possible difficulties in the mobilisation of a sufficient number of personnel that refer to the volunteer background of emergency personnel and severe related budget constraints:

"As we have both professional and volunteer fire fighters. This is our major challenge now. In a state of major crisis, our volunteer fire fighters might not be as available as we could hope." (Interviewee #3, France)

"But the reality is, in the last five years we have lost you know 20.000 police officers due to budget constraints. And I think that has possibly impacted upon our ability to respond as quickly as we once could a few years back." (Interviewee #14, UK)

In this context, all personnel will be transferred to a higher level of preparedness to CBRN incidents in order to ensure that additional recruits can be mobilised more quickly in case of need. (Interviewee #17, Ukraine). Thereby, personnel might be transferred to a different area (Interviewee #15, UK):

"They [police officers, respectively patrols] are on standby, driving around in their normal job, but when tension is raised, we will say: Right, you keep your PPE in the back of your car. So, if you are called to a big job, you can drive there, and you don't have to waste time going back to police station et cetera. So, patrols might be stepped up certainly around areas of vulnerability or sites of national infrastructure will be subject to enhance patrols where possible." (Interviewee #14, UK)

This approach facilitates the mobilisation of CBRNe responders within an organisation. Furthermore, interviewees form the UK (Interviewee #1) and the Czech Republic (Interviewee #2) indicate that personnel from other organisations will be mobilised and inter-agency cooperation might be increased among different LEAs, firefighters and emergency medical services. At this stage, the success of existing cooperation agreements established at the preparedness stage will become apparent (see Chapter 8.2.4.). Also, units and personnel that is off-duty will be alerted (Interviewee #15, UK). This includes dedicated expert units that are available on call (Interviewee #1, Belgium; #4, Germany; #11, Poland).

"They [the dispatcher from the control centre] have like a checklist and when they receive information, that it is a possible hazardous environment or CBRNe environment, we will be called." (Interviewee #1, Belgium)

Each country addresses unique expert units, some of which cannot be compared with each other. Therefore, the report does not show any detailed country comparisons at this point. Furthermore, the choice for such experts depends strongly on the type of incident:

"If it's a terrorist attack and we suspect this or we know about it, our unit as a central counter terrorism unit in police is involved […], but when there is only the accident, […] and we don't have any suspicions for purpose, […] our unit will be not involved in this incident." (Interviewee #11, Poland)

Besides the necessary human resources, the equipment has to be chosen according to the defined security level. A German interviewee stresses, that the equipment should correspond to the expected CBRNe agent on site (Interviewee #4, Germany) to meet the necessary self-protection standards and corresponds to the unfolding tasks to be undertaken.

"Concerning chemical and biological incidents, we have heavy equipment, which allows us to carry out more risk reduction operations, which are much more consequence." (Interviewee #3, France)

The better the selected equipment meets the identified security level, the more likely the CBRNe responders will trust it (see Chapter 8.2.3.). Therefore, the equipment has to be constantly updated and, if necessary, exchanged between the emergency agencies during the mobilisation phase (Interviewee #4, Germany). Furthermore, material reserves should be replenished at all levels (Interviewee #18, Ukraine). Such a joint approach was already described in chapter 8.2.3.

8.3.2. Key tasks of CBRNe response

The interviewees reveal that CBRNe practitioners perform a broad variety of tasks in CBRNe response. Especially LEAs perform the leading coordination, the containment and evacuation of affected civilians, the detection of CBRNe agents, the criminal investigation, the crime scene investigation and the insuring of public order and the safety. The firefighters and emergency medical responders complement the CBRNe response covering key tasks of disaster control (e.g. firefighting,

rescue, technical assistance, recovery, etc.) and on-site medical treatment. Depending on the different allocation of responsibilities among European countries and the nature of the CBRNe event regarding the agent, the trigger and the location, different stakeholder are involved to perform those key tasks. In this regard, further organisations will be involved such as the train services in railway environments or specialised units trained for certain CBRNe agents. Moreover, the responsibilities of certain professional groups can overlap, making it hard to distinguish certain responsibilities among different professional groups. One interviewee mentions that the medical treatment of civilians might be undertaken by LEAs in some European regions as part of a special unit[7]. Therefore it is not possible to provide an in depth overview of the different key tasks performed by LEAs, firefighters and emergency medical responders in the individual European countries at this point. A more detailed examination of SOPs that focus on CBRNe incidents will be examined in the PROACTIVE Deliverable D2.4. In the following, the general approach of CBRNe responders across Europe will be presented to understand the above mentioned key tasks and the respective responsible stakeholders. In this context, general differences and commonalities will be identified.

8.3.2.1. Detection and containment

As an initial key task, the threat will be confirmed, identified and eliminated or, where this is not possible, contained (Interviewee #4, Germany). In this stage, CBRNe responders will define the hot zone of the CBRNe incident and create a cordon in place as quick as possible.

Respondents from all European countries that participated in the interview study confirm that mainly LEAs execute the detection of a CBRNe agent within the imminent hot zone (e.g. UK). For other countries like Germany, interviewees further indicate the possible involvement of special CBRNe laboratory units that are part of some professional fire brigades, the German railway or research institutes like the Robert Koch Institute. The technical possibilities to detect certain agents also differs across Europe and the individual detection responders. An interviewee from Poland illustrates in more detail what technical solutions are currently applied in his country:

> *"We have two vans for the mobile detection systems. We can scan from the radiology materials on the movement."*
> (Interviewee #11, Poland)

For Germany, the use of robotic systems is implied (Interviewee #4, Germany). For all countries, a close cooperation between the detecting responders and the LEAs who cordon off the investigated area can be found.

8.3.2.2. Evacuation

The hot area constitutes an imminent threat to the population on site. Therefore, this barrier is intended to stop the public from getting into the defined hot zone and becoming infected or contaminated (Interviewee #8, Ireland). Depending on the type of incident and the expected spread of CBRNe agents, the distance between the cordon and the hot zone could be a kilometre back or two kilometres back. Additionally, the perimeter has to be adjusted (Interviewee #8, Ireland). The interviewees do not reveal major differences in the set extend of the hot zone. Regarding civilians

[7] This refers to one interviewee who is engaged in military services (Interview #1, Belgium).

that are already inside the defined hot zone, a further key task is the evacuation of affected persons from the hot zone.

"We guarantee to pick out the people, the worst infected. […] We have to save their way out, to go to the hospital, to go to that evacuation. […] But the rest of the people stays inside." (Interviewee #12, Spain)

The Latvian interviewee considers this task to be of central importance (Interviewee #9, Latvia).

"The task of the CBRN units is to promptly reduce or eliminate CBRN consequences" (Interviewee #17, Ukraine) and at the same time the people have to be removed from the assumed source of contamination (Interviewee #14, UK).

Similar to the detection and the containment of CBRNe agents, interviewees indicate that the evacuation is undertaken by different organisations, including LEAs, firefighters and special CBRNe units.

8.3.2.3. Criminal and crime scene investigation

Besides the detection of the agent, LEAs are engaged in the criminal investigation and the prosecution of suspects that caused the CBRNe incident (Interviewee #9, Latvia). An interviewee named it as neutralising any outstanding threat (Interviewee #14, UK).

"The police has to go inside, to neutralise the bad people, the criminals." (Interviewee #12, Spain).

Once the area is decontaminated and sealed off, a further key tasks of LEAs is the crime scene investigation. Measures comprise the (photographic) documentation and the preservation of evidence (Interviewee #8, Ireland). This key tasks is predominantly associated with LEAs.

8.3.2.4. Insuring public order and safety

One interviewee stresses the importance of measures to ensure public order as an eminent key task of LEAs in CBRNe response. Alongside the already mentioned site containment, those measures comprise amongst other the regulation of the traffic in the perimeter of the hot zone. This key tasks is also primarily the responsibility of European LEAs. None of the interviewees explicitly mentioned the involvement of military units.

8.3.2.5. Medical treatment

The medical treatment is seen as a major key tasks undertaken by emergency medical responders. However, as in the case of Germany, some professional fire brigades have their own medical units. Furthermore, in Belgium, a special military unit provides on-site support for medical emergency care:

"We are focussed on the medical treatment, to treat the symptoms. In CBRNe, in medical CBRNe, you have the saving try-out. And the saving try-out is emergency decontamination is oxygen and antidotes. And that's really our focus." (Interviewee #1, Belgium)

A comparison of countries shows strong differences in the involvement of certain organisations. Medical treatment thus represents a key task in which there is a particular need for close cooperation between the organisations involved.

8.3.2.6. Decontamination

Depending on the substance and the national SOPs, different decontamination procedures are applied. These range from hand washing to dry decontamination and chemical showers (see Hall et. al. 2020a, 11). The decontamination process was not explicitly mentioned as a key tasks in the interview study. This partially depends on the sample that focused on LEAs. Scientific research suggests that the decontamination of hazardous contaminants is mainly in the responsibility of firefighters, special trained emergency medical responders and special CBRNe units that closely cooperate in the event of a CBRNe incident.

A review of 95 guidance documents from 18 different countries (see Hall et al. 2020a, 11-12) revealed that in regard to evacuation, medical treatment, undressing, decontamination and the subsequent after-care, a range of CBRNe response management strategies exist that don't necessarily are consistent, neither within nor between countries. The same is to be expected of SOPs in regard to the other key tasks. In view of the very close cooperation between different CBRNe responders, especially in the medical treatment and decontamination sector, greater harmonisation should be implemented (see PROACTIVE Deliverable 2.4).

8.3.3. Communication with the public

Especially after September 11, 2001, crisis communication experienced a rapid boom (Glik, 2007). It is now known that providing timely and up-to-date information from trusted sources is the most reliable and effective way to address the challenges of disasters (Abunyewah et al. 2017). Consequently, communication with the public is crucial for successful CBRNe management. It comprises the range of communication measures required during the different stages of a CBRNe incident to inform the public for decision making, to encourage the adoption of positive behaviour and to adverse the impact of the event (e.g. Savoia et. al. 2013, 171). Based on the different stages of a CBRNe incident, a basic distinction is made three different types of communication: The **risk communication** takes place prior to an event. It informs the public about expected scenarios and educates relevant information on how to behave during a CBRNe incident. The **crisis communication** is used to address the imminent threat situation and lasts throughout the incident. During this stage, communication strategies evolve based on the respective nature of the incident, the location and the target groups. Hereby, the communication with those affected within the hot zone and the general public will greatly differ in regard to the demand for information, the necessary content, the used communication channels and the language formats. Referring to the total number of information recipients, the majority of information is communicated not directly to the individual but through the media. Therefore, special attention should be given to the use of media by CBRNe practitioners. Following a CBRNe incident, the **continuity communication** management provides follow-up information of the event. Building on the previous phase, those directly affected by the incident will demand different information content than the general public.

The public's perception of and the behaviour during a CBRNe incident is strongly influenced by the overall communication management of CBRNe practitioners. Through the provision of preparing information material and adequate education and training prior to a CBRNe incident, CBRNe practitioner can enhance the social resilience to cope with an event. Furthermore, the adequate communication of relevant information during and after an event can further strengthen the compliance with given instructions and the overall trust level. Relevant insights into crisis, disaster and continuity communication in scientific literature that particularly observe CBRNe incidents can

be found by Rubin et al. 2012; Ruggiero & Vos 2014; Ruggiero et al. 2015 and Stanciugelu et al. 2016.

The report focuses on risk communication in regard to an elevated risk and the subsequent crisis communication. It thereby presents relevant findings in regard to joint communication approaches for CBRNe incidents, communication strategies during the event, the role of media to distribute information, the offering of further information material and the subsequent assessment of the effectiveness of the overall communication with the public.

8.3.3.1. Joint-communication approach

The quantitative survey examined the underlying strategy used by First Responder organisations to deal with the public (as a single agency or as part of an inter-institutional approach). Of the 223 survey participants, 74.4% indicate that their organisation has a communication strategy for major emergencies. In contrast, 9.4% of the respondents negate this and 11.7% of the respondents state that they are unaware of such a communication strategy. A significant proportion of the online survey respondents (29.8%) further state that their organisation does not provide information resources to the public on how to deal with a CBRNe incident (see Figure 77Att.). However, not all organisations need a communication strategy for the public since they are not equally involved in the communication. On a personal level, some interviewees state that they are not involved at all in communication with the public in their daily work.

"From the level of our unit, we don't take the matter of the communication." (Interviewee #11, Poland)

In this respect, one interviewee from Germany explains, that the long distances to the hot zone of his unit leads to the situation in which upon arrival they don't get in contact with those affected anymore. He further stresses the clear division of responsibilities between communication tasks and the response tasks (Interviewee #4, Germany).

Other interviewees confirm to have a public relations department within their organisation that deals with public communication (Interviewee #8, Ireland; #13, Sweden; #14, UK):

"We have permanent staff dedicated to handling media and press […]." (Interviewee #13, Sweden)

"I think in any public order event and certainly any CBRNe event, we have media teams, corporate communication assets that will be stood up to the events, to work under the control suite or under the commander." (Interviewee #14, UK)

Consequently, communication with the public is carried out by different stakeholders in a joint communication approach. In a crisis, successfully communication can only be optimally achieved through a networked, coordinated information policy that includes all levels (federal government, organisations, associations, companies, etc.). Thereby, information needs coordination. The majority of the interviewees confirm that the main communication with the public in case of a CBRNe incident is usually coordinated and carried out by a national stakeholder.

"[It] must be known that the fire fighters will communicate only with the clearance of the state representative, the Prefect. Communication, public communication, is a mission of the state representative." (Interviewee #3, France)

"[The] National Public Health Emergency team have a daily press conference." (Interviewee #7, Ireland)

For Ukraine, the interviewee states that communication with the public is provided through “the State Commission for Technological and Environmental Safety and Emergencies or the head of the work for eliminating the consequences emergency situation” (Interviewee #18, Ukraine). A Polish interviewee explains, that “all the communication goes from the National Police Headquarters spokesman, and they're decided to what information, on what channel, and there is all the media division for… in National Police Headquarters, and we just give them information as much as they want it" (Interviewee #11, Poland). Also, the Latvian interviewee (#9) refers to a specialist of the public relation Department of the state police. In contrast, only one interviewee from Ireland named a stakeholder from the emergency health services, namely the health service executive that would mainly distribute related information to the public (Interviewee #8, Ireland). The much more frequent assignment to stakeholders from the police sector could be an indicator for the coordinating role of LEAs in CBRNe response. Following a further basic rule of communication, important information should be continuously coordinated horizontally and vertically in order to be able to speak with one voice. Based on his experiences, one interviewee from the UK (#15) advocates that agencies work together on methods of consistent communication as opposed to individual agencies. Rubin et al. (2012, 11), confirm that consistent messages from representatives of different organisations are crucial for effective crisis communication. In this way, conflicting of differing messages are minimised. The interviewee further explains that it is still possible to deliver different messages that are aimed for different groups or for different affected groups, but the whole communication process is far more coordinated. Additionally, he refers to special communication courses that are aimed for First Responders regardless of their organisation. This reflects an inter-institutional communication approach in which the information of the individual responder organisations are bundled and communicated to the population as one main message. In this context, the set-up of an inter-institutional operation management common centre is mentioned by a Latvian interviewee (#9). The centre strategically decides how best to help the population.

8.3.3.2. Communication strategies in case of an elevated risk of a CBRNe incident

Regarding the communication strategy applied in the situation of an imminent threat situation, similar approaches are found within the interviews:

> *“People want to know straight away, what's going on.”* (Interviewee #7, Ireland)

> *“I think the information has been out to the front very quickly from the start and there is a learning curve as well for everybody.”* (Interviewee #7, Ireland)

In case of an assumed elevated risk of a CBRNe incident, the public has to be informed accordingly (Interviewee #17, Ukraine; #18, Ukraine, #15, UK):

> *“Communicating with the public in the prevention and occurrence of CBRN incidents is one of the main measures in responding to the CBRN threat.”* (Interviewee #17, Ukraine)

Interviewees from Ireland (#8), the UK (#14 & #15) and Norway (#10) agree that the dissemination of information must be prompt or respectively quick. An interviewee from the UK (#15) advocates an urgent call for capacity building since there is simply not enough personnel to fully redirect the public without them helping themselves. Therefore, he stresses the need for early messaging. He concludes that the vast majority of the public need to be armed with enough information to make sensible judgements themselves. Large-scale emergencies, such as Hurricane Katrina in New Orleans in 2005 or the floods in Central Europe in 2013, have shown how important it can be to

provide adequate warnings. As early forms of warning mechanisms, official organisations mainly used sirens or loudspeaker announcements in combination with television or radio to reach as many civilians as possible. An interviewee from Poland also strongly advocates the effectiveness of traditional media channels during this response phase:

> *"Mostly, in my opinion, the fastest way is TV. The second one is the radio, then I think there is from the government centre of security, SMS is working, and the last one would be the Internet."* (Interviewee #11, Poland)

As a consequence, some interviewees still regard TV and radio[8] as important tools to quickly raise awareness and continuously provide information during the event: In fact, six interviewees name **TV** as a frequently used medium (Interviewee #8, Ireland; #12, Spain; #14, UK; #17, Ukraine). An interviewee from Latvia (#9) explains that the country even uses a special news programme on TV with a dedicated time slot for sharing real time information with the public. State television is also used in Poland (Interviewee #11). The **radio** is still used in a comparable way (Interviewee #5, Germany; #8, Ireland; #9, Latvia; #12, Spain). For example, in Norway (#10) the radio is used in combination with the still used siren alarm system. In case of an urgent situation, the sirens are still ringing like back during wartime under the Civil Protection Act. When the sirens sound, citizens know to turn on the radio to get information.

Besides the traditional alarm channels, modern mobile devices are widely distributed throughout the population in many parts of the world. In the phase of an imminent threat situation, so-called warning apps are of particular importance. There are mobile apps for both warning and advising, which have the advantage of warning and providing information to citizens individually, i.e., based on their current location. Kotthaus (2016) highlights that the use of mobile apps has shown that individually targeted warnings are possible and are also more likely to be noticed. Looking at the German crisis communication, authorities currently use two mobile apps to warn citizens, namely KATWARN and NINA. Both apps offer functions to receive warnings, such as weather, floods, fires or bombs/ bomb defuses, partly based on the user's current location. They focus on information distribution and general behavioural instructions. About one-tenth of the survey respondents (11.0%) indicate that their organisation uses mobile applications to inform the public (see Figure 77Att.). Especially those responders who already experienced a CBRNe incident during their professional career use mobile apps to inform the public about a threat situation. Whereas 34.7% of CBRNe practitioners in this group indicate the use, only 2.9% of operational unexperienced respondents do so (see Figure 47). Looking at the different professional groups, firefighters most frequently involve mobile apps in their communication strategy. 18.8% of firefighters, 10.2% of emergency medical responders and 7.1% of LEAs make use of apps (see Figure 48). Regarding the provided content, by the individual professional groups, emergency medical services are least likely to provide pre-incident information (28.2%) whereas the organisations of 61.1% of the firefighters and of 59.0% of LEAs provide such information (see Figure 45). Interviewees from Belgium, Spain and Germany confirm the use of mobile apps in their countries. However, these applications differ in their ways to communicate with the public. In Germany, especially the warning mobile application NINA is mentioned that provides

[8] On the importance of the medium radio during major emergencies, see for example Hugelius et al. (2019), who conducted a literature review of 13 selected scientific contributions.

citizens with relevant information (Interviewee #5, Germany). In Belgium, a similar application is combined with a SMS notification system:

"We have a BE-Alert [https://www.be-alert.be/en]. It is like an SMS. If you are signed to BE-Alert, you get an SMS […], in that area, please stay inside. That's BE-Alert, [it] will go via the fire department or via the police." (Interviewee #1, Belgium)

By contrast, in Spain the App is used as a direct communication tool:

"And one year ago, we made like a project that was, we designed like an application. If somebody was attacked, through like a red button, in real time, that guy or woman asked help to our coordination centre. […] [as an affected one] can stay in touch with the police centre coordination in real time. […] And this application is able to send a text message to all the citizens. And also it is possible to make a conversation." (Interviewee #12, Spain)

The interviewee from Norway (#10) indicates, that the country is also working on the introduction of an alarm system via cell phones. Besides mobile application, the Ukraine, France and Poland use a pure SMS notification system without the end users having to be registered via an App (Interviewee #17, Ukraine; #3, France; #11, Poland):

"Because the very good solution is this SMS system. Because even if you don't watch the TV, or on the shopping or something; you take the message from there from the government security centre, and there is short information." (Interviewee #11, Poland)

An interviewee from the UK (#15) highlights the difficulties of CBRNe as a topic during this phase of a CBRNe incident. He reflects that the topic is so varied and so dependent on what agent caused the incident that one cannot have too many pre-prepared fixed messages. A similar statement is found for Ireland:

"Until you identified and established an idea on what kind of substance it is, you can't really say anything." (Interviewee #7, Ireland)

Furthermore, an interviewee stresses the need for continuously adapted messages that reflect the very distinct time lines of a CBRNe: during the pre-event, during the event itself, and during the post-event (Interviewee #15, UK). In this context, similar to another British interviewee (#14) he proposes the usage of framework messages that focus on specific aspects during the individual phases. A similar voice is found for Greece (Interviewee #6). Both warning and instructing affected citizens in emergencies remains a challenge. Especially the content, personalisation as well as timing of the messages sent should be taken into account, as these facilitate proper preparedness for a CBRNe incident and the behaviour during the event.

8.3.3.3. Communication strategies during a CBRNe incident

A majority of those (76.7%) whose organisations have a communication strategy state that the crisis communication during a CBRNe incident focuses on general communication topics (see Figure 75Att.). Two interviewees explain, that the governmental agencies provide some highlights or advice of how to react and confront this situation (Interviewee #6, Greece):

"You know; what happened, what is currently happening, what are the security measures for the population, what are safety procedures." (Interviewee #3, France)

The strategy also often focuses on evacuation (74.2%) and post-incident information (71.2%). In more than half of the cases, the topics of medical care (58.3%) and decontamination (55.8%) are

addressed. In slightly less than half of the cases, the strategy covers traffic information (46.6%). Traffic information are for example information on the traffic situation after a terrorist attack with CBRNe substances. At least half of all respondents across all groups indicate that their organisation provides information about evacuation, medical care, decontamination and post-incident information (see Figure 45).

However, the comparison of the different professional groups partially reflects the joint communication approach that allocates certain content to certain CBRNe practitioners. Information about medical care is predominantly provided by emergency medical services (79.5%), whereas the information about evacuation (83.60%) and traffic information (72.1%) are mainly considered by LEAs as part of their key tasks (e.g. pubic order etc.). Overall, strategies in all professional groups consider the general communication and information following the event in about 65.0% to 80.0%.

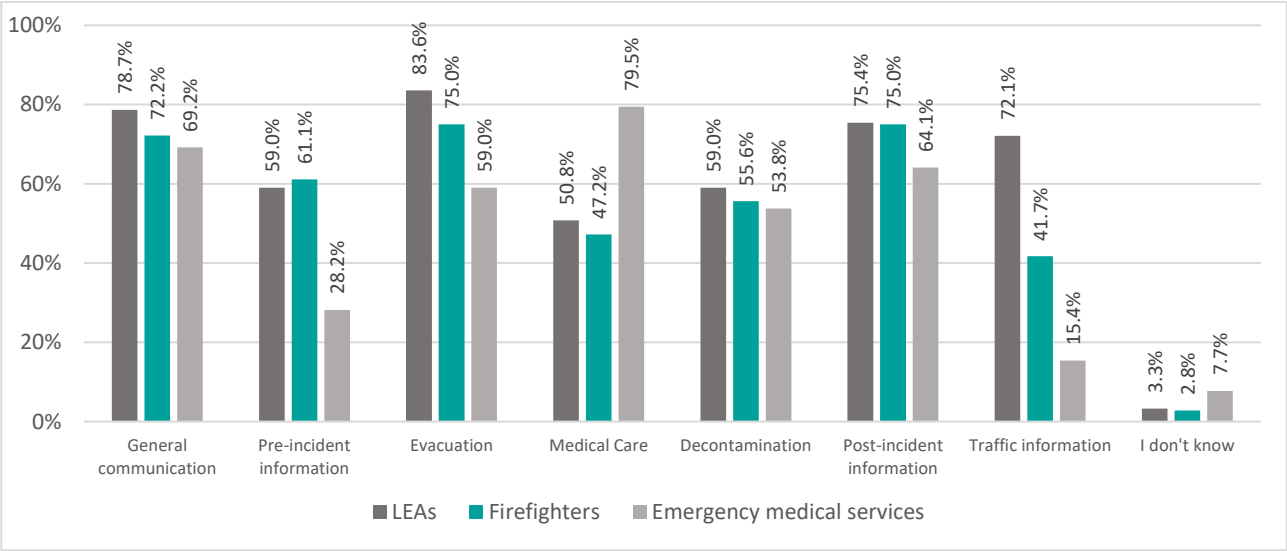

Figure 45: Topics of the organisation communication strategy for major emergencies by profession; multiple selection option (LEAs: n=86; Firefighters: n=36; Emergency medical services: n=39)

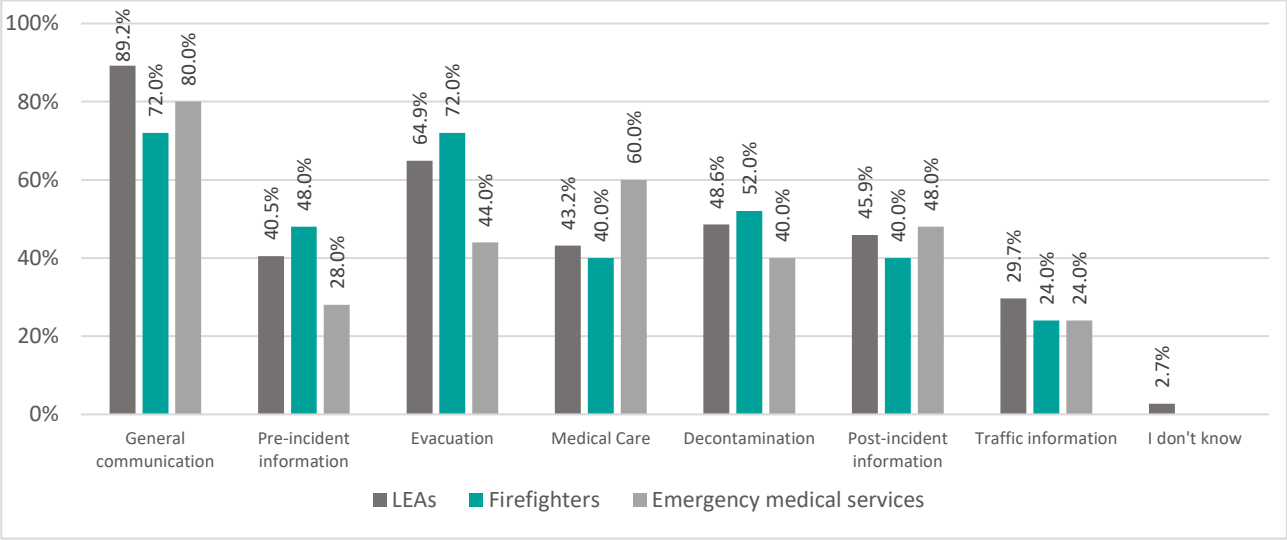

Figure 46: Topics covered in the information material for major emergencies by profession; multiple selection option (LEAs: n=37; Firefighters: n=25; Emergency medical services: n=25)

The communication strategy is reflected in the provided information resources by communication stakeholders (see Figure 76Att.). 83.2% of the survey participants whose organisations provide related information resources state that the information resources cover general information on CBRNe. In addition, 62.6% of the respondents indicate that the information resources address the issue of evacuation during a CBRNe incident. In slightly less than one half of the cases, information resources address the topics of decontamination (47.7%), medical care (46.7%), post-incident information (43.9%) and pre-incident information (42.1%). Less frequently, traffic information (25.2%) are taken into account in the information resources. It is interesting to note that although the individual professional groups indicate to pay attention to certain topics in their overall communication strategy, the topics appear to be less often covered in the related information material (see Figure 46). However the trends among the groups still apply.

One interviewee (#15) remarks that the biggest issue in communicating with the general public is not the content of the communication itself, but how to reach certain groups. Therefore, it is important to understand the community ahead not at the time of crisis. Thereby, he notes, that the difficulty that many organisations face now is that the communities are very diverse and a one-size communication strategy doesn't work since not everybody can be reached at once. Scientific research suggest that vulnerable groups have special needs with regard to language formats that limit their participation in the communication processes. These include, for example, citizens who lack knowledge of the local language or people who have special communication needs due to their physical and mental abilities (see Chapter 8.3.4.). Furthermore, not all members of the public actively participate in the communication process to the same extent like children or homebound older people. Those hard-to-reach members of the public should be considered in the communication strategies. Since some regions will have higher or smaller rate of certain population groups, Rogers et al. (2007, 283) point out that practitioners should consider the different social contexts within the area of the incident for an effective risk communication. According to an Irish interviewee (#8) the communication therefore should be based on a snowball system: The communication centre notifies the media, the media disseminates information out to the public, and the public tells their friends.

8.3.3.4. The role of the media in communication with the public

With regard to publicity, the media and especially the influence of the media play a major role in today's world. Arguably, one of the most promising ways of assessing crisis communication at the moment is through systematic media monitoring before, during and after an event. Facing potential crisis such as pandemics, industrial accidents, bioterrorism, natural disasters, or other serious health threats in today's world, it is even more important to find appropriate ways to communicate with the public. According to Glik (2007), understanding and working with the media are two major components of crisis communication. Recent studies suggest that working with the media is the most important aspect in communicating relevant information to the public, as people are increasingly dependent on the media as their primary source of information. The public often only assess the event based on the information the media provide. They cannot verify the information on their own. As a consequence, it is crucial not only whether the information provided is true, but also whether it is believed to come from a trusted source. As a consequence, the media play an important dual role for CBRNe practitioner: They communicate trust-building information and at the same time maintain trust by giving information.

With the ease and speed of access to Internet and broadcast sources, people's expectations for rapid information retrieval have increased. In particular, the news media play an increasingly important role in communicating health risks to the public. In 2002, a survey of media use found that Americans continue to use local television (51%) and local newspapers (44%) as primary sources of daily news and information, followed by cable news channels (39%) and nightly network newscasts (36%). Radio continues to be recognised as a viable daily news source. Although the interviewees still advocate a high effectiveness of traditional media channels during the response phase, the findings of the survey with CBRNe practitioners imply that in comparison, the radio (34%), personal contact (31.1%), partner websites (29.2%), the TV (28.3%) and the mail (23.6%) are used much less frequently than digital and social media (see Figure 47).

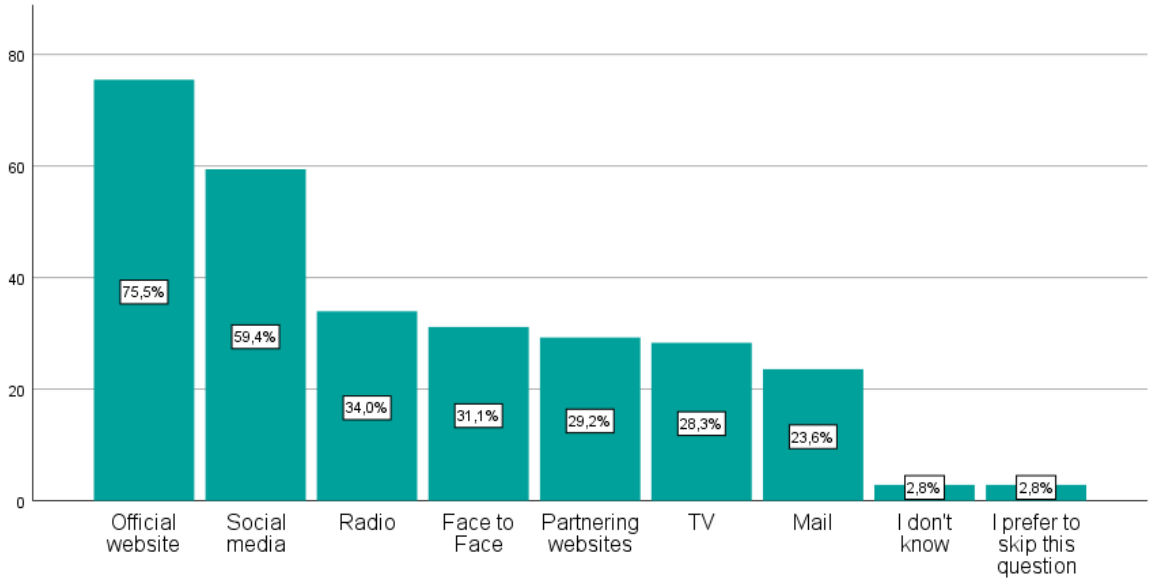

Figure 47: Information channels organisations use to distribute CBRNe-related information for the public; multiple selection option (n=106)

Nevertheless, in a study with crisis communication experts, Ruggiero & Vos (2015, 138 & 147) emphasise that the respondents describe the use of various communication media as a "good practice" characteristic of every crisis communication. Thus, during the CBRNe response, **TV and radio** play a major role in sharing, amongst other content, live press conferences (Interviewee #7, Ireland; #8, Ireland; #18, Ukraine). In total, the organisation of 8.7% of the respondents share TV material and in 4.6% of cases audio material (see Figure 77Att.). Considering former experience with CBRNe incidents, far more respondents with operational experience indicate the use: For TV material this distribution is 15.0% to 2.9% and for audio material 9.8% to 2.9% (see Figure 48). For the individual professional groups, emergency medical responders most frequently indicate the offer of TV material (12.2%) (see Figure 49). In comparison the numbers are very low for LEAs (9.5%) and firefighters (2.1%). In regard to audio material, only emergency medical responders (6.1%) and LEAs (6.0%) indicate that their organisation uses those formats. As not every organisation participates equally in the communication, it is unclear how strong the overall share of such information provided by national stakeholders is.

Following the above findings in regard to the role of digital media, the **Internet** plays a very important role, providing almost instant access to news from around the world. Of the 72,000,000 American adults who go online on an average day, 6% search for health information, typically about specific

diseases, conditions, or treatments. In news gathering, it was additionally found that ethnic minorities and disadvantaged Americans also have quick access to this medium (Glik, 2007). With regard to the project PROACTIVE, this is an interesting aspect that highlights the relevance of expanding online-based communication strategies. 75.5% of the respondents indicate to provide the public with relevant information via their official webpages and additional 29.2% cooperate with partnering websites. Consequently, 34.9% of respondents indicate the offer of online material (see Figure 77Att.). In the group of operational experienced responders, this even applies to 52.0% whereas the number is considerably lower for those who haven't yet been involved in such an incident (23.5%) (see Figure 48). In terms of digital information, all three professional groups seem to be equally involved in communicating with the public. 40.8% of emergency medical responders, 34.5% of LEAs and 29.2% of firefighters report communicating information in this way (see Figure 49). Regarding the role of websites in CBRNe response, the interviewees gave mainly positive feedback: A Polish interviewee (#11) stated that all the institutions have a website, the single organisations and the government itself.

"But the most information, the most concrete information we wrote on the website, the city website. Of the city hall website. Every day, someone was like keeping up date all the news." (Interviewee #12, Spain)

"So, there was an effort made by representatives of the different cultures to develop a website so that they could deliver the same message in their respective language." (Interviewee #7, Ireland)

But there are negative experiences as well like in Norway. Because of difficulties in the maintenance of the major crisis communication website, the site had to be closed down (Interviewee #10, Norway).

Thus, both traditional news and the Internet offer the most efficient means of quickly disseminating information to a large number of people. Therefore, the current crisis communication concern of creating clear and consistent messages and communicating them effectively to the media also makes perfect sense. Furthermore, Glik (2007) states that during a crisis situation, the use of media sources increases exponentially. For example, in the immediate aftermath of the September 11 attacks, Internet usage doubled from 6 million users before the attacks to an average of 11.7 million users after the attacks who visited online news sites daily. The Red Cross Web site alone averaged 398,000 visitors per day that week. Although television and print media remain the primary sources of news and information for the American public, in the event of a public crisis and the resulting need for immediate information, online media are used primarily to stay informed around the clock (Glik, 2007).

In the survey, **social media** (59.4%) are indicated somewhat less often than the organisation's websites to provide relevant information about the current situation (see Figure 47)[9]. However, the results of the interviews show that almost all countries use at least one social media platform (Interviewee #7, Ireland; #6, Greece).

"And there is everything from […] twitter to Facebook to YouTube to, you know, all kinds of social media are used and there are accounts that are set-up specifically, authorised official accounts for police forces […]." (Interviewee #14, UK)

"*We started using massively social networks. I mean Facebook, Twitter…*" (Interviewee #3, France)

[9] On the use of social media during major emergencies, see for example Hornmoen & Backholm (2018); Subba & Bui (2017) and Wendling et al. (2013).

Thereby, Twitter (Interviewee #5, Germany; #8, Ireland; #12, Spain) and Facebook (Interviewee #5, Germany; #10, Norway) seem to be the most frequently used social media channels that are repeatedly mentioned during the interviews. Some interviewees consider social media to be the future in relation to the traditional communication technologies. One interviewee from Ireland (#8) remarks, that these days social media is very important to get information fast out to the general public.

There are similar voices in the UK. One interviewee (#15) elaborates that most emergency organisations have relied on 'historic' methods, like radio broadcast and TV broadcast. The interviewee perceives those technologies as potentially far weaker compared to the social media. Although the emergency organisations in the UK are still considerably weak in using the internet and social media as tools for communication, there are already improvements (Interviewee #15, UK). In this context, an interviewee from the Czech Republic highlights the new possibilities of social media:

"And what we are doing now is the using of the social network. During the emergencies, we provide 100% of the information through social network like Facebook or like Twitter. And we evaluate too the response or the retweets or comments, which are coming on that social networks. And after that we can say: Ok, this is the fake news and we need to make on the right." (Interviewee #2, Czech Republic)

8.3.3.5. The provision of different information materials to prepare for a CBRNe incident and to become informed during an event

As previously mentioned, some members of the civil society will have special needs and preferences regarding the communication design. This includes the favoured use of certain formats like journals, books or TV material to get informed about CBRNe-related topics.

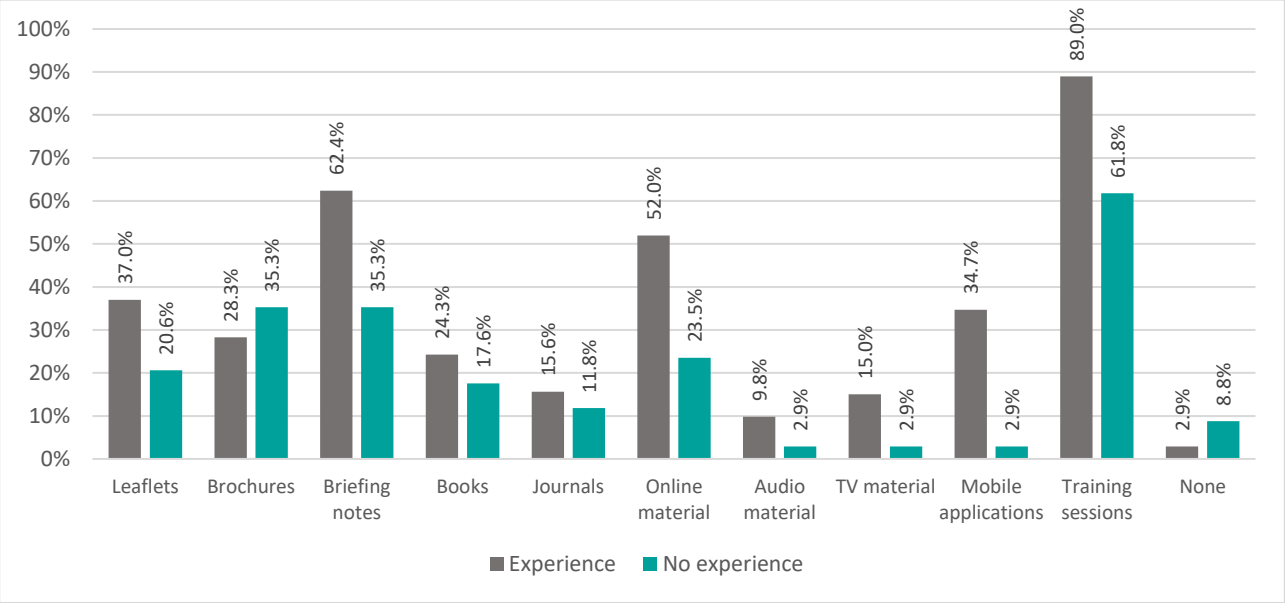

Figure 48: CBRNe-related information resources the own organisation provides for the public to cope with a CBRNe incident by experience with CBRNe incidents; multiple selection option (experienced n=171; unexperienced n=35)

In addition to TV, audio and online material, organisations provide mainly **leaflets** (22.5%) and **brochures** (16.1%) (see Figure 77Att.). No major differences were found among those with and without operation experience (see Figure 48) and among the individual professional groups (see Figure 49). In the interviews, leaflets and newspapers were only mentioned by interviewees from the

Ukraine and Spain (Interviewee #17, Ukraine; #18, Ukraine; #12, Spain). An interesting finding is found in regard to written briefing notes. Whereas in the organisation of responders with operational experience, 62.4% over such information, the number is significantly lower for those organisations without previous contact with CBRNe incidents (35.3%). Very rarely do organisations offer journals (6%), audio material (4.6%) and books (2.8%) with CBRNe-related information.

It should also be noted that about one-fifth (18.3%) of the online survey respondents are unaware (I don't know) which information resources their organisation provides to the public to deal with a CBRNe incident.

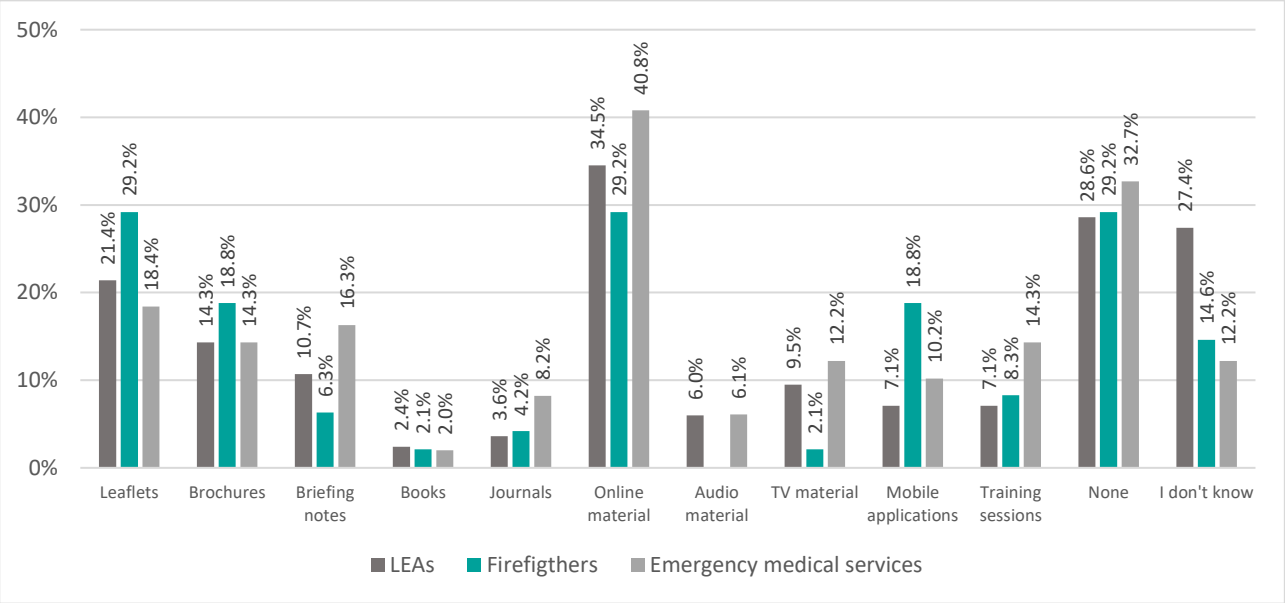

Figure 49: CBRNe-related information resources the own organisation provides for the public to cope with a CBRNe incident by profession; multiple selection option (LEAs: n=84; Firefighters: n=48; Emergency medical services: n=49)

8.3.3.6. Effectiveness of the communication with the public

A consideration of the suitability of the overall communication strategy for major emergencies reveals that about a half of the respondents (46.1%) consider the communication strategy to be "extremely suitable" or "very suitable" to respond to CBRNe incidents (see Figure 78Att.). Furthermore, 35.2% of the respondents perceive the strategy to be "somewhat useful" to respond to CBRNe incidents and only 12.1% of the respondents indicate a "slightly suitable" or "not suitable at all" communication. A country comparison also shows that the participants are predominantly “extremely or very satisfied” with the existing communication strategy (see Figure 46). In Germany, Ireland, Norway, the Netherlands and the UK, comparatively only few participants identify the strategy as insufficient. In Spain, the study shows that participants are either very satisfied or very dissatisfied. However, these smaller samples must be considered with caution.

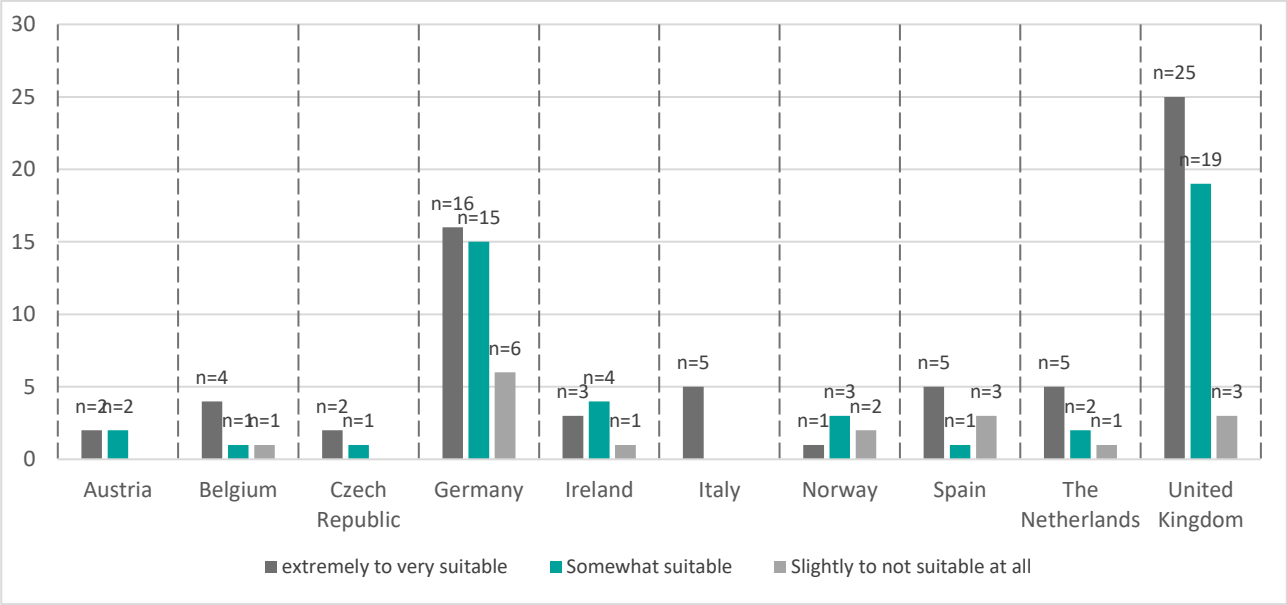

Figure 50: Suitability of the organisation communication strategy for major emergencies to respond to CBRNe incidents by country (Austria: n=4; Belgium: n=6; Czech Republic: n=4; Germany: n=39; Ireland: n=8; Italy: n=5; Norway: n=7; Spain: n=9; The Netherlands: n=8; United Kingdom: n=52)

Asking the respondents to assess the effectiveness of the information resources for the public, it appears that more than a third of the respondents (35.8%) attribute a "very high effectiveness" or "rather high effectiveness" to the information resources (see Figure 79Att.). In contrast, 31.2% of the respondents consider the effectiveness to be "medium" and 18.3% of the respondents classified the effectiveness as "rather low" or "very low".

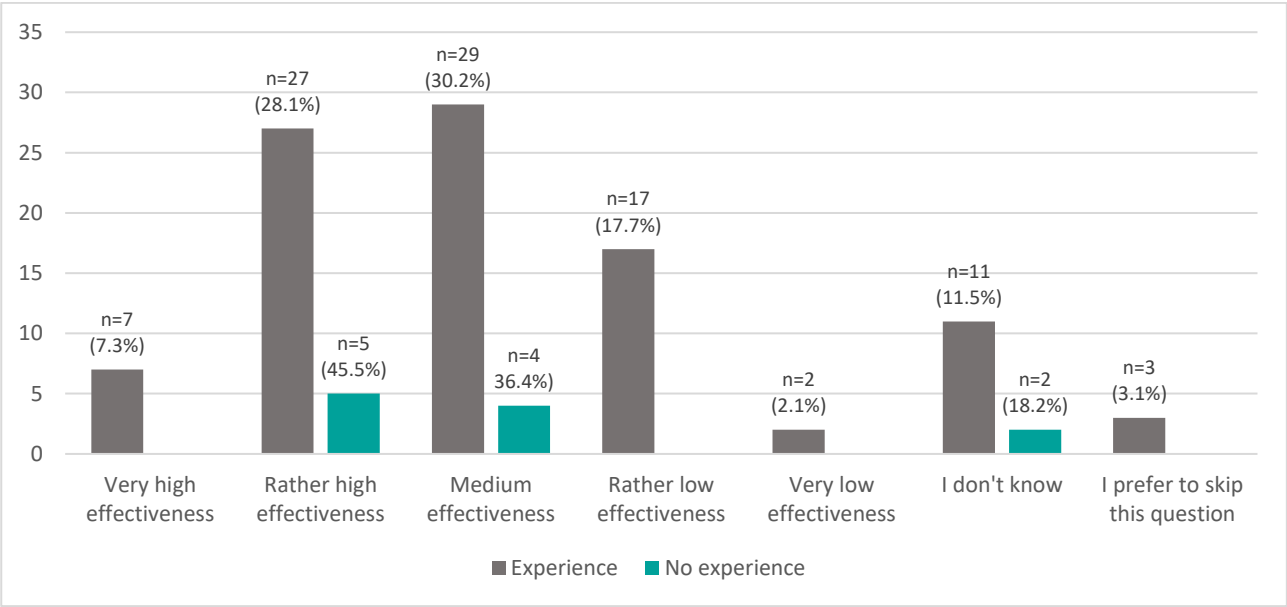

Figure 51: Effectiveness of information material for the public by experience with CBRNe incidents (experienced: n=96; unexperienced: n=11)

Taking into account the experience with CBRNe incidents, it is striking that no respondent of the operationally inexperienced group indicates a very high effectiveness (see Figure 51). In contrast, they are twice as likely as the experienced group to report rather high effectiveness (45.5% to 28.1%). In the middle field there are no differences between the groups. It is also worth noting that

19.8% of the experienced responders attest a rather low effectiveness to the information materials. A country comparison shows similar trends across European countries (see Figure 52). A direct comparison between the UK and Germany reveals that the majority of respondents are somewhat or very satisfied with the information. In comparison, they are only rarely dissatisfied with it. However, in this respect, the values in Germany are higher than in the UK.

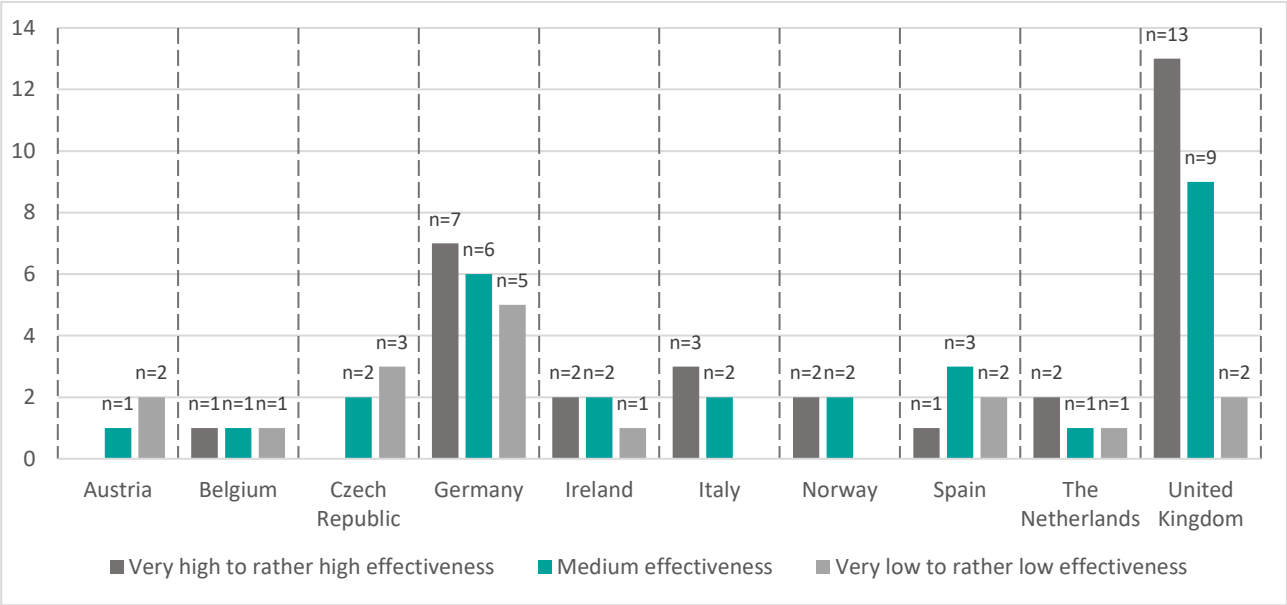

Figure 52: Effectiveness of information material for the public by experience with CBRNe incidents by country (Austria: n=3; Belgium: n=3; Czech Republic: n=5; Germany: n=30; Ireland: n=5; Italy: n=5; Norway: n=6; Spain: n=6; The Netherlands: n=7; United Kingdom: n=30)

Two practitioners from the UK perceive the communication with civilians to be still inadequate (see Interviewee #14, UK; and #15, UK). Thus, there is still room for improvement in all countries.

8.3.4. Consideration of vulnerable citizens in CBRNe response

The following chapter examines the awareness for vulnerable groups in CBRNe incidents in regard to their respective consideration in CBRNe response.

8.3.4.1. Identified challenges in dealing with diverse groups of civilians

Previous research indicates a broad range of different vulnerabilities in relation to CBRNe response measures (e.g. Eid et al. 2019, Chung et al. 2020, Edkins et al. 2010). However, not all interviewees perceive issues in the handling of vulnerable persons in a CBRNe environment. This assessment is based on their area of responsibility as well as their general experience and familiarity with the topic of vulnerabilities in CBRNe incidents. Both interviewees from Germany note that they do not have any points of contact with civilians in their area of responsibility during a CBRNe incident that require a special treatment because as a LEA they are more concerned with the fight against the threat itself. Regarding the evacuation of affected civilians from the hot zone, a German interviewee (#5) states that it doesn't matter what kind of civilians the CBRNe responders deal with and whether they are particularly vulnerable or not since the vulnerability could also steam from the incident itself. Therefore he assumes, no special SOPs are needed in this respect. Another interviewee from Germany mentions another point in the context of vulnerable civilians in CBRNe response. He states that they can't be included in a designated response plan because the police has to be prepared for

all situations or groups in a broader focus. However, he further explains that this plans have to be designed with special focus and sensitivity towards the operational situations.

For the other interviewed CBRNe practitioners, certain challenges in dealing with diverse groups of civilians are identified. Interviewees from countries such as Ireland and the UK note crucial points of contacts between LEAs and vulnerable civilians that have to be explicitly considered in CBRNe response. Especially in the context of the key tasks containment, evacuation and decontamination, the interviewees profoundly stress the special needs of vulnerable civilians. One interviewee notes the difficulties in dealing with vulnerable civilians during the evacuation phase:

"The police will conduct evacuations. It's very difficult to evacuate. There may be children around, there may be very elderly. So there are so many problems." (Interviewee #7, Ireland)

Furthermore, in the UK, measures are undertaken to assist vulnerable people in the hot zone in regard to decontamination processes:

"If there are vulnerable people that can't self-decontaminate or decontaminate with the aid of a fire fighter, they would be pushed in the direction of ambulance, who can do the clinical decontamination for people who can't walk. They may be impeded in movements. So, there is a stratification of decontamination." (Interviewee #14, UK)

In the course of the interviews, a number of interviewees further commented likely challenges in dealing with CBRNe situations. Those comprise the lack of understanding of the topic CBRNe, the spread of misinformation, the resistance of civilians to follow given instructions by the First Responders and issues concerning the interaction between the civilians and the First Responders in regard to the protection gear of the latter. Furthermore, one interviewee addressed the topic of decency regarding the decontamination process and the challenge of dealing with unforeseen challenges. In the following part, these six main challenges will be examined in more detail.

1. Misinformation and missing knowledge

Not only the Federal Office of Civil Protection and Disaster Assistance (2009) but also Dickmann et al. (2011) explicitly address the importance of transparency and proactive communication. In a psychologically difficult crisis situation, active information work must be implemented right from the start (see Chapter 8.3.3.). The more up-to-date and reliable the "official" information is, the better the chance that it will be present in the media. If the organisation does not communicate or does not communicate openly, journalists tap into other, usually less reliable sources. If information deficits have already arisen, the aim must be to regain "information sovereignty" and the trust of the general public through appropriate, open information. The feeling of not knowing creates powerlessness and fear. Therefore, every communication strategy in a crisis must aim to create trust in crisis management. In the past, there has been an increasing amount of mistrust, low trust in authorities and risk perception, a breakdown of communication channels or ambiguous and unclear contents of risk messages, resulting in a rather lose or weak relationship between authorities and the population. According to one interviewee, a media representative should therefore demonstrate certain characteristics such as trustfulness (Interviewee #7, Ireland).

An interviewee additionally refers to the great impact of social media that at the same time poses new challenges for the communication with the public in general and consequently also with the vulnerable civil society during a CBRNe incident:

"News spreads fast, especially now with the social media news and misinformation spreads so fast." (Interviewee #7, Ireland)

The assessment reflects a famous quote by Marc Twain that states that "*A lie can travel half way around the world while the truth is putting on its shoes*." Fault risk perceptions can hinder communication because people misunderstand information, which is why translating scientific knowledge into useful concepts has long been a major concern in risk communication (Glik, 2007). To reduce this challenge, CBRNe practitioners should win the media as partners: In a crisis, the media are the most important "intermediaries" to the public. They have a broad impact and are "close to the people". The aim must therefore be to involve their opinion leaders (editors-in-chief/chief editors, etc.) by providing as much background information as possible and to inform journalists "on the spot" as much as possible about the current situation during the crisis. Internet portals for journalists with up-to-date information relieve the burden on the press offices and support uniform language regulations. This will help **all those affected** to better cope with an incident.

An Irish interviewee adds that beyond misinformation, the missing knowledge is a considerable challenges for CBRNe responders. He explains that even internally within his own police force the term CBRNe is widely unknown. Therefore, it is not surprising that the population is largely unfamiliar with the term (Interviewee #8, Ireland). On that basis, it can be assumed, that the majority of civilians in a CBRNe incident do not have the knowledge to understand the measures of CBRNe responders. This is even more severe in regard to vulnerable groups with certain information needs that have to be addressed in the CBRNe response. This underlines even more why further efforts are needed in the future to achieve an increased risk communication (Abunyewah et al. 2017). An adequate risk communication prior to a CBRNe incident can create awareness for this topic and help educate the public and especially members of the vulnerable civil society about disaster hazards and their adequate behaviour during such events. Since information related to biological hazards has increased in the wake of Covid-19, partial aspects of CBRNe have become omnipresent through the (social) media (e.g. the use of PPEs, self-protection measures etc.). Parts of the population will even have dealt with the topic in depth. On the other hand, misinformation about the spread and the vaccination have equally increased. Further research should focus on the success of certain communication strategies used during the Covid-19 pandemic to identify relevant lessons learned for future CBRNe-related incidents.

2. Resistance

If the public does not trust authorities, this thinking can lead to ignorance for the validity of the information. One interviewee (#14, UK) assumes, that one could only speculate how individual civilians will behave in the specific case of a CBRNe scenario. In general, both interviewees from the UK assume a cooperation with the order of CBRNe responders:

"[…] if you look at the bombings in Britain, nearly everyone was doing exactly what they were told by emergency services. No one was dissenting. There were no problems. There was no disorder. Everyone was doing exactly what was asked of them by the police. The same with the Manchester Arena bombing. Everyone was doing exactly what they were told to do. That could be because the principle that, if you are drowning, you grab on to anything." (Interviewee #15, UK)

In regard to the trainings with vulnerable civilians the interviewee criticises that even if the responders are able to test some aspects that might become a challenge during a CBRNe incident, it's still not real. He further explains, that during a real CBRNe incident, if vulnerable civilians become exposed

to something that is burning or blistering their skin or make them feel unwell in any other way, they might become far more compliant, because they want help. Therefore, some of the issues one might expect to encounter, in realistic terms they don't. Because people know they need help. (Interviewee #15, UK). In this context, an exchange of knowledge between those practitioner who already experienced CBRNe incidents involving members of the public and especially vulnerable people and those practitioners without operational experience should be intensified (see also Chapter 8.1.2. & 8.2.2.). The interviewee further argues that initially, most of the civilians would simply be afraid. As soon as this fear disappears, however, he expects two different types of behaviour: Those who are involved directly in the situation would behave differently than those who experienced the situation as outside witnesses (Interviewee #15, UK). A similar statement can be found by other interviewees:

"It was the observers who were not part of the operation who got suspicious, their mind-set was different." (Interviewee #7, Ireland)

In this context, the topic of resistance is explicitly stressed:

"They [the First Responder] will then have to deal with society and in that evacuation, you will come across so many different types and groups of people and some of them won't move. […] They have a similar problem in other countries as well. People will not evacuate." (Interviewee #7, Ireland)

The interviewee from the UK therefore advocates further research that focuses on differences in the psychological impact of affected people in a CBRNe scenario (Interviewee #15, UK). This comprises amongst other the effect on **children** and **people with mental health conditions**.

3. Fear-inducing character of protective gear

With regard to the psychological effects of the protective gear on the population, no trend can be identified among the interviews. Some interviewees consider mainly negative aspects:

"We look as we look, we don't look very nice because we have all the equipment. We have the gun, we have the…everything. So, this is the first… it could be the first barrier to communicate on the level and say to somebody; OK, everything will be OK." (Interviewee #11, Poland)

An Irish interviewee indicates a similar challenge for CBRNe responder. If civilians look at somebody dressed in a CBRN gear, it looks very serious. Furthermore, he imagines, that some civilians might even get a little scared about the type of equipment (the full-body suit with a mask and rubber gloves). Especially for **vulnerable people**, to look at someone wearing this kind of gear approaching who gives order to move is going to have a psychological impact. Additionally, the interviewee mentions the physical issues surrounding the interaction in full protective gear. In case of a **hearing disability**, it would be difficult to understand the verbally communicated instructions (Interviewee #8, Ireland). The argument of self-protection was also raised as a challenge when wearing protective gear.

"If you got CBRNe specialists where in PPE and certainly RPE, there is an issue about, you can't get too close to the crowd. Especially if crowd want that PPE from you and so I think you have to look at some distance tactics which is not something we often use on mainland Britain." (Interviewee #14, UK)

But the interviews also reveal positive feedback regarding protective gear.

"But, I don't think that [wearing a mask] has been a massive frustration when on a talk with people." (Interviewee #14, UK)

Another interviewee from the UK notes, that most of the equipment now is geared in a way that assists the active amplification of the voice. This makes the voice louder and clearer when speaking through the mask (Interviewee #15, UK). Regarding Covid-19, the same interviewee attests a clear change in public's awareness of CBRNe-related measures: He perceives public awareness of PPE now as far higher than ever before not only in his country but in other countries as well (Interviewee #15, UK).

4. **Decency**

Overall, only one interviewee (#15) raises the issue of decency. When instructing those affected to remove their clothes in front of people and shower, the interviewee expects religion-based incomprehension for certain vulnerable groups who do not want to remove their clothing, for example Sikhs in turbans. Additionally, the mixing of women and men during the showering process is expected to lead to problems. Within certain **religious groups** males and females are not allowed to be seen together. So far only one interviewee indicates that his organisation already addresses this challenge:

"Especially women from […] particular religions who really don't like appearing naked in front of men […]. We started this kind of operational reflection […] a few years before." (Interviewee #3, France)

There is an increased need to address this challenge in SOPs and trainings.

5. **Unforeseen challenges**

Only one interviewee addresses the challenges of dealing with **vulnerable civilians with restricted mobility**. Vulnerabilities that require a wheelchair are expected to be an unforeseen challenge during the decontamination process (Interviewee #15, UK). However, such a challenge can easily be mitigated by addressing the adequate handling of mobility impaired people during the education and subsequent training of CBRNe responders.

8.3.4.2. Consideration of vulnerable groups in communication strategies

It turns out that asking for the general consideration of vulnerable civilians in communication strategies, about a quarter of the online survey respondents (24.2%) state that their organisation's communication strategy for major emergencies does not take vulnerable groups into account (see Figure 53). A further quarter of the respondents (25.5%) is unaware of whether vulnerable groups are a focus of their communication strategy. When vulnerable groups are taken into account, the communication strategy **mainly** focuses on **people with mobility restrictions** (22.4%), **older persons** (20%) and **children** (16.4%). Compared with the other vulnerable groups, these three groups are also the most frequently addressed in the information resources that organisations provide for their personnel to prepare for a CBRNe incident (see Chapter 8.2.2.). Hearing impaired people (10.3%), visually impaired people (10.3%), people with mental health conditions (10.3%), pregnant women (9.7%) and ethnic minorities (7.9%) are very rarely considered in the communication strategy.

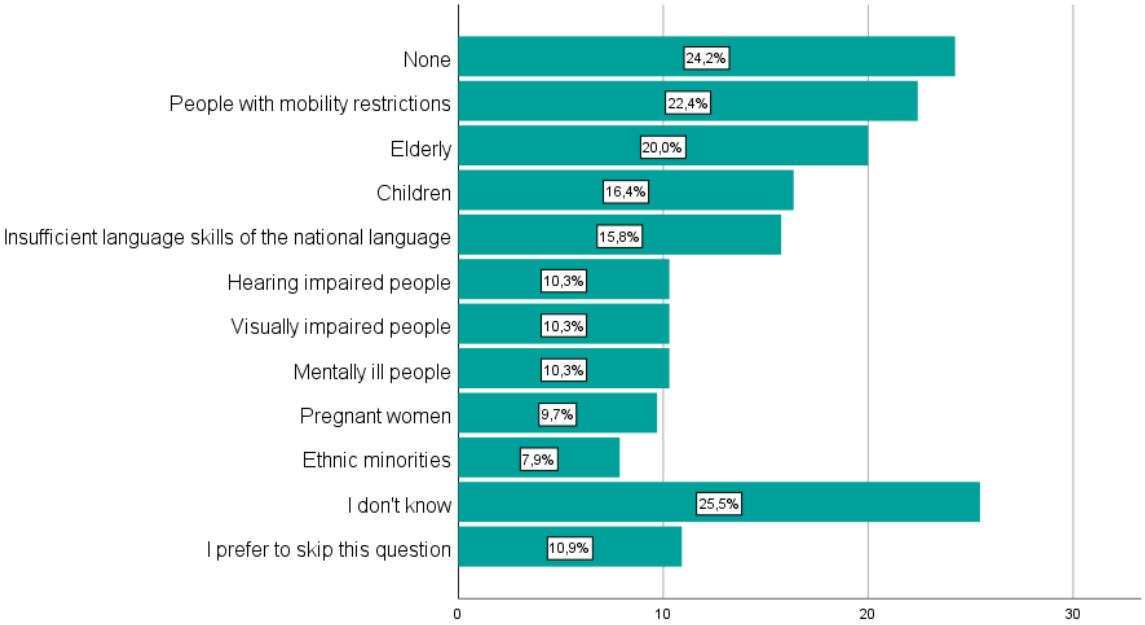

Figure 53: Focus on vulnerable groups in the organisation's communication strategy for major emergencies; multiple selection option (n=165)

A comparison of countries also shows that in the UK, **children, older people and people with limited mobility** and language difficulties are the main groups taken into account (see Figure 80Att.). Participants from the UK also frequently state that they are not aware of such consideration. In Germany, the trend is similar, with children and people with mobility impairments being the most frequently mentioned groups. Similar trends as for the UK emerge especially in regard to firefighters (see Figure 54). In comparison, LEAs and emergency medical responders less often consider people with no or insufficient language skills. Children are also least frequently reported by emergency medicals responders. Overall, there is still need for improvement to address the needs of people with mental health conditions, with visual and hearing impairments, ethnic minorities and pregnant women in CBRNe response. Considering the high number of respondents who are unaware whether these groups are actually addressed in the communication strategy, overall awareness for vulnerability in communication process should be intensified.

Similar results are found in the interview study. The majority does not consider vulnerable groups at all or only to a certain extent in measures of response. In Germany, none of the interviewees indicate that they had any communication strategies in this respect (Interviewee #4, Germany and #5, Germany). One German interviewee (#4) explains, that in his area of responsibility during a CBRNe incident, it is merely a matter of separating the person involved from the immediate threat. Everything else about interaction is done by special professionals. In this case, he commented, it would not really matter what groups of people are on site and whether they are particularly vulnerable or not. The other German interviewee states that although there are no pre-designed concepts for dealing with vulnerable groups during the response phase, the respective persons are nevertheless treated with the given sensitivity (Interviewee #5, Germany). Interviewees from Poland and Spain also indicate only general communication strategies:

"[There are] no special communication strategies that consider the needs of vulnerable people." (Interviewee #12, Spain)

"But for our unit and our operators, we just don't have a time sometimes for making this. Sometimes, our work needs to be a little bit rough, because also, we don't have all the knowledge, who is who. So, for example, if it's older person, we don't know is a suspect or it's a target. So, we most likely will be treat all the person the same, not too very polite maybe, but it's all about the tactics." (Interviewee #11, Poland)

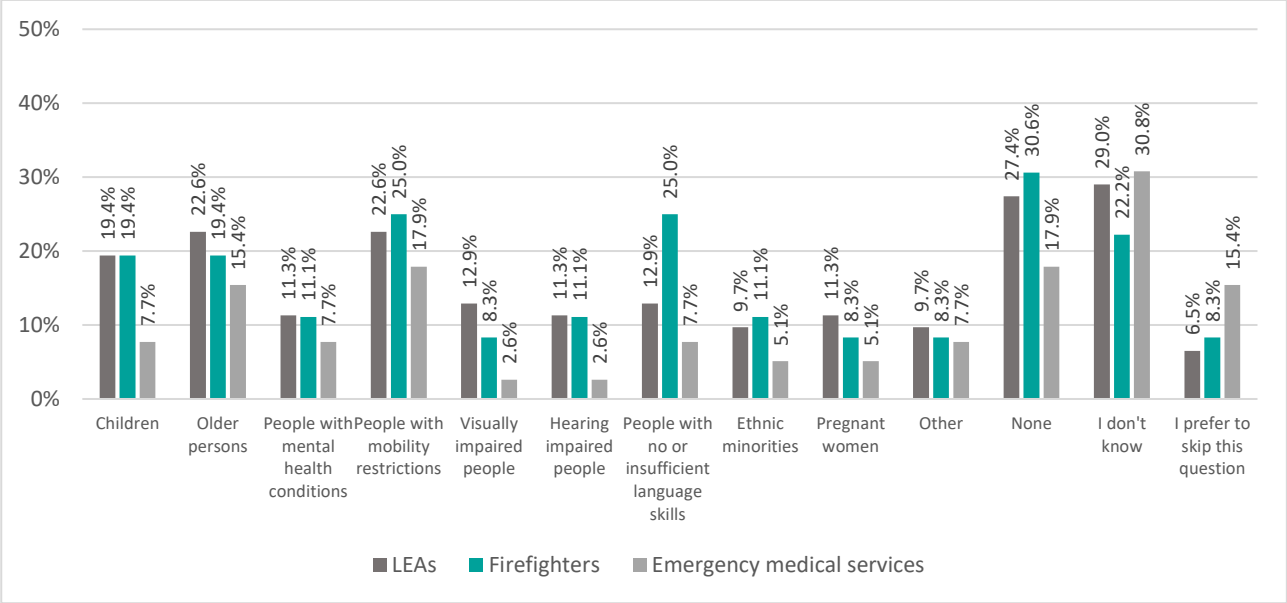

Figure 54: Consideration of vulnerable groups in the organisation's communication strategy for major emergencies by profession; multiple selection option (LEAs: n=62; Firefighters: n=36; Emergency medical services: n=39)

An interviewee from the UK criticises, that the communication strategy mediated in the trainings of the respective organisations provide only a framework, not concrete guidelines for action (Interviewee #15, UK). In contrast, the communication strategy presented by a Ukrainian interviewee follows defined algorithms for processing and transmitting information to the citizens about the situation and the measures taken in the area of the CBRN incident (Interviewee #17, Ukraine). However, no concrete measures in regard to **all vulnerable groups** are mentioned. The Spanish interviewee (#12) also negates any specific tools to communicate with vulnerable civilians. However, he implies that is at least already an awareness for improvement. Sweden is already one step ahead:

"We have language competencies within the force and we are used to meeting people with special needs. We obviously can't solve all problems and meet all needs, but the general police training deals a lot with interacting with different parts of the population and how to handle them." (Interviewee #13, Sweden)

But, similar to the previous statements by the German interviewees, *"there really isn't much of a difference in how we would treat them"* (Interviewee #13, Sweden). These statements underline that there is still a need for action in the field of communication strategies that recognise vulnerable groups.

The benchmarking categorisation also reveals considerable differences among communication strategies across Europe. The Greek interviewee (#6) indicates a still developing communication strategy approach in his country. Although a generic communication strategy for CBRNe preparedness and response is in place, there is no recognition of the special needs of members of the vulnerable civil society in regard to CBRNe incidents. For the Ukraine, the interviewee (#18) identifies a moderate level of the communication strategy. Besides the approaches as seen in Greece, CBRNe respondents additionally have protocols in place to facilitate the communication

between different CBRNe practitioners and vulnerable civilians. In contrast, for Latvia, an optimal communication strategy is implied (Interviewee #9) that comprises a nationally consistent communication plan which addresses the special needs of vulnerable civilians prior, during and after a CBRNe incident. Furthermore, the strategy is continuously updated.

In conclusions, the findings indicate that CBRNe practitioners should share their knowledge on communication with vulnerable persons and, if not already done, concretise and harmonise their SOPs.

8.3.4.3. Accessibility of CBRNe-related information material

Amongst others, Savoia (et. al. 2013, 171) stresses that individuals and groups may not be able to access and use some of the provided information because of existing physical and mental health impairments and social inequalities. Other factors include age and gender.

Persons with no or insufficient language skills in the respective national language(s) are particularly vulnerable during a CBRNe incident. Information in **additional languages** can help those persons to better cope with a CBRNe incident. Of 109 online survey respondents, nearly one half (46.8%) indicate that their organisation provides CBRNe-related information resources in additional languages (see Figure 55). 39.4% of the respondents negate this, and 11.9% of the respondents indicate that they do not know whether their organisation provides information resources in additional languages. There are commonalities between the professional groups studied. Of 25 firefighters surveyed, more than one half (52%) state that their organisation provides CBRNe-related information resources in additional languages. Of 38 LEAs one half indicate this and of 26 emergency medical services, this is true in 46.2% of the cases.

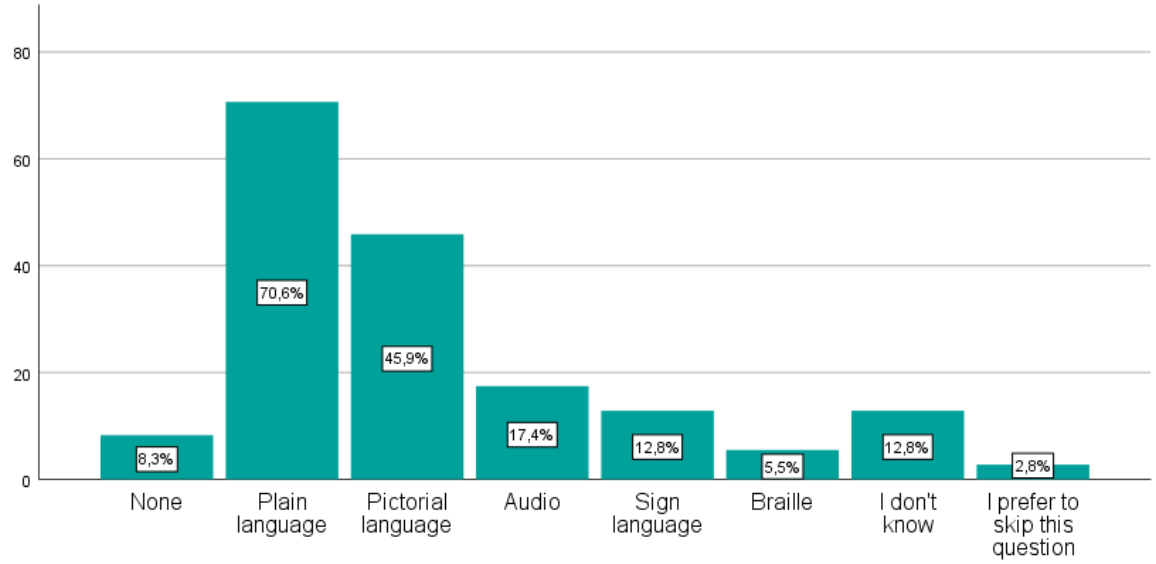

Figure 55: Special formats organisations use to provide CBRNe-related information for the public; multiple selection option (n=109)

According to the interview study, all countries represented by interview participants offer information in at least two different languages. To a certain extent, this also applies to the English speaking countries. Although the daily national press conferences are only conducted in English, there was an effort made by representatives of the different countries to develop a website so that they could

deliver the same message in their respective language (Interviewee #7, Ireland). Similarly, the UK provides supplementary pre-prepared materials in a variety of languages (Interviewee #15, UK). In contrast, countries which are characterised by multilingualism have a higher linguistic diversity in emergency communication. Belgium already covers three to four languages on a daily basis (Interviewee #1, Belgium). Remarkably, France, although not a country of multiple official languages like Belgium, is very involved in translation:

> *"We translate it into English, Classical Arabic, Russian, Chinese, Italian, German."* (Interviewee #3, France)

Furthermore, the country encourages the learning of English among their CBRNe responders (Interviewee #3, France). However, no general trend towards the provision of linguistic diversity across Europe can be deduced from this. It depends strongly on the individual countries.

With regard to **all vulnerable groups**, it is also of interest whether organisations offer CBRNe-related information in special formats. 70.6% of the survey respondents indicate that their organisation uses **plain language**. 45.9% state that the respective organisation uses pictorial language to distribute the information.

This is also reflected in the interview study. The use of **pictorial language** is mentioned a few times (Interviewee #3, France; #6, Greece; #5, Germany; #8, Ireland; #14, UK; #15, UK): A German interviewee lists as an example the use of screens on the patrol cars, onto which pictorial information can be projected as a way of visualisation (Interviewee #5, Germany). Another advocates the simple uplifting of signs (Interviewee #8, Ireland). Regarding the style, one interviewee notes the use of marking, like black lines or triangle obviously, in different type of colours (Interviewee #6, Greece). Another interviewee from the UK (Interviewee #15, UK) comments that most of the communication with the public relies on pictorial information like used in leaflets. In this context, he introduced a campaign called Initial Operational Response, IOR that especially focuses on CBRNe incidents. A part of the campaign is called the Remove Campaign. It comprises **infographics** and is designed in a very simplistic way for the general public to understand the topic. If civilians get exposed to hazardous materials, the campaign provides them with a step-by-step guide about how to react. In case of a CBRNe incident, the government is able to use this campaign that was actually tested on lots of different groups to see if it was effective. The interviewee remarked, that former events have shown, that it is even better if there's someone that the public can trust and follow, but the campaign allows civilians to do it on their own if they have too.

Audio messages (17.4%), **sign language** (12.8%) and **Braille** (5.5%) are rarely used to provide information. In fact, only one interviewee considers loudspeakers as a further way of communication especially for **hard of hearing civilians** on site (Interviewee #14, UK). In contrast, measures that address the needs of **deaf and blind people** were actually frequently mentioned in the interviews (Interviewee #3, France; #7, Ireland; #9, Latvia; #11, Poland; #12, Spain). Here, too, France already appears to be taking a variety of measures into account to include vulnerable groups:

> *"We are currently working on the use of sign language, but not only with deaf people or mute people; we also try to us sign language or an adaptation of sign language with mentally disabled persons, autistic people; especially children; and foreign people."* (Interviewee #3, France)

However, some of the interviewees point out that sign language for **visually impaired people** often only refers to special TV programmes and is not provided at all national press conferences

(Interviewee #9, Latvia; #11, Poland; #12, Spain). Only the Polish interviewee presented measures that make online content available for a **blind** audience:

> *"On the websites there are a lot of things for help to read the text or for hear the text. And the police site uses them. I don't know [if the] the fire brigade [uses them], but I think yes. Because there are some government regulations about it for all the institutions. The […] government has to do it on the website."* (Interviewee #11, Poland)

With regard to **psychologically vulnerable groups** in a CBRNe incident, several interviewees from different countries stated that **psychologists** were involved (Interviewee #6, Greece; #17, Ukraine).

> *"One of the parts of SOPs is to have the communication with the affected population. We have something like psychological teams which can involve in the incident and they are able to communicate with the specific group of the people and explain them or provide them like a first psychological."* (Interviewee #2, Czech Republic)

Furthermore, 8.3% of the online survey respondents indicate that their organisation does not use any of the aforementioned formats to distribute CBRNe-related information to the public. Here, too, there is a general need to provide more formats for vulnerable groups in order to strengthen their participation in the communication process.

9. LIMITATIONS AND FUTURE CONSIDERATIONS

Over the course of the research period, both the quantitative and the qualitative part of the research have revealed some limitations but also ideas for future research.

The quantitative questionnaire was uniformly written in English, due to language difficulties the answers may differ from those that would have been given in the respondents' mother tongue. Therefore, special attention was paid to the linguistic dimension of the questions. The questions were written as simple and clear as possible. Furthermore, a lower response rate was expected compared to a survey questionnaire in the respective mother tongue. Due to the professional level of education of First Responders, which does not always require training in English, the English language character of the study may have been a deterrent.

With the qualitative interviews, a similar restriction applies due to the language barrier. As the interviews were conducted only in English, German, Swedish and Ukrainian language, the answers may differ from those that would have been given in the respective mother tongues. Therefore, like in the previous part of the study, special attention was paid to the linguistic dimension of the questions. The questions were asked as simple and clear as possible.

The interviews were conducted by different researchers, as the project partners were also trained and involved in the interview study. An interviewer training was conducted in the course of an online web meeting session to ensure that the interviews were conducted in a consistent manner by the different interviewers across the consortium and the EU to minimise inter-interviewer discrepancies.

As already mentioned in Chapter 7.1., country comparisons were drawn mainly between Germany and the UK and supported by all countries with more than seven participants. A possible cause for the under-representation of certain countries may be the challenges posed by the newly emerged Covid-19 disease, which shortly before the start of the study impacted the world and the participating countries. Countries that were considerably impacted by the virus had to put most of their available resources into the fight against the pandemic. Thus, the number of participants likely differs significantly, depending on the countries' epidemiological situation at the time of both parts of the study. Due to the limited number of interviewees per country the interviews reflect only a partial understanding of the respective country's conditions. Therefore, in-depth comparisons between countries in regard to their level of preparedness for CBRNe incidents are only possible to a certain extent. The same applies to the assessment of vulnerable groups. Nevertheless, considerable differences were found between the ten countries included in the country comparison.

In general, all research objectives as stated in Chapter 3.1. have been successfully covered.

Differences and similarities between countries in the preparedness /response to a CBRNe incident were identified. In addition to the comparison of individual countries, the report also focusses on the comparison of professional groups (LEAs, firefighters, health professionals) with regard to preparedness and response measures for a CBRNe incident. In addition, the experience of the participants with CBRNe incident was taken into account where relevant.

The extent to which the vulnerable groups are taken into account in CBRNe preparedness and response was also examined (see Chapter 8.2.6. & 8.3.4.)

10. CONCLUSION AND RECOMMENDATIONS

In this section, key results of the research will be summarised with an eye towards the identification of measures associated with CBRNe preparedness and response and potential shortcomings in existing practitioner procedures with respect to vulnerable groups.

Special attention is paid to the research questions formulated in Chapter 3.1. Based on the results, the chapter also features recommendations for practitioners to increase their effectiveness in CBRNe situations and especially in handling vulnerable persons.

10.1. Research questions

This chapter summarises the key results of the report. The quantitative study identified commonalities and differences in CBRNe management between different CBRNe involved practitioners in different European countries. The report further provided an up-to-date picture of the state of CBRNe preparedness and response across European countries in regard to the awareness of the needs of vulnerable citizens in CBRNe management. The complementary interview study with CBRNe practitioners further revealed the threat assessment with regard to CBRNe incidents, security measures in cases of an assumed elevated risk of a CBRNe incident, and the communication with the public, including the media. The research questions are answered in logical sequence and do not refer to the individual parts of the study.

Research question 3: *To what extent does threat assessment by CBRNe practitioners differ between European countries?*

The interview study with 18 selected experts in the field of CBRNe (mostly LEAs) provided a diverse picture regarding CBRNe-related threat assessment. Whereas some of the interviewees (e.g. from Latvia and Poland) assumed a low probability of a CBRNe incident in their area of responsibility and their country, other interviewees assumed a medium (Czech Republic) or high (Sweden and Ukraine) probability of a CBRNe incident. Reference was made to regional and national perspectives. Furthermore, the interview study showed that the majority of interviewees considered the probability of a CBRNe incident due to an accident or technical emergency to be considerably higher than the probability of a CBRNe incident due to terrorist activities.

Research question 1: *To what extent do measures of preparedness and response differ among CBRNe practitioners across Europe?*

In general, the findings revealed that most respondents assumed that their organisation is well or very well prepared for a CBRNe incident in regard to their organisation's preparedness and response. The quantitative study has shown that there are clear differences between the professional groups surveyed (LEAs, firefighters, emergency medical services). Almost 90% of the firefighters stated that their organisation had participated regularly (at least once a year) in CBRNe exercises over the last 10 years. This proportion was considerably lower for LEAs (69%) and emergency medical services (54%). For Germany and the UK, the respondents clearly identified the level of preparedness within their organisation as "very high to rather high". This trend also emerged

in Austria, Spain and the Netherlands. In Belgium, the Czech Republic and Italy, preparedness was considered to be medium.

The majority of respondents stated that they consider the internal education material to be extremely relevant or very relevant to prepare their organisation for a CBRNe incident. Differences emerged when comparing respondents according to their experience with CBRNe incidents in regard to trainings. Those with operational experience significantly more often indicated that their organisation conducts CBRNe exercises on a regular basis. Furthermore, it appeared that LEAs more often carry out exercises with other emergency services (e.g. firefighters, emergency medical services). However, some interviewees expressed the wish to conduct such inter-institutional exercises more regularly. The majority of respondents were satisfied when it came to the quality of equipment for a CBRNe incident. In the online survey, more than half of the respondents rated their organisation's equipment for a CBRNe incident as completely sufficient or rather sufficient. However, differences were found between professional groups. In particular, firefighters, followed by emergency medical services, rated their organisations' equipment as completely sufficient or rather sufficient. Such an assessment was made much less frequently by LEAs. The interview study also revealed differences in the equipment of police and fire brigades for a CBRNe incident. The equipment of fire brigades was described as considerably more comprehensive for this type of tasks as the equipment of the police. Regarding the perceived level of internal allocation of responsibilities in CBRNe response, there is still potential for improvement across Europe. Whereas three quarters of the firefighters gave a rating of "very high" or "rather high", only about half of the respondents from LEAs came to the same conclusion and among emergency medical responders it was not even one in two.

With regard to CBRNe response, similar joint security measures appeared across all professional groups and countries. Furthermore, similar key tasks of CBRNe response were mentioned across all countries, although the allocation of responsibilities strongly depends on the organisations involved in the CBRNe response in each country. In regard to the communication strategy, it became evident, that not all professional groups participate equally in communicating with the public. Corresponding communication strategies exist in all countries, mainly implemented in a joint coordination approach that involves a national spokesperson and various communication channels including traditional and modern digital and social media. However, only about half of the respondents assess the strategy overall as very suitable for managing CBRNe incidents. Nevertheless, in Germany, Ireland, Norway, the Netherlands and the UK, only comparatively few participants described the strategy as insufficient. In addition to the communication strategy, respondents in all countries also addressed the provision of information material to the public. Only slightly more than one third of the respondents attested to a high level of effectiveness in this regard. A country comparison pointed to similar trends across European countries. A direct comparison between the UK and Germany showed that the majority of respondents are somewhat or very satisfied with the information.

Research question 2: *To what extent do European CBRNe practitioners consider the special needs of vulnerable citizens in measures of preparedness and response?*

With regard to the consideration of needs of vulnerable groups, both parts of the study showed that organisations rarely consider the needs of vulnerable groups in CBRNe preparedness and response measures. As discussed in Chapter 8.2., SOPs are necessary to prepare for a CBRNe incident. The online study showed that the majority of organisations have specific SOPs for CBRNe incidents.

However, these SOPs **rarely consider** the needs of vulnerable groups, especially **ethnic minorities**, **hearing impaired people** and **people with mental health conditions**. The interview study also revealed that the needs of vulnerable groups are rarely taken into account in organisations' preparedness measures for a CBRNe incident including education and training and cooperation approaches. The study also revealed that the training of CBRNe responders rarely takes into account the needs of vulnerable groups. The needs of **people with mobility restrictions, older persons and children are the most likely** to be considered. Other groups are barely present.

Similar results emerged for the response phase. Vulnerable groups are often not addressed in communication strategies and are therefore not considered in terms of special language formats. The needs of **children, older people and people with mobility restrictions are most likely** to be considered. **Very rarely**, however, the needs of **people with mental health conditions, visually impaired people, hearing impaired people and ethnic minorities** are taken into account. When looking at the accessibility of information for vulnerable populations, it was found that almost half of all practitioners stated that multilingual information is available for **people with no or insufficient proficiency in the national language**. It was found that in the countries represented in the interview study, the organisations surveyed offered at least one bilingual option. Nevertheless, there are major differences between the countries: While the English-speaking countries focus primarily on English, multilingual countries and other countries like Belgium consider the diversity of their population in the provision of information materials. The bottom line is that there is no general trend towards the provision of multi-lingual diversity across Europe. It depends strongly on the respective country. The results of the online survey stress, that in slightly more than a third of cases organisations do not offer information in another language. Contrary to what the results in respect to the awareness for vulnerable civilians in communication strategies across Europe suggest, **children, older persons and people with mental health conditions** are considered to a certain extent. Of those who acknowledge the needs of vulnerable civilians by providing special language formats, almost three quarters offered information in plain language, and pictorial language was provided in almost half of the cases. The use of visual language was also strongly emphasised in the interview study in regard to **visually impaired people**. In this respect, the needs of **individuals with dyslexia** are also served. But as reflected in the communication strategy, the needs of **hearing impaired people and visually impaired people are far less frequently taken into account**. Even if information is provided at all that takes into account the needs of vulnerable people, visually impaired people can only access this information in the form of audio material in 17.4% of cases. The rates are even less with Braille with 5.5% and only 12.8% of the respondents could confirm the availability of sign language for hearing impaired people. Those figures give cause for concern. Compared to these figures from the quantitative survey, interviewees confirmed far more frequently that linguistic formats addressing these vulnerable groups are used. The interviews further revealed that the availability of these formats is often limited, e.g. at certain broadcasting times and on selected TV channels. Therefore, improvements need to be made to provide those vulnerable populations with the information they need to cope with a CBRNe incident.

Differences between countries in addressing the needs of vulnerable groups in CBRNe situations have been particularly evident between the UK and Germany. Respondents from the UK stated considerably more often that their organisation considers the needs of vulnerable groups.

In conclusion, the awareness of the needs of particularly vulnerable groups is relatively low among CBRNe responders across Europe. Consequently, the ultimate consideration of these needs is likely

to be even lower. As a basis for stronger future consideration, the general understanding of such marginalised groups must therefore first be improved (see recommendations).

10.2. Recommendations

The findings point to certain aspects of CBRNe management across Europe that are perceived as insufficient to meet the challenges related to such incidents. The assessment is based on the statements of CBRNe practitioners in both the quantitative survey and the interview study. In addition to the recommended actions to mitigate or clear the identified shortcomings, the recommendations identify the responsible stakeholders who play a crucial role in the implementation of these recommendations. In total, the following recommendations comprise the key elements 'why' the recommendations should be implemented (identified gap), 'how' the implementation should take place (recommended actions) and 'who' should implement the recommendation (responsible stakeholders). Additionally, some recommendations indicate necessary 'conditions for implementing the proposed actions'. The recommendations are intended to enable stakeholders to address the identified points in a targeted manner. For this purpose, the individual recommendations have been designed in such a way that they are inherently consistent and can be copied individually from the document. References within individual recommendations to others make it easier for stakeholders to address corresponding recommendations.

The report has shown that there is an urgent need to raise awareness of the needs of vulnerable groups in CBRNe situations. The following recommendations arise from the findings of the report:

Recommendation 1: *The needs, expectations and challenges in regard to especially vulnerable members of the civil society should be considered more extensively in CBRNe-related SOPs.*

Identified gap	Overall, too little attention is paid to vulnerable groups in CBRNe incidents (e.g. measures of response, communication strategies, etc.). In particular, ethnic minorities, hearing impaired persons, and people with mental health conditions are insufficiently considered in SOPs.
Recommended actions	• LEAs and first responders should revise their SOPs to identify vulnerable groups that are insufficiently considered. • LEAs and first responders should engage with CSOs to exchange knowledge about the needs, expectations and challenges (especially CSOs representing ethnic minorities, hearing impaired persons and people with mental health conditions) of particular vulnerable groups. ***(see Recommendation 3)*** • LEAs and first responders should use networks (conferences, seminars, joint trainings, the PROACTIVE App, etc.) with other practitioners (also from other countries) (including blue light organisations, municipal authorities, security companies, etc.) and interested/relevant CSOs to exchange "lessons learned" and "best practices". • LEAs and first responders should raise overall awareness of their efforts to include vulnerable groups in their SOPs via social media channels/networks (giving impulses and setting a good example). ***(see Recommendation 2)***
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management.

Recommendation 2: Vulnerability *should be addressed more intensively in CBRNe-related discussions in order to raise awareness of the needs, expectations and challenges in regard to especially vulnerable members of the civil society in CBRNe incidents.*

Identified gap	As has been shown in the online study, vulnerability is too rarely addressed in CBRNe SOPs, CBRNe exercises, CBRNe communication strategies, etc.
Recommended actions	• LEAs and first responders should create/use communication platforms with other practitioners and CSOs to raise awareness for the topic of vulnerability in CBRNe management (e.g. conferences, seminars, trainings, e-libraries with relevant research and guidelines, etc.). • LEAs and first responders should engage in knowledge exchange with practitioners from other countries in terms of dealing with/addressing vulnerable groups in CBRNe incidents (e.g. conferences, seminars, joint trainings, projects, etc.). • LEAs and first responders should raise overall awareness of their efforts to include vulnerable groups in their SOPs and exercises via social media channels/networks (giving impulses and setting a good example).
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management.

Recommendation 3: *More extensive inter-institutional cooperation between organisations involved in CBRNe incidents and CSOs should be sought.*

Identified gap	More than half of the respondents report having no cooperation agreement with CSOs representing members of the vulnerable civil society. Only in one out of ten cases such cooperation was confirmed. Also in the interviews, only two participants reported their own experiences with this kind of cooperation. Furthermore, vulnerable persons are insufficiently involved in relevant exercises. As a result, first responders lack the knowledge to adequately address the needs of vulnerable civilians in CBRNe operations. This creates an urgent need for CBRNe practitioners to implement cooperation agreements with CSOs. Especially with regard to CBRNe response, there is an insufficient inclusion of translators, psychologists and psychiatrists in networks of LEAs and first responders.
Recommended actions	• LEAs and first responders should (more regularly) involve members of CSOs in joint exercises. ***(see Recommendation 5)*** • Unforeseen challenges in dealing with vulnerable civilians might be decreased by strengthening the exchange of knowledge between first responder organisations and CSOs representing vulnerable groups. LEAs and first responders should exchange knowledge about the specific needs of vulnerable groups with relevant CSOs in order to adequately adapt CBRNe-related exercises, SOPs and information materials **(see Recommendation 1, 5, 6, 7 & 8)** Furthermore, the topics "containment," "evacuation," and "decontamination" in regard to diverse groups of civilians should be firmly discussed to reduce stress symptoms. ***(see also Recommendation 6)*** • LEAs and first responders should include relevant translators, psychologists and psychiatrists into their networks to facilitate the engagement with certain members of the vulnerable civil society. • LEAs and first responders should disseminate CBRNe-related information to CSOs to raise awareness of such incidents. • If possible, LEAs and first responders should implement cooperation agreements with CSOs to implement a firm partnership. • LEAs and first responders should exchange “lessons learned” and “good practices” of such cooperation with other practitioners. • LEAs and first responders should raise overall awareness of their efforts to cooperate with CSOs via social media channels and other networks (giving impulses and setting a good example).
Conditions for implementing the proposed actions	When initiating a cooperation, it should be clarified at which level the cooperation should be established (management level, etc.). In addition, a clear cooperation goal should be formulated, as well as approaches for achieving this goal. Furthermore, evaluation mechanisms seem to be useful in order to check the effectiveness of the approaches.
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management and CSOs representing vulnerable groups.

Inter-institutional exercises contribute to an understanding of the responsibilities of the other emergency services during a CBRNe incident. Furthermore, joint CBRNe exercises have been assigned a coordinating role. Therefore, the following recommendation should be considered:

Recommendation 4: *An increase in regular CBRNe exercises is desirable to train SOPs, to harmonise procedures, and to increase the level of preparedness and the clarity of responsibilities. Furthermore, interagency exercises should be conducted more regularly to create an understanding of the responsibilities of other involved practitioners during a CBRNe incident.*

Identified gap	Respondents indicate, that whereas almost 90% of the firefighters regularly engage in exercises, the proportion was considerably lower for LEAs (69%) and healthcare workers (54%). Furthermore, since 67.4% of respondents rated inter-institutional exercises as "extremely helpful" or "very helpful" in regard to the response to major incidents, exercises with relevant practitioners should be conducted more intensively.

Recommended Actions	• CBRNe exercises should be conducted more frequently, especially by healthcare workers.
	• LEAs and first responders should intensify inter-institutional CBRNe exercises with other relevant practitioners (blue light organisations, municipal authorities, private security companies, staff working in critical infrastructures such as the railway, etc.). ***(see also Recommendation 5 & 6)***
	• LEAs and first responders should engage more regularly in training exercises that focus especially on the interaction with the public. ***(see also Recommendation 5 & 6)***
	• LEAs and first responders should exchange respective knowledge, “lessons learned” and “best practices” with practitioners (from other countries) via conferences, seminars, joint trainings, projects, the PROACTIVE App, etc.:
	  ○ Templates for confidentiality agreements when including external people in CBRNe exercises.
	  ○ Guidelines for exemplary exercises that address tactical issues.
	  ○ Helpful contact points for recruiting volunteers.
	• LEAs and first responders should continuously adapt their SOPs based on the learning outcomes of the exercises. ***(see Recommendation 1)***
	• The outcomes should be shared with other relevant stakeholders (e.g. via conferences, published guidelines, the PROACTIVE App, etc.). ***(see Recommendation 2)***
	• The relevance of such trainings should be stressed among first responders (e.g. via seminars, information materials, etc.).

Conditions for implementing the proposed actions	The following points should be discussed prior to joint trainings: • Recruitment issues. • Legal/Confidential obligations in including external people. • Logistical/tactical issues to be considered.
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management, but especially practitioners operating within the hot zone, other practitioners dealing with critical infrastructures such as railways and airports, relevant municipal authorities and private security companies.

As with other preparedness measures for a CBRNe incident, the online study has shown that vulnerable groups are very rarely included in CBRNe exercises.

Recommendation 5: *An increase in regular CBRNe exercises that involve members of the vulnerable civil society is desirable to train specific SOPs, to adapt relevant procedures, and to increase the level of preparedness.*

Identified gap	Respondents indicate, that exercises only sporadically address contact with the public. Only in very few cases, exercises focus on contact with vulnerable groups. Additionally, vulnerable persons are insufficiently involved in relevant exercises. An increased participation of vulnerable groups in CBRNe exercises is urgently needed to adequately adapt CBRNe-related SOPs. Especially people with mobility restrictions, older people and also children participate too rarely in such exercises.
Recommended actions	• LEAs and first responders should more regularly involve members of the vulnerable civil society in training exercises. • In particular, the needs of people with mobility restrictions, older people and children should be more strongly included. • Cooperation with schools, CSOs representing vulnerable groups or retirement homes should be sought to recruit volunteers. ***(see Recommendation 3)*** • LEAs and first responders should involve representatives of CSOs more regularly in the design and supervision of exercises. ***(see Recommendation 3)*** • LEAs and first responders should exchange "lessons learned" and "good practices" of such exercises (e.g. recruitment issues, legal and ethical restrictions, helpful briefing notes, checklists of points to be considered when involving vulnerable people, etc.). ***(see Recommendation 2)*** • LEAs and first responders should continuously adapt their SOPs based on the learning outcomes of the exercises. ***(see Recommendation 1)*** • The outcomes should be shared with other relevant stakeholders (e.g. via conferences, published guidelines, the PROACTIVE App, etc.) ***(see Recommendation 2)*** • The relevance of such trainings should be stressed among first responders (e.g. via seminars, information materials, etc.). • LEAs and first responders should raise overall awareness of their efforts to include vulnerable groups in their exercises via social media channels/networks (giving impulses and setting a good example). ***(see Recommendation 2)***
Conditions for implementing the proposed actions	The following points should be discussed prior to trainings involving vulnerable groups: • Recruitment issues. • Legal/Confidential obligations in including external people. • Logistical/tactical issues to be considered. • Ethical obligations in including vulnerable people.
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management, but especially practitioners operating in the hot zone, relevant CSOs, schools and nursing homes.

Drawing on the insights of the interview study, the 'containment', the 'evacuation' and the 'decontamination' of diverse groups of civilians were noted as expected processes that cause profound stress especially for vulnerable civilians. In this context, interviewees mentioned intimidation of civilians by the PPE[10], the issue of decency in the frame of decontamination and the occurrence of unforeseen challenges in dealing with vulnerable civilians.

Recommendation 6: *In particular, the topics of "containment", "evacuation" and "decontamination" should be trained during CBRNe exercises.*

Identified gap	Respondents indicate in only 52.7% of cases that exercises "always" or "frequently" focus on the topic of evacuation during a CBRNe incident. Furthermore, as mentioned above the topics of containment and decontamination were noted as expected processes that cause profound stress especially for vulnerable civilians.
Recommended actions	• LEAs and first responders should more regularly focus on challenges of the undressing and decontamination process during exercises. • Identified challenges of the undressing and decontamination process should be discussed in smaller groups internally or with the partner organisations involved in order to develop possible solutions that can be incorporated into SOPs. ***(see also recommendation 7 & 8)*** • LEAs and first responders should exchange their suggestions to address certain CBRNe response challenges (e.g. the decontamination of vulnerable people, reluctance of people to follow the evacuation measures of emergency forces, etc.) with relevant CSOs. ***(see Recommendation 3)*** • LEAs and first responders should continuously adapt their SOPs based on the learning outcomes of the exercises. ***(see Recommendation 1)*** • The outcomes should be shared with other relevant stakeholders (e.g. via conferences, published guidelines, the PROACTIVE App, etc.). ***(see Recommendation 2)***
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management, but especially practitioners operating in the hot zone.

[10] Although Covid-19 is expected to improve the understanding of CBRNe and thus of PPE.

To facilitate the cooperation approaches identified in the study in terms of education, training, communication and overall preparedness and response, the allocation of responsibilities should be made clearer, especially for those who have not yet experienced a CBRNe incident.

Recommendation 7: *LEAs and first responder organisations should review their SOPs, cooperation agreements, etc. to determine if the documents are clear enough about responsibilities during a major incident (including CBRNe incidents). This includes responsibilities within the own organisation as well as the division of responsibilities between the individual organisations (fire brigades, LEAs, etc.) in the event of a major incident.*

Identified gap	Partly, cooperation agreements, SOPs, etc. seem to be missing or insufficient to outline clear responsibilities within and between LEAs and first responder organisations in the event of a major incident.
Recommended actions	• Where necessary, LEAs and first responders should define clear responsibilities that are documented and made available to the relevant stakeholders (e.g. organisational charts, guidelines, contact lists with responsible stakeholders, minutes of relevant meetings where decisions were formulated, etc.). • If necessary, LEAs and first responders should update their cooperation agreements with other blue light organisations to clearly define the responsibilities in case of a major incident. If corresponding cooperation agreements do not exist, it should be examined on a case-by-case basis whether respective cooperation agreements are suitable for the distribution of responsibilities during a large-scale operation. • The distribution of responsibilities should be trained regularly during exercises. • Members of the involved partners should conduct short joint debriefings after exercises and CBRNe incidents to identify issues at an early stage. • LEAs and first responders should continuously adapt their SOPs based on the learning outcomes of the exercises. ***(see Recommendation 1)*** • LEAs and first responders should use networks (group meetings, conferences, seminars, etc.) with other practitioners to exchange “lessons learned” and “best practice”.
Responsible stakeholders	All LEAs and first responder organisations involved in CBRNe management, but especially practitioners operating within the hot zone.

To increase the number of information materials accessible to members of the vulnerable civil society, CBRNe responder organisations engaged in communication with the public should expand their services:

Recommendation 8: *Communication before, during and after a CBRNe incident should support the public more effectively to prepare for and to cope with the specifics of a CBRNe incident.*

Identified gap	Respondents report a low number of CBRNe-related information materials available to the public; an infrequent communication of the topics “medical care”, “decontamination”, and “pre-incident information”; the lack of communication strategies designated to the peculiarities of CBRNe incidents; and a partially insufficient communication with the public in the hot zone.
Recommended actions	• LEAs and first responders should publish CBRNe-related information material prior to an incident to enhance public preparedness. ***(see also Recommendation 9)*** • If possible, cooperating LEAs and first responders should refer to further information on each other's pages. • LEAs and first responders should review their CBRNe-related information materials and (if applicable) address the topics “medical care”, “decontamination”, and “pre-incident information” more strongly. • Where possible, information campaigns should inform the public about CBRNe-related aspects (e.g. Remove campaign in the UK). • LEAs and first responders should revise their existing communication strategies for large-scale incidents to identify gaps and insufficient coverage of the specifics of CBRNe incidents. Where necessary, dedicated communication strategies should be formulated. ***(see also Recommendation 9)*** • LEAs and first responders should exchange knowledge about communication procedures with relevant practitioners (e.g. other blue light organisations, municipal authorities, etc.) to create joint communication strategies. • LEAs and first responders should exchange knowledge with practitioners from other countries in terms of effectively communicating in CBRNe incidents (e.g. via conferences, seminars, joint trainings, projects, the PROACTIVE App, etc.). • LEAs and first responders should use networks with other practitioners and interested/relevant CSOs to exchange “lessons learned” and “best practices”.
Responsible stakeholders	All LEAs and first responder organisations involved in CBRNe management.

An important point that was addressed several times in the interview study is not only to reach a broad public, but to specifically target vulnerable groups through communication measures. Based on the previous sections, the following recommendation is formulated:

Recommendation 9: *The needs of vulnerable groups should be addressed more frequently in the communication strategies before, during and after a CBRNe incident. Thereby, first responder organisations should acknowledge and understand the diversity of their audience prior to a CBRNe event in order to be able to increase the number of people actually receiving their information.*

Identified gap	The special needs of the vulnerable civil society are insufficiently taken into account with regard to the design of CBRNe-related information materials (e.g. information materials available in Braille, sign language, etc.). Additionally, they are insufficiently addressed in the overall communication strategy. Respondents indicate to a large extent that their organisations' communication strategies, especially those for major incidents, do not take vulnerable groups into account. Where vulnerable groups are taken into account, communication strategies focus mainly on people with mobility impairments, older persons, and children. In contrast hearing impaired persons, visually impaired persons, people with mental health conditions, and pregnant women are very rarely taken into account. Ethnic minorities are included even less frequently.
Recommended actions	• LEAs and first responders should review their CBRNe-related information materials in regard to the accessibility by different members of the vulnerable civil society. • LEAs and first responders should strongly implement and increase the amount of information available in additional language formats (e.g. Braille, sign language, etc.). In this regard, in particular the needs of hearing impaired people and visually impaired persons should be addressed more frequently. Furthermore, people with mental health conditions, pregnant women and ethnic minorities (who in addition partly do not understand the respective national language sufficiently or at all) should be given more attention. In this context, information materials should be offered at least in English in addition to the respective national language(s). • At the same time, LEAs and first responders should reduce existing restrictions on accessing information that is already publicly available (e.g. e-accessibility of webpages). • LEAs and first responders should expand the number of communication channels used (e.g. new online and social media vs. traditional media). • LEAs and first responders should exchange knowledge about the specific needs of members of the vulnerable civil society in regard to communication strategies with relevant CSOs. In addition, cooperation can be sought to prepare CBRNe-related information materials in special language formats (Braille, sign language, etc.). ***(see Recommendation 3)*** • LEAs and first responders should revise their existing communication strategies for large-scale incidents in regard to affected vulnerable civilians to identify gaps and insufficient coverage of the peculiarities of CBRNe incidents. If necessary, dedicated communication strategies should be formulated. ***(see Recommendation 1)*** • LEAs and first responders should exchange knowledge about successful communication strategies with relevant practitioners (other blue light organisations, municipal authorities, etc.) to create joint communication strategies. • LEAs and first responders should exchange knowledge with practitioners from other countries in terms of effectively communicating with vulnerable groups in CBRNe incidents (e.g. via conferences, seminars, joint trainings, projects, the PROACTIVE App, etc.). ***(see Recommendation 2)*** • LEAs and first responders should use networks with other practitioners and interested/relevant CSOs to exchange “lessons learned” and “best practices”. ***(see Recommendation 2)***
Responsible stakeholders	All LEA and first responder organisations involved in CBRNe management.

Within this chapter, **9 recommendations** for CBRNe practitioners were presented that cover different phases of CBRNe management. The recommendations will be further specified in the subsequent and complementary PROACTIVE sub-study with representatives of the vulnerable civil society (see Deliverable 3.4; Carbon et al. 2021). Following the recommendations of this study as well as those of the study with representatives of CSOs can help to address the specific needs of vulnerable groups more appropriately in the event of a CBRNe incident. In conclusion, the studies can thus make a modest contribution to the visibility of vulnerable groups in the event of a CBRNe incident.

11. OUTLOOK ON COVID-19

It can be assumed that the global Covid-19 pandemic has influenced practitioners' perceptions of CBRNe incidents, particularly those triggered by biological agents. In fact, practitioners are aware of such a pandemic situation in the individual risk assessment. When asked about the context of CBRNe incidents, 7.5% of the participants of the online survey mentioned pandemics such as Covid-19 as a concrete threat (see Chapter 8.1.). The interview study indicates that this awareness was not so pronounced before Covid-19. Apparently, the overall likelihood of a CBRNe incident is perceived to have risen after the outbreak of Covid-19 even though the threat levels of CBRNe incidents in general differ between countries. Also in the interview study, participants addressed the situation, even though this topic was not originally intended to be part of the interviews. Some even seemed to feel a strong desire to talk about it.

In the interviews it became apparent that the pandemic situation has highlighted deficiencies as well as opportunities. On the one side, the experience with the Covid-19 pandemic has contributed to a greater focus on the vulnerabilities of certain groups (see Chapter 8.3.4). While parts of the population had not previously been the focus of practitioners' measures, this changed in the course of the pandemic. The various vulnerabilities became more visible, demonstrating the need for more comprehensive measures. But it is not only the awareness of the practitioners towards the vulnerable population that has increased. There is also a greater understanding of the measures taken by practitioners on the part of the civilian population (see Chapter 8.3.4). During the pandemic, aspects of CBRNe have become omnipresent through the (social) media. Basic knowledge about protective gear, hygiene concepts, hospital capacities, containment policy and even the epidemiological calculation of incidence levels is perceived to be far higher than ever before.

Future studies will be able to provide more concrete and detailed information on the impact of the current pandemic on practitioners as well as civilians.

12. SYNERGIES WITH OTHER WPS AND TASKS

WP1: The deliverables of WP1 provide a valuable overview of the content of existing guidance documents as well as respective shortcomings in regard to vulnerable people in a CBRNe environment. Based on the findings of the participants in both the survey and the interview study, some recommendations could be revised and strengthened during this research.

WP2: Selected members of the PSAB gave feedback during the development of the questionnaire. Members of the PSAB were further involved in the final review of D2.3. Moreover, the PSAB strongly contributed to the findings and recommendations in D2.3 by participating in the survey and sharing the survey within their networks.

WP3: The 9 recommendations of D2.3 entail certain needs for action on part of practitioners. They will be further explored and made concrete in D3.4 in which the (perceived) needs and expectations of the vulnerable civil society will be examined. In this process, the observed shortcomings on the part of practitioners are analysed with a view to the concrete needs of the vulnerable civil society in order to identify gaps between the measures taken by practitioners and the actual needs of the vulnerable civil society. In this way, necessary adaptation strategies can be developed that aim to close these gaps.

WP4: Moreover, the outcomes of D2.3 will feed into the development of the toolkit for LEAs and security policy makers in WP4. The App will pay particular attention to the identified shortcomings. In this regard, the App will use some of the recommendations formulated in D2.3. The findings of D2.3 suggest that there is rarely an exchange between practitioners in the field of CBRNe on the one hand and CSOs representing vulnerable groups on the other (e.g. appropriate information material, education, training, etc.). This gap needs to be closed. In this regard, the App which is developed in WP4 can serve as a useful tool. For example, a list of CSOs representing vulnerable groups could be provided (if possible with contact details and web addresses) that both the CSOs and the practitioner can access to exchange relevant information. During the registration process, CSOs could be asked if they are willing to share the organisation's contact details in the app. These contact details could then be added to a list of CSOs. Furthermore, the registration process could ask if CSOs are interested in certain types of collaboration (CBRNe exercises, project participation, etc.). In this way, practitioners can find CSOs representing certain vulnerable groups in their region to establish a cooperation. Another gap identified in D2.3 is the lack of consideration of vulnerable groups in CBRNe-related SOPs. It appeared that CBRNe information is often not provided in additional language formats (e.g. Braille and sign language). The App should be designed to be accessible to as many vulnerable groups as possible. To provide more CBRNe information for vulnerable groups, the App could provide a European library where information material, especially related to CBRNe is offered (e.g. papers for vulnerable groups, books on CBRNe, etc.). The material could be uploaded or linked. In addition, relevant European projects dealing with the topic could be presented (e.g. via links, flyers). In this way, practitioners can also establish closer cooperation with other practitioners at European level and engage in joint activities (e.g. trainings, information campaigns, joint threat assessment).

WP6: The outcomes of D2.3 will further feed into the development of the joint exercises in WP6. Following the influence of this deliverable on the toolkit for practitioner in WP4, the measures will be evaluated in the exercises to determine its effectiveness in improving the interaction between practitioners and the vulnerable civil society. Furthermore, the outputs from D2.3 will be incorporated into the tactical objectives that will be set out for each of the field exercises within WP6. The tactical objectives are reviewed by the consortium at the quarterly progress meetings and updated in line with the ongoing requirements of the PROACTIVE project. Following each exercise, an evaluation will take place based on the tactical objectives; this will feed back into WP2 to ensure a cycle of continuous development and improvement.

WP8: The research was conducted in close cooperation with the partners in WP8 to ensure data security and ethics standards (see Chapter 4).

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14. APPENDIX A – FIGURES

Figures APPENDIX A

Figures of Chapter 8.1.1.

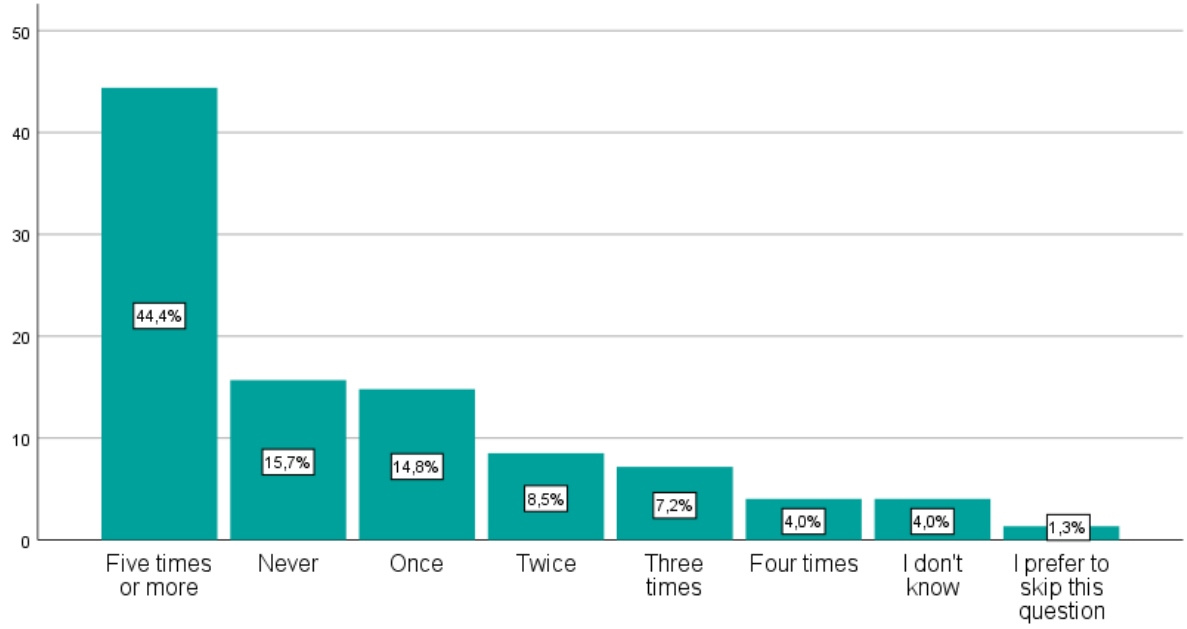

Figure 56: Frequency of survey participants' involvement in a CBRNe incident during their professional life (n=223)

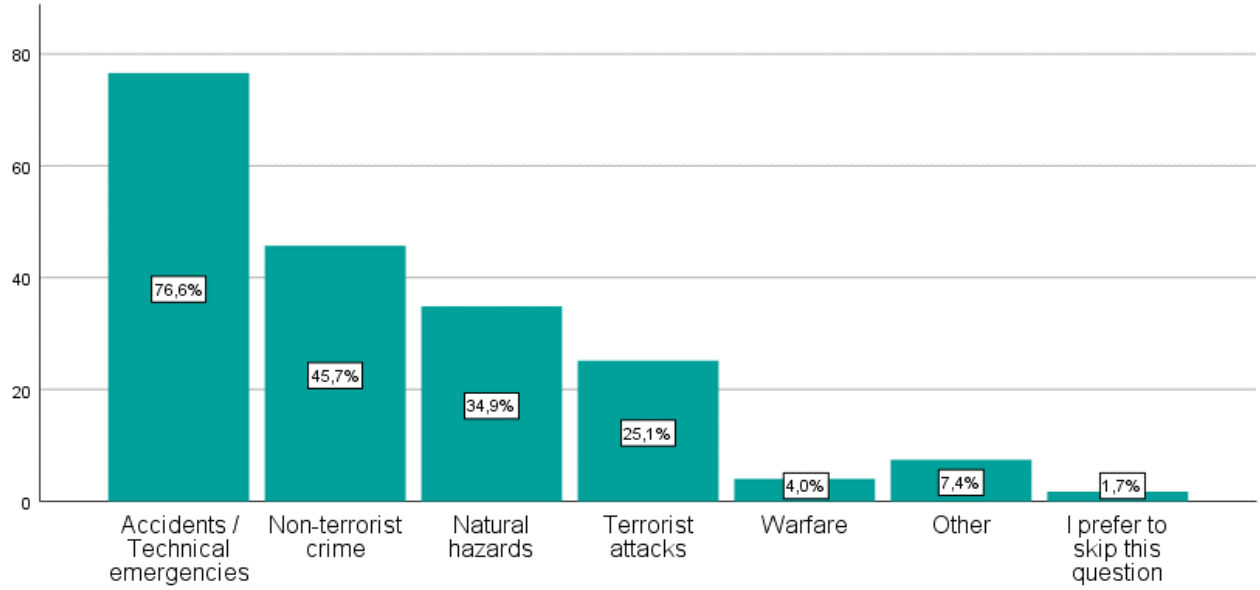

Figure 57: Context of CBRNe incidents in which the survey participants were involved during their professional life; multiple selection option (n=175)

Figures of Chapter 8.1.2.

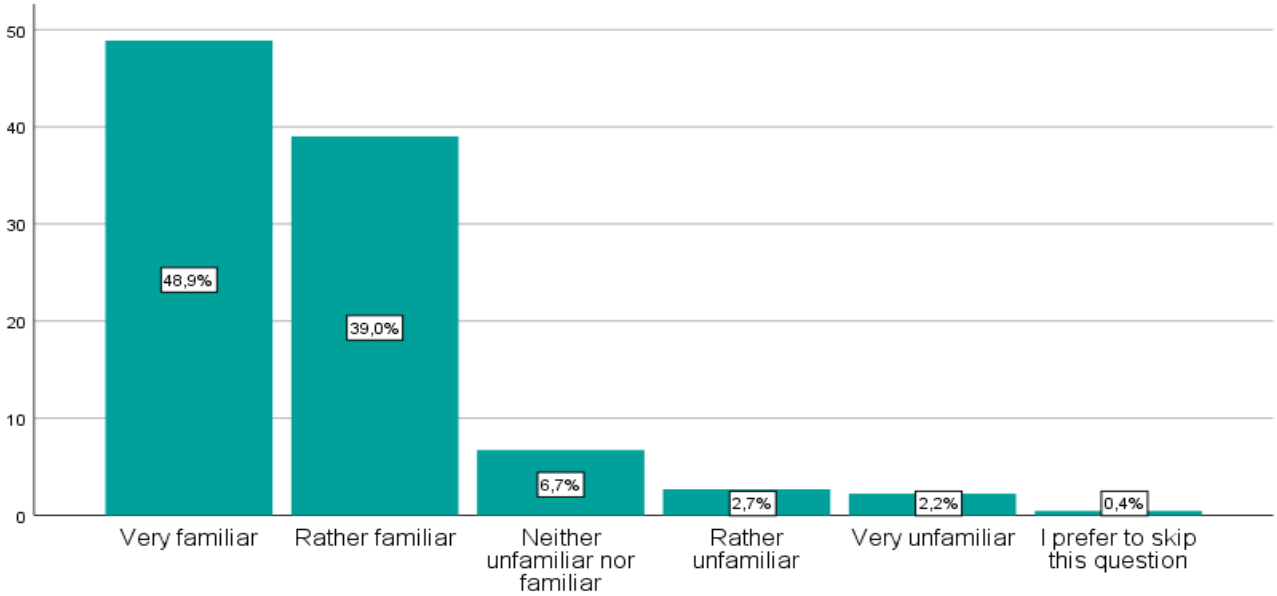

Figure 58: Experience of the survey participants with the topic CBRNe (n=223)

Figures of Chapter 8.2.1.

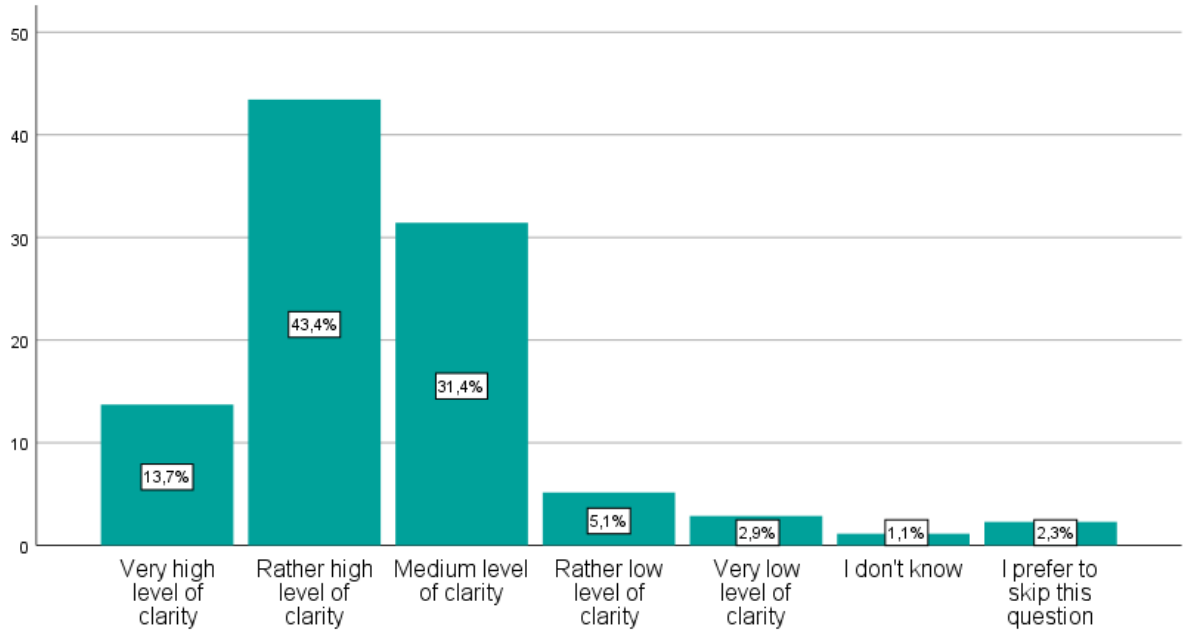

Figure 59: Assessment of the (expeced) clarity of responsibilities within the organisation during a CBRNe incident (n=175)

Figures of Chapter 8.2.2.

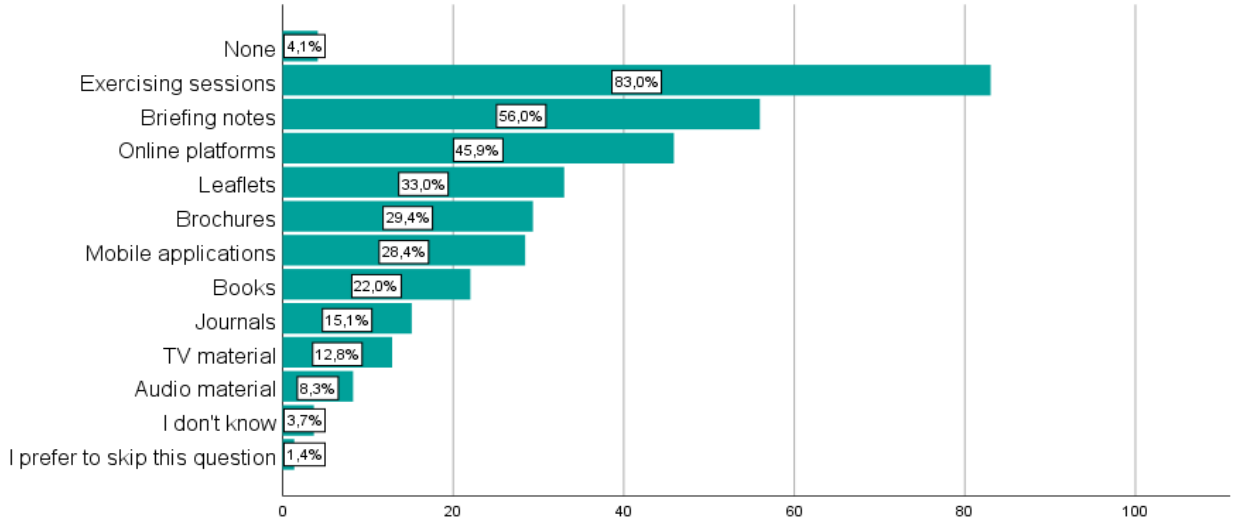

Figure 60: Information resources for organisational personnel to prepare for a CBRNe incident; multiple selection option (n=218)

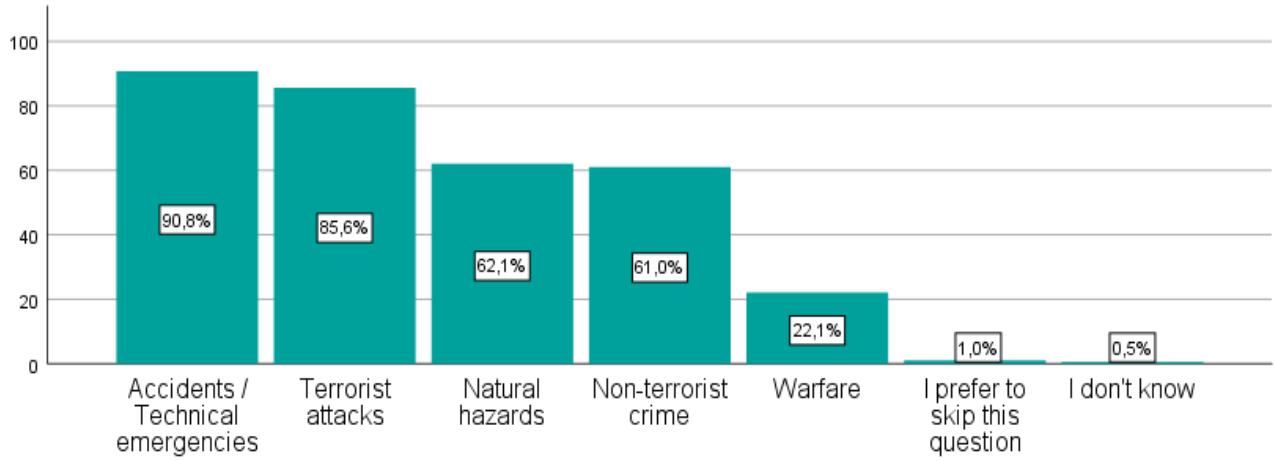

Figure 61: Topics of the information resources organisations provide for their personnel to prepare for a CBRNe incident; multiple selection option (n=195)

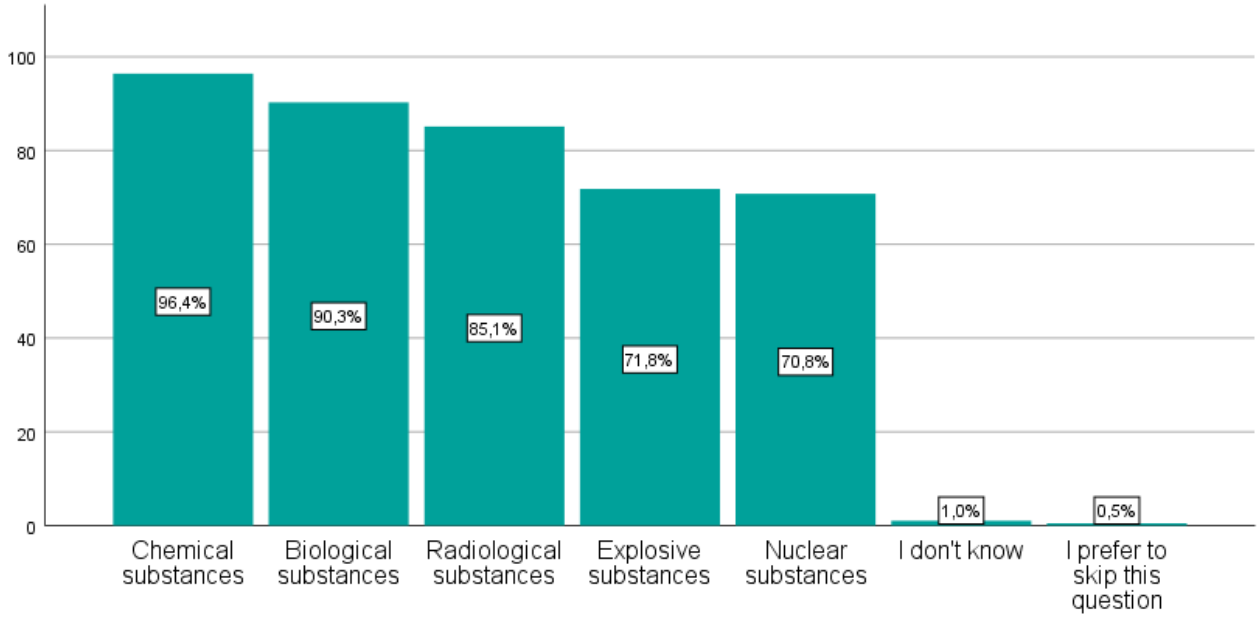

Figure 62: CBRNe substances addressed in the information resources organisations provide for their personnel to prepare for a CBRNe incident; multiple selection option (n=195)

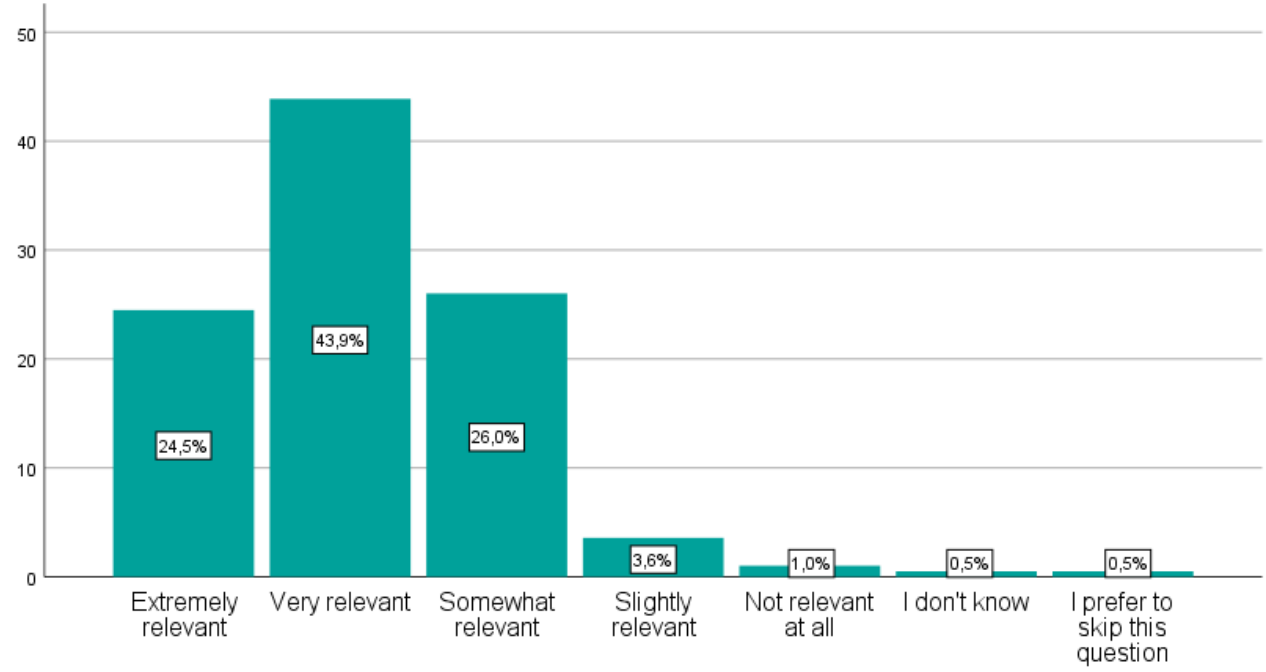

Figure 63: Relevance of the information resources organisations provide for their personnel to prepare for a CBRNe incident (n=196)

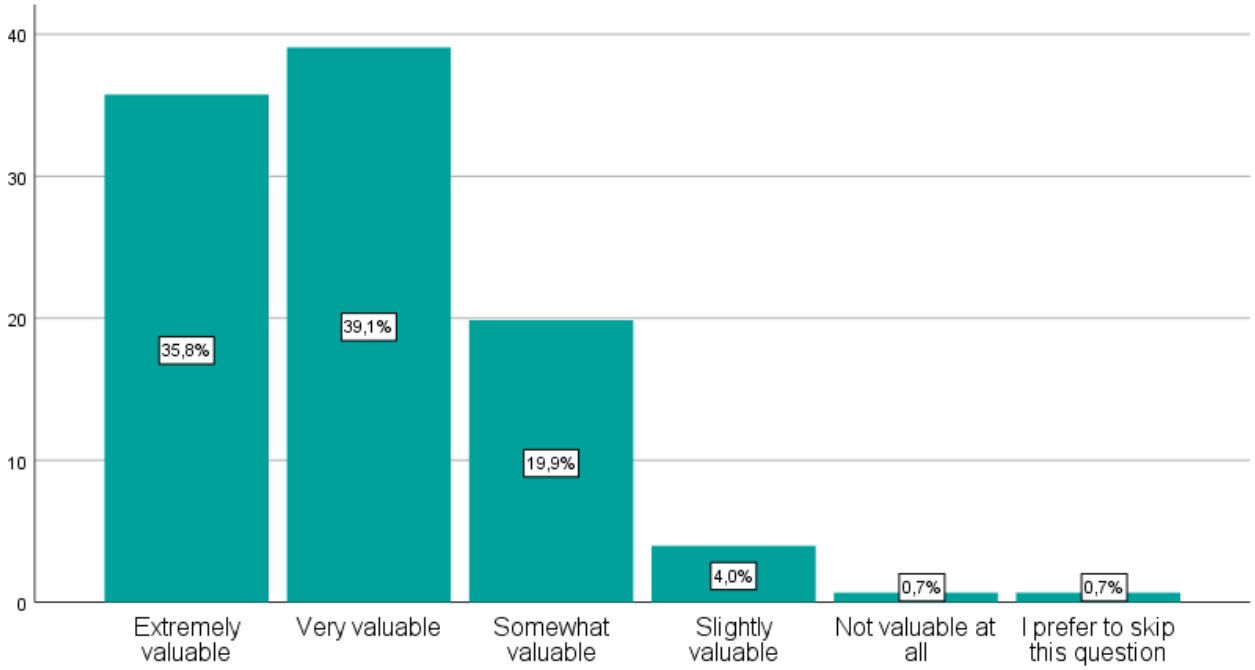

Figure 64: Value of CBRNe exercises in which the own organisation has participated over the last ten years to prepare for a CBRNe incident (n=151)

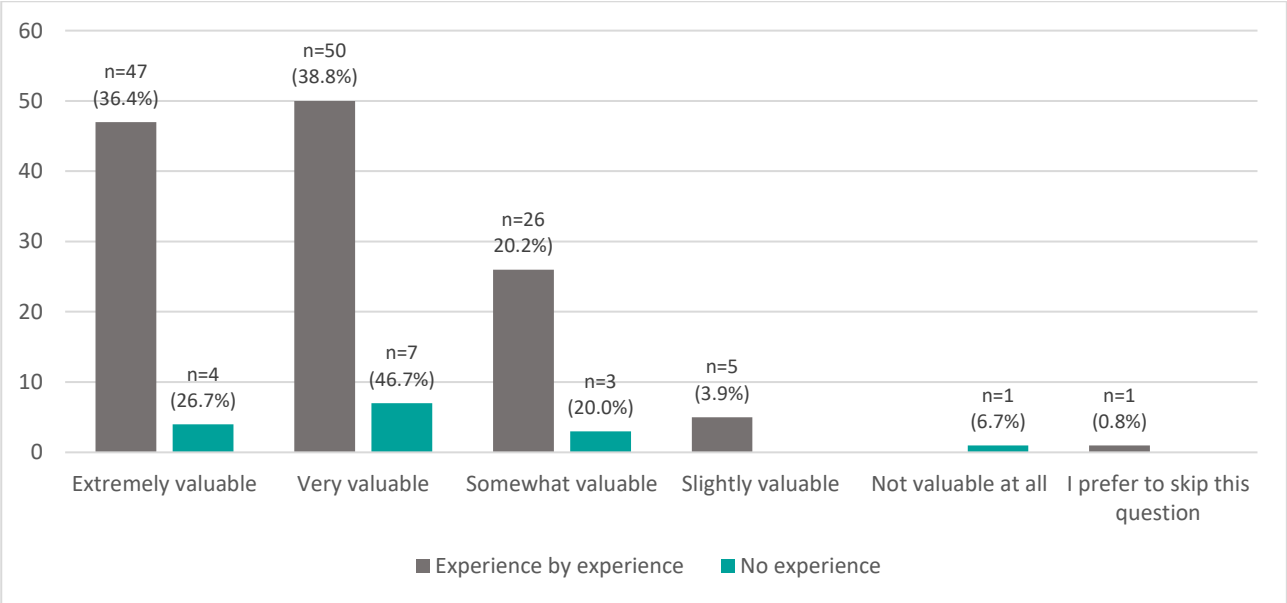

Figure 65: Value of CBRNe exercises in which the own organisation has participated over the last ten years to prepare for a CBRNe incident by experience with CBRNe incidents (experienced n=129; unexperienced n=15)

Figures of Chapter 8.2.3.

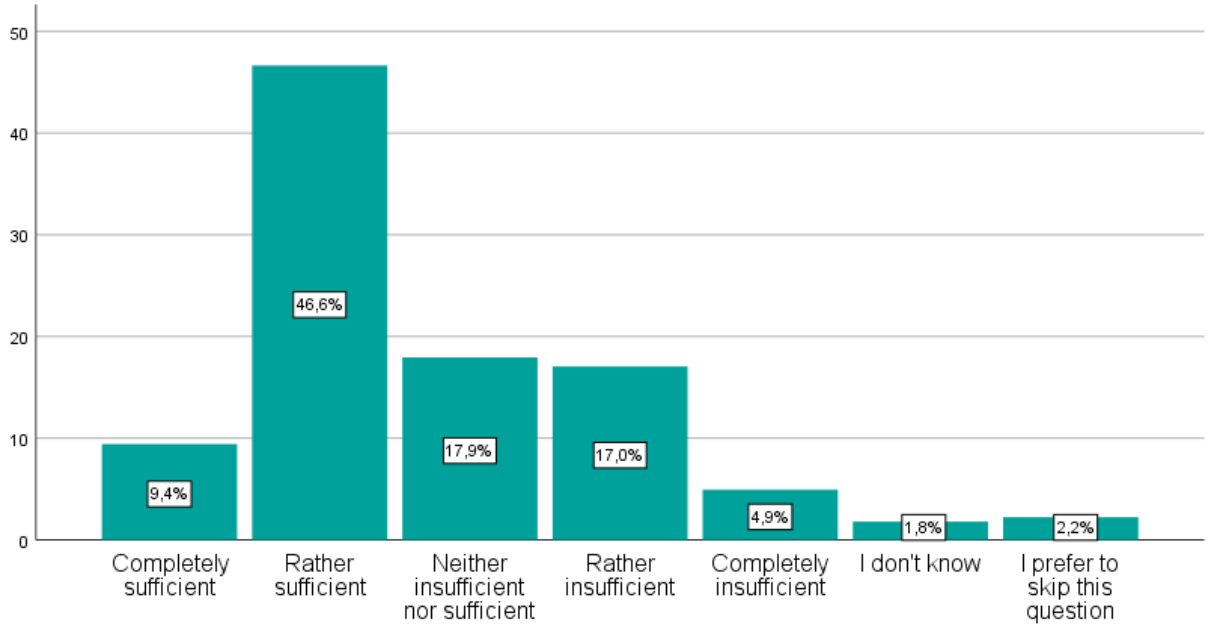

Figure 66: Assessment of the organisational equipment for a CBRNe incident (n=223)

Figures of Chapter 8.2.4.

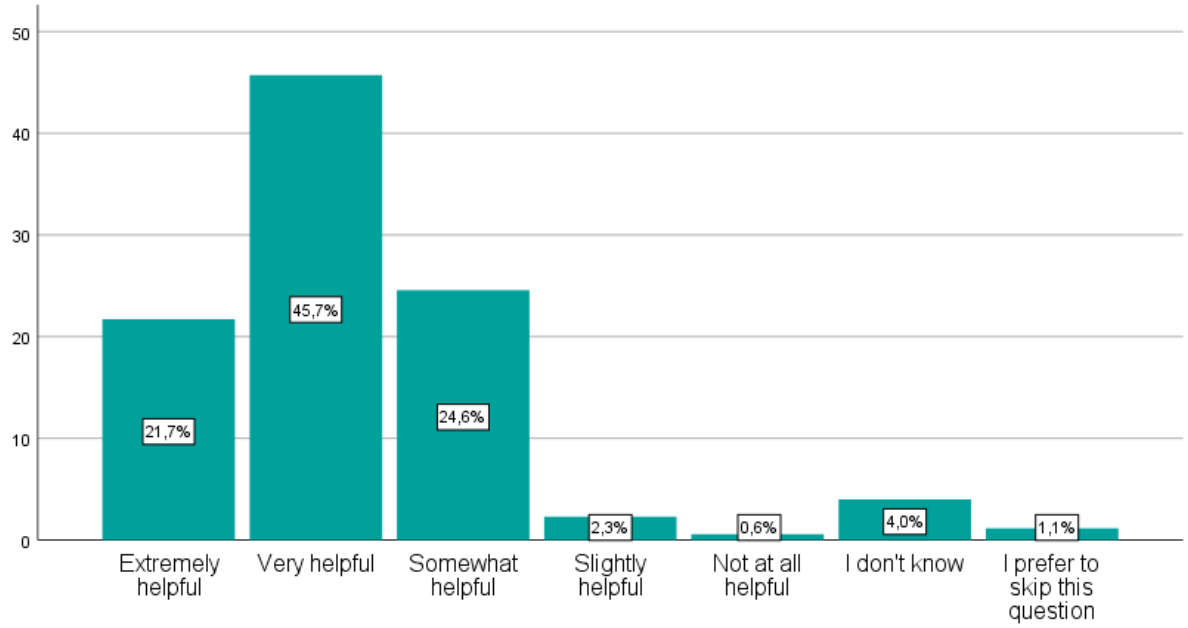

Figure 67: Helpfulness of cooperation agreements for major emergencies for the cooperation during these incidents (n=175)

Figures of Chapter 8.2.5.

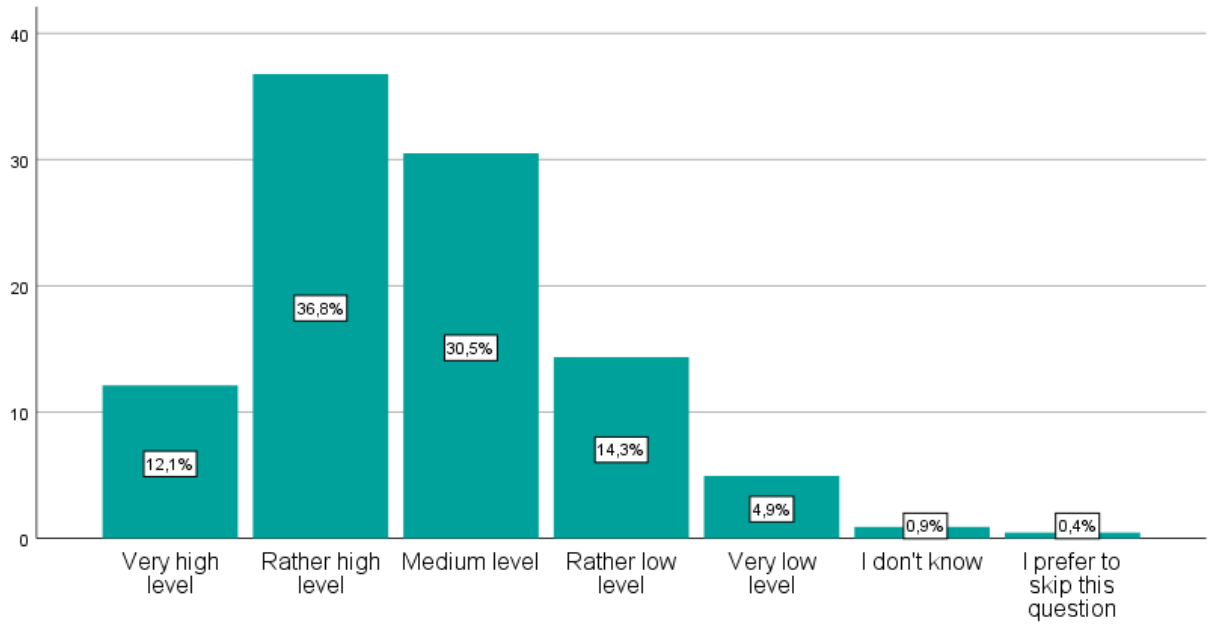

Figure 68: Assessment of the organisational level of preparedness for a CBRNe incident (n=223)

Figures of Chapter 8.2.6.

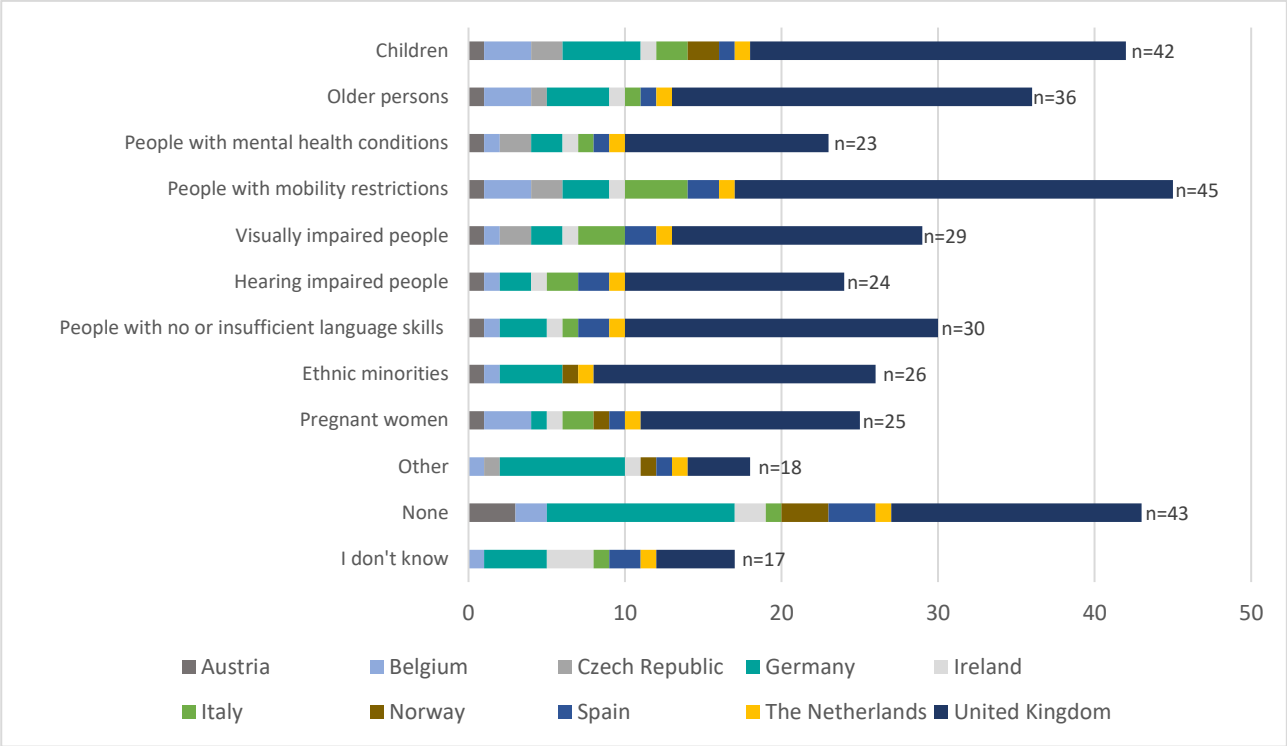

Figure 69: Vulnerable groups represented by the respective organisation through CBRNe SOPs by country; multiple selection option (Austria: n=5; Belgium: n=7; Czech Republic: n=4; Germany: n=63; Ireland: n=7; Italy: n=8; Norway: n=6; Spain: n=8; The Netherlands: n=5; United Kingdom: n=61)

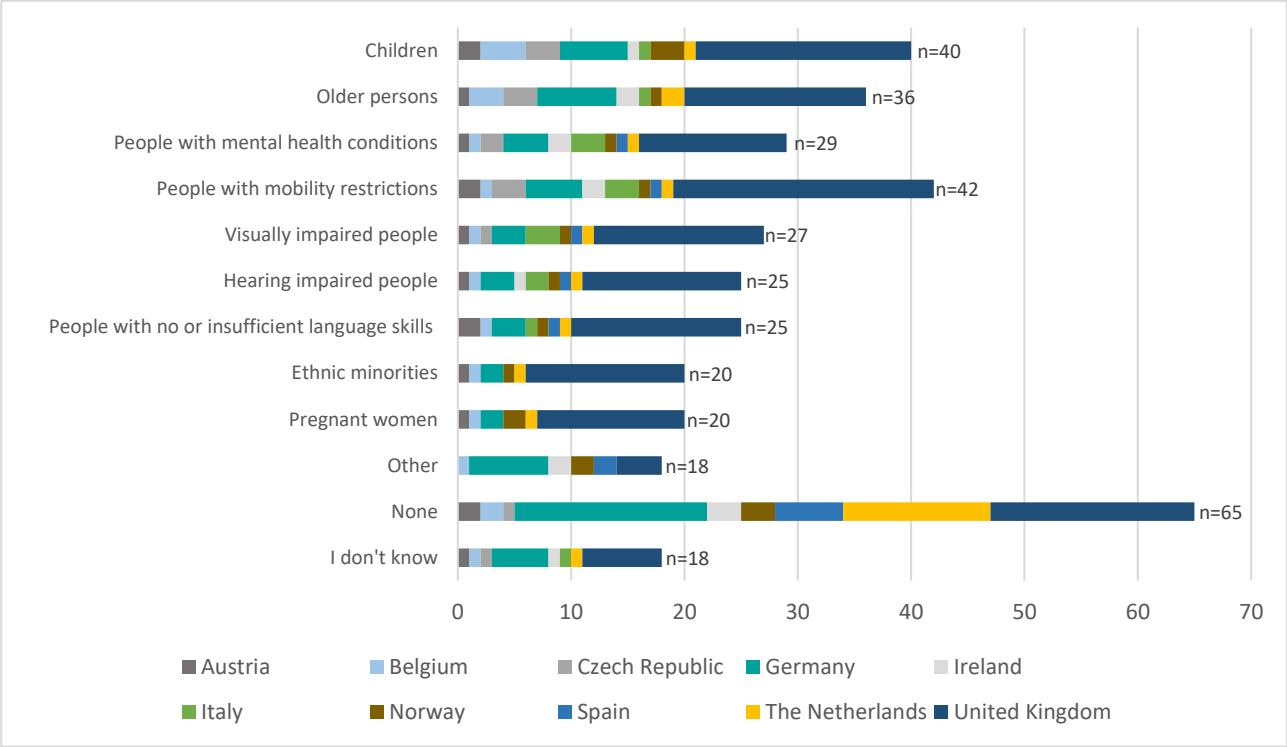

Figure 70: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident by country; multiple selection option (Austria: n=5; Belgium: n=8; Czech Republic: n=7; Germany: n=47; Ireland: n=9; Italy: n=7; Norway: n=7; Spain: n=9; The Netherlands: n=6; United Kingdom: n=62)

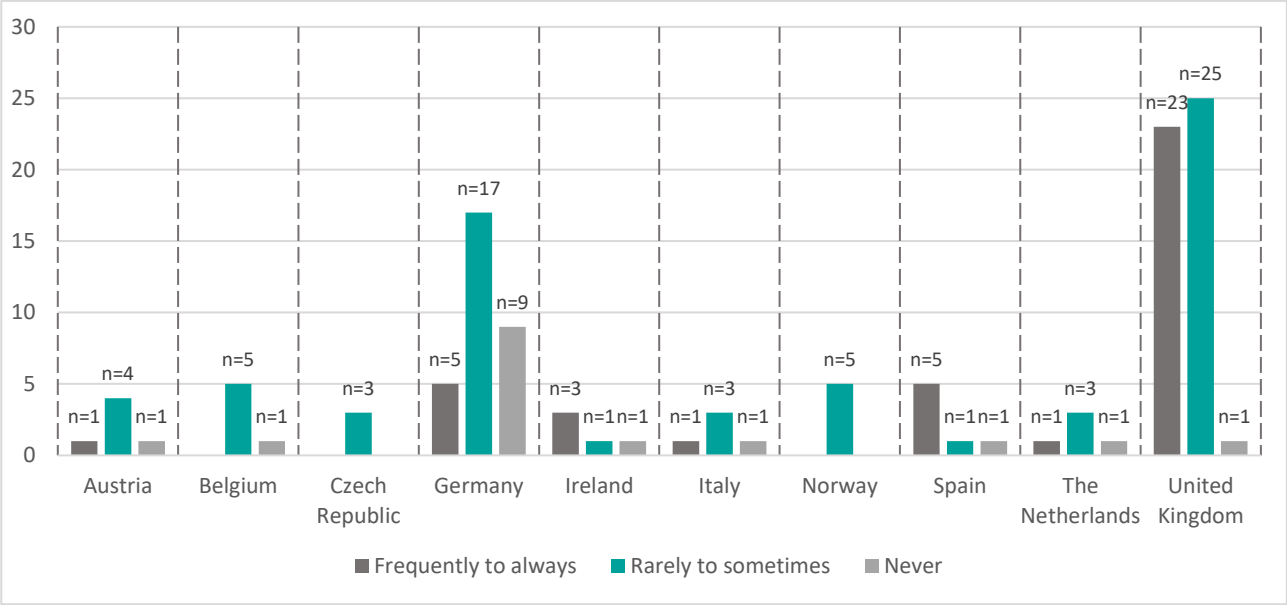

Figure 71: Contact with public addressed during CBRNe exercises in the last ten years in which the own organisation was involved by country (Austria: n=6; Belgium: n=6; Czech Republic: n=3; Germany: n=33; Ireland: n=5; Italy: n=6; Norway: n=5; Spain: n=8; The Netherlands: n=5; United Kingdom: n=51)

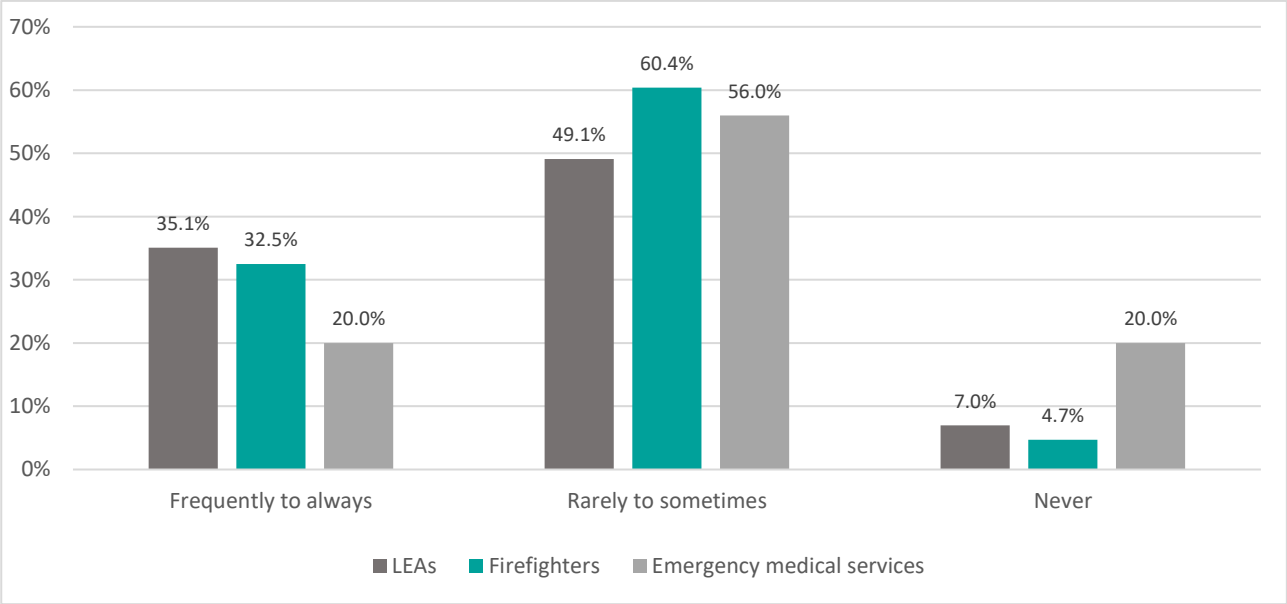

Figure 72: Contact with public addressed during CBRNe exercises in the last ten years in which the own organisation was involved (see Figure 25) by profession (LEAs: n=57; Firefighters: n= 43; Emergency medical services: n=25)

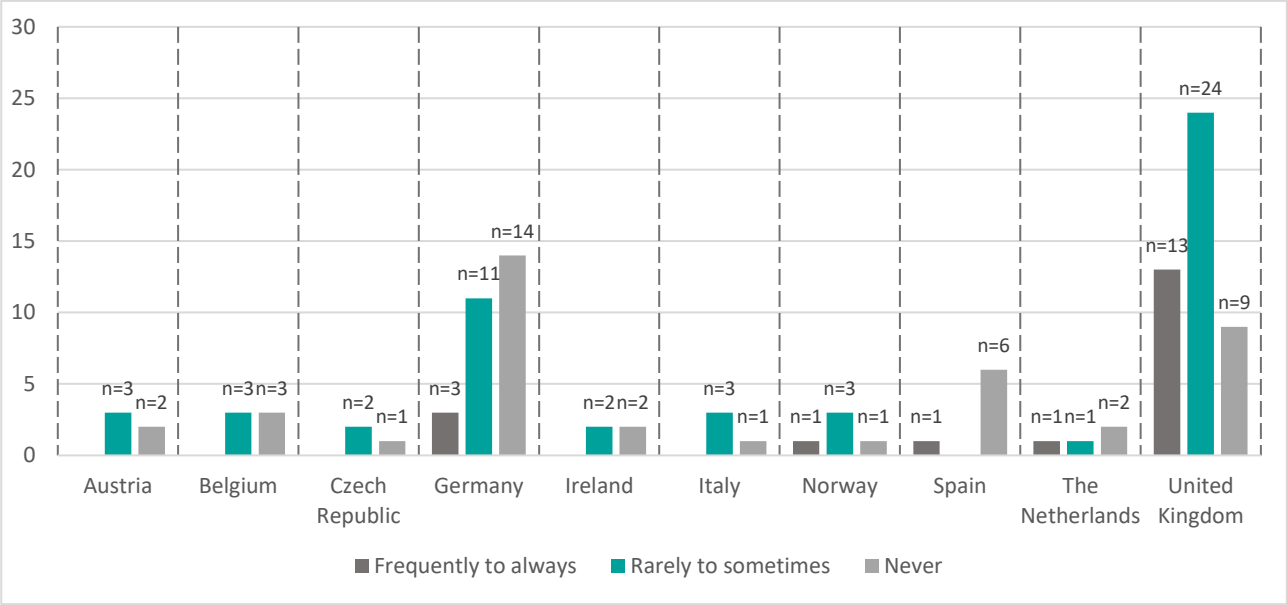

Figure 73: Involvement of members of the public in CBRNe exercises by country (Austria: n=6; Belgium: n=6; Czech Republic: n=3; Germany: n=33; Ireland: n=4; Italy: n=6; Norway: n=5; Spain: n=7; The Netherlands: n=5; United Kingdom: n=49)

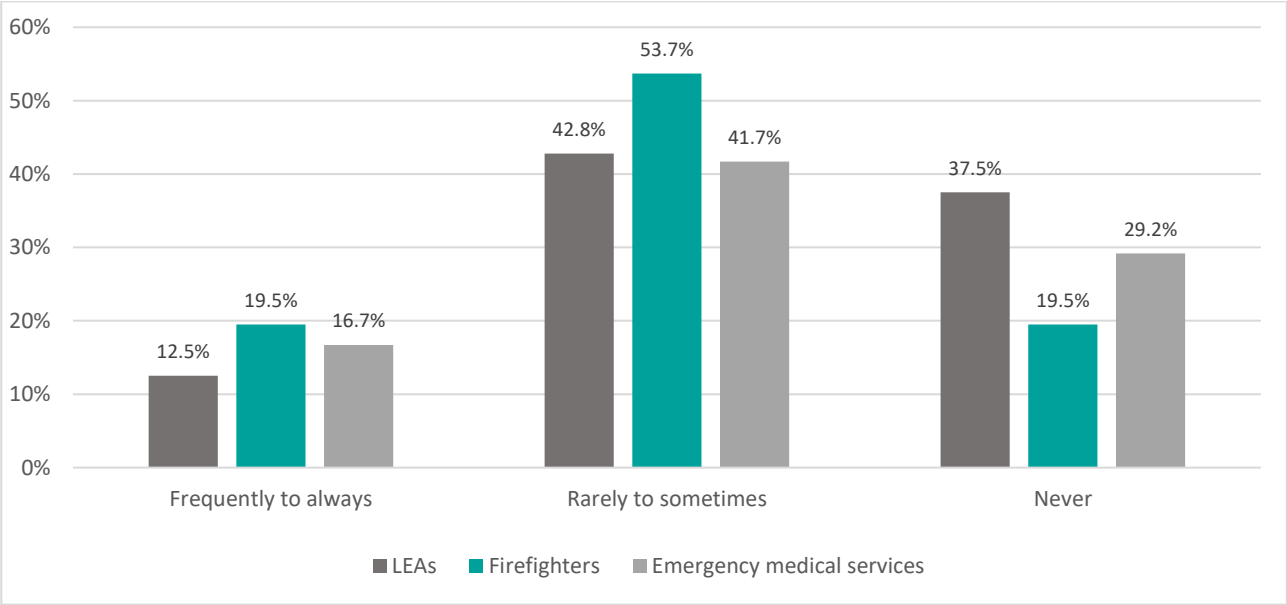

Figure 74: Involvement of members of the public in CBRNe exercises by profession (LEAs: n=56; Firefighters: n= 41; Emergency medical services: n=24)

Figures of Chapter 8.3.2.

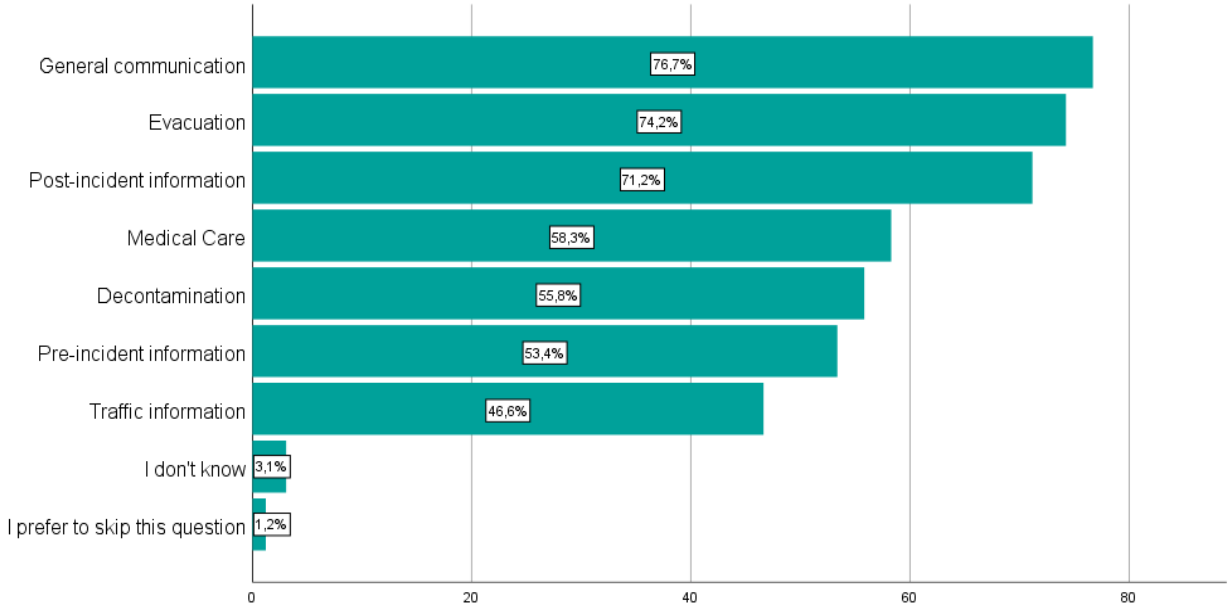

Figure 75: Topics of the organisation communication strategy for major emergencies; multiple selection option (n=163)

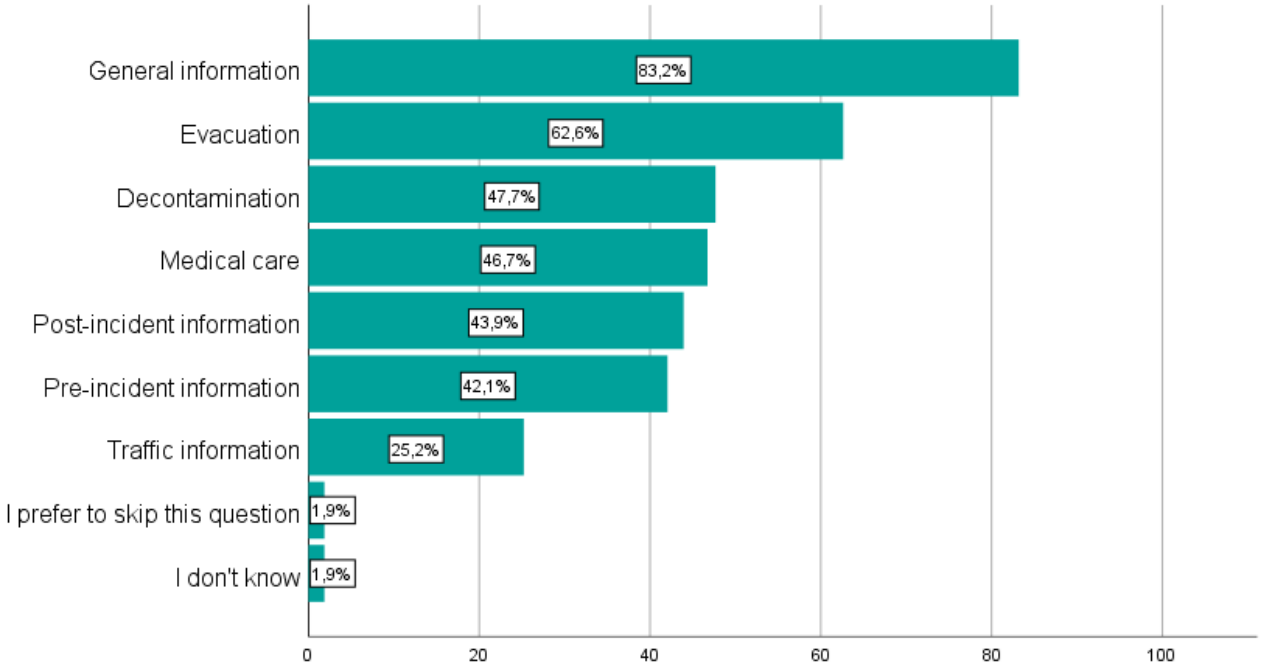

Figure 76: Topics of the information resources organisations provide for the public to cope with a CBRNe incident; multiple selection option (n=107)

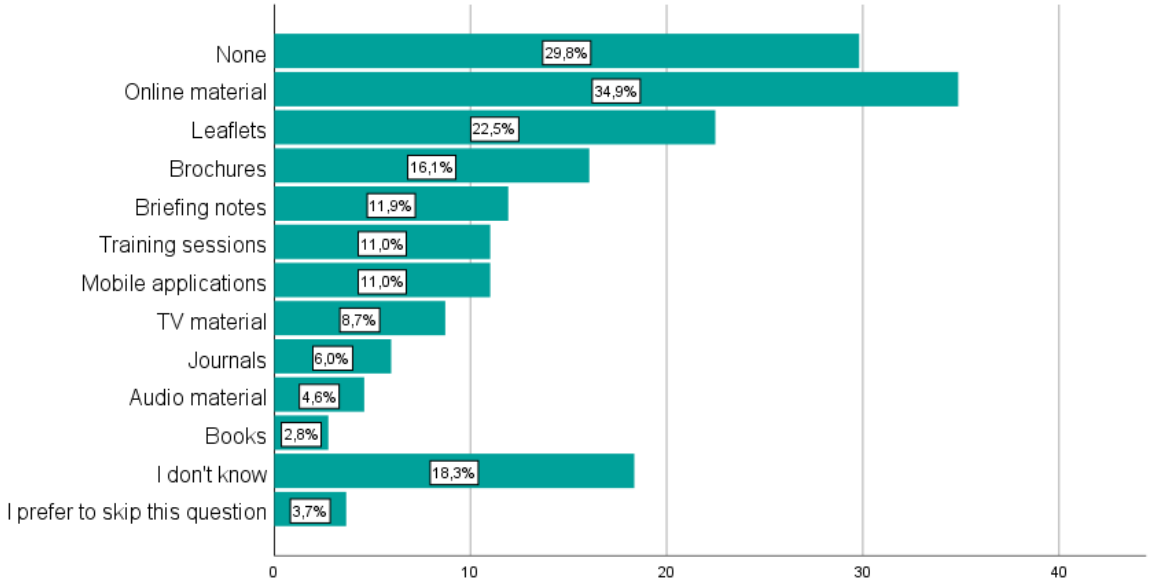

Figure 77: CBRNe-related information resources the own organisation provides for the public to cope with a CBRNe incident; multiple selection option (n=218)

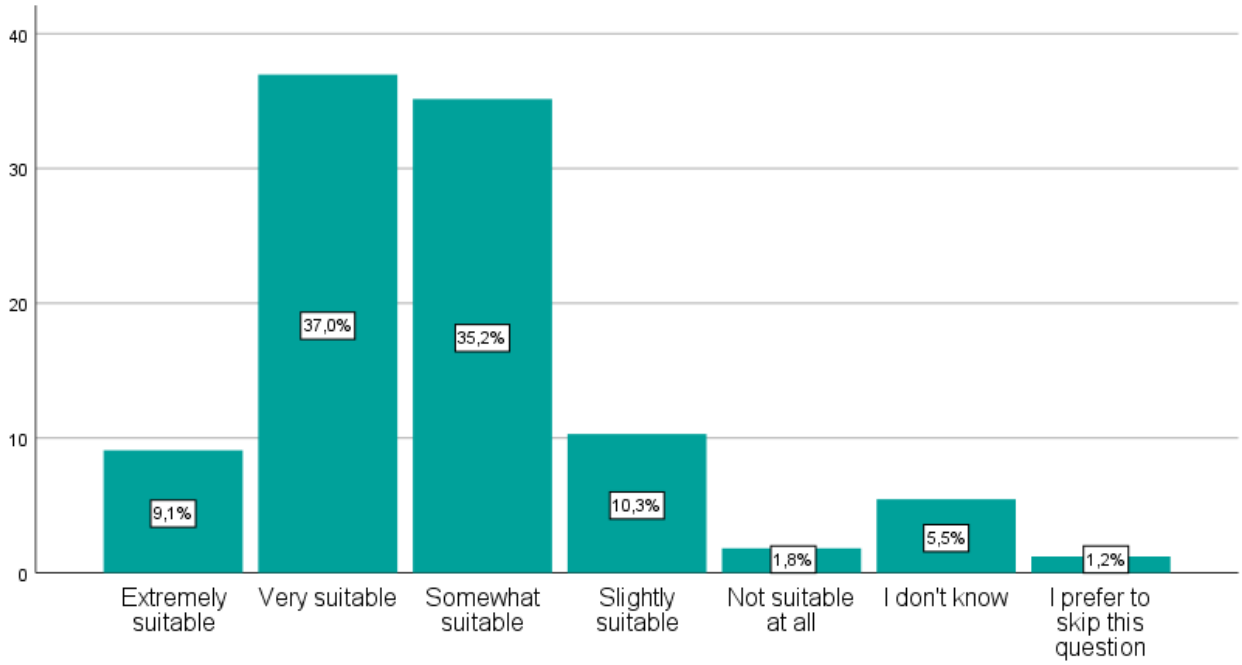

Figure 78: Suitability of the organisation communication strategy for major emergencies to respond to CBRNe incidents (n=165)

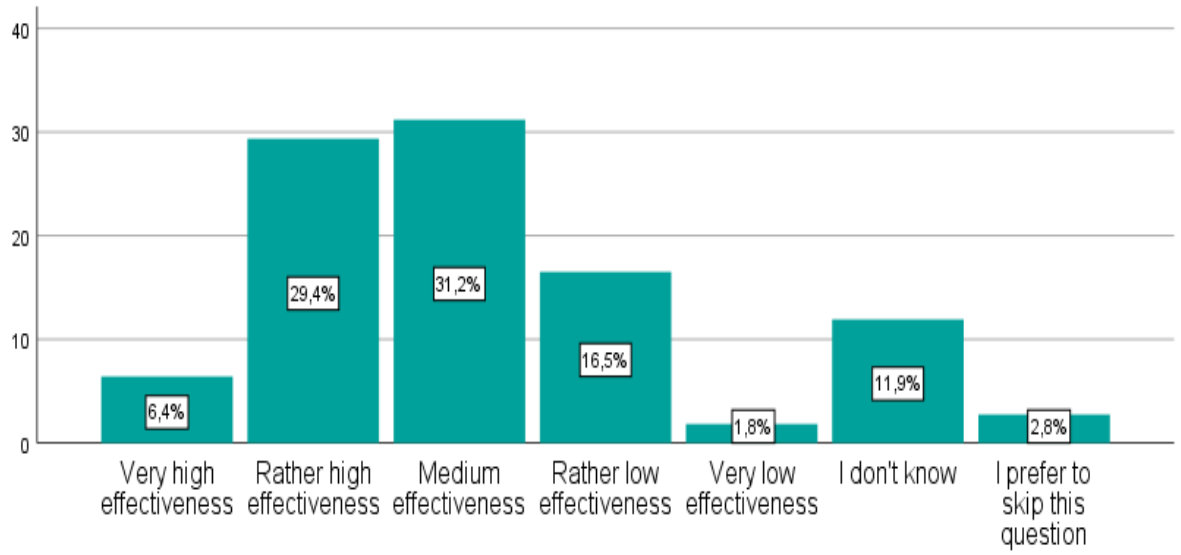

Figure 79: Assessment of the effectiveness of the information resources organisations provide for the public to cope with a CBRNe incident (n=109)

Figures of Chapter 8.3.3.

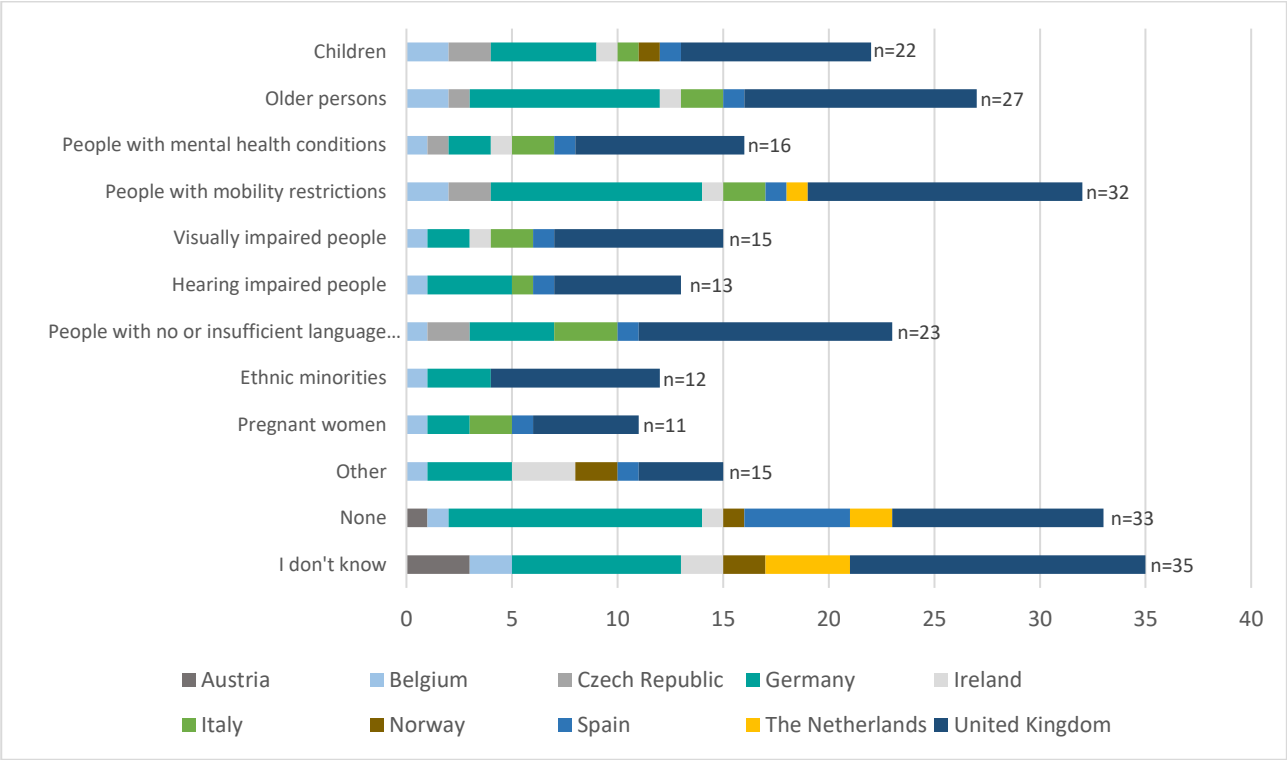

Figure 80: Consideration of vulnerable groups in the organisation's communication strategy for major emergencies by country; multiple selection option (Austria: n=4; Belgium: n=6; Czech Republic: n=4; Germany: n=39; Ireland: n=8; Italy: n=5; Norway: n=7; Spain: n=9; The Netherlands: n=8; United Kingdom: n=52)

15. APPENDIX B – MINUTES OF THE SAB MEETING

Minutes of the SAB meeting **APPENDIX B**

Security Advisory Board (SAB)
Meeting 11th May 2020 at 10.00 – 11.00hrs
Via Zoom

Persons Present:

Laura Peterson	(LP)	UIC
Finbarr O'Sullivan	(FOS)	Garda Police
Marcus Griffiths	(MG)	College of Policing
Natasha Newton	(NN)	RINISOFT
Dominic Kelly	(DK)	CBRNE Ltd
Tony Godwin	(TG)	CBRNE Ltd
Steve Swain	(SS)	CBRNE Ltd

Minutes of the last meeting

SS went through the actions from the previous meeting:

ACTION: *SS to circulate the PROACTIVE PSAB membership spreadsheet to the SAB for their information:-* Done.

ACTION: *SS to circulate soft copies of the PSAB and SAB ToR to the SAB members:-* Done.

ACTION: *Members of the SAB to read these ToRs and submit comments by the 1st August 2019:-* No comments received.

ACTION: *SS to discuss these issues with the Project lead and secure approval:-* Following a debate with members of the Consortium, it was agreed that this would be an unnecessary and overly bureaucratic procedure, so was not adopted.

ACTION: *SS to check with the Consortium to ascertain the date and location of the next Consortium meeting to see if they can run at the same time and location:-* The next PROACTIVE meeting was held online owing to the Covid-19 Pandemic. Owing to the unavailability of the SAB members this meeting was postponed.

ACTION: *SS to determine date of next SAB meeting and consider a schedule of meetings for the PSAB.* Done.

What does the Consortium require from the SAB for the Field Exercises?

TG outlined the exercise plan for Rieti. The main issues are:

The first field exercise in Rieti is scheduled to take place on the 28th October 2020 and will take place unless the Covid-19 restrictions on travel are still in place. There are contingency plans in place for exercise if difficulties are encountered.

The Rieti site is a military establishment and houses an NBC school. There are security and access control systems on the site, managed by the Italian military. In normal circumstances, civilians are not allowed onto the base, so this exercise involving civilian members of the public is a first for them. There will be vetting

systems in place to clear these people before they are allowed in. The consortium members should not be subject to the same rigorous vetting controls.

There will be around 35 members of the public, plus around 100 members of the consortium and others. There may be some GDPR issues relating to these checks, but this issue will be addressed in the exercise planning. There is to be an evaluation process plus a report, which will need to be scrutinised by the SAB.

The second exercise will be in Germany, managed by DHPol and the German Police.

NN: Do you want the App to collect any information from this exercise?

TG: As long as we collect some data to examine the workings of the App, there is not too much to concern ourselves. We need to satisfy Irina and Mariano with regard to the Ethical and Legal issues. All the data collected should be anonymised and kept separately from the first exercise. We should consider greater use of the App for the second exercise and think about what learning we take from the first exercise to put this in the App for the second exercise.

DK: For the second exercise, it will be a good test to see who has loaded the App prior to this exercise, to examine how it works and what it delivers.

TG: It will be valuable learning to see how the App works and understand its operating parameters.

Presentation by RINISOFT about the App they have developed and security issues emerging from this App?

NN gave an explanation of the App. With regard to GDPR, we plan to gather very little personal data, so this shouldn't be an issue. With regard to accessing the data, there will be three levels of access:

At the first level, LEAs will have Administrative access, so they will be able to view all the data collected.

The second level will be for policy makers and the like, so they will have a restricted level of access.

The third level will give minimal access, so the data will be secured.

Additional points relating to the App:

- We will review the working of the App after the first exercise with Mariano relating to the issue of personal data and access controls for it.
- With regard to LEAs, we are unsighted as to the GDPR implications and this will be the subject of further debate.
- We are still working on the issues relating to personal data that the owners want reviewed and removed. We are working to build this into the App standard operational procedures (SOPs).
- We are examining how to manage the data on the App and the fact that it is not to be used for emergencies.

This will all be documented in the Deliverable. We welcome any feedback, ideas and suggestions regarding use of the App and the data gathered.

Feedback from the SAB members on this App and suggestions/proposals.

MG: An emerging issue we have faced recently during an incident related to conducting an Impact Assessment and the relevance to having disclaimers in the App.

NN: ETICAS are examining these issues on behalf of the project

Given the early stage of development of the App, there were no other suggestions or proposals from the SAB members at this point.

AOB

SS: The DoW states that the SAB should comment on any security issues relating to the Deliverables. Many of them will be public documents, so this might not be an issue.

LP: We should give a copy of the Deliverables to the Sab for their perusal and comment.

DK: There is insufficient information in the titles of the Deliverables for them to determine the security concerns.

ACTION: LP agreed to check with the EU commission and that if there were no issues, the SAB could be issued with a list and description of the Deliverables.

UPDATE: LP has discussed this issue with the Project Officer and we are allowed to share the list plus a description of all "public" deliverables to non-consortium SAB members (MG). The confidential Deliverables cannot be shared outside the Consortium. As these mainly pertain to project management (e.g. the dissemination plan) this shouldn't be a problem.

TG asked whether there is a role for the SAB at the first exercise in Rieti?

LP endorsed this point.

DK suggested that they could assist with the evaluation with PHE.

TG agreed to examine this as the exercise planning progressed.

MG offer to provide this function, but expressed concerns over the funding issues and the bureaucratic hurdles that he faced. Suggestions were made to alleviate these.

Date of next meeting.

There is a Project Board meeting in Brussels on the 17/09/2020 and one in Spain in January 2021. There was also a suggestion that a SAB meeting could take place in Rieti as the SAB members will be present. This is to be determined in the next couple of months as the Covid-19 pandemic lockdown situation develops.

Steve Swain
CBRNE Ltd
12th May 2020.

16. APPENDIX C – INVITATION LETTER OF QUANTITATIVE SURVEY

Invitation letter of quantitative survey **APPENDIX C**

Dear Mr./Ms. XY,

The German Police University (DHPol) as partner of the EU funded project ***PROACTIVE*** would be very grateful if you could help us by answering a couple of questions about key tasks and phases of CBRNe incidents. The survey analyzes commonalities and differences of CBRNe-related measures of preparedness and response across European countries from the perspective of LEAs and First Responders. A special emphasis is put on the consideration and awareness of the special needs of vulnerable citizens. Your participation helps to identify open gaps and areas for improvement.

The European research project **PROACTIVE** *(PReparedness against CBRNE threats through cOmmon Approaches between security praCTItioners and the VulnerablE civil society)* aims to increase practitioner effectiveness in managing large and diverse groups of people in a CBRNe environment. Chemical Biological Radiological Nuclear & Explosive (CBRNe) incidents, whether accidental or terrorist-based, can have a high impact on society. Therefore, the project will provide profound research to facilitate the interaction between European Law Enforcement Agencies (LEAs) as well as First Responders and the vulnerable civil society.

Attached we provide you with a detailed information sheet and a document that explains the key terms used in the questionnaire in case you want to participate in the survey.

Due to the current Covid-19 pandemic, we are aware that you are currently working at the limit and are under a great deal of additional stress. Therefore, we are all the more grateful for every questionnaire and appreciate the time that you spend on this. We made sure this survey will only take up to 15 minutes to complete.

Please click on the link below to launch the survey:

https://proactive.limequery.com/951566?lang=en

The deadline for participating in the survey is **June 10, 2020**.

If you feel they can help, please feel free to circulate the mail to your colleagues. Also, please note that your responses to the questionnaire are strictly confidential and handled in line with the GDPR.

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

Danielle Carbon and Andreas Arnold

PROACTIVE_study@dhpol.de
German Police University
Zum Roten Berge 18-24, 48165 Münster, Germany

Best regards and stay healthy!

To keep on track with our Projects outcomes you are more than welcome to join our **Practitioner Stakeholder Advisory Board** (PSAB) or follow us on our social media accounts. For more information, please visit us on:

www.proactive-h2020.eu
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#PROACTIVE_EU

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 832981

17. APPENDIX D – QUESTIONNAIRE OF QUANTITATIVE SURVEY

Questionnaire of quantitative survey APPENDIX D

General Questions

In this section you will be asked general questions.

1. Please state your gender. Please select one of the following options.

   □ Male
   □ Female
   □ Diverse
   □ I prefer to skip this question

2. How old are you? Please indicate in years: _____

3. In which country is your organisation located? _____

4. Which of the following sectors do you belong to? Please select one of the following options.

   □ Law Enforcement Agency (LEA)
   □ Fire Brigade
   □ Health Service
   □ Civil Protection
   □ Other (please specify): _____
   □ I prefer to skip this question

5. Please state the name of your organisation as detailed as possible (e.g. Fire Department Cologne, Swiss Red Cross canton of Zurich, City of London Police): _____

6. How long have you been working in this environment (LEA / Fire Brigade / Health Service / Civil Protection / Other)? Please indicate in years: _____

7. At what level does your organisation operate? You can select more than one answer below. Please check all that apply.

   □ International level
   □ National level
   □ Regional level
   □ Local level
   □ I prefer to skip this question

8. Which of the following management levels do you currently belong to or have belonged to over a period of at least five years? You can select more than one answer below. Please check all that apply.

   □ Strategical level
   □ Tactical level
   □ Operational level
   □ Other (please specify): _____
   □ I prefer to skip this question

CBRNe Experiences

In the following section you will be asked questions about your experiences with CBRNe incidents.

9. How familiar are you in general with the topic CBRNe (knowledge about CBRNe)? Please select one of the following options.

   □ Very familiar
   □ Rather familiar
   □ Neither unfamiliar nor familiar
   □ Rather unfamiliar
   □ Very unfamiliar
   □ I prefer to skip this question

10. How often have you been professionally involved in a CBRNe incident throughout your career? CBRNe exercises are treated separately in the questionnaire and should not be considered here. Please select one of the following options.

    □ Never (Filter, next question is question 12)
    □ Once
    □ Twice
    □ Three times
    □ Four times
    □ Five times or more
    □ I don't know (Filter, next question is question 12)
    □ I prefer to skip this question (Filter, next question is question 12)

11. In what contexts did these CBRNe incidents occur? You can select more than one answer below. Please check all that apply.

    □ Natural hazards
    □ Accidents / Technical emergencies
    □ Terrorist attacks
    □ Non-terrorist crime
    □ Warfare
    □ Other (please specify): _____
    □ I don't know
    □ I prefer to skip this question

CBRNe Preparedness

In the following section, you will be asked questions about preparing for CBRNe incidents. The questions are related to your organisation.

Questions are related to the overall preparedness

12. How would you assess the level of preparedness of your organisation for a CBRNe incident? Please select one of the following options.

    □ Very high level
    □ Rather high level
    □ Medium level
    □ Rather low level
    □ Very low level
    □ I don't know
    □ I prefer to skip this question

13. How do you assess the equipment of your organisation for a CBRNe incident? Please select one of the following options.

    □ Completely sufficient
    □ Rather sufficient
    □ Neither insufficient nor sufficient
    □ Rather insufficient
    □ Completely insufficient
    □ I don't know
    □ I prefer to skip this question

Questions are related to Standard Operating Procedures (SOPs)

14. Does your organisation have specific SOPs for CBRNe incidents?

    □ Yes
    □ No (Filter, next question is question 16)
    □ I don't know (Filter, next question is question 16)
    □ I prefer to skip this question (Filter, next question is question 16)

15. Which of the following vulnerable groups do the specific CBRNe SOPs take into account? You can select more than one answer below. Please check all that apply.

    □ Children
    □ Older persons
    □ People with mental health conditions
    □ People with mobility restrictions
    □ Visually impaired people
    □ Hearing impaired people
    □ People with no or insufficient language skills of the national language
    □ Ethnic minorities
    □ Pregnant women
    □ Other (please specify): _____
    □ None

□ I don't know
□ I prefer to skip this question

Questions are related to information resources for emergency personnel

16. Which of the following information resources does your organisation provide for your personnel to prepare for and to cope with a CBRNe incident? You can select more than one answer below. Please check all that apply.

    □ Leaflets
    □ Brochures
    □ Briefing notes
    □ Books
    □ Journals
    □ Online learning platforms
    □ Audio material
    □ TV material
    □ Mobile applications
    □ Training and exercising sessions
    □ Other (please specify): _____
    □ None (Filter, next question is question 21)
    □ I don't know (Filter, next question is question 21)
    □ I prefer to skip this question (Filter, next question is question 21)

17. What topic(s) is/are covered in the information resources? You can select more than one answer below. Please check all that apply.

    □ Natural hazards
    □ Accidents / Technical emergencies
    □ Terrorist attacks
    □ Non-terrorist crime
    □ Warfare
    □ Other (please specify): _____
    □ I don't know
    □ I prefer to skip this question

18. What substances do the information resources deal with? You can select more than one answer below. Please check all that apply.

    □ Chemical substances
    □ Biological substances
    □ Radiological substances
    □ Nuclear substances
    □ Explosive substances
    □ Other (please specify): _____
    □ I don't know
    □ I prefer to skip this question

19. How relevant do you think the information resources are in preparing your organisation for a CBRNe incident? Please select one of the following options.

    □ Extremely relevant
    □ Very relevant
    □ Somewhat relevant
    □ Slightly relevant
    □ Not relevant at all
    □ I don't know
    □ I prefer to skip this question

20. Which of the following vulnerable groups do the information resources take into account? You can select more than one answer below. Please check all that apply.

    □ Children
    □ Older persons
    □ People with mental health conditions
    □ People with mobility restrictions
    □ Visually impaired people
    □ Hearing impaired people
    □ People with no or insufficient language skills of the national language
    □ Ethnic minorities
    □ Pregnant women
    □ Other (please specify): _____
    □ None
    □ I don't know
    □ I prefer to skip this question

Questions are related to training exercises

21. Has your organisation been regularly (i.e. at least once a year) involved in practical/realistic exercises simulating CBRNe incidents in the last ten years?

    □ Yes
    □ No (Filter, next question is question 25 or 26)
    □ I don't know (Filter, next question is question 25 or 26)
    □ I prefer to skip this question (Filter, next question is question 25 or 26)

22. Besides your own organisation, how frequently did other actors jointly participate in these CBRNe exercises?

	Frequency				
	Never	Rarely	Sometimes	Frequently	Always
LEAs	□	□	□	□	□
Fire Brigades	□	□	□	□	□
Medical Staff	□	□	□	□	□
Civil Protection	□	□	□	□	□
Members of the Public	□	□	□	□	□
Members of vulnerable groups	□	□	□	□	□

23. How frequently were the following processes trained in these CBRNe exercises?

	Frequency				
	Never	Rarely	Sometimes	Frequently	Always
Evacuation process	□	□	□	□	□
Decontamination process	□	□	□	□	□
Medical care	□	□	□	□	□
Building of a safety zone	□	□	□	□	□
Contact to the public	□	□	□	□	□
Contact with vulnerable groups	□	□	□	□	□

24. How valuable do you think these CBRNe exercises have been in preparing your organisation for a CBRNe incident? Please select one of the following options.

    □ Extremely valuable
    □ Very valuable
    □ Somewhat valuable
    □ Slightly valuable
    □ Not valuable at all
    □ I don't know
    □ I prefer to skip this question

<u>CBRNe Response</u>

In the following section, you will be asked questions about responding to CBRNe incidents. The questions are related to your organisation.

Questions are related to the internal communication

25. If you have been professionally involved in CBRNe incidents, how do you assess the communication within your organisation during these operations? Please select one of the following options.

    □ Very efficient communication
    □ Rather efficient communication
    □ Neither efficient nor inefficient communication
    □ Rather inefficient communication
    □ Very inefficient communication
    □ I don't know
    □ I prefer to skip this question

26. If you have not been professionally involved in a CBRNe incident, how would you assess the communication within your organisation during an assumed CBRNe operation? Please select one of the following options.

    □ Very efficient communication
    □ Rather efficient communication
    □ Neither efficient nor inefficient communication
    □ Rather inefficient communication
    □ Very inefficient communication
    □ I don't know
    □ I prefer to skip this question

27. If you have been professionally involved in CBRNe incidents, how do you assess the clarity of responsibilities within your organisation during these CBRNe incidents? Please select one of the following options.

    □ Very high level of clarity
    □ Rather high level of clarity
    □ Medium level of clarity
    □ Rather low level of clarity
    □ Very low level of clarity
    □ I don't know
    □ I prefer to skip this question

28. If you have not been professionally involved in a CBRNe incident, how would you assess the clarity of responsibilities within your organisation during an assumed CBRNe incident? Please select one of the following options.

    □ Very high level of clarity
    □ Rather high level of clarity
    □ Medium level of clarity
    □ Rather low level of clarity
    □ Very low level of clarity
    □ I don't know
    □ I prefer to skip this question

Questions are related to the cooperation with other organisations

29. Are there special - written - cooperation agreements between your organisation and other organisations (LEAs, Fire Brigades etc.) for major emergencies, which specify the distribution of tasks / cooperation in major emergencies?

    □ Yes
    □ No (Filter, next question is question 31 or 32)
    □ I don't know (Filter, next question is question 31 or 32)
    □ I prefer to skip this question (Filter, next question is question 31 or 32)

30. How helpful were these agreements for the cooperation during major emergencies? Please select one of the following options.

    □ Extremely helpful
    □ Very helpful
    □ Somewhat helpful
    □ Slightly helpful
    □ Not at all helpful
    □ I don't know
    □ I prefer to skip this question

31. If you have been professionally involved in CBRNe incidents, how do you assess the clarity of responsibilities between the operational forces (e.g. Fire brigades, LEAs, Medical staff) during these CBRNe incidents? Please select one of the following options.

    □ Very high level of clarity
    □ Rather high level of clarity
    □ Medium level of clarity
    □ Rather low level of clarity
    □ Very low level of clarity
    □ I don't know
    □ I prefer to skip this question

32. If you have not been professionally involved in a CBRNe incident, how would you assess the clarity of responsibilities between the operational forces (e.g. Fire brigades, LEAs, Medical staff) during an assumed CBRNe incident? Please select one of the following options.

    □ Very high level of clarity
    □ Rather high level of clarity
    □ Medium level of clarity
    □ Rather low level of clarity
    □ Very low level of clarity
    □ I don't know
    □ I prefer to skip this question

33. Has your organisation established institutional collaboration with public, private and / or social organisations grouping vulnerable groups (e.g. associations of deaf people, public entities protecting children) to tackle CBRNe incidents?

    □ Yes
    □ No
    □ I don't know
    □ I prefer to skip this question

Questions are related to the communication strategy with the public

34. Does your organisation have a communication strategy for major emergencies?

    □ Yes
    □ No (Filter, next question is question 38)
    □ I don't know (Filter, next question is question 38)
    □ I prefer to skip this question (Filter, next question is question 38)

35. Which of the following topics does the communication strategy address? You can select more than one answer below. Please check all that apply.

    □ Evacuation
    □ Decontamination
    □ Medical care
    □ Pre-incident information
    □ Post-incident information
    □ Traffic information
    □ General communication
    □ Other (please specify): _____
    □ I don't know
    □ I prefer to skip this question

36. How suitable do you think the communication strategy is to respond to CBRNe incidents? Please select one of the following options.

    □ Extremely suitable
    □ Very suitable
    □ Somewhat suitable
    □ Slightly suitable
    □ Not suitable at all
    □ I don't know
    □ I prefer to skip this question

37. Which of the following vulnerable groups does the communication strategy explicitly take into account? You can select more than one answer below. Please check all that apply.

    □ Children
    □ Older people
    □ People with mental health conditions
    □ People with mobility restrictions
    □ Visually impaired people
    □ Hearing impaired people
    □ People with no or insufficient language skills of the national language
    □ Ethnic minorities
    □ Pregnant women
    □ Other (please specify): _____
    □ None
    □ I don't know
    □ I prefer to skip this question

Questions are related to information resources for the public

38. Which of the following CBRNe-related information resources does your organisation provide for the public to cope with a CBRNe incident? You can select more than one answer below. Please check all that apply.

    □ Leaflets
    □ Brochures
    □ Briefing notes
    □ Books
    □ Journals
    □ Online material
    □ Audio material
    □ TV material
    □ Mobile applications
    □ Training sessions
    □ Other (please specify): _____
    □ None (Filter, end of the questionnaire)
    □ I don't know (Filter, end of the questionnaire)
    □ I prefer to skip this question (Filter, end of the questionnaire)

39. What topics are covered by the information resources? You can select more than one answer below. Please check all that apply.

□ General information
□ Evacuation
□ Decontamination
□ Medical care
□ Traffic information
□ Pre-incident information
□ Post-incident information
□ Other (please specify): _____
□ I don't know
□ I prefer to skip this question

40. What channels are used to distribute the information resources? You can select more than one answer below. Please check all that apply.

□ Radio
□ TV
□ Official website
□ Partnering websites
□ Social Media (Twitter, Facebook etc.)
□ Mail
□ Face to Face
□ Other (please specify): _____
□ I don't know
□ I prefer to skip this question

41. Besides your national language(s), does your organisation provide information resources in additional languages?

□ Yes
□ No
□ I don't know
□ I prefer to skip this question

42. In which of the following special formats does your organisation provide information resources for the public? You can select more than one answer below. Please check all that apply.

□ Plain language
□ Pictorial language
□ Sign language
□ Braille
□ Audio
□ Other (please specify): _____
□ None
□ I don't know
□ I prefer to skip this question

43. How do you assess the effectiveness of the information resources for the public? Please select one of the following options.

□ Very high effectiveness
□ Rather high effectiveness
□ Medium effectiveness
□ Rather low effectiveness
□ Very low effectiveness
□ I don't know
□ I prefer to skip this question

18. APPENDIX E – INVITATION LETTER OF QUALITATIVE STUDY

Invitation letter of qualitative study **APPENDIX E**

Dear Mr./Ms. XY,

The German Police University (DHPol) as partner of the EU funded project ***PROACTIVE*** would be very grateful if you could help us identifying key aspects of CBRNe incidents from the perspective of European LEAs. The study is concerned with your organisation's threat assessment with regard to CBRNe incidents, security measures in cases of an assumed elevated risk of a CBRNe incident, and the communication with the public, including the media. As a result, the study aims to provide an up-to-date picture of the approach of LEAs across European countries regarding CBRNe incidents, especially in respect to the consideration and awareness of the needs of vulnerable citizens. The study will be carried within the frame of an interview. In preparation, the interview questions will be shared via e-mail beforehand after the appointment has been arranged.

The European research project ***PROACTIVE*** *(PReparedness against CBRNE threats through cOmmon Approaches between security praCTItioners and the VulnerablE civil society)* aims to increase practitioner effectiveness in managing large and diverse groups of people in a CBRNe environment. Chemical Biological Radiological Nuclear & Explosive (CBRNe) incidents, whether accidental or terrorist-based, can have a high impact on society. Therefore, the project will provide profound research to facilitate the interaction between European Law Enforcement Agencies (LEAs) as well as First Responders and the vulnerable civil society.

If you are willing to support us, we hereby provide you with a detailed information sheet and an informed consent form that has to be filled in and returned to DHPol as soon as possible but in any case before the **14th of May 2020**. Thereby, please indicate your preferred interview format (web conference/telephone) and propose several dates of preference.

All interviews will take place on agreed dates during the months of May and June 2020. We realise how precious your time is. That's why we made sure the interview will take no more than 45 minutes and that the interview format corresponds to your preferences.

Due to the current Covid-19 pandemic, we are aware that you are currently working at the limit and are under a great deal of additional stress. Therefore, we are all the more grateful for every interview and appreciate the time that you spend on this.

Please note that your responses are strictly confidential and handled in line with the GDPR. If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

Danielle Carbon and Andreas Arnold

PROACTIVE_study@dhpol.de
German Police University
Zum Roten Berge 18-24, 48165 Münster, Germany

Best regards and stay healthy!

To keep on track with our Projects outcomes you are more than welcome to join our **Practitioner Stakeholder Advisory Board** (PSAB) or follow us on our social media accounts. For more information, please visit us on:

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19. APPENDIX F – INTERVIEW GUIDELINE OF QUALITATIVE STUDY

Interview guideline of qualitative study **APPENDIX F**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 832981

Guideline

Name of interviewee:

_____

Country:

_____

Organisation:

_____

Age:

_____

Gender:

_____

Name of interviewer (Organisation):

_____

Date:

_____

Interview mode (please select):

- ○ Face-to-face
- ○ Web conference
- ○ Telephone
- ○ Other (please specify):_____

Introduction

- Thanks for agreeing to be interviewed
- Presentation of interviewer and function, presentation of content, definition of used terms (e.g. CBRNe incident, vulnerable groups), goals and course of the expert interview
- Assure confidentiality and anonymity

Professional Background

Current position / Area of responsibility	**1) Which position do you currently hold?** **2) How long have you been professionally involved with CBRNe?** **3) What is your current area of responsibility in the field of CBRNe?**

Risk assessment regarding to CBRNe incidents / Measures to prepare for a CBRNe incident

Likelihood of a CBRNe incident	**4) How would you describe the current likelihood of a CBRNe incident in your area of responsibility?** a) To what extent (if any) have ad hoc experiences with CBRNe-related incidents during your career influenced/shaped your current risk assessment?

Measures to prepare for a CBRNe incident	**5) What measures of preparedness are you taking for a CBRNe incident?** a) To what extent have these measures changed in the past ten years? b) To what extent do these measures consider the needs of vulnerable citizens? Have vulnerable or other social groups participated in the definition or design of these measures? c) To what extent do you see a potential for improvement in the preparedness measures? (specific suggestions)

Response measures in case of an assumed elevated risk of/during a CBRNe incident

Response measures	**6) What measures of response are you taking if there is an elevated risk or a real CBRNe incident?** a) To what extent have these measures changed over the last ten years? b) To what extent do these measures consider the needs of vulnerable citizens? If so, how have their needs been tackled?

CBRNe response technologies and procedures	**7) How do you assess the perceived <u>usefulness</u> of your current CBRNe technologies, guidelines and methods?** a) Have you analyzed the perceived ease of use of these mechanisms? o With and between LEAs o With members of the public o With vulnerable members of the public b) Have you examined or considered to what extent stakeholders believe that using CBRNe response technology will be secure and confidential? (It concerns the privacy and perceived risk in interaction, especially when stakeholders such as certain vulnerable groups have no experience with these technologies). If so, how? **8) How may the perception of the first responders' behavior by the public influence the response of vulnerable groups to CBRNe attacks?** a) Could different treatment concerning specific social groups (children, women, elderly, etc.) influence the acceptability of CBRNe response technologies, processes and procedures? (E.g. due to barriers posed by certain methods to particular groups). If so, which groups and why? b) Which features or functionalities of first response toolkits could foster the engagement and cooperation of vulnerable citizens in response action? (e.g. availability of pre-incident information, Live updates during an incident, access to relevant contacts)

Cooperation with other organisations in case of a CBRNe incident

Cooperation	**9) To what extent do you cooperate with other organisations in case of a CBRNe incident? (e.g. distribution of tasks, MoU, etc.)** a) Which leading or non-leading tasks does your organisation take over during CBRNe incidents that involve other organisations? b) To what extent is the mode of cooperation determined by legal regulations on the one hand and by cooperation on a case-by-case basis on the other hand?

Communication with the public during a CBRNe incident (incl. the media)

Communication strategy	**10) How would you describe the communication with the civil society in case of a CBRNe incident? (e.g. communication principles, media selection, etc.)** *(This includes causalities as well as the general public being informed about the event who aren't at the site)* a) Are there communication strategies that give special consideration to CBRNe incidents or comparable major incidents? b) If not, would you treat communication any differently during a CBRNe incident? How so? **11) To what extent do you think communication with the public can influence the way they react to a CBRNe incident?** a) Through which media channels do you communicate during such scenarios? Could you please share some examples of such communication? b) To what extent do these communication strategies consider the needs of vulnerable citizens? (e.g. sign language interpreters during press conferences)

End of the interview and expressing thanks to the interviewee

- Brief summary of the main points discussed
- Is there another topic that you want to address / do you have any questions?
- Thanks for the time provided and for the opportunity to discuss our research issues with you
- Addressing an opportunity to contact the interviewee again if the interviewer has further questions

20. APPENDIX G – BENCHMARKING MATRIX

Benchmarking Matrix APPENDIX G

	1	2	3	4	5
	absent/ minimal	developing	moderate	significant	optimal
I.1 (Joint) Threat assessment	Basic early warning and surveillance strategies for identifying CBRNe incidents are in place to inform local CBRNe practitioners. There are no protocols for inter-agency threat assessment at local, regional and national levels. Inter-agency response to an incident tends to be reactive and not informed by existing (national) threat assessments.	As category 1, but there is evidence of inter-agency collaboration for generic threat assessment in some places. This is not consistent at regional and national level.	As category 2, but ongoing threat assessment and monitoring is implemented between different agencies at local level.	There is evidence of a regional inter-agency threat assessment; however, the early warning and surveillance strategy is incoherent among different regions.	A nationally uniform generic threat assessment is implemented to facilitate early warning and surveillance of CBRNe incidents. A protocol for inter-agency collaboration is in place that facilitates a CBRNe threat assessment that incorporates the subnational and national perspectives of the different agencies.
I.2 Legal and policy framework for inter-agency collaboration	Different agencies are involved in CBRNe preparedness and response. Generic rules of engagement with external agencies are established, but a legal and policy framework that effectively defines roles and responsibilities is lacking.	There is legislation clarifying the roles and responsibilities of all CBRNe practitioners to ensure a nationally consistent approach. However, inter-agency collaboration is not covered.	As category 2 but protocols are in place to facilitate inter-agency collaboration between different CBRNe practitioners; however, this is only sporadically the case across the country and lacks effectiveness.	As category 3, but inter-agency collaboration protocols are embedded into the national emergency management governance.	Inter-agency collaboration protocols are in place at all levels where needed. There is a clear understanding and distinction of roles and responsibilities for CBRNe preparedness and response. Functioning coordination mechanisms and routines for information sharing are established.
I.3 (Joint) Training	Specific training for CBRNe incidents is rarely or insufficiently provided. No inter-agency collaboration is implemented.	As category 1, exercises are performed ad hoc, with some examples of CBRNe management. Cooperation is rarely initiated.	Training and exercising protocols are implemented. Relevant CBRNe practitioners participate in the exercises. CBRNe incidents are trained more frequently, however those trainings are not included in the regular training schedule.	As category 3, but additional actors are occasionally engaged in exercises (e.g., civilians, media etc.). CBRNe management is an integrated part of the common education practice and it is partially standardised.	A nationally consistent CBRNe training is conducted periodically by all relevant CBRNe practitioners to train existing SOPs and to evaluate „Best Practice". Additional stakeholders are regularly involved in exercises where relevant.

	1	2	3	4	5
	absent/ minimal	developing	moderate	significant	optimal
I.4 Evaluation and capacity building	A specific evaluation of CBRNe events is rarely or poorly carried out.	As category 1, but there is evidence of debriefing protocols following a significant CBRNe incident to identify weaknesses and strengths of CBRNe management.	As category 2, but single SOPs recognise the special needs of a certain vulnerable group; however this is not nationally consistent.	Following a proactive approach, institutional learning facilitates the exchange of knowledge within and between agencies beyond the evaluation of significant incidents. CBRNe preparedness and emergency management plans, SOPs and local capacities are periodically evaluated.	An evaluation routine is implemented to promote institutional learning at short intervals and following emergency events. Mechanisms are in place to facilitate knowledge exchange, sharing of experiences, and best practices. The CBRNe preparedness and emergency management plans and SOPs are regularly updated. The local capacities (e.g. essential services, human resource capabilities) are continuously updated and maintained.
I.5 Security measures	Basic security measures are in place to respond to a CBRNe event. No specific plan for engaging with a vulnerable public is in place.	As category 1, but there is evidence of individual planning documents for generic engagement with a diverse population.	As category 2, but single SOPs recognise the special needs of a certain vulnerable group; however this is not nationally consistent.	At a national level, SOPs recognise certain vulnerabilities. Single SOPs further elaborate the needs of greater vulnerable groups.	A consistent generic recognition of special needs is established in all national SOPs in regard to CBRNe incidents. Special SOPs are especially dedicated to the needs of smaller vulnerable groups.
I.6 Communication with the public	A generic communication plan for the public is applied to CBRNe preparedness and response.	As category 1, but there is a generic communication strategy for CBRNe preparedness and response. However, there is no recognition of the special needs of members of the vulnerable civil society in regard to CBRNe incidents.	As category 2, but in addition, protocols are in place to facilitate the communication between different CBRNe practitioners and vulnerable civilians.	There is evidence of standard communication strategies that provide CBRNe practitioners with generic SOPs in regard to vulnerable civilians during a CBRNe incident; however this is not nationally consistent.	A nationally consistent communication plan addresses the special needs of vulnerable civilians prior, during and after a CBRNe incident. The strategy is continuously updated.