



Deliverable D2.5

Final Report on common approaches of CBRNe Practitioners

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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

Abbreviations and Acronyms

Abbreviation/ Acronym	Meaning
CBRNe	Chemical, Biological, Radiological, Nuclear, and explosive
CEPOL	European Union Agency for Law Enforcement Training
CSAB	Civil Society Advisory Board
CSO	Civil Society Organisation
CUTA	Coordination Unit for Threat assessment
D	Deliverable
EU	European Union
FEMA	Federal Emergency Management Agency
GDPR	General Data Protection Regulation
IOR	Initial Operational Response
JESIP	Joint Emergency Services Interoperability Programme
LEA	Law Enforcement Agency
PPE	Personal Protective Equipment
PSAB	Practitioner Stakeholder Advisory Board
RPE	Respiratory Protective Equipment
SAB	Security Advisory Board
SOP	Standard Operating Procedure
WP	Work Package

Executive summary

The following D2.5 is part of the second Work Package of PROACTIVE that focuses on the *Engagement of Law Enforcement Agencies and other Practitioners*. This deliverable presents the findings from a two-phase research approach with CBRNe practitioners.

Based on the data collected during the second opening of the survey and additional interviews, this new D2.5 is an update of D2.3, extending the comparative study to additional countries.

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 involving vulnerable groups.

The report is structured in two main parts. The first part comprises a quantitative standardised survey among CBRNe experts (European Law Enforcement Agencies (LEAs), first responders, and other relevant practitioner categories). The deliverable outlines key tasks, procedures and resources related to CBRNe preparedness and response. The results present an up-to-date picture of the state of CBRNe preparation and readiness to respond. The complementary qualitative study with CBRNe experts that includes a benchmarking approach is the second phase of this research. The deliverable outlines 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’.

The report presents commonalities and differences in preparing for and responding to CBRNe incidents amongst (the various) categories of practitioners and country specific approaches. Both elements of the research place special emphasis on the consideration of vulnerable citizens in the phases of preparing for and responding to CBRNe events.

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 and Civil Protection personnel) became apparent. In particular, firefighters rated their equipment as adequate for responding to a CBRNe incident; in contrast, LEAs expressed no such confidence. Differences between country approaches were also noticeable, although it should be noted that country-specific threat levels may have played a role in arriving at this result.

With regard to factoring in the needs of vulnerable groups (e.g. older persons, children, those with mental health conditions), results of the interviews and the online study indicated that the organisations canvassed rarely consider the needs of these groups during the preparation or response phase of a CBRNe event. The needs of children, older persons and people with mobility restrictions are most likely to receive some degree of consideration. However, the needs of those who have mental health conditions, visual or hearing impairments, and those from ethnic minorities are less likely to be taken into account. Again, differences in approaches between countries in addressing the needs of vulnerable groups in CBRNe situations have become evident.

Additionally, it is important to note that the actors usually involved in responding to a CBRNe event have fundamentally different focuses, responsibilities, priorities, training and equipment. These differences influence their views and opinions when engaged in information gathering or research projects.

In general, as indicated above, little consideration is generally given to the needs of vulnerable groups in the context of CBRNe events, so they need to be identified and taken into account to a greater extent in the future. In this context, this deliverable provides ten recommendations for CBRNe practitioners.

Table of Contents

1. INTRODUCTION	14
2. KEY TERMS	16
3. METHODOLOGICAL APPROACH	18
3.1. Research objectives.....	19
3.2. Sample design.....	20
3.3. Format.....	21
3.3.1. Questionnaire	21
3.3.2. Benchmarking rating	22
3.3.3. Interview guideline	23
4. DATA COLLECTION.....	24
4.1. Recruiting survey participants	24
4.2. Promotion of the PSAB.....	28
5. ETHICS AND SAFETY.....	29
6. SAMPLE DESCRIPTION	30
6.1. Sample of quantitative standardised survey	30
6.2. Sample of qualitative study	34
7. RESULTS.....	37
7.1. CBRNe threats in and beyond Europe	37
7.1.1. Experience with CBRNe incidents	38
7.1.2. Familiarity with the topic of CBRNe incidents	41
7.1.3. Assessment of prospective CBRNe incidents within Europe	45
7.2. CBRNe preparedness across Europe.....	48
7.2.1. Allocation of responsibilities.....	49
7.2.2. Education and training of CBRNe practitioners	62
7.2.3. Organisational equipment for a CBRNe incident	73
7.2.4. Cooperation approaches of CBRNe practitioners	75
7.2.5. Organisational level of preparedness for a CBRNe incident	80
7.2.6. Recognition of vulnerable citizens in CBRNe preparedness	87
7.3. CBRNe response across Europe.....	103
7.3.1. Security measures in case of an assumed high risk of a CBRNe incident	103
7.3.2. Key tasks of CBRNe response.....	110
7.3.3. Communication with the public.....	113
7.3.4. Consideration of vulnerable citizens in CBRNe response	129
8. OUTLOOK ON COVID-19 AND ITS IMPLICATIONS FOR OTHER CBRNe INCIDENTS	145
9. STRONG POINTS AND LIMITATIONS.....	150

10. CONCLUSION AND RECOMMENDATIONS.....	152
10.1. Main findings on the research questions.....	152
10.2. Recommendations	158
11. SYNERGIES WITH OTHER WPs AND TASKS	168
12. REFERENCES	170
13. APPENDIX A – FIGURES.....	173
14. APPENDIX B – INVITATION LETTER OF QUANTITATIVE SURVEY	187
15. APPENDIX C – QUESTIONNAIRE OF QUANTITATIVE SURVEY	188
16. APPENDIX D – INVITATION LETTER OF QUALITATIVE STUDY.....	197
17. APPENDIX E – INTERVIEW GUIDELINE OF QUALITATIVE STUDY	198
18. APPENDIX F – BENCHMARKING MATRIX.....	202

List of Figures

Figure 1: Disaster Management Cycle (adapted figure based on Austrian Standards Institute / Österreichisches Normungsinstitut 2011).....	18
Figure 2: Sample by country group	30
Figure 3: Participants in quantitative standardised survey by country of origin	31
Figure 4: Participants in quantitative standardised survey by profession	32
Figure 5: Participants by type of management responsibility; multiple selection option	32
Figure 6: Participants by organisational level of action; multiple selection option	33
Figure 7: Gender of participants in quantitative standardised survey.....	33
Figure 8: Sample of Benchmarking rating	35
Figure 9: Map with countries represented in the quantitative survey and qualitative study	36
Figure 10: Involvement of participants in a CBRNe incident during their professional life by country.....	39
Figure 11: Frequency of involvement in a CBRNe incident during their professional life by country group.....	40
Figure 12: Frequency of involvement of participants in a CBRNe incident during their professional life by profession.....	40
Figure 13: Familiarity with the topic of CBRNe by experience with CBRNe incidents	41
Figure 14: Familiarity with the topic of CBRNe by country.....	42
Figure 15: Familiarity with the topic of CBRNe by respondents' country status as EU or non-EU	43
Figure 16: Familiarity with the topic of CBRNe by profession	43
Figure 17: Availability of CBRNe-related SOPs of respective organisation by experience with CBRNe incidents.....	48
Figure 18: Perceived clarity of internal responsibilities by experience with CBRNe incidents	50
Figure 19: Perceived clarity of internal responsibilities by country	51
Figure 20: Perceived clarity of internal responsibilities by profession	51
Figure 21: Perceived clarity of responsibilities between operational forces during a CBRNe incident by experience with CBRNe incidents	52
Figure 22: Perceived clarity of responsibilities between operational forces during a CBRNe incident by country	53
Figure 23: Perceived clarity of responsibilities between operational forces during a CBRNe incident by country group	53
Figure 24: Perceived efficiency of internal communication during a CBRNe incident by experience with CBRNe incidents	61
Figure 25: Topics of the information resources organisations provide for their personnel to prepare for a CBRNe incident by profession; multiple selection option.....	62
Figure 26: Perceived relevance of information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident by experience with CBRNe incidents	63
Figure 27: Involvement of organisation in CBRNe exercises (at least once a year) in the last ten years by experience with CBRNe incidents.....	64
Figure 28: Reported frequency of topics addressed in CBRNe exercises in which the respondent's organisation has been involved in the last ten years	65
Figure 29: Involvement in CBRNe exercises by profession	66
Figure 30: Involvement (frequency) of different actors in CBRNe exercises in the last ten years besides the own organisation.....	67

Figure 31: Perceived 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	71
Figure 32: Perceived value of CBRNe exercises the respondent's organisation participated in the last ten years to prepare the organisation for a CBRNe incident by country group	72
Figure 33: Assessment of the organisational equipment for a CBRNe incident by experience with CBRNe incidents	73
Figure 34: Assessment of the organisational equipment for a CBRNe incident by profession	74
Figure 35: Written cooperation agreements of respondent's organisation with other practitioner organisations (e.g. LEAs and Fire Brigades) for major emergencies by experience with CBRNe incidents	75
Figure 36: Perceived helpfulness of cooperation agreements for major emergencies for cooperation during these incidents by country	77
Figure 37: Perceived level of preparedness for a CBRNe incident by experience with CBRNe incidents	80
Figure 38: Perceived level of preparedness for a CBRNe incident by country	81
Figure 39: Perceived level of preparedness for a CBRNe incident by country group	82
Figure 40: Perceived level of preparedness for a CBRNe incident by profession	82
Figure 41: Vulnerable groups considered in CBRNe SOPs of the respondents organisation; multiple selection option	87
Figure 42: Vulnerable groups considered in CBRNe SOPs of the respondents organisation by profession; multiple selection option	90
Figure 43: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident; multiple selection option	91
Figure 44: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident by profession; multiple selection option	92
Figure 45: Contact with vulnerable groups during CBRNe exercises involving own organisation in the last ten years by country	93
Figure 46: Contact with the public and with vulnerable groups during CBRNe exercises in which respondent's organisation was involved in the last ten years by country group	94
Figure 47: Contact with vulnerable groups during CBRNe exercises involving respondent's organisation in the last ten years by profession	94
Figure 48: Involvement of vulnerable groups in CBRNe exercises by country	95
Figure 49: Involvement of the public and vulnerable groups in CBRNe exercises by country group	96
Figure 50: Involvement of vulnerable groups in CBRNe exercises by profession	97
Figure 51: Topics of the organisation's communication strategy for major emergencies by profession; multiple selection option	119
Figure 52: Topics covered in information material for the public on coping with a CBRNe incident by profession; multiple selection option	120
Figure 53: Information channels used by respondent's organisation to disseminate CBRNe-related information to the public; multiple selection option	121
Figure 54: CBRNe-related information resources respondent's organisation provides for the public to cope with a CBRNe incident by experience with CBRNe incidents; multiple selection option	124
Figure 55: CBRNe-related information resources respondent's organisation provides for the public to cope with a CBRNe incident by profession; multiple selection option	125

Figure 56: Perceived suitability of the organisation's communication strategy for major emergencies to respond to CBRNe incidents by country.....	126
Figure 57: Perceived effectiveness of information material for the public by experience with CBRNe incidents.....	127
Figure 58: Perceived effectiveness of information material for the public by country	128
Figure 59: Perceived effectiveness of information material for the public by country group	128
Figure 60: Reported focus on vulnerable groups in respondent's organisation's communication strategy for major emergencies; multiple selection option	134
Figure 61: Consideration of vulnerable groups in the organisation's communication strategy for major emergencies by profession; multiple selection option.....	135
Figure 62: Special formats used by organisations to provide CBRNe-related information to the public; multiple selection option.....	139
Figure 63: Frequency of survey participants' involvement in a CBRNe incident during their professional life.....	173
Figure 64: Context of CBRNe incidents in which survey participants were involved during their professional life; Respondents with experience only; multiple selection option.....	173
Figure 65: Familiarity of survey participants with the topic of CBRNe.....	174
Figure 66: Information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident; multiple selection option.....	174
Figure 67: Topics of information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident; multiple selection option	175
Figure 68: CBRNe substances addressed in information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident; multiple selection option.....	175
Figure 69: Perceived relevance of the information resources organisations provide for their personnel to prepare for a CBRNe incident.....	176
Figure 70: Perceived practical value of CBRNe exercises in which respondent's organisation has participated in the last ten years to prepare for a CBRNe incident.....	176
Figure 71: Perceived practical value of CBRNe exercises in which respondent's organisation has participated in the last ten years to prepare for a CBRNe incident by experience with CBRNe incidents.....	177
Figure 72: Assessment of the organisational equipment for a CBRNe incident	177
Figure 73: Perceived helpfulness of cooperation agreements for major emergencies for cooperation in these events	178
Figure 74: Assessment of the organisational level of preparedness for a CBRNe incident.....	178
Figure 75: Vulnerable groups addressed by the respondent's organisation in CBRNe SOPs by country; multiple selection option	179
Figure 76: Focus on vulnerable groups in information resources organisations provide for their personnel to prepare for a CBRNe incident by country; multiple selection option.....	180
Figure 77: Contact with the public during CBRNe exercises in the last ten years in which the respondent's organisation was involved, by country.....	181
Figure 78: Contact with the public during CBRNe exercises in the last ten years in which the respondent's organisation was involved, by profession.....	182
Figure 79: Involvement of the public in CBRNe exercises by country.....	182
Figure 80: Involvement of the public in CBRNe exercises by profession	183
Figure 81: Topics of the organisations' communication strategy for major emergencies; multiple selection option.....	183

Figure 82: Topics of information resources respondents' organisations provide for the public to cope with a CBRNe incident; multiple selection option	184
Figure 83: CBRNe-related information resources that the respondent's organisation provides to the public to cope with a CBRNe incident; multiple selection option	184
Figure 84: Perceived suitability of the organisation's communication strategy for major emergencies to respond to CBRNe incidents.....	185
Figure 85: Assessment of the effectiveness of the information resources organisations provide for the public to cope with a CBRNe incident	185
Figure 86: Consideration of vulnerable groups in respondent's organisation's communication strategy for major emergencies by country; multiple selection option	186

List of Tables

Table 1: Overview of recruitment of survey participants using an email, social media and network approach.....	25
Table 2: Interviewees by country, organisation and professional background in 1st phase of qualitative study (n=18).....	34
Table 3: Profile of interviewees by country in 2nd phase of qualitative study (n=30).....	35
Table 4: Benchmarking rating of legal and policy framework for inter-agency collaboration.....	55
Table 5: Benchmarking rating for (joint) training	68
Table 6: Benchmarking rating of evaluation and capacity building.....	83
Table 7: Benchmarking rating of recognition of vulnerable people in SOPs.....	89
Table 8: Benchmarking rating of (joint) threat assessment	104
Table 9: Benchmarking rating of communication with the public.....	136

1. INTRODUCTION

CBRNe incidents, whether accidental or deliberately caused by terrorists, can have a major impact on society. Evidence demonstrates 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 H2020 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. 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 insights into the professional perspective and methods of CBRNe practitioners, especially in regards to their awareness of the needs of vulnerable citizens in measures of preparedness and response in the context of CBRNe situations.

This deliverable presents the outcomes of research conducted by DHPol among CBRNe experts (LEAs, first responders, and other relevant practitioner categories). This research comprises two separate but complementary parts: a quantitative standardised survey and a qualitative interview study. In order to increase the number of participants in both the quantitative survey and the qualitative study, two phases of research were conducted (1st phase June-August 2020, 2nd phase May-July 2021). Furthermore, during the second interview phase, additional topics in the area of CBRNe were addressed in order to obtain a more detailed picture of the level of CBRNe preparedness and response. This deliverable includes the results of both research phases¹.

The quantitative standardised survey among CBRNe practitioners 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 countries.

The qualitative interview study supplemented the quantitative survey approach. The study was based on two slightly different interview guidelines which touched upon key aspects of CBRNe incidents. In the first interview phase (June-August 2020) the interview guideline focused on threat assessment by LEAs with regard to CBRNe incidents, on security measures in case of an assumed high risk of a CBRNe incident, and on communication with the public, including the media. Subsequently, a benchmarking rating was used and a new interview guideline (interview phase between May-July 2021), which was based on the rating, was used to clarify and further develop responses to the rating. The benchmarking rating covered the following topics: (1) The (joint) threat

¹ For an overview of the first phase of the research see Deliverable D2.3 (Carbon et al. 2021a).

assessment by CBRNe practitioners with regard to CBRNe incidents, (2) the legal and policy framework for inter-agency collaboration, (3) the (joint) training, (4) the evaluation and capacity building, (5) security measures and (6) the communication with the public.

This report describes the results 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. On the basis of the outcomes, the deliverable provides 10 recommendations that indicate the need for action on the part of practitioners.

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). D2.5 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 not within the scope of this research.

The term **Vulnerable Citizens** refers to members of the public who show a particular level of vulnerability to threats from CBRNe incidents. 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 disrobe for decontamination due to religious reasons.

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

Practitioners include 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.

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 and the thematic area to which the respondent or 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 lead to a CBRNe incident.

3. METHODOLOGICAL APPROACH

CBRNe preparedness and response are two phases of CBRNe management. Preparedness requires cross-sectoral and cross-border approaches, education, awareness and engagements with civil society, citizens, and communities such as research and industry. The response phase describes an ongoing process that enables practitioners to manage a CBRNe incident. Altogether, CBRNe management can be divided into four phases (Figure 1). 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.

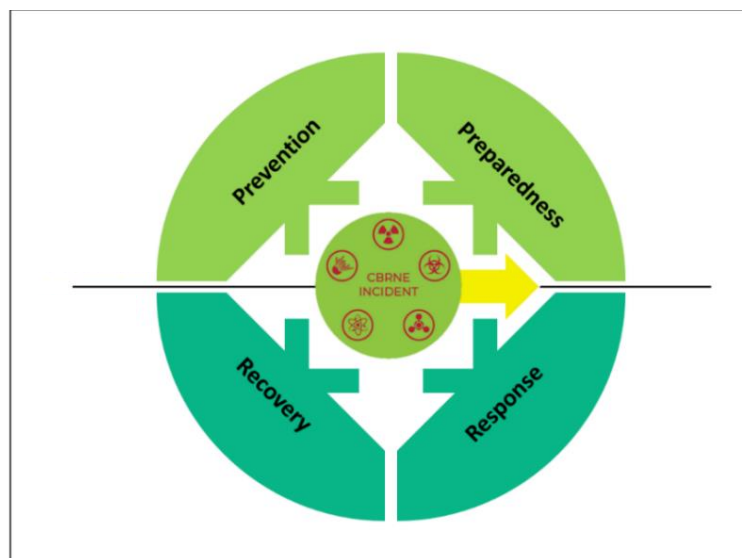


Figure 1: Disaster Management Cycle (adapted figure based on Austrian Standards Institute / Österreichisches Normungsinstitut 2011)

Building on research carried out in 2020/2021 in PROACTIVE D2.3 (Carbon et al. 2021a), the present study includes additional data, including input from new countries, to provide a broader benchmarking of CBRNe preparedness and response in and beyond Europe. Thus, the study consists of a second phase of the previous quantitative survey and qualitative interview study². The following part of this chapter describes the methodological approach of the second phase of the study.

² A detailed methodological approach of both study phases can be found in Deliverable D2.3 (Carbon et al. 2021a).

3.1. Research objectives

The study is based on two complementary methodologies, each corresponding to a specific goal. The **quantitative survey** aims to identify commonalities and differences in CBRNe management between different CBRNe involved practitioners. Besides Member States of the European Union and associated countries, the survey further aimed to include the perspectives of relevant third countries with track record in CBRNe incident preparedness and response. The term EU and non-EU countries thereby refers to the membership status of each party to the European Union (i.e. EU refers to a Member State and non-EU to associated and third countries). Furthermore, the survey aims to provide an up-to-date picture of the state of CBRNe preparedness and response 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.

The second phase of the study relies besides a quantitative survey on a **qualitative methodology** aiming to identify differences and similarities between countries especially with regard to (1) the (joint) threat assessment by CBRNe practitioners with regard to CBRNe incidents, (2) the legal and policy framework for inter-agency collaboration, (3) the (joint) training, (4) the evaluation and capacity building, (5) security measures and (6) the communication with the public. The second phase of this qualitative study thereby complements the findings of the first interview phase which included a broader perspective on CBRNe management. The execution of the second phase is based on a two-part structure composed of a rating of the above six topics followed by interviews to explore these topics in more detail. In addition to the inclusion of European countries (1st phase), non-EU countries with significant track records in CBRNe incident preparedness and response are included to explore relevant lessons learned. Furthermore, the interview study aims to provide an up-to-date picture of the awareness and consideration of the needs of vulnerable citizens across EU and non-EU CBRNe practitioners. The interview study aims to clarify to what extent especially European practitioners 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, anonymised quotations are included, which provide information on specifics, lessons learned and good practice examples of CBRNe management in the respective countries.

Overall, the present study aims to answer the following research questions:

Research question 1: *To what extent do measures of preparedness and response differ among CBRNe practitioners across European Member States and beyond? And which lessons learned can be found in non-EU countries with a significant track record in CBRNe incident preparedness and response?*

Research question 2: *To what extent do CBRNe practitioners consider the special needs of vulnerable citizens in measures of preparedness and response across European Member States and beyond?³ And what lessons can be learned from non-EU countries with a significant track record in CBRNe incident preparedness and response?*

³ 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.

3.2. Sample design

The **quantitative standardised survey** and the **qualitative study** among LEAs and first responders focused on EU Member States. Additionally, participants from non-EU countries with track record in CBRNe incident preparedness and response were involved.

Inclusion criteria

The survey focused on **LEAs** with management responsibility.

The term **firefighter** referred to participants who are firefighters (as volunteers or professionals) with a management responsibility.

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** included practitioners involved in CBRNe planning, education and training activities including sectors that can be involved in emergency situations alongside first responders (e.g. safety experts at transport companies).

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.

3.3. Format

For comparability, the second phase of the study was based on the first study design (see deliverable D2.3)⁴ of the **quantitative survey** that collected data using an electronic survey format (see Chapter 3.3.1).

The **qualitative study** collected data through an initial benchmarking rating document and follow-up interviews. The benchmarking rating consisted of six topics (see Chapter 3.3.2). The follow-up interviews were based on a semi-structured guideline that proceeded along the rating and asked about the assessment's background (see Chapter 3.3.3). The respondents were further asked about respective lessons learned and best practice examples. The interviews took place between one interviewer and one interviewee and were designed to be conducted online using an online telecommunication platform. The interview channel (e.g. telephone or video conferencing system) and the time were individually adapted to the needs of the interviewee. The time frame of the interviews was a minimum of 15 minutes with an upper limit depending on the availability of the participants. Most interviews were conducted by the research team of DHPol with some additional ones conducted by UIC.

To minimise language differences in the research design and collected data, both parts of the study took place in English. In line with the DoA, the questionnaire was not translated into other languages as the survey was aimed at CBRNe practitioners at high management levels. It could be assumed that this group of people would have fair 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. Similarly, English proved to be suitable for almost all interviews. Only in one case a Turkish interpreter was involved, in another case, UIC conducted an interview in French providing the translation afterwards. Interviews were scheduled and conducted between May and July 2021.

3.3.1. Questionnaire

The questionnaire (see Appendix C - Questionnaire of quantitative survey) asked practitioners about their experience and familiarity with CBRNe, as well as their assessment of CBRNe preparedness and response in each participant's organisation⁵. In regard to CBRNe preparedness, the questions related to the allocation of responsibilities, education and training, organisational equipment for CBRNe incidents, cooperation approaches with other organisations that participate in CBRNe operations, overall preparedness in the respective organisation and the recognition of vulnerable citizens in this phase. In regard to CBRNe response, participants were asked about the communication strategy with the public, the information resources that are made available to the public and the recognition of vulnerable citizens in this phase. The questionnaire was implemented

⁴ A detailed description of the study design can be found in Carbon et al. 2021a.

⁵ A detailed description of the questionnaire can be found in Carbon et al. 2021a.

online using the LimeSurvey platform and disseminated by email and social media channels. Data were collected between May and July 2021. The questionnaire included questions with single and multiple response formats. In addition, some of the questions offered the possibility to provide additional answers in free text form. Filter questions allowed to look at further aspects with certain participants. An example is the adaptation of the questions to the previously indicated level of experience with CBRNe incidents (question referring to practically experienced operations vs. question referring to assumed operational situation).

3.3.2. Benchmarking rating

The benchmarking rating focused on functional areas of CBRNe management that cannot be measured quantitatively such as the 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 used benchmarking rating covered a classification of the topics as: ‘(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 F – Benchmarking Matrix). For each topic, participants were asked to indicate which predefined statement they considered to be most applicable to CBRNe management in their country. Only one of the five statements was to be ticked per topic. Following the five-level assessment described above, the five statements corresponded to the following scores: (1) absent/minimal, (2) emerging, (3) moderate, (4) significant and (5) outstanding.

The ratings were then combined for each country and compiled in a benchmarking matrix. The countries were grouped into European countries and Third countries in line with the quantitative study (see Chapter 6.1). If several participants from the same country took part in the rating, all data was combined. This means that if all participants agreed with their assessment, only one statement is presented in the matrix, whereas if there is disagreement, several statements are presented for one country. To visually underline the assignment of the answers from 1-5, a traffic light colour system was applied, ranging from red (absent/minimal) to yellow (emerging and moderate) to green (significant and outstanding). This is intended to facilitate the identification of differences in the country comparison of the matrix.

Some of the statements contained several sub-statements that reflected the corresponding level 1-5 of the topic. Since the participants were asked to choose only one statement, it can be assumed that it was not always easy to choose between two adjacent statements if their sub-statements did not fully apply. For this reason, the follow-up interviews served as an important tool to understand the considerations behind the rating.

3.3.3. Interview guideline

For this study, the original interview guideline used in the D2.3 study was revised. It followed the benchmarking rating to facilitate greater comparison between the countries (see Appendix E - Interview guideline of qualitative study). The new guideline was structured according to the six topics of the benchmarking rating. In addition to a brief outline of the professional background and an explanation of the ratings, the interview went into detail about the respective potential for improvements, lessons learned and best practice examples of each topic. The consideration of vulnerable persons was also discussed in more detail. In addition to the previous interview study in D2.3 (Carbon et al. 2021a), the influence of Covid-19 on the respective topic was specifically explored.

4. DATA COLLECTION

This chapter describes how both parts of the study were conducted and how data were collected.

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. Furthermore, other CBRNe experts were included in the study (such as CBRNe experts in the railway sector). 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 via email (Appendix B - Invitation letter of quantitative survey):

- An information letter that extensively informed about all aspects of the survey (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 potential respondents across Europe and beyond. Overall, persons in 47 countries 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. In total, records suggest, that the PROACTIVE consortium reached out directly via email to at least 745 potential respondents⁶ (see Table 1). 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 800 followers, the LinkedIn account had 100 connections (see Table 1).

⁶ 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	Potential respondents contacted	Medium	Responsible partner
Albania	1 (1) ⁷	email	DHPol
Andorra	1 (1)	email	DHPol
Argentina	1 (1)	email	DHPol
Armenia	1 (1)	email	DHPol
Australia	31 (5)	email	DHPol
Austria	32 (4)	email	DHPol/ RINI/ CBRNE
Belgium	10 (3)	email	DHPol / RINI / UIC
Bosnia Herzegovina	2 (1)	email	DHPol/ CBRNE
Bulgaria	18 (1)	email	DHPol
Canada	4 (1)	email	DHPol
China	1 (0)	email	UIC
Croatia	28 (23)	email	DHPol/ CBRNE
Cyprus	10 (3)	email	DHPol
Czech Republic	10 (5)	email	DHPol/ CBRNE
Denmark	7 (2)	email	DHPol
Estonia	16 (7)	email	DHPol
Finland	17 (12)	email	DHPol/ RINI/ CBRNE
France	20 (5)	email	DHPol/ RINI/ CBRNE/ UIC
Greece	10 (2)	email	DHPol/ RINI
Hungary	4 (1)	email	DHPol/ RINI/ UIC
Iceland	1 (1)	email	DHPol
India	1 (0)	email	UIC
Ireland	35 (12)	email	DHPol/ RINI/ AGS
Israel	11 (3)	email	DHPol/ RINI/ CBRNE
Italy	47 (25)	email	DHPol/ RINI/ UIC
Japan	10 (2)	email	DHPol/ UIC
Jordan	1 (0)	email	CBRNE
Latvia	25 (10)	email	DHPol/ SPL/ UIC
Lithuania	22 (15)	email	DHPol/ SPL
Luxemburg	7 (2)	email	DHPol

⁷ The numbers in brackets indicate how many of the potential survey respondents were additionally contacted for the interview study.

Malaysia	1 (0)	email	PPI
Malta	6 (4)	email	DHPol
Moldova	2 (1)	email	DHPol/ UIC
Monaco	2 (1)	email	DHPol/ RINI
Montenegro	1 (1)	email	DHPol
The Netherlands	7 (1)	email	DHPol/ RINI
New Zealand	19 (1)	email	DHPol
North Macedonia	2 (1)	email	DHPol/ CBRNE
Norway	41 (17)	email	DHPol/ RINI/ FFI/ CBRNE
Poland	12 (2)	email	DHPol/ CBRNE/ UIC
Portugal	13 (1)	email	DHPol
Romania	16 (2)	email	DHPol/ RINI/ CBRNE
Russia	2 (0)	email	UIC
Serbia	2 (2)	email	DHPol
Slovakia	6 (2)	email	DHPol/ RINI
Slovenia	29 (13)	email	DHPol/ UIC
South Africa	28 (14)	email	DHPol
South Korea	10 (1)	email	DHPol/ UIC
Spain	56 (9)	email	DHPol/ RINI/ ETICAS/ UIC
Sweden	22 (8)	email	DHPol/ RINI/ UMU
Switzerland	32 (7)	email	DHPol/ RINI
Turkey	1 (0)	email	UIC
Ukraine	25 (1)	email	DHPol/ SESU
United Kingdom	1 (0)	email	DHPol
United States	25 (4)	email	DHPol/ CBRNE
Overall number of potential respondents contacted via mail	745 (242)		
Not specified	100	PROACTIVE LinkedIn Account	PROACTIVE
Not specified	800	PROACTIVE Twitter Account	PROACTIVE
Czech Republic	unknown	LinkedIn	PPI
France	713	Private LinkedIn Account	UIC
France	2400	Private LinkedIn Account	UIC
France	841	Private Twitter Account	UIC
France	1500	Private Twitter Account	UIC

- The PSAB (83 members as of June 2021) was made aware of the survey via emails with a request to forward the survey within their networks. A PSAB member from Belgium confirmed that the request had been forwarded to the CBRN Knowledge Centre.
- UIC shared the survey link and the study documents with several projects asking their respective coordinators to further distribute the information to their networks; eNOTICE, ENCIRCLE, Counterfog, RESIST, COVINFORM, BULLSEYE, NO-FEAR, TRANSTUN, CEN STAIR4SECURITY, as well as with the European association RAILPOL (RAILway POLice).
- At European level, the survey was also addressed to the European Biosafety Association and promoted through the international master program "Protection against CBRNe events" of the University of Rome "Tor Vergata". Furthermore, the survey was promoted via DHPol through the European Union Agency for Law Enforcement Training (CEPOL).
- At international level, the survey was sent to the Global Initiative to Combat Nuclear Terrorism, the International Association of Fire and Rescue services, the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and the United Nations Office of Disaster Risk Reduction (UNDRR). The survey was further promoted through the International Police Association IPA.
- Moreover, the survey was promoted through several conferences and events:
 - a presentation at the 26th German Prevention Congress;
 - a joint-webinar of PROACTIVE and NO-FEAR on Communication in Crisis. Members of the webinar received an email after the event with the survey link and a request to forward the survey to their network;
 - a presentation at the International e-Conference CBRNE - Research & Innovation;
 - a presentation at the 18th ISCRAM conference;
 - a presentation at the CERIS (Community of European Research and Innovation for Security) DRS state-of-play and way forward;
 - a presentation at the EUPROTECT H2020 project "Development of New Solutions for the Protection of European Citizens and Infrastructures Against Terrorist Threats" webinar;
 - a presentation at the EU H2020 project INCLUDING joint action in Athens; and
 - a presentation at the 7th International Human Factors Rail Conference.

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 potential participants 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 showed that LEAs are not always authorised to release information about their work to researchers without approval from certain official bodies, whether that be via online surveys and/or interviews. Therefore, DHPol had to go through several time-consuming approval processes that eventually took several months in order to be allowed to interview certain LEAs. However, such a process was not feasible in every country and for every partner (time resources, former contacts to such institutions, etc.)

The data collection phase of the quantitative survey was extended once 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. Data collection eventually took place between May and July 2021.

The target group of the **qualitative study** was composed of EU and non-EU CBRNe practitioners. The scope for recruiting participants to 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 CBRNe practitioners across Europe and beyond by email (Appendix D - 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 same methods as for the quantitative study.

4.2. Promotion of the PSAB

In the wider context of WP2, 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 for new candidates to be able to join the project board of experts.

5. ETHICS AND SAFETY

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

PROACTIVE/PEO/4/05/05/2020 and PROACTIVE/PEO/10/27/04/2021

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 prefer to 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's Approval Reference:

PROACTIVE/PEO/3/08/04/2020 and PROACTIVE/PEO/11/11/05/2021

Regarding the data protection and the ethical development of the qualitative study, the approach was similar in both parts of the study. All benchmarking ratings and interviews were conducted and recorded in line with the data protection and ethical criteria of the GDPR. The head section of the benchmarking rating provided a consent form that had to be completed along the rating. Unlike the rating and 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 E - 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. SAMPLE DESCRIPTION

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

6.1. Sample of quantitative standardised survey

In total, 405 LEAs and first responders took part in the online survey, of which 182 participated during the second data collection phase. The following sample description is based on all 405 respondents. Please note that the reported case numbers of partial responses do not always correspond to the sample size, as participants always had the option to omit a question by stating "I don't know" or "I prefer to skip this question". These answers are usually not included in the figures and the overall sample size is reported accordingly.

As shown in Figure 2, almost three quarters of the respondents came from EU Member States and the rest from non-EU countries. Since this work was conducted after the Brexit, the UK was included in the non-EU country group. The non-EU participants were mainly associated countries (22.7%) and only 4.7% of the sample came from third countries. Figure 3 highlights that Germany, Ireland and the UK provided the largest percentages of participants, followed by Belgium and Spain. All twelve countries represented in the consortium have at least one participant in the survey. In total, practitioners from 47 different countries engaged in the online survey.

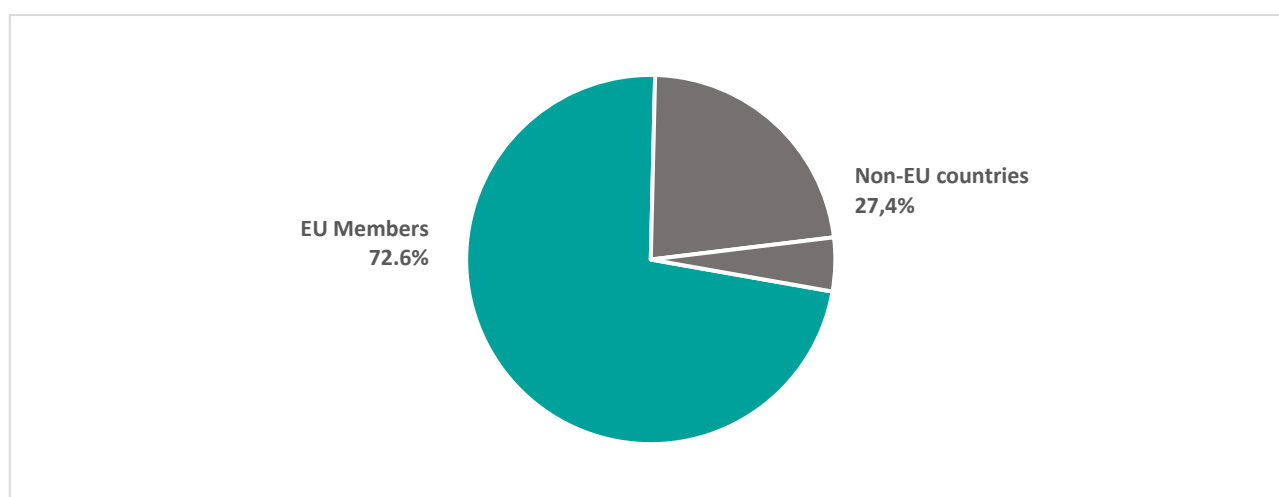


Figure 2: Sample by country group (n=401)

In the Results Chapter, a comparison is made between EU countries (EU Member States) and non-EU countries (associated and third countries). Furthermore, a more detailed country comparison focuses on countries with more than three respondents. These include: Austria, Belgium, Croatia, Cyprus, the Czech Republic, Finland, France, Germany, Greece, Ireland, Italy, Latvia, the Netherlands, Norway, Poland, Portugal, Spain, Turkey and the UK. Pakistan, the only Asian country having reached this threshold, is not included in the comparison. For cultural and geographical proximity, we limited this in-depth comparison to EU Member States and associated countries.

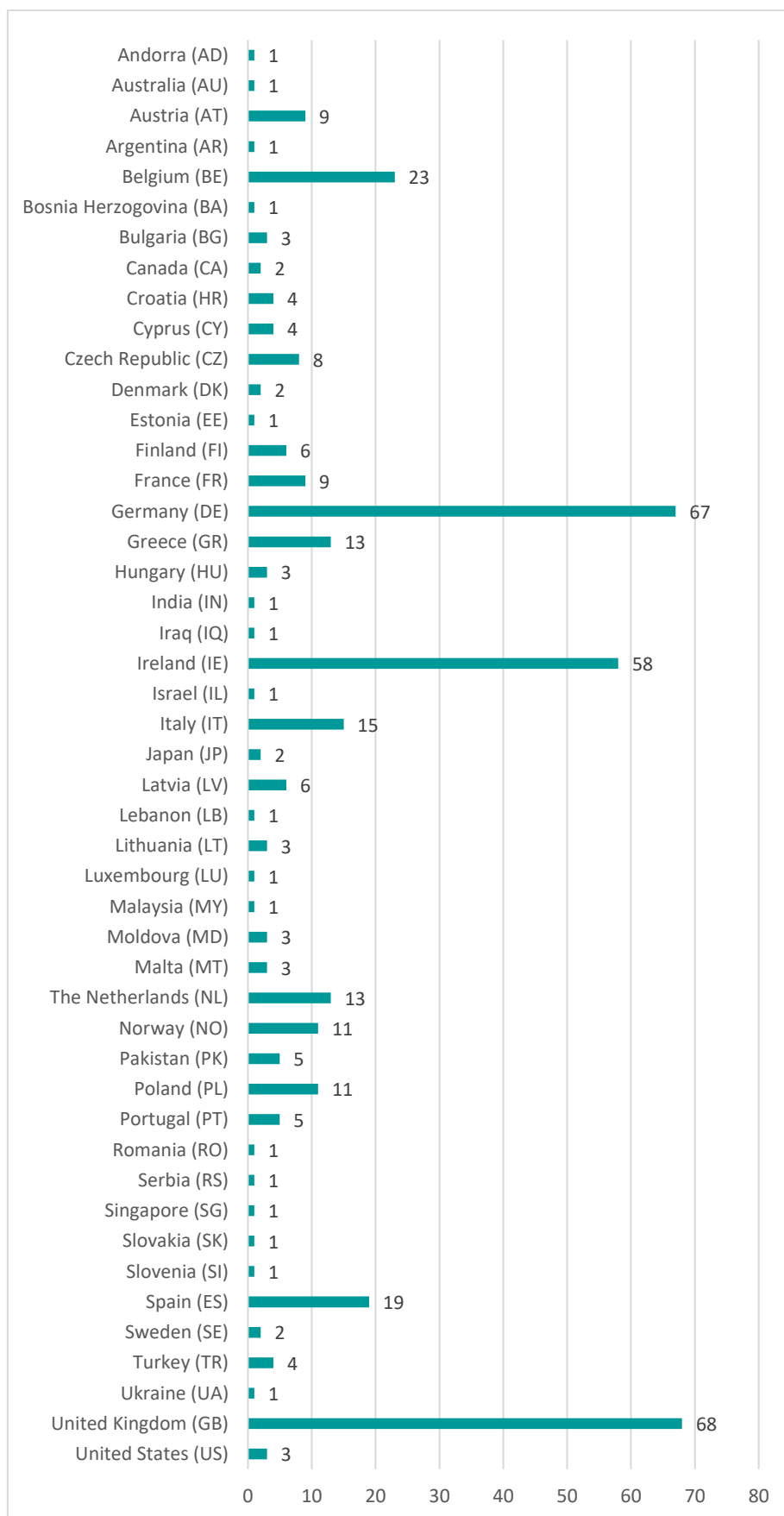


Figure 3: Participants in quantitative standardised survey by country of origin (n=401)

The professions held by participants that took part in the quantitative standardised survey can be found in Figure 4. Predominantly, representatives of law enforcement agencies participated in the survey, followed by representatives of emergency medical services, fire brigades and Civil Protection. In the comparison by profession, the report therefore focuses on the five categories of 'LEAs', 'firefighters', 'emergency medical services', 'Civil Protection' and 'others' (with 'others' regrouping the categories 'research', 'railway security', 'consultant service' and 'other' from Figure 4).

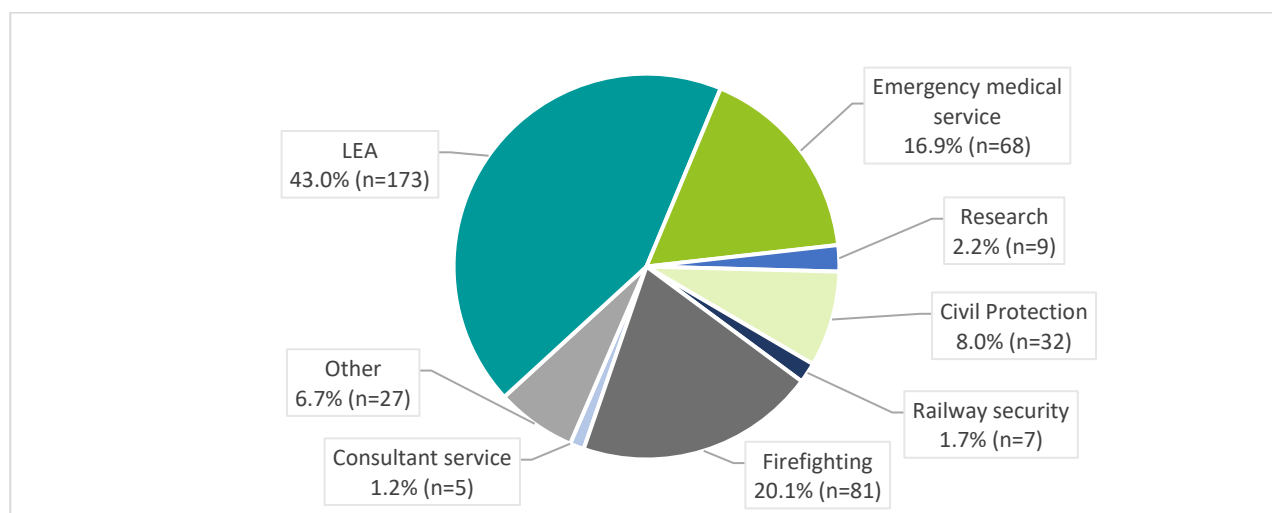


Figure 4: Participants in quantitative standardised survey by profession (n=402)

According to Figure 5, the sample reflects all three levels of CBRNe management responsibility. 74.0% of the respondents indicate that they are active at the "operational level". 53.7% are professionally working at the "tactical level" and 46.8% at the "strategic level". 2.5% indicated to be active at "other" levels. Overall, respondents are active at multiple strategic levels and present the full range of CBRNe preparedness and response.

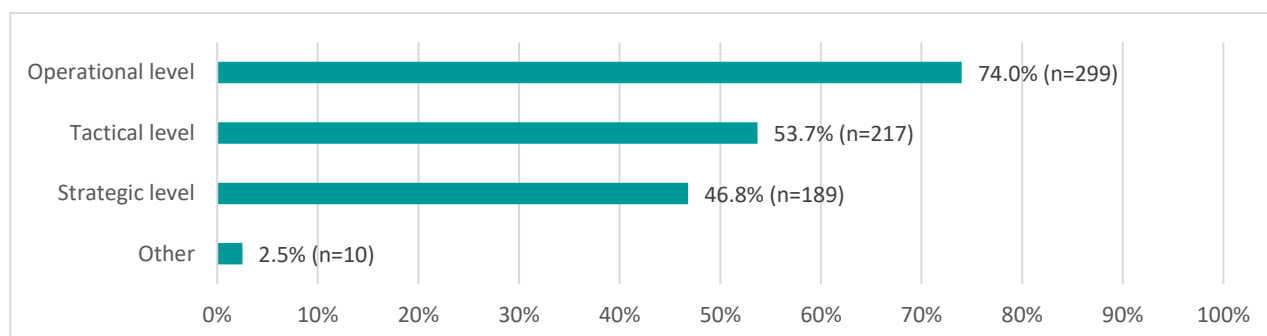


Figure 5: Participants by type of management responsibility; multiple selection option (n=404)

While the participants are active at multiple levels of action, most participants are mainly active at the national level (65.1%), followed by the regional level (55.0%). Further 43.3% are active at the local level while in comparison a smaller number of respondents indicate their engagement in the international field (35.9%) (see Figure 6). Thus, it would appear that CBRNe management could be further intensified at the European level.

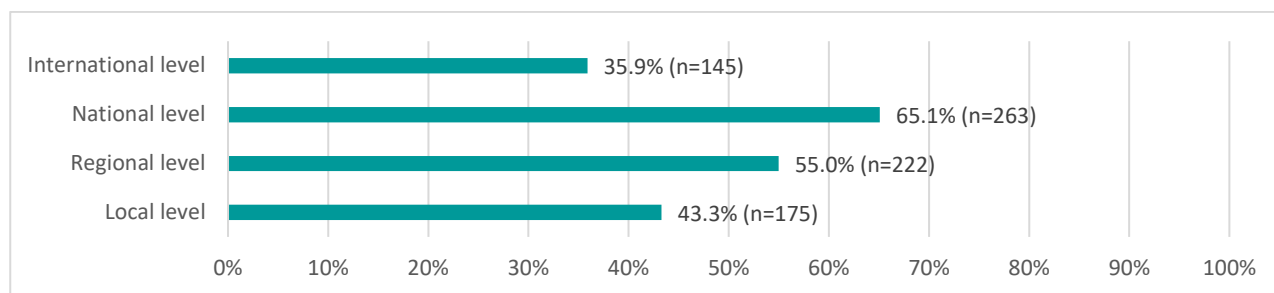


Figure 6: Participants by organisational level of action; multiple selection option (n=404)

As part of the project PROACTIVE, the standardised comparative survey aims to pay attention to the inclusion of the perception of women working in emergency management (fire brigades, Civil Protection, Red Cross, Red Crescent, etc.). Overall, 13.4% of participants are female. The majority consists of male practitioners (85.6%) (see Figure 7). Furthermore, one participant preferred to be identified as diverse. Lastly, three participants preferred to skip this question.

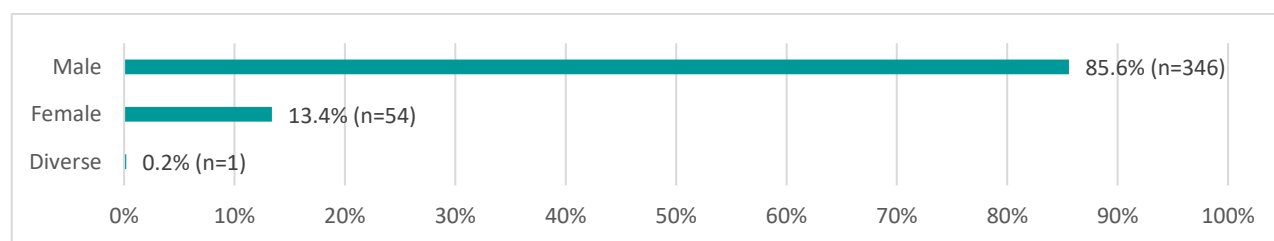


Figure 7: Gender of participants in quantitative standardised survey (n=404)

6.2. Sample of qualitative study

In total, the sample comprises 48 interviewees. In addition to the 18 participants from the first phase, a total of 30 interviewees contributed to the second study phase. With the exception of Bulgaria⁸, all countries represented in the consortium were involved with at least one participant. In total, practitioners from 22 different countries took part in the qualitative study. Tables 2 and 3 further present the profile of the interviewees. Unlike the first phase of the study (Table 2), the second phase (Table 3) included a range of CBRNe experts aside from LEAs, as the aim was to make a general assessment of overall CBRNe management in the country, rather than a security-specific assessment.

Table 2: Interviewees by country, organisation and professional background in 1st phase of qualitative study (n=18)

	Country	Organisation	Professional background
#1	Belgium	LEA	Crisis manager for military emergency; specialised in disaster medicine/ CBRNe unit
#2	Czech Republic	Fire brigade	Operational deputy chief of fire and rescue service; fire officer
#3	France	LEA	Operational unit commander of regional fire station; specialised in radiological hazards/ hazmat unit commander
#4	Germany	LEA	Explosives expert at State Criminal Police Office
#5	Germany	LEA	Ministry official for dangerous goods legislation
#6	Greece	LEA	Ministry official for National Defence
#7	Ireland	LEA	Ordnance officer of Defence Forces
#8	Ireland	LEA	Sergeant for crime scene investigation
#9	Latvia	LEA	Operational chief inspector for state police; major
#10	Norway	Civil Protection	Ministry official for Civil Protection and industrial accidents
#11	Poland	LEA	Deputy team leader
#12	Spain	LEA	Deputy commissar of local police
#13	Sweden	LEA	Regional crisis preparedness coordinator; representative of national CBRNe coordination unit
#14	UK	LEA	Interdisciplinary CBRNe instructor and tactical advisor
#15	UK	LEA	Interdisciplinary CBRNe instructor for civilian based response
#16	UK	LEA	Interdisciplinary CBRNe instructor for civilian based response
#17	Ukraine	Civil Protection	Lieutenant Colonel for Radiation, Chemical and Biological Protection
#18	Ukraine	Civil Protection	Chief Specialist for Radiation, Chemical Protection and Evacuation

All participants of the second interview phase also took part in the benchmarking rating. In addition, further ratings were accepted without a follow-up interview. In total, the matrix comprises 50 ratings reflecting the assessment of interviewees from 19 different EU and associated EU countries (see Figure 8). Furthermore, the perspective of four third countries (Canada, Japan, Lebanon and the US) were included.

⁸ Bulgarian CBRNe practitioners required special permission from national ministries to participate in research, which unfortunately was not granted before the end of the data collection phase.

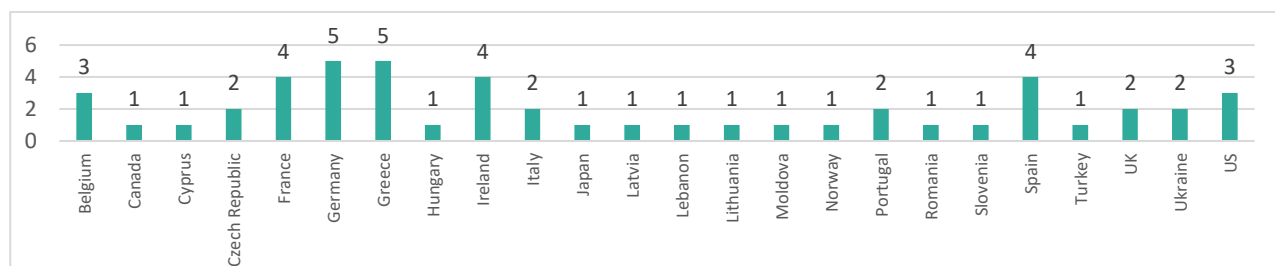


Figure 8: Sample of Benchmarking rating (n=50)

Table 3: Profile of interviewees by country in 2nd phase of qualitative study (n=30)

	Country	Organisation	Professional background
#19	Canada	LEA	Chief of Police & Corporate Security
#20	Cyprus	LEA	CBRNe National Coordinator, member of CBRN European advisor group
#21	Belgium	LEA	Crisis manager for military emergency; specialised in disaster medicine/ CBRNe unit
#22	Belgium	Civil Protection	Operational Coordinator CBRNe expertise centre
#23	Belgium	Civil Protection	Captain of Belgium Civil Protection, member of CBRNe expertise centre
#24	France	Research	Risk manager in CBRNe
#25	France	LEA	French Gendarmerie Nationale CBRN cell training expert
#26	France	Research	Accident Risk Division, Security & Terrorism Program
#27	France	Consultant service	DMI Associates
#28	Greece	Military	Hellenic Navy
#29	Greece	Military	Warrant officer, first responder, planner of operations and training
#30	Ireland	Fire brigade	Third Fire Officer
#31	Ireland	LEA	Sergeant
#32	Ireland	LEA	Sergeant
#33	Italy	Other	Biologist, expert in CBRNe
#34	Japan	Railway security	Senior Fellow
#35	Lebanon	Civil Protection	CBRN practitioner
#36	Lithuania	LEA	Lithuanian Border Police
#37	Moldova	LEA	CBRNe crime scene management
#38	Norway	Military	Commandant
#39	Portugal	LEA	CBRNe responder
#40	Portugal	Research	Second Lieutenant, researcher at Chemical Defense Laboratory
#41	Spain	LEA	Spanish National Police
#42	Spain	Research	University Professor
#43	Spain	LEA	Member of CBRN Unit
#44	Spain	LEA	Metropolitan Police
#45	Turkey	Railway security	Trainer specialised in dangerous goods
#46	UK	Fire brigade, Consultant service	CBRNe consultant
#47	UK	Consultant service, Civil Protection	Resilience Advisor Network
#48	USA	Consultant service, Civil Protection	National Exercise & Technical Hazards Division

The following map (see Figure 9) again clearly shows the countries from which participants took part in the quantitative survey and the qualitative study. All countries represented only in the quantitative survey are shown in blue, and those represented in the qualitative study in addition to the quantitative survey are shown in green.

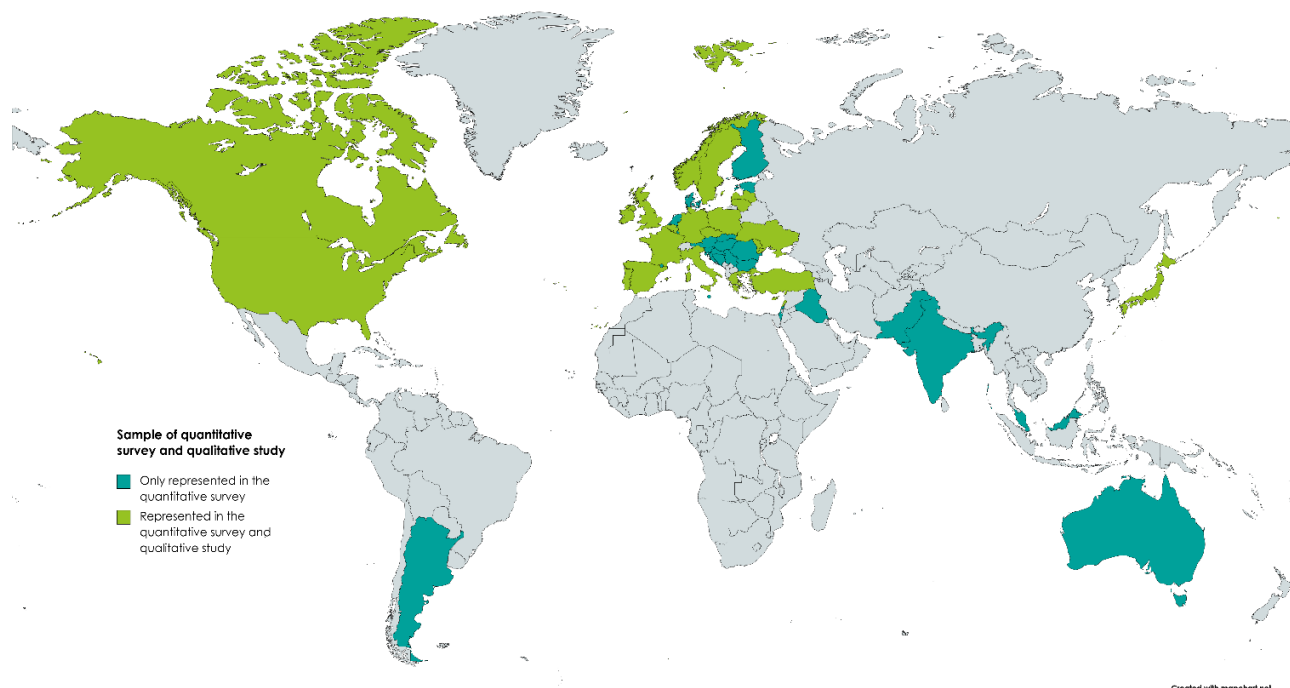


Figure 9: Map with countries represented in the quantitative survey and qualitative study

7. RESULTS

7.1. CBRNe threats in and beyond Europe

A key feature of CBRNe events is that they are uncertain in their nature, severity, imminence, frequency, duration and likelihood (see Meloy et al. 2014, 3). In assessing the credibility and or consequences of a potential CBRNe threat, as well as the probability that the threat will eventually result in a viable CBRNe incident, professional judgment coupled with experience in this field by relevant experts is a required prerequisite.

Thus, CBRNe threat assessment (levels) rely on the expertise from those “who are the focus of the assessment” (Meloy et al. 2014, 4). As part of a proactive CBRNe management approach, this section is dedicated to the threat assessment involving European LEAs that consider the specific circumstances of CBRNe type events which occur or may occur in their respective countries.

CBRNe incidents can be caused by natural events, industrial accidents / incidents or terrorist related attacks. An example of a natural event is the current Covid-19 pandemic, whereas accidents include leakage from oil platforms and nuclear power plants such as Fukushima and Chernobyl. As part of PROACTIVE, special attention is focused on terrorist related events. Increased geographic spread and invisible borders require a collective threat assessment to effectively counter terrorism (EUROPOL, 2019). Furthermore, CBRNe incidents reveal to be particularly challenging for threat assessment because they are difficult to detect and their consequences are often unpredictable and catastrophic, including the possible delayed effects of significant contamination to persons, land, sea and crops. Thereby, the causes or goals of CBRNe incidents are as diverse as the number of potential terrorist groups. A distinction is made between scenarios involving chemical, biological, radioactive, nuclear and/or explosive substances. CBRNe incidents can further occur in many different locations (e.g. train stations, airports, public places, schools) as well as simultaneously. CBRNe events are unique to the location (e.g. high density population), to the substance, amount of substance and the intended target and accordingly the consequences are difficult to measure. A joint threat assessment appears to be the most appropriate approach to understand the multiplicity of CBRNe incidents and to facilitate a collective preparedness and response from state actors and civilian agencies. As the subject proves to be very diverse, there is a broad range of CBRNe-related experiences and knowledge among European CBRNe practitioners. It is important to acknowledge that the threat assessment and the subsequent CBRNe management will be significantly influenced by the experience and knowledge of responders. For this reason, the report examines the extent to which prior experience and knowledge of CBRNe incidents affect / influence the reported CBRNe management strategies⁹. By synergising the diverse experiences, knowledge and perspectives on CBRNe incidents of different European practitioners, the following chapter provides a greater understanding of the current experience of European responders, their familiarity with the topic and their subsequent assessment of prospective CBRNe incidents.

⁹ In this context the report analyses whether the consideration of vulnerable people differs markedly between CBRNe responders with and without experience in CBRNe incidents.

7.1.1. Experience with CBRNe incidents

Addressing the CBRNe incidents that have occurred to date plays a crucial role in European threat level assessment methodology. The following section provides a brief overview of the state of CBRNe-related terrorism across Europe, in order to draw a broader picture of how European CBRNe responders (organisations) operate and develop experiential learning techniques. Subsequently, the results of both elements of the study are examined in more detail with regard to CBRNe-related experience.

Various cities in Europe have fallen victim to terrorist attacks in recent years (EUROPOL, 2019). Examples are the Madrid (2004) and London (2005) bombings that involved improvised explosives (Colliard, 2015; Turégano-Fuentes et al. 2008a & 2008b); 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). The attacks were committed both by terrorists from within the country as well as from foreign countries:

“And every country in Europe has had problems with conventional terrorism, whether it was serious or minor, but, you know, Italy had the Red Brigades, UK and Ireland had the IRA, Spain had ETA, you know, you had the Baader-Meinhof gang in Germany. Everybody has had problems, particularly in the 60s and 70s, maybe into the 80s, with explosive devices in a domestic thing.” (Interviewee #46, UK)

“In Belgium we had a lot of foreign terrorist fighters during 2015 to 2018.” (Interviewee #22, Belgium)

Following the various CBRNe-related operations in Europe, more than two-thirds of the survey participants (67.7%) indicate that they have been involved in at least one CBRNe incident during their professional life (see Figure 63Att.¹⁰). Of all 405 respondents, 36.3% report having been involved more than five times. In contrast, only 26.7% of respondents indicate that they have never been involved in a CBRNe incident so far. A cross-country comparison shows that participants from 14 countries report having been involved in more than three CBRNe incidents in their professional career in greater numbers than not having been involved in a CBRNe incident. (see Figure 10). Only for the participants from Croatia, France, Greece, Ireland and Poland this does not apply.

¹⁰ Attachment.

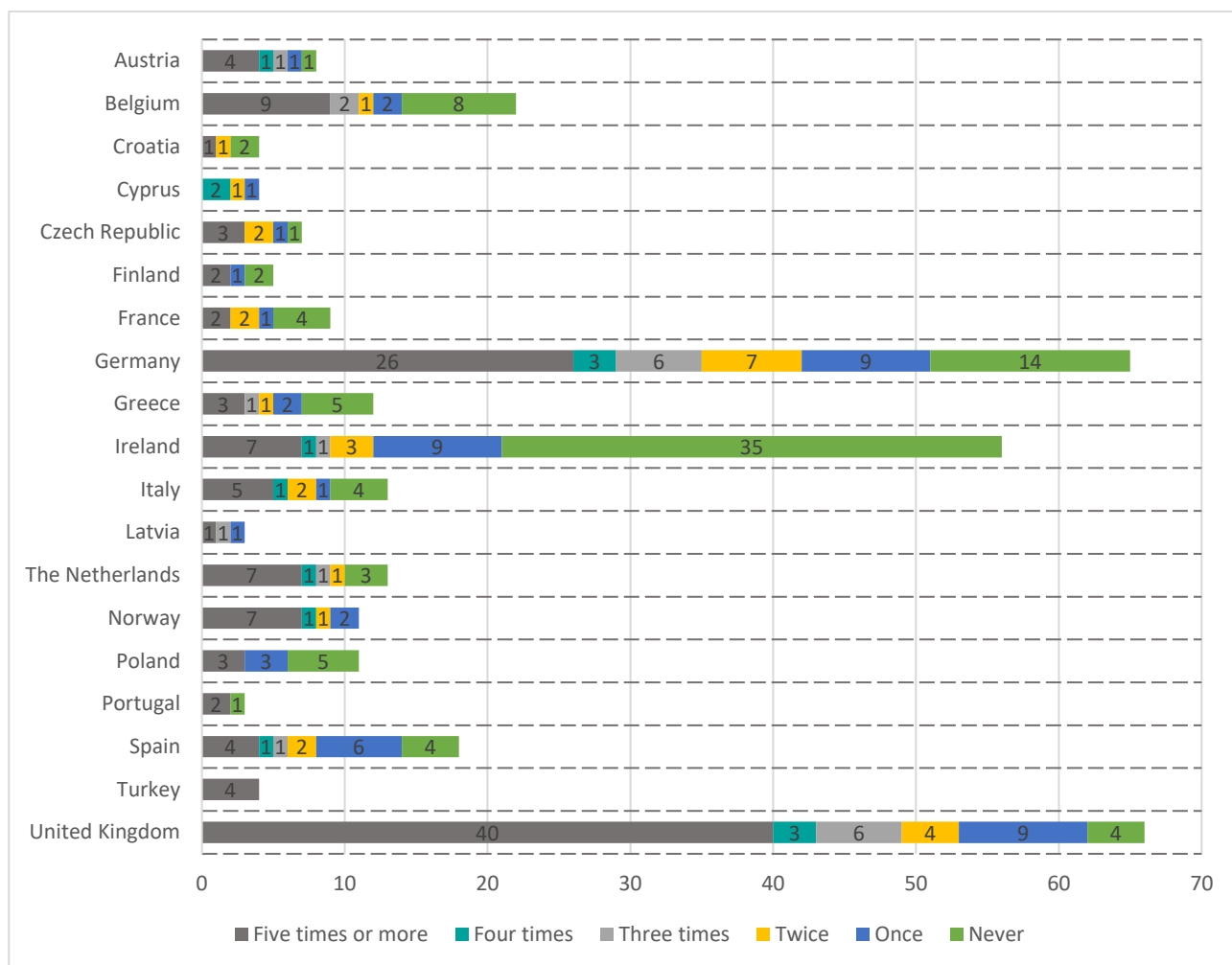


Figure 10: Involvement of participants in a CBRNe incident during their professional life by country (Austria: n=9; Belgium: n=23; Croatia: n=4; Cyprus: n=4; Czech Republic: n=8; Finland: n=6; France: n=9; Germany: n=67; Greece: n=13; Ireland: n=57; Italy: n= 15; Latvia: n=6; Norway: n=11; Poland: n=11; Portugal: n=5; Spain: n=19; The Netherlands: n=13; Turkey: n=4; United Kingdom: n=68)

A breakdown by EU Member States shows that the proportion of participants who state that they have been involved in a CBRNe incident more than five times in their career is higher in the group of non-EU countries (see Figure 11). In contrast, more respondents from EU Member States mention that they have never been confronted with a CBRNe incident.

Looking at the involved professional groups in regard to the categories “more than five times” “once” and “never” (see Figure 12), 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. As can be seen in the next figure, firefighters more regularly deal with incidents involving CBRNe agents (e.g. an overturned hazardous goods truck) whereas emergency medical services deal with the respective casualties. The range of tasks performed by LEAs (see Chapter 7.3.2) 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 (78.0%) (see Figure 64Att.). Non-terrorist crimes (43.6%) are indicated by around half of the respondents. In about one-third of cases natural hazards (36.3%) and in 22.7%

of cases terrorist attacks are mentioned. Very rarely do respondents refer to warfare (6.2%). In the category "Other" (7.0%), pandemics such as Covid-19 are mentioned.

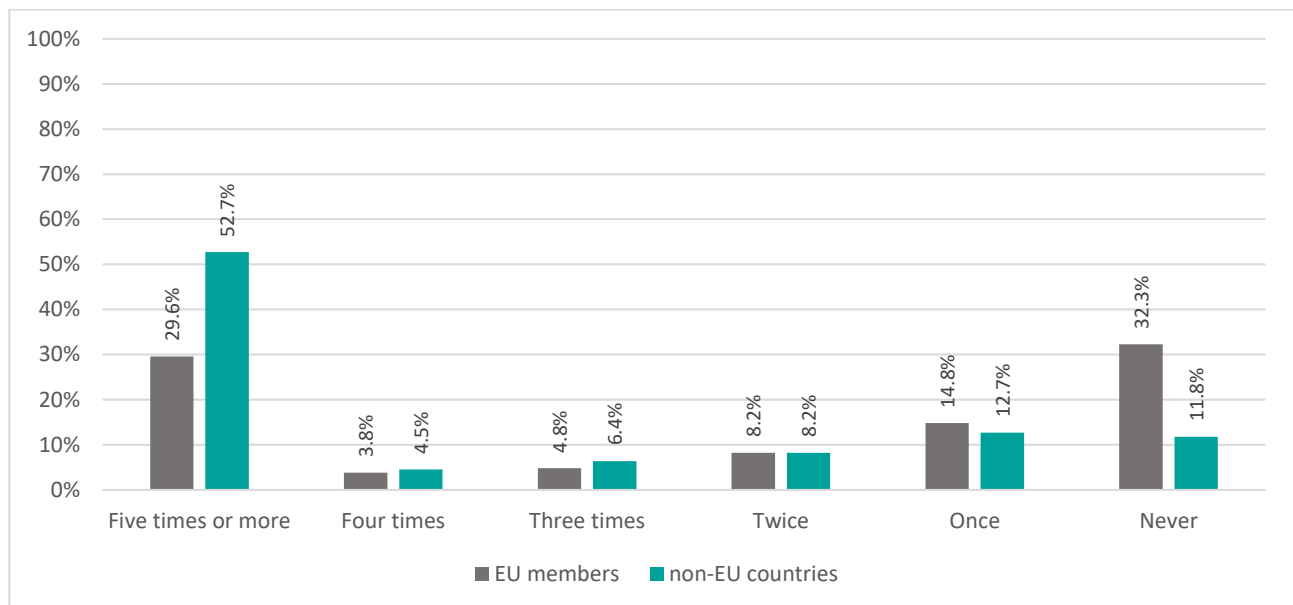


Figure 11: Frequency of involvement in a CBRNe incident during their professional life by country group (EU members: n=291; non-EU countries: n=110)

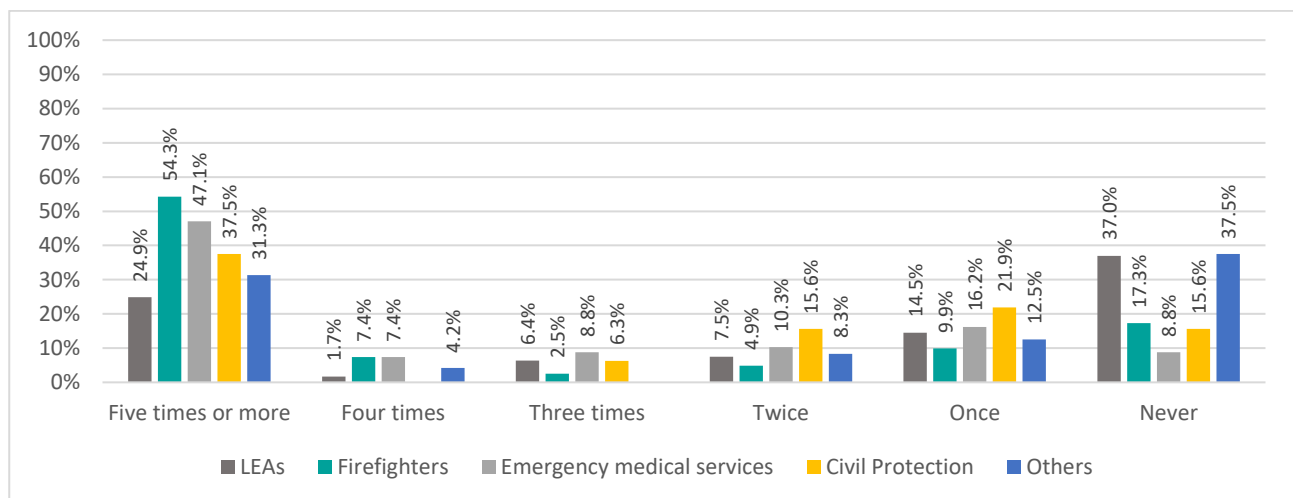


Figure 12: Frequency of involvement of participants in a CBRNe incident during their professional life by profession (LEAs: n=173; Firefighters: n=81; Emergency medical services: n=68; Civil Protection: n=32; Others: n=48)

CBRNe response is characterised by features such as non-plannability, immense coordination and communication needs and high knowledge intensity. Operational experience can only be acquired through operations, which hopefully are rare. 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. Therefore, an exchange between the group of already experienced CBRNe responders and those without previous practical experience is important.

7.1.2. Familiarity with the topic of CBRNe incidents

CBRNe practitioners' current familiarity with CBRNe events is based on previous experience with such events. The incidents offer specific operational knowledge that can only be acquired in non-routine settings. Consequently, knowledge exchange 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). However, the knowledge gained 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 considered and reconsidered (e.g. involved agent, locations, trigger). 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, 80.3% of the respondents feel that that they are “very familiar” or “rather familiar” with the topic (see Figure 65Att.). Another 9.9% indicate to be “neither unfamiliar nor familiar”, and only 9.3% of all respondents feel “rather unfamiliar” or “very unfamiliar”. In terms of familiarity with the topic of CBRNe incidents on an individual level, especially those who have already experienced a CBRNe incident throughout their career indicate a high level of familiarity. In this group, more than 87% say they are “very or rather familiar” with the topic (see Figure 13). In contrast, only 4.8% 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, 60.2% indicate to be “very or rather familiar” with the topic, while 21.3% rate themselves as “rather or very unfamiliar”. The comparison illustrates how important practical experience, either in the form of operational experience or training exercises, is in terms of familiarity with the topic.

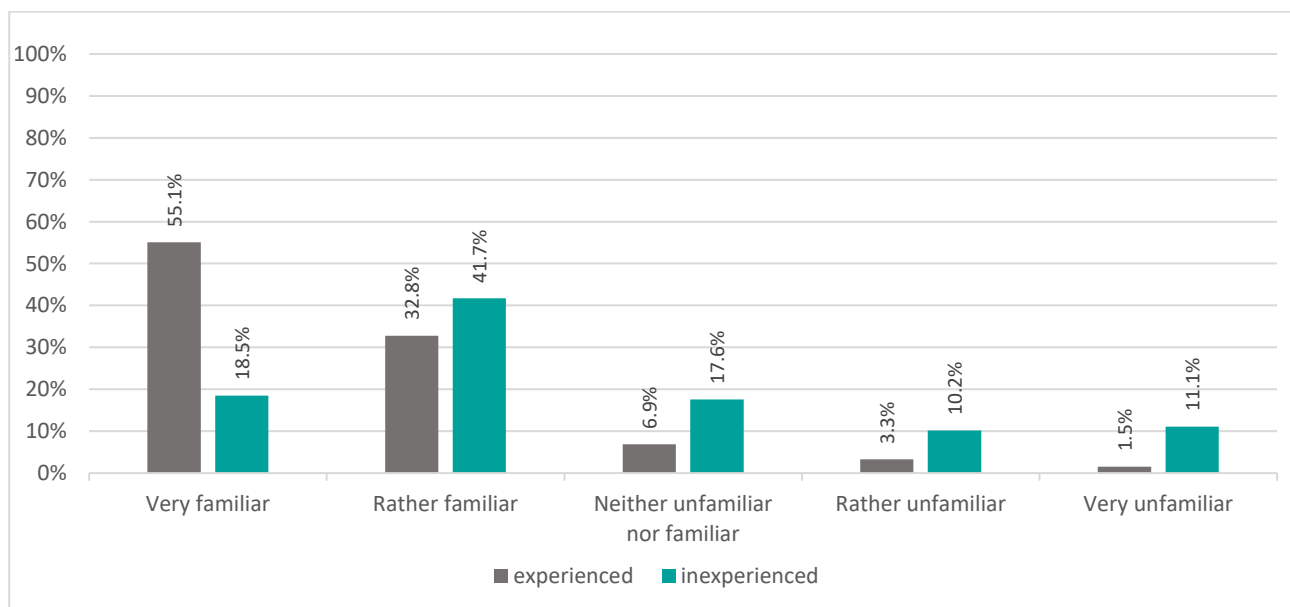


Figure 13: Familiarity with the topic of CBRNe by experience with CBRNe incidents (experienced n=274; inexperienced n=108)

A closer look at the categories “very familiar and rather familiar” shows that the proportion of participants indicating one of those categories is generally higher compared to the overall number of participants in each country (see Figure 14). In Austria, Norway, Poland, Turkey and the UK, all

respondents referred to one of these two categories. Overall, 70% to 100% of participants from 17 countries indicate one of these categories. Only in Ireland and Croatia the proportion is somewhat lower, at around 50%.

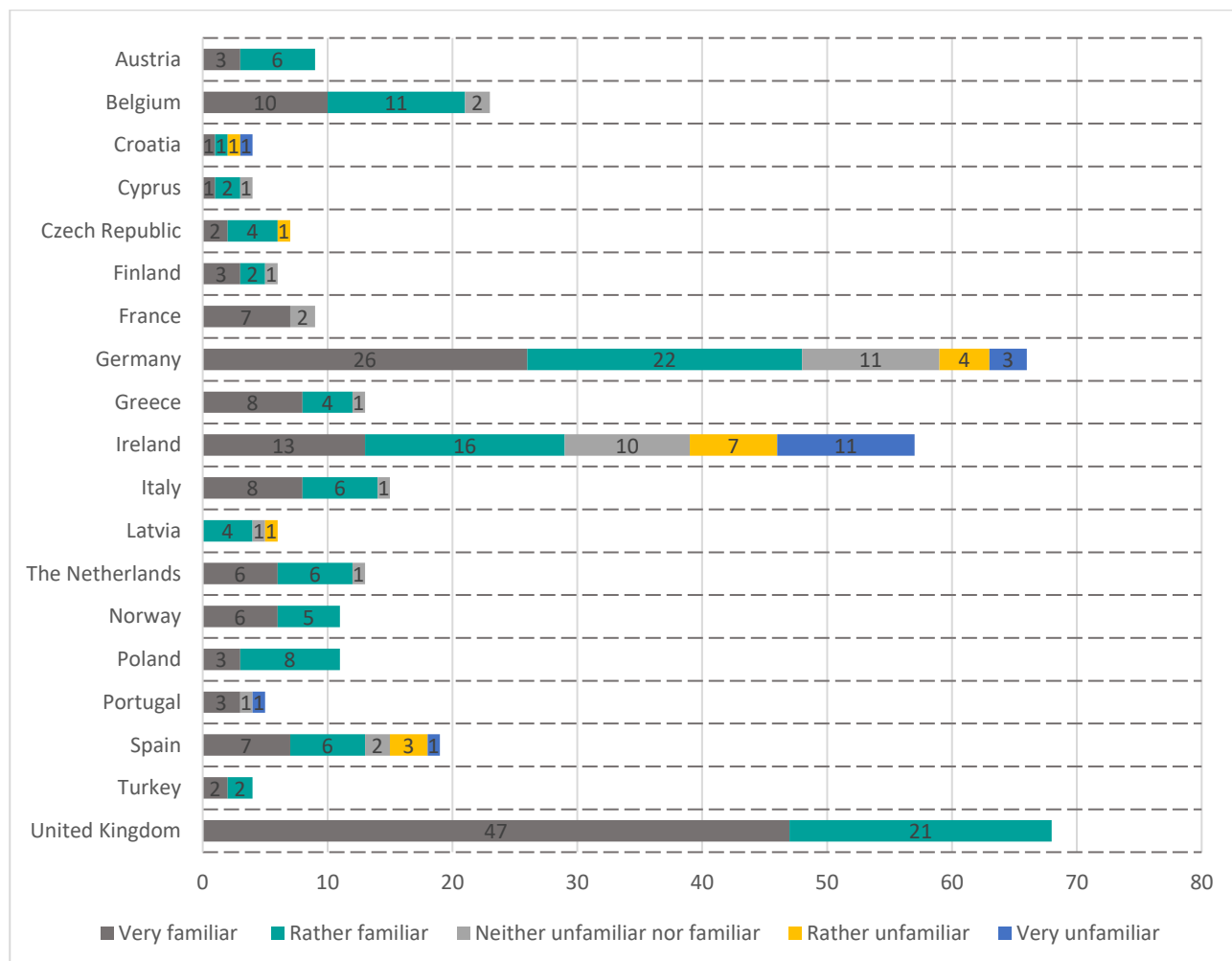


Figure 14: Familiarity with the topic of CBRNe by country (Austria: n=9; Belgium: n=23; Croatia: n=4; Cyprus: n=4; Czech Republic: n=8; Finland: n=6; France: n=9; Germany: n=67; Greece: n=13; Ireland: n=57; Italy: n= 15; Latvia: n=6; Norway: n=11; Poland: n=11; Portugal: n=5; Spain: n=19; The Netherlands: n=13; Turkey: n=4; United Kingdom: n=68)

When the characteristic of EU membership is taken into account, it is noticeable that more participants in the non-EU group indicate that they are very familiar with the topic of CBRNe (see Figure 15). This is in line with the findings on the number of CBRNe incidents experienced (see Chapter 7.1.1).

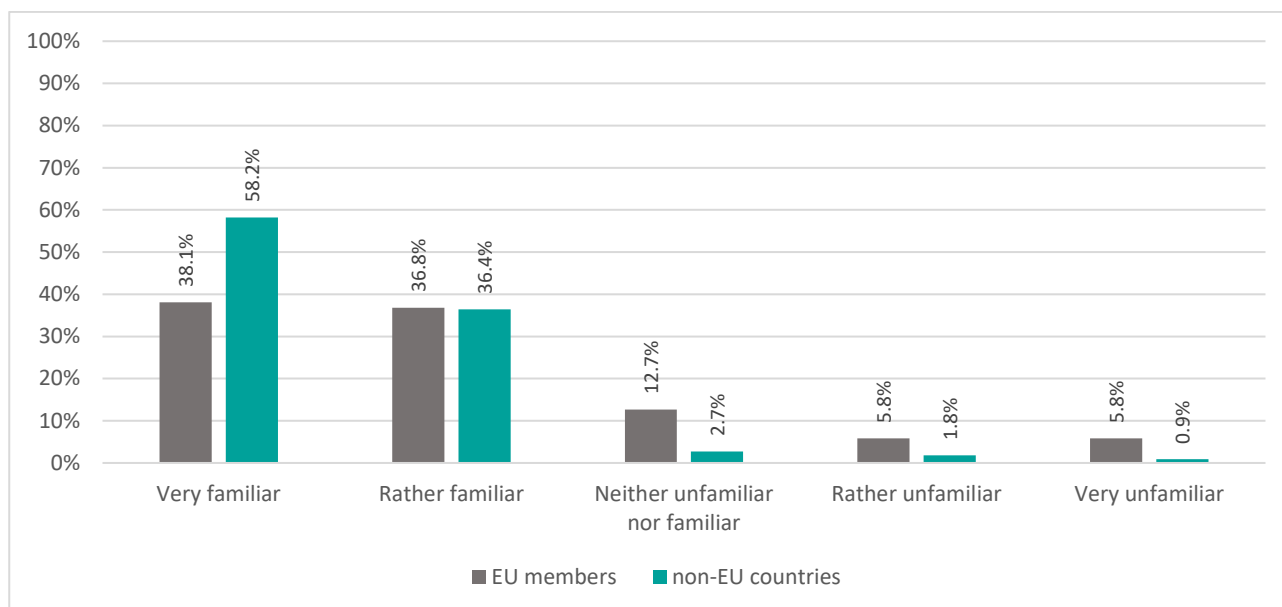


Figure 15: Familiarity with the topic of CBRNe by respondents' country status as EU or non-EU (EU: n=291; non-EU: n=110)

Slight differences can be observed between professional groups with regard to their familiarity with the topic (see Figure 16). 70.5% of LEA respondents indicate being “very familiar” or “rather familiar” with the topic. Of the firefighters surveyed, 91.4% refer to the same two categories. The same applies to 86.8% of the emergency medical services surveyed and 81.3% of the participants working for a Civil Protection agency.

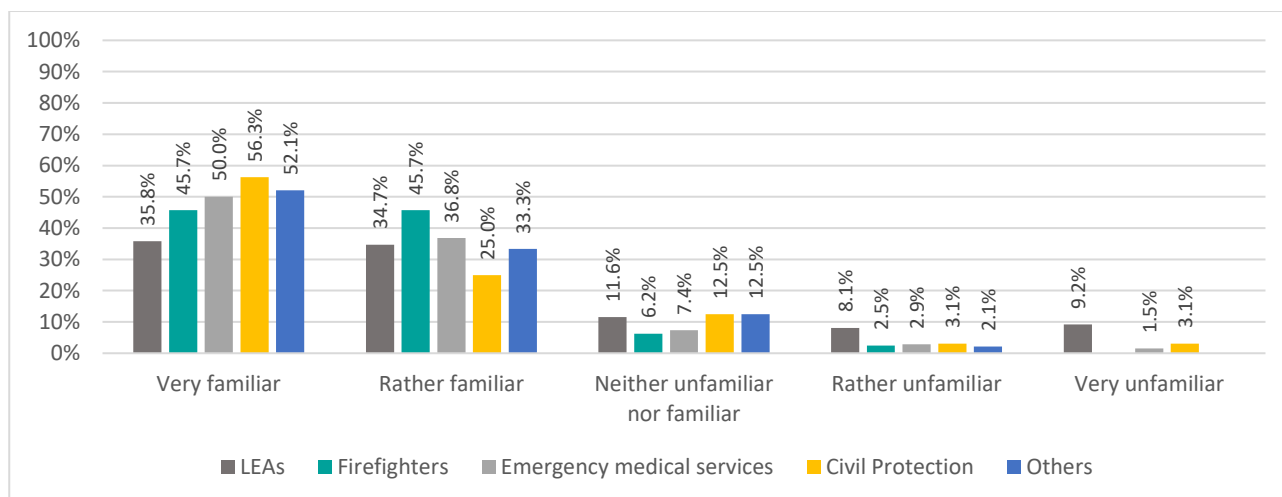


Figure 16: Familiarity with the topic of CBRNe by profession (LEAs: n=173; Firefighters: n=81; Emergency medical services: n=68; Civil Protection: n=32; Others: n=48)

It should be noted that familiarity can develop and improve through continuous exchange of knowledge and adequate education, as was found in the interviews. Indeed, several interviewees stressed 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). One of the two Ukrainian interviewees stressed the importance of exchanging information with CBRNe units from other countries in addition

to national exchange. 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.

7.1.3. 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 from the first interview phase provides an up-to-date picture of the current threat assessment of possible CBRNe incidents in Europe.

The interviews reveal a mixed picture¹¹. Based on their experience and familiarity, some interviewees consider the probability of a CBRNe incident in their country and area of responsibility to be **rather low**. This is the case for 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 assessed 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 at the current likelihood of a CBRNe incident, it is somewhere in the middle. This means, we have some chemical factories, some chemical storage facilities and we have two highways and rail transport routes that are used for transport of CBRNe. It means, we are somewhere in the middle or in the first five or six regions with the specific danger of CBRNe in the Czech Republic.” (Interviewee #2, Czech Republic)

Another group of interviewees judge the threat level as **high**. This applies to Sweden and 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 Ukrainian interviewee stresses a threat in the form of nuclear and radiological substances, in other countries a hazard from biological and chemical substances is considered to be more likely (e.g. Germany, Ireland and Spain). For Germany, the interviewee assumes that incidents will involve chemical substances since it is easier to get hold of chemical substances than radioactive material. He also stresses that chemical substances have become safer to handle than in the past

¹¹ 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).

(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 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 the likelihood of a CBRNe incident due to terrorist activities to be lower as for accidents/technical emergencies (e.g. Czech Republic, Spain and Latvia). The Latvian interviewee emphasises that in Latvia in the past and still today, the risk of 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 in transportation or accidents in handling chemicals in the storage facilities 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 chemical factory 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, 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 from 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 these 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 a 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 threat assessment impacts the subsequent CBRNe management.

Key Takeaways Chapter 7.1

- More than two-thirds of respondents (online survey) reported having experienced at least one CBRNe incident in their professional career.
- Firefighters reported being involved in CBRNe incidents more frequently than LEAs.
- Accidents / technical emergencies were predominantly mentioned as triggers for CBRNe incidents.
- A large majority of respondents indicated that they are rather familiar or very familiar with the topic of CBRNe. This is especially true for respondents who have experienced at least one CBRNe incident in their professional career.
- Firefighters especially stated to be very familiar or rather familiar with the topic of CBRNe. In this context, it is important to note the different responsibilities of response organisations in the event of a CBRNe incident (firefighters are primarily involved in the hot zone).
- Differences between the countries studied are evident in the assessment of the threat level for a future CBRNe incident, with a range from a very low to a very high. Furthermore, differences are apparent not only at the national level but also at the regional level. The threat assessment depends heavily on the occurrence of previous CBRNe events, experience and familiarity with the topic.
- In general, the probability of a future CBRNe incident due to an accident / technical emergency is considered higher than due to a terrorist attack.
- Furthermore, it can be generally said that awareness of CBRNe incidents has increased due to the Covid-19 pandemic.

7.2. 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 75% of the online survey respondents indicate that their organisation has specific SOPs for CBRNe incidents (see Figure 17). Of the 273 respondents involved in CBRNe incidents, 79.1% have CBRNe-related SOPs in their organisation and only 15.0% do not have such specific strategies in place. It is noteworthy that of those 107 respondents that have not experienced any incidents so far, 24.3% are unaware if such SOPs exist in their organisation. Nevertheless, 51.4% say they are aware of such documents. 20.6% denied the existence of such SOPs. 4.4% denied the existence of such SOPs.

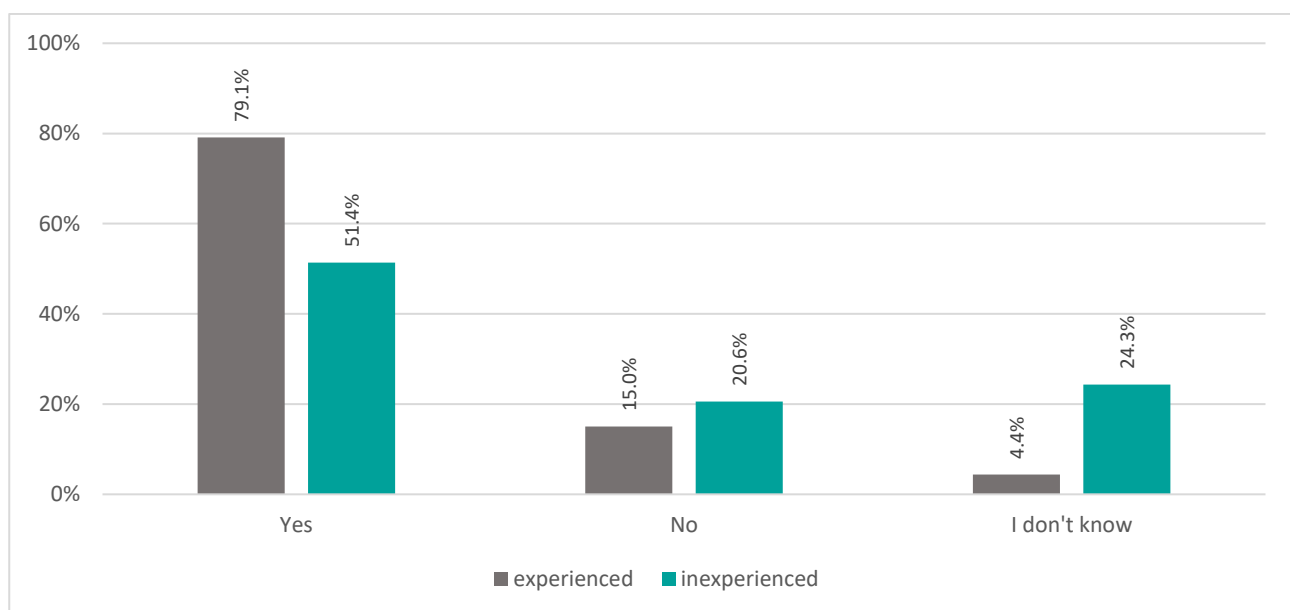


Figure 17: Availability of CBRNe-related SOPs of respective organisation by experience with CBRNe incidents (experienced n=273; inexperienced n=107)

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, 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 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).

7.2.1. Allocation of responsibilities

In order to facilitate CBRNe management during an event, SOPs define the allocation of tasks among all responders within an organisation as well as their relationship to other CBRNe practitioners involved. 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 and voluntary fire brigades, a broad range of law enforcement agencies (e.g. border patrol, criminal investigation, military police), medical service providers (e.g. the Red Cross, St. John Ambulance, the Order of Malta Ambulance Corps) 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 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 and the evacuation of affected citizens, the detection of CBRNe agents, the criminal investigation, the crime scene investigation and ensuring of public order and safety. Additionally, medical treatment of citizens is indicated as a further task undertaken by LEAs in some European regions as part of a special unit (Interviewee #1, Belgium). This deviation 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 of those respondents who have experienced at least one CBRNe incident, 54.3% state that during these incidents there was a "very high" or a "rather high" level of clarity in the allocation of responsibilities (see Figure 18). Only 11.0% of the respondents perceive clarity as "rather" or "very low". Among respondents who have never been involved in a CBRNe incident throughout their professional life, 22.4% indicate a "rather low" or "very low" level of clarity. 25.2% 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 31.8%. The findings imply that among non-experienced responders there is less confidence about the clarity of responsibilities. This may mean that the roles become clearer once an incident is in progress.

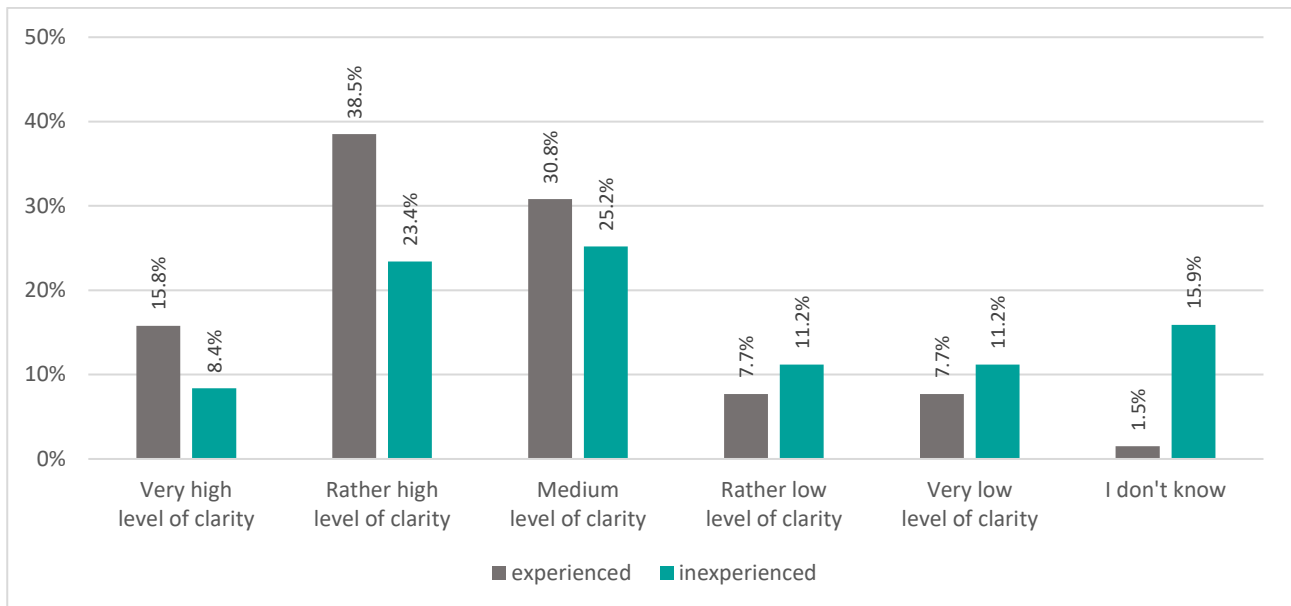


Figure 18: Perceived clarity of internal responsibilities by experience with CBRNe incidents (experienced n=273; inexperienced n=107)

A country comparison shows that the respondents primarily indicated a “medium to very high level of clarity of responsibilities” (see Figure 19). There are no noticeable differences between EU members and non-EU countries.

Differences appear by comparing the professional groups. Of those who were involved in a CBRNe incident during their professional life, firefighters especially rate the level of clarity of responsibilities within their organisation during CBRNe incidents as “very high” or “rather high” (70.3%) (see Figure 20). Of the surveyed LEAs, 51.6% classify the level of clarity as “very high” or “rather high” whereas only 43.3% of the emergency medical services and 42.3% of the Civil Protection responders refer to those categories. Further 10.0% or 7.6% of respondents in the last-mentioned categories perceive the clarity of responsibilities during former incidents to be “rather or very low”.

The overall success of the operation depends not only on the internal allocation of responsibilities within one’s own organisation, but also on the cooperation between all 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 firefighters. 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)

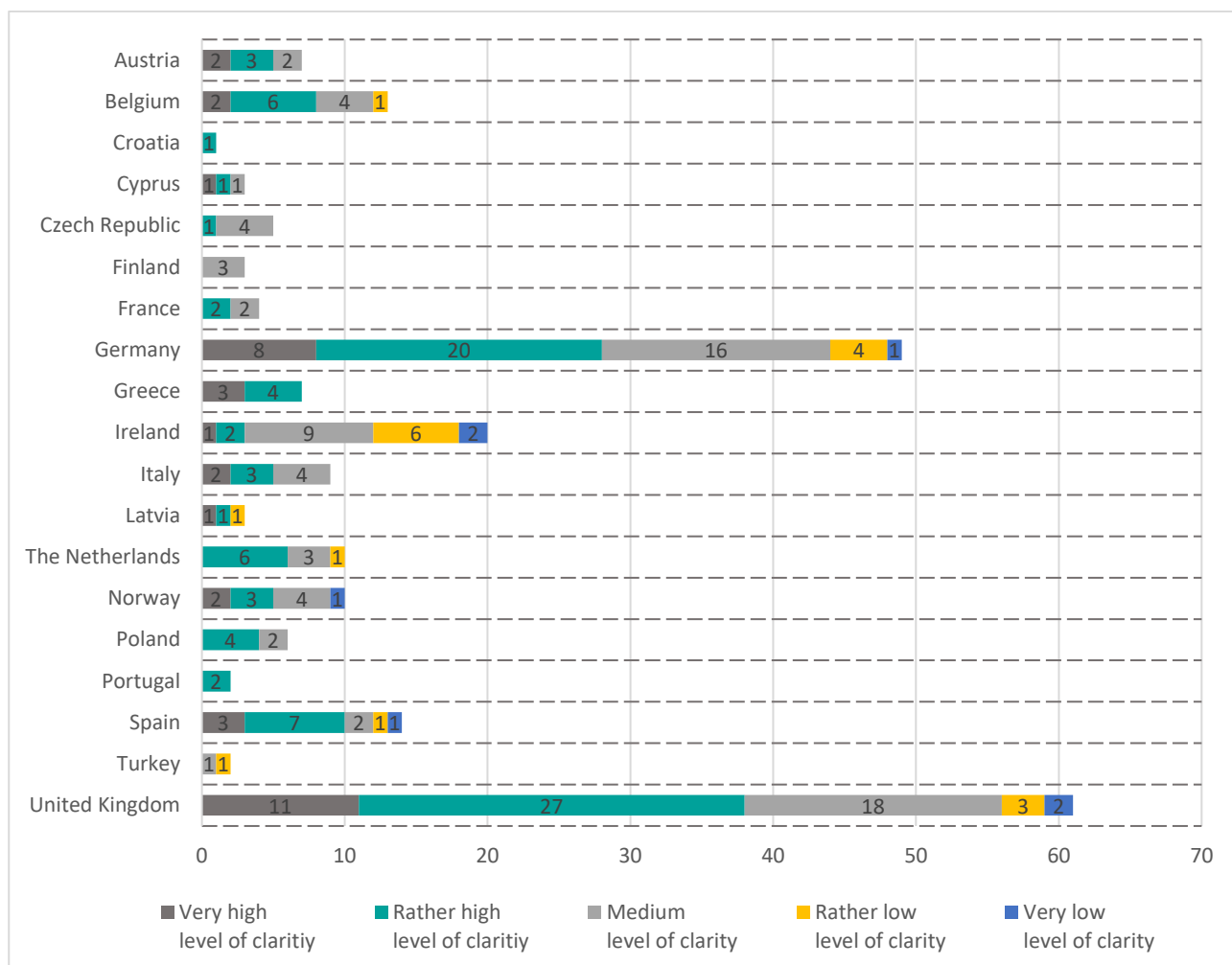


Figure 19: Perceived clarity of internal responsibilities by country (Austria: n=7; Belgium: n=14; Croatia: n=2; Cyprus: n=4; Czech Republic: n=6; Finland: n=3; France: n=5; Germany: n=50; Greece: n=7; Ireland: n=21; Italy: n=9; Latvia: n=3; Norway: n=11; Poland: n=6; Portugal: n=2; Spain: n=14; The Netherlands: n=10; Turkey: n=4; United Kingdom: n=62)

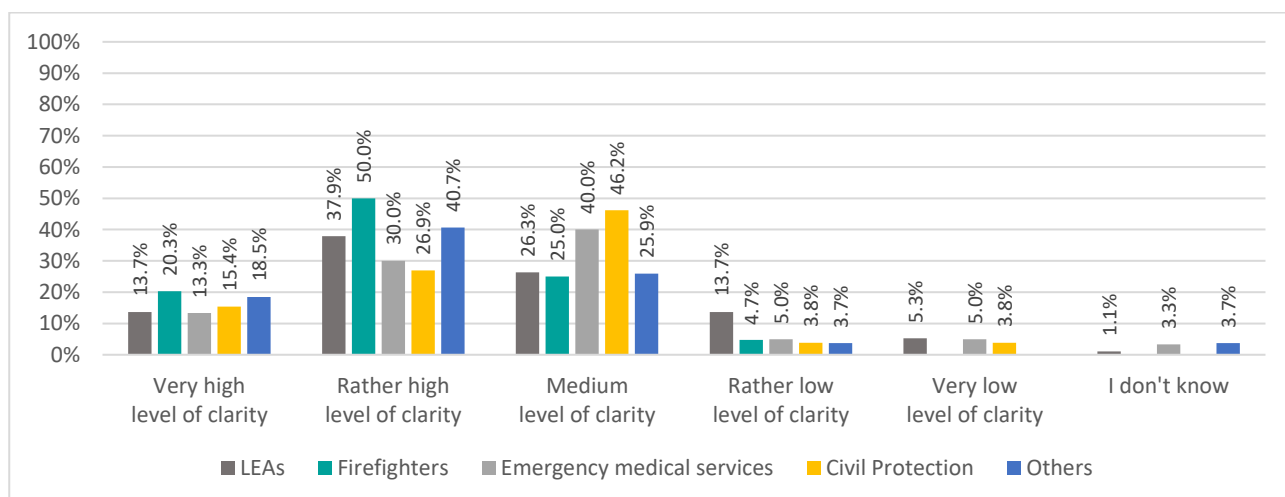


Figure 20: Perceived clarity of internal responsibilities by profession (LEAs: n=95; Firefighters: n=64; Emergency medical services: n=60; Civil Protection: n=26; Others: n=27)

Regarding the clarity of responsibilities between different organisations involved, almost half (48.9%) of those who had been involved in a CBRNe incident in their professional life stated that there was a "very high level of clarity" or "rather high level of clarity" of responsibilities (see Figure 21). Another 37.9% of respondents refer to a "medium level of clarity". Fortunately, only 7.3% of the respondents indicate a "rather low" or "very low" level.

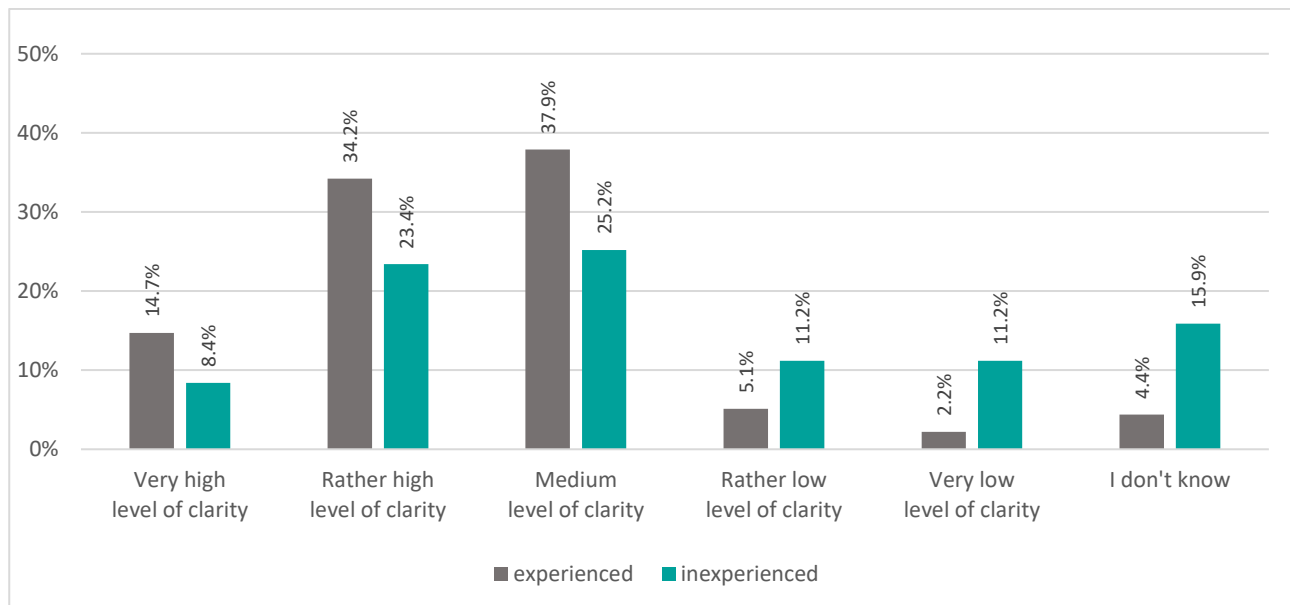


Figure 21: Perceived clarity of responsibilities between operational forces during a CBRNe incident by experience with CBRNe incidents (experienced n=272; inexperienced n=107)

Different results emerge for those respondents who have not been involved in a CBRNe incident so far. 22.4% 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. 25.2% expect a "medium level" and 31.8% of the respondents a "rather high level" or "very high level". This high variability may be due to the number of e.g. trainings that unexperienced CBRNe practitioners have undertaken, although further research is required to understand this phenomenon.

The country comparison reveals that the participants mainly indicate a "very high to rather high" or at least a "medium level of clarity" (see Figure 22). On a positive note, none of the country representatives predominantly indicate a "rather low to very low level". A comparison of the country groups shows that a higher proportion of participants in the non-EU countries indicate a very high or rather high level of clarity (see Figure 23). In contrast, a higher proportion of EU members are uncertain about the level of external clarity.

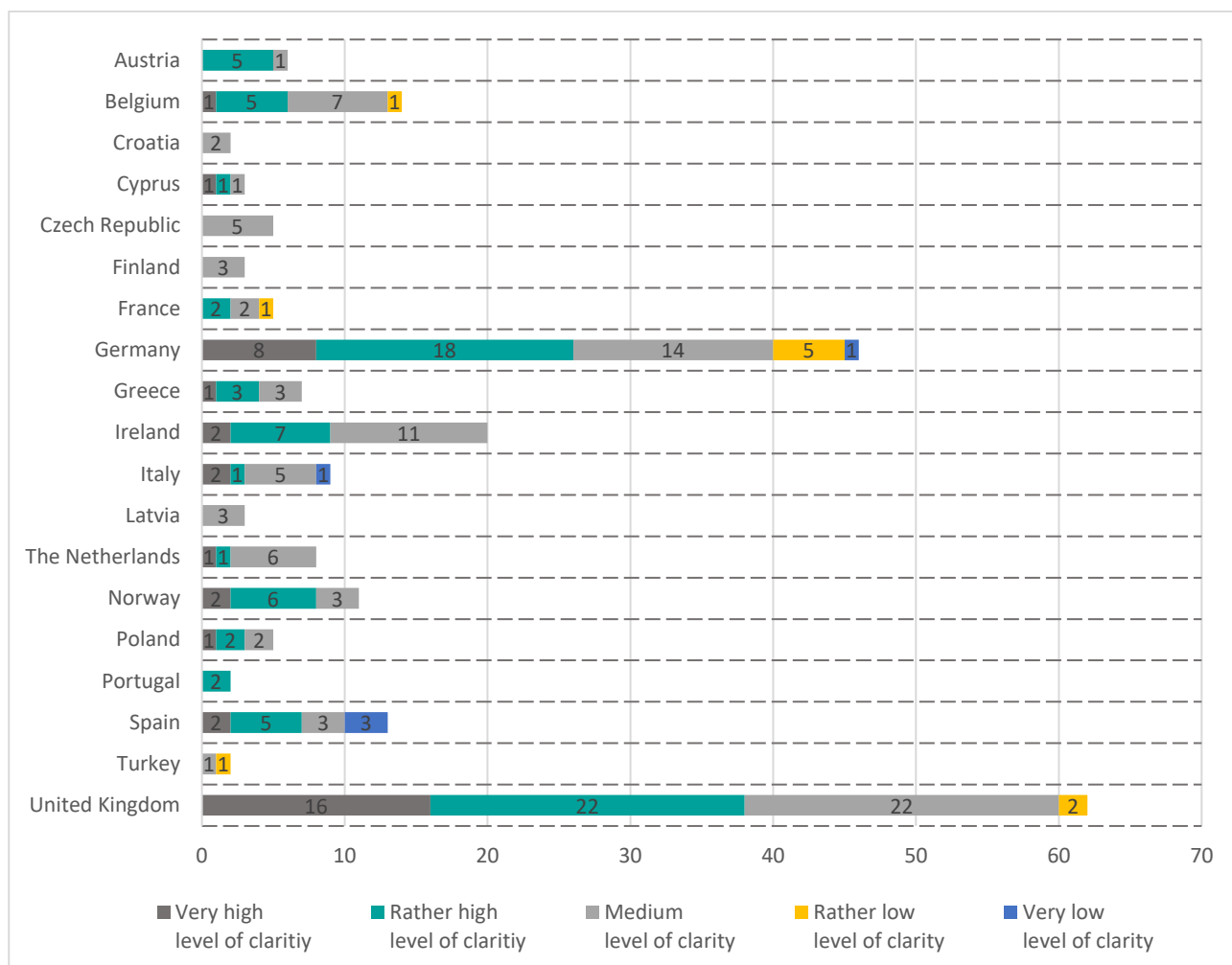


Figure 22: Perceived clarity of responsibilities between operational forces during a CBRNe incident by country (Austria: n=7; Belgium: n=14; Croatia: n=2; Cyprus: n=4; Czech Republic: n=6; Finland: n=3; France: n=5; Germany: n=50; Greece: n=7; Ireland: n=21; Italy: n=9; Latvia: n=3; Norway: n=11; Poland: n=6; Portugal: n=2; Spain: n=14; The Netherlands: n=10; Turkey: n=4; United Kingdom: n=62)

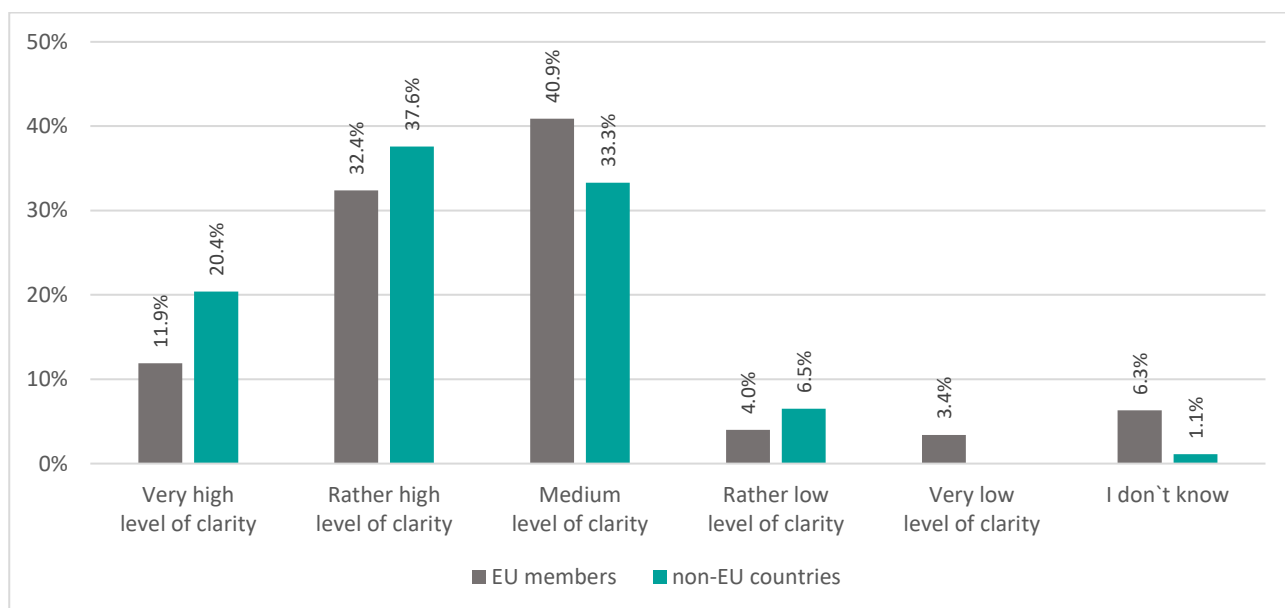


Figure 23: Perceived clarity of responsibilities between operational forces during a CBRNe incident by country group (EU members: n=176; non-EU countries: n=93)

Differences between countries become more apparent in the benchmarking study. With regard to the area of "Legal and policy framework for inter-agency collaboration", it is evident that respondents in some countries indicate that protocols for inter-agency collaboration in the area of CBRNe exist in their country, which make responsibilities and roles in CBRNe preparedness and response comprehensively clear. Furthermore, functioning coordination mechanisms exist between units working in the field of CBRNe, as well as information sharing routines between the units. In the benchmarking matrix, this approach was labelled with the category "outstanding" (see Table 4 – Benchmarking-Matrix). Respondents from Belgium, the Czech Republic, France, Greece, Italy, Portugal, Spain, Japan, Lebanon, Ukraine, and the United States selected this label for their country. For information sharing routines, regular meetings between CBRNe units were mentioned for example. However, it must be mentioned that in some cases respondents from the same country provided different information regarding the interagency collaboration protocols. The label absent/minimal was selected by participants from Germany, Ireland, Moldova and Turkey. Representatives of Latvia, Slovenia and Cyprus indicated that there are interagency collaboration protocols in their country, but that this is only sporadically the case and does not apply to all country levels (national, regional, local level, etc.). According to the Latvian interviewee, 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 the benchmarking matrix, this response category was classified with the label "moderate". In addition, respondents from Belgium, Greece, Portugal, the United Kingdom and the USA made this classification. Other respondents from these countries, as was shown, gave a more positive assessment in relation to the area of interagency collaboration protocols. Overall, it can be summarised that countries such as Germany, Moldova and Turkey can learn in the mentioned area from countries such as Belgium, France, Greece, Japan and Ukraine, where, according to the respondents, there are comprehensive protocols in place that regulate collaboration between CBRNe entities.

Table 4: Benchmarking rating of legal and policy framework for inter-agency collaboration¹²

	1 absent/minimal	2 emerging	3 moderate	4 significant	5 outstanding
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.
Belgium					
Cyprus					
Czech Republic					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Portugal					
Romania					
Slovenia					
Spain					
Canada					
Japan					
Lebanon					
Moldova					
Norway					
Turkey					
UK					
Ukraine					
US					

The follow-up interviews further elaborated these assessments. In France for example, a country with a high score rating, there are written protocols (e.g. national plans which define which agency does what), but it is not always easy to implement them and they are not uniquely dedicated to the CBRNe threat:

“There is not a specific plan for CBRN in general but there is one in case there is a plague pandemic, if there is an accident in a nuclear power plant, etc. At a terrorist level there are plans like this, but they are more for mass killings like the attack at the Bataclan. Then for a CBRN attack I personally haven’t seen really big documents.”
(Interviewee #25, France)

¹² As indicated, several participants from some countries took part in the benchmarking rating. Other countries have only one representative in the benchmarking rating. The various responses have been color-coded. White means that none of the respondents in this country selected this option.

For Spain, the interviews provided a mixed assessment: Whereas some interviewees found the legal and policy framework to be very clear, another practitioner from the country stated that there are no legal agreements in place that effectively define the roles and responsibilities between units in the area of CBRNe preparedness and response and that no interagency collaboration protocols are available. There was also strong disagreement in Ireland. In Ireland, national documents are in place that discuss the setting up and responsibilities of CBRNe measures, however, one of the Irish interviewees explains, that those documents provide no actual practice measures but work as a draft working document:

"I say, it's more for the local coordination centres rather than the actual frontline services."
(Interviewee #30, Ireland)

He would desire a framework such as found in the UK that seems to provide a very good collaborative response system compared to Ireland.

"So they [the UK] use the joint inter-agency service [JESIP], protocols and they seem to have a very good collaborated App and response system compared to what we use here in Ireland." (Interviewee #30, Ireland)

Good practice example

JESIP - Joint Emergency Services Interoperability Programme in the UK

The UK introduced models and principles to standardise the inter-agency collaboration within the country including education and training aspects. The five joint working models and principles can be applied to any type of multi-agency incident like CBRNe and enhance joint response, the sharing of information between agencies and joint decision making. The five principles are:

Co-locate with commanders as soon as practicably possible at a single, safe and easily identified location near to the scene.

Communicate clearly using plain English.

Co-ordinate by agreeing the lead service. Identify priorities, resources and capabilities for an effective response, including the timing of further meetings.

Jointly understand risk by sharing information about the likelihood and potential impact of threats and hazards to agree potential control measures.

Shared Situational Awareness established by using METHANE and the Joint Decision Model.

Another good example of clear legislation is Belgium. Both Belgian interviewees confirm that the current framework in their country is very structured, protocols and even national laws are in place to define who is responsible for what kind of task, how the tasks should be completed, when and why (Interviewee #23). Also, all responsibilities are clearly assigned with the 5 disciplines method that separates the responsibilities of the fire brigades (1st discipline), the emergency medical services (2nd discipline), the federal and local police as well as the federal reserve (3rd discipline), the Civil Protection including the logistics (4th discipline) and the communication (5th discipline).

In order to enhance the management of future incidents, the Lebanese interviewee clearly defines their three-level commandship that includes the strategic, tactical and operational level (Interviewee #35, Lebanon). Other countries like Cyprus are also currently learning from such examples and adapting their documents. The Cypriot interviewee elaborates that efforts are currently being made to introduce a unified legislation, superior to all others to define very specifically, which

ministry is going to respond to each agent and which minister is going to be responsible for strategy. As part of this, a national committee regarding CBRNe threats was established:

“A lot of departments are part of this committee, police, fire departments, Civil Protection, civil aviation, ministry of health, ministry of interior, ministry of exterior, environmental departments, the governmental laboratory, a lot of departments because we wanted to gather knowledge and expertise and also representatives for every department that might be involved in such incidents and risks.” (Interviewee #20, Cyprus)

Besides Cyprus, the complexity and legality of the documents is not equally evident in every country. For Moldova, the interviewee explains that instead of a legal agreement for CBRN incidents, there is unofficial cooperation (Interviewee #37). And for Lebanon, the following statement was made in regard to the necessity for further legislations that include neighbouring involved countries as well:

“We don’t have a regional inter-agency, for example among Lebanon, Cyprus, Syria and Greece. We are four neighbouring countries and actually we must have protocols and we must have inter-agency collaboration since in the South of Lebanon, in Israel there is nuclear power plants. If an incident takes place there, the wind will blow the radioactive plume towards Lebanon. We have to be prepared for such events and as we all know, during the Syrian conflict, chemical warfare agents were used during the conflict, such as sarin agents and chlorine choking agents. So for these reasons I can see that we have to start as soon as possible regional collaboration among these countries in order to better respond to such unfortunate events.” (Interview #35, Lebanon)

There is also disagreement on the clarity of assigned responsibilities within the country. Among other things, the governmental system was identified as a cause, which affects the entire CBRNe management system and determines its complexity. The federal system in particular seems to cause problems. In Belgium, 9 ministers of health share responsibility within the country. As a consequence, the management of incidents depends on the federal allocation:

“So, we are very good at deciding who is responsible for what and then thinking about how we are going to solve it. [But] Sometimes we even have different rules depending on the region where you at.” (Interviewee #23, Belgium)

This statement was brought up as an example of the Covid-19 pandemic. The effect of federal diversity on CBRNe management can be also found in countries like Germany, Austria, Switzerland or Norway. In federal countries like Switzerland, some cantons like Zürich appear very independent from the national government in Bern (Interviewee #46, UK). This also affects the levels of responsibility of the individual agencies.

Lesson learned

Fragmentation versus unity of agencies

In Norway, crisis response is divided between 11 counties with the local police being mainly responsible for CBRNe management within the borders. However, the police is fragmented. The Norwegian interviewee explains that the local responsibility of the police thereby does not correspond directly to the counties:

“One police area would stretch over multiple county areas and vice versa one county could have 2 or more police areas.” (Interviewee #38, Norway)

In addition, Norway has a municipal firefighting system, each responsible for their own local fire fighting, which again, is not corresponding with either the county or the police regions. Furthermore, although firefighters would be the first responders on site, the lead is always undertaken by the police until otherwise decided, leaving “room for a lot of confusion”. The interviewee also explains that therefore two main rescue centres, one in the South and one in the North, try to coordinate all major

accidents. A further aspect of fragmentation he brings up is the fact that specialised non-military CBRNe practitioners are usually “alone and fragmented” across the country. Therefore, Norway conducted military-civilian exercises on a higher level that includes CBRNe to enhance the exchange between the experts.

A mixed approach in Ireland has also proved difficult:

“So, the ambulance service is a national service, the Garda is a national service but the fire service, it’s a national service delivered locally. So, we have 26 different authorities delivering in different ways.”
(Interviewee #30, Ireland).

Such a mixed approach is also evident in non-EU countries such as Japan.

“The police organisation is unified within, a monopoly, but fire is quite different. Each fire department is individual. So that’s fire, we have 12 branch-offices and each branch office has to connect, communicate with a lot of fire departments, the branch offices of the railway company. Each branch will cooperate with its local fire department, yes. Each city has an individual fire department.” (Interviewee #34, Japan)

In contrast, an interviewee from the UK explains the value of a certain degree of regional unity that enables the country to effectively coordinate inter-agency collaboration:

“Scotland used to have a number of different police departments and Scotland merged its police departments into one regional police department, Police Scotland, and the same thing with the fire brigades. So, there are unified services up there.” (Interviewee #46, UK)

The UK in general runs a national emergency response service:

“[...] policing, counter-terrorism, fire brigade response, emergency medical response, these things are more nationalised than they are regionalised in the UK. [...] Now whether or not their policy is given the same emphasis in rural Cornwall as it is in the middle of London, that’s a different problem. But there is this national model and this national model is pushed down. There is no room for deviation.” (Interviewee #46, UK)

However, such (in) dependencies are more evident in larger countries with a division into legal counties. For Cyprus, for example, there is little possibility of fragmentation:

“We are a small island, so the regional and the national level is actually the same due to our size.”
(Interviewee #20, Cyprus)

Due to the complexity of responsibilities with or without legal and policy frameworks put in place, joint coordination approaches are found among all interviews that aim to enhance the interagency collaboration.

“We really needed the creation of a CBRNe centre or the national crisis centre. It helps for services to talk to each other because it’s a very neutral platform. [...], they are the mediator and they will call everything, everyone together and talk it through and see where are the points of discussion and why didn’t we do this at that point and most of the time everyone has a good explanation for why they did what at what time. The communication to the other services is not always that good.” (Interviewee #23, Belgium)

Good practice example

Inter-agency collaboration: the Belgian CBRNe expertise centre

In order to enhance inter-agency collaboration with regards to the field of CBRNe, the Belgian CBRNe expertise centre was created within the National Crisis Centre (CITRA) and is made up of relevant experts from different services: FPS Public Health, Ministry of Defence, Federal Police, Directorate General Civil Security, Federal Agency for Nuclear Control and SCIENSANO. The collaborative approach has been signed as an inter-ministerial framework agreement by the Minister of Security and the Interior, the Minister of Defence and the Minister of Public Health.

Besides Belgium, there are also (national) coordination centres in countries like Cyprus (Interviewee #20), Canada (#19) or Spain (#43):

“At the national level, [...] we would have customs border control, the Royal Canadian Mounted Police and all the major local police, like Montreal police or other police, territory authorities. They all sit together in these committees.”
(Interviewee #19, Canada)

“So, all the local entities are subordinated to what we call the Civil Protection system and they are all coordinated from our emergency room, who is the one who coordinates Civil Protection, firemen, ambulances and police services and what other things they may need.” (Interviewee #43, Spain)

Similar to his Belgian colleague, the Spanish interviewee sees a strong advantage in such a joint centre to facilitate the exchange of information between different agencies. He considers it almost impossible to be in dialogue with the multitude of individual and sometimes very small local entities. He also points out that although the police are alerted alongside the fire brigade and emergency medical services, they even make little contact with them during an incident because of the different areas of responsibility. Consequently, any interagency requests for support measures are managed entirely through the central coordination centre which facilitates the overall management. Even though the coordination runs upwards, both interviewees rate the cooperation among the agencies as very good, because they got to know each other through previous incidents that they have experienced over the past years. Only cooperation with the military is often noted as difficult.

Lesson learned

Inclusion of military within the borders

In the interview with a Norwegian practitioner (#38), it appeared that the military has the biggest resources and the most detailed knowledge of CBRN. However, due to legal policies the military is not allowed to operate within the borders of Norway. A similar assessment was made by a Greek (#29) and Belgian (#23) interviewee. In Greece, too, the military capacities are mainly foreseen to monitor the borders at ports and airports. In Belgium, the military policy allows response on national level only after a certain amount of time after the incident occurred. However, to a certain extent, the military is able to cooperate with the civilian police and other agencies. That said, in Norway, it appeared in the past that not all agencies were aware of this option and the possible ways to receive support (Interviewee #38). To enhance inter-agency collaboration, a national CBRN conference was installed. And in 2016, a national CBRN strategy was put in place to address inter-agency

collaboration and to discuss the legal framework and the political expectations with all agencies. Thereby, the issue of involving the military training, equipment, logistics, CBRN equipment, helicopters and other options were explicitly discussed. As a consequence, legal restrictions were loosened and simplified: Agencies can now submit a request for military assistance to the national headquarters and prior to any confirmation, military advice can be given until there is a negative confirmation.

This means that not only should the knowledge of the possibilities of military assistance for other CBRNe practitioners be communicated more strongly, but also legal policies should clearly regulate this collaboration by defining a simple mechanism that can be used to incorporate the valuable resources for national CBRNe management.

Besides the engagement with other commonly known CBRNe practitioners, a French interviewee added the value of cooperation approaches with relevant laboratories:

"And so we have an important collaboration between different labs and the labs that developed these tests are working with end users, with firemen, to teach them how to use the technical kit to make a good identification of the pathogen."

(Interviewee #24, France)

Besides the clarity of responsibility, the practitioners of the quantitative survey who have been involved in a CBRNe incident in their professional life were also able to evaluate the quality of the internal communication within their organisation during these past incidents. More than half of the respondents (56.4%) state that communication was "very efficient" or "rather efficient". 24.5% indicate that communication was "neither efficient nor inefficient", and only 14.3% of the respondents rate communication as "rather inefficient" or "very inefficient" (see Figure 24). Differences emerge when comparing the experienced group with the inexperienced group, who are asked to assess the efficiency of communication within their organisation in the event of an assumed CBRNe incident. 37.3% of respondents state that they would expect communication to be "very efficient" or "rather efficient". 22.4% expect communication to be "neither efficient nor inefficient" and only 16.8% of respondents expect that communication will be "rather inefficient" or "very inefficient". However, it should be mentioned that 18.7% of respondents could not say anything about the efficiency of communication ("I don't know").

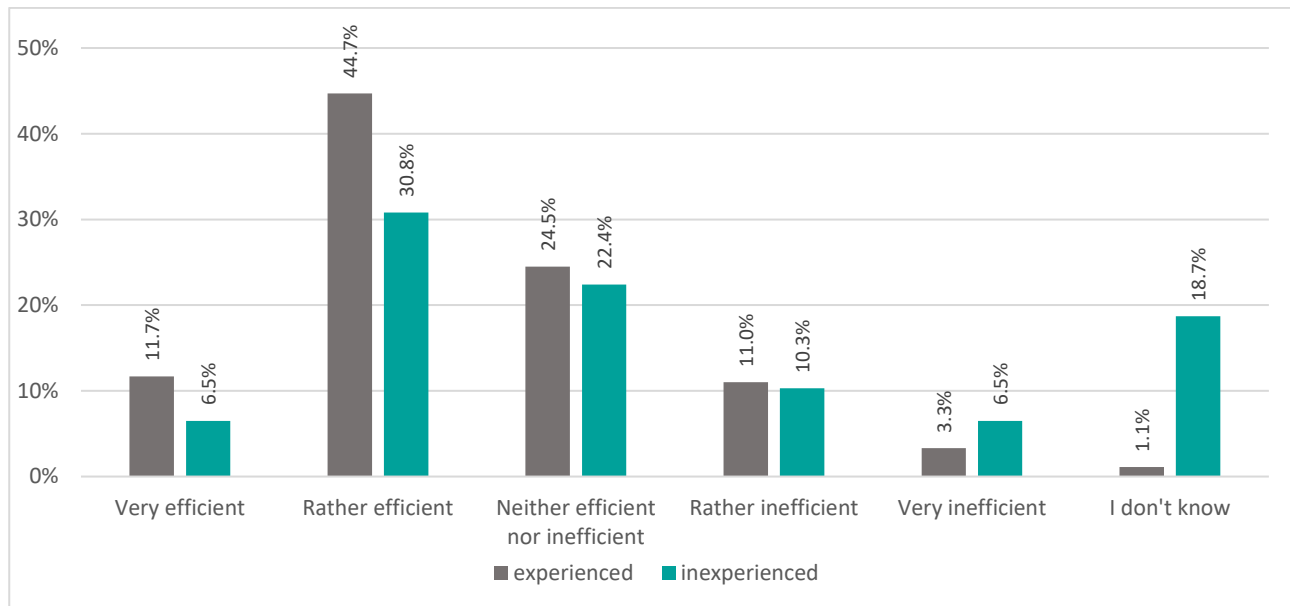


Figure 24: Perceived efficiency of internal communication during a CBRNe incident by experience with CBRNe incidents (experienced n=273; inexperienced n=107)

Difficulties in sharing information emerged in the interview study when looking at inter-agency collaboration. Although there were positive statements, such as in Spain or third countries like Canada, where legal regulations strongly support an inter-agency collaboration:

"We usually exchange information regularly, every month, with all the files we have had. We give them ours and they give us also theirs, and we have direct contact with the members of the other units." (Interviewee #43, Spain)

"Montreal or in Quebec, they have its own structure of sharing threat assessments and it's very clear the intelligence sharing amongst them." (Interviewee #19, Canada)

The exchange appeared not to proceed that well in all European countries.

Inter-agency collaboration can be restricted by legal policies. The interview with a Norwegian practitioner revealed that the sharing of classified information between different agencies is often fraught with uncertainty:

"But what we have identified is the problem of sharing classified information. That is a new finding on every exercise that we tend to, on the military side, to classify information too high, even though it's not necessary and then we cannot share it with people who don't have clearance, even though they are high-ranked police or firefighters. Even if they have the clearance, we quite often lack the actual means of communication, the white PCs or the classified radios, encrypted things, and I don't see a way to solve this anytime soon." (Interview #38, Norway)

Similar experiences are expressed in regard to Ireland. The awareness of the SOPs of other agencies appears to be lacking consideration. Interviewee #30 explains that some agencies such as the lead agency Garda don't seem to share their documents. Here, too, the exchange of sensitive information may be the reason. In Cyprus, the exchange of information is sometimes inadequate, with negative consequences for threat assessment:

"Each service has its own perspective and its own procedure and its own point of view regarding to threats and some of the services cannot share some information." (Interviewee #20, Cyprus)

A clear legal framework could help to enhance the inter-agency collaboration and promote the exchange of information.

7.2.2. Education and training of CBRNe practitioners

Education and training of responders is a crucial component of an effective CBRNe response, allowing practitioners to familiarise themselves with SOPs. As we have seen in the section above, familiarity with CBRNe is not only dependent on previous experience with such incidents; rather, we assume that it also depends on education and training.

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 (72.3%) use exercising and training sessions (see Figure 66Att.). Furthermore, organisations refer frequently to briefing notes (43.1%) and online learning platforms (38.7%). TV material (10.0%) and audio material (7.2%) are the least used as education media. Only 8.0% of respondents indicate that their personnel do not have access to information resources that specifically prepare them for a CBRNe incident.

An examination of the topics covered in the training resources reveals that there is a focus on accidents and technical emergencies in 86.8% of cases (see Figure 67Att.). For terrorist attacks, the proportion is slightly lower (77.0%). More than half of respondents state that information resources focus on natural hazards (61.3%) and non-terrorist crime (54.9%). The topic of warfare (18.7%) is relatively rarely addressed. This corresponds thematically with the CBRNe incidents experienced and the experts' assessment of the likelihood of future events (see Chapter 7.1.1).

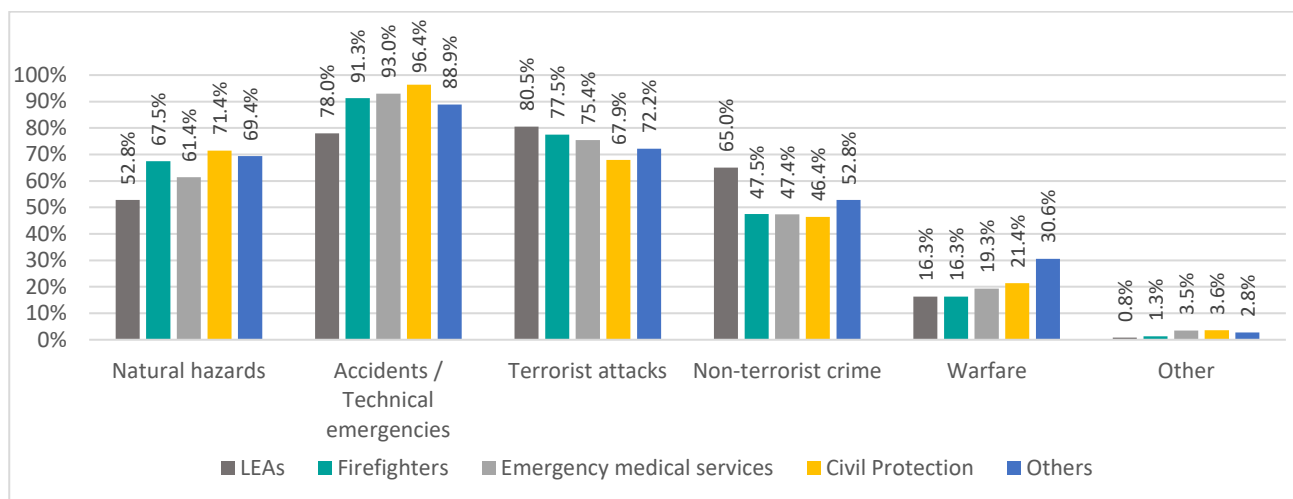


Figure 25: Topics of the information resources organisations provide for their personnel to prepare for a CBRNe incident by profession; multiple selection option (LEAs: n=123; Firefighters: n=80; Emergency medical services: n=57; Civil Protection: n=28; Others: n=36)

Figure 25 reveals that natural hazards, accidents and technical emergencies, terrorist attacks and non-terrorist crime are taken into account to a greater or lesser extent in the information resources organisations provide for their personnel to prepare for a CBRNe incident, depending on their importance for the respective responsibilities of the individual professional groups. Consequently, LEAs are mainly trained for terrorist attacks, accidents and non-terrorist crime. Less often, training focuses on natural hazards. Firefighters receive similar training on the first two topics. However,

natural hazards play a greater role in their education. Emergency medical services receive slightly less training on terrorist attacks and natural hazards. Together with the Civil Protection sector, however, they are trained more than anyone else for accidents and technical emergencies. Non-terrorist crimes are the least common subject of training. For all groups, only 18.7% refer to warfare situations. However, it is noticeable that 30.6% in the "Other" category indicated that this topic is covered in the information materials. This group includes military personnel, among others, and therefore this result is not surprising.

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 (91.4%) (see Figure 68Att.). This is also in line with the findings from the previous chapter. Furthermore, biological (82.3%), radiological (82.3%), nuclear (65.1%) and explosive substances (69.4%) are often considered in the information resources.

Encouragingly, most respondents (67.0%) consider the information resources to be "extremely relevant" or "very relevant" in preparing their organisation for a CBRNe incident (see Figure 69Att.). Only 6.4% 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, 72.4% assess the material to be in fact "extremely" and "very relevant" to prepare CBRNe responders for such events (see Figure 26). Accordingly, only 21.5% of the respondents indicate a "medium" degree of relevance. Of those who have not been involved in a CBRNe incident so far, 49.2% perceive the information resources as "extremely" and "very relevant". Another 35.4% at least assess the information resources as "somewhat relevant" to be prepared for a CBRNe incident. This indicates that those who are inexperienced in operations cannot sufficiently assess how valuable the knowledge provided will prove to be in an emergency or that it is less understandable for those who have not yet experienced an incident. In order to generate greater self-confidence, an exchange between the two groups would be advisable.

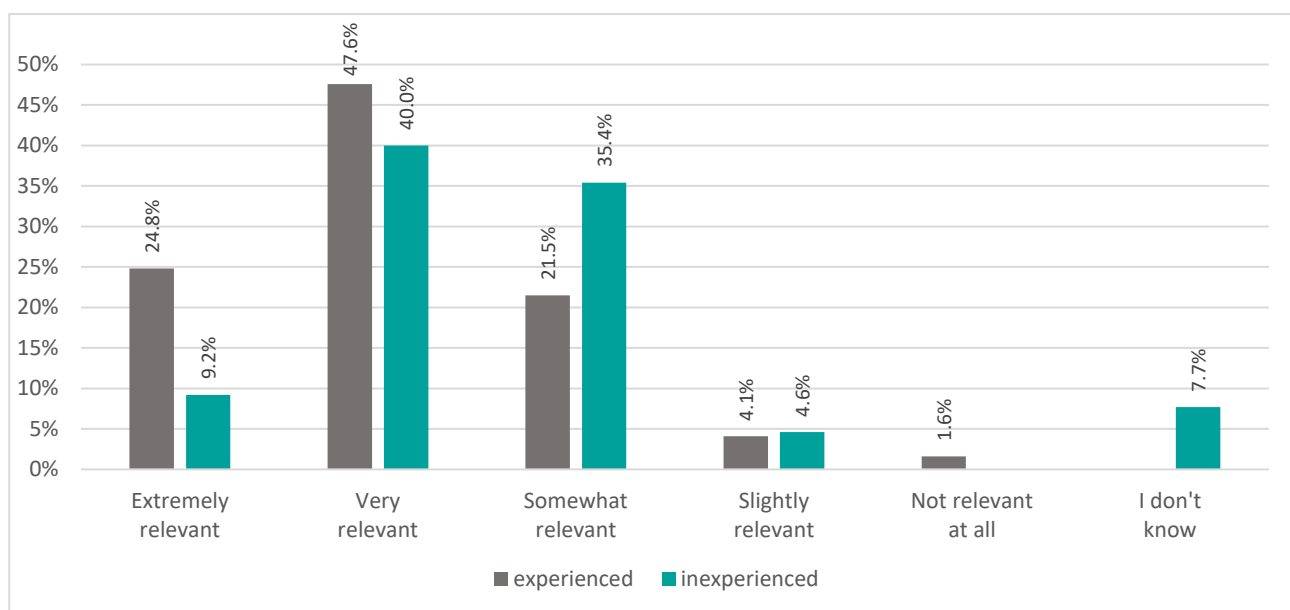


Figure 26: Perceived relevance of information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident by experience with CBRNe incidents (experienced n=248; inexperienced n=65)

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, 72.3% of organisations conduct exercises to prepare their staff for a CBRNe incident.

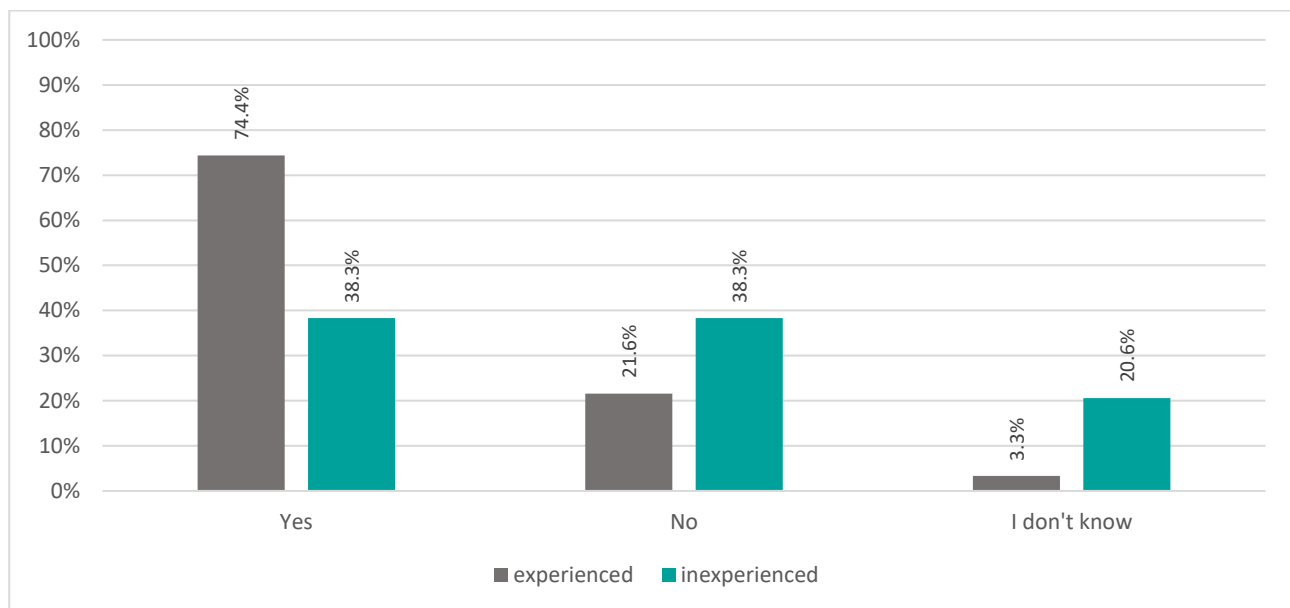


Figure 27: Involvement of organisation in CBRNe exercises (at least once a year) in the last ten years by experience with CBRNe incidents (experienced n=273; inexperienced n= 107)

A comparison by experience reveals that the percentage of participants who confirm that their organisation participates in CBRNe exercises (at least once a year) is almost twice as high among participants who have already been involved in a CBRNe incident (see Figure 27). In this context, it can be assumed that organisations with CBRNe experience are more likely to see the need for training. This also affects the familiarity with the topic of CBRNe (see Chapter 7.1.2). 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 training is conducted at all, but also how often certain CBRNe aspects are addressed in the exercises. Figure 28 reveals that 73.3% of respondents say that the exercises “always” or “frequently” focused on decontamination. In addition, according to the participants, the the training aspects of building a safety zone (62.7%) and medical care (61.9%) were frequently addressed during the exercises. Almost half of the respondents (48.4%) stated that the area of evacuation was trained to the same extent. In contrast, contact with the public was less frequently trained. Only 11.4% of respondents indicated that this contact was “always” trained while 10.6% negated any training in this regard. Less than one tenth (8.7%) of participants indicated that contact with vulnerable groups was “always” or “frequently” included in CBRNe exercises. Although, such contact is sometimes considered by CBRNe practitioners in trainings (19.1%), 56.8% of respondents indicated that CBRNe exercises in which their organisation had been involved in the last ten years only “rarely” or “never” addressed this topic.

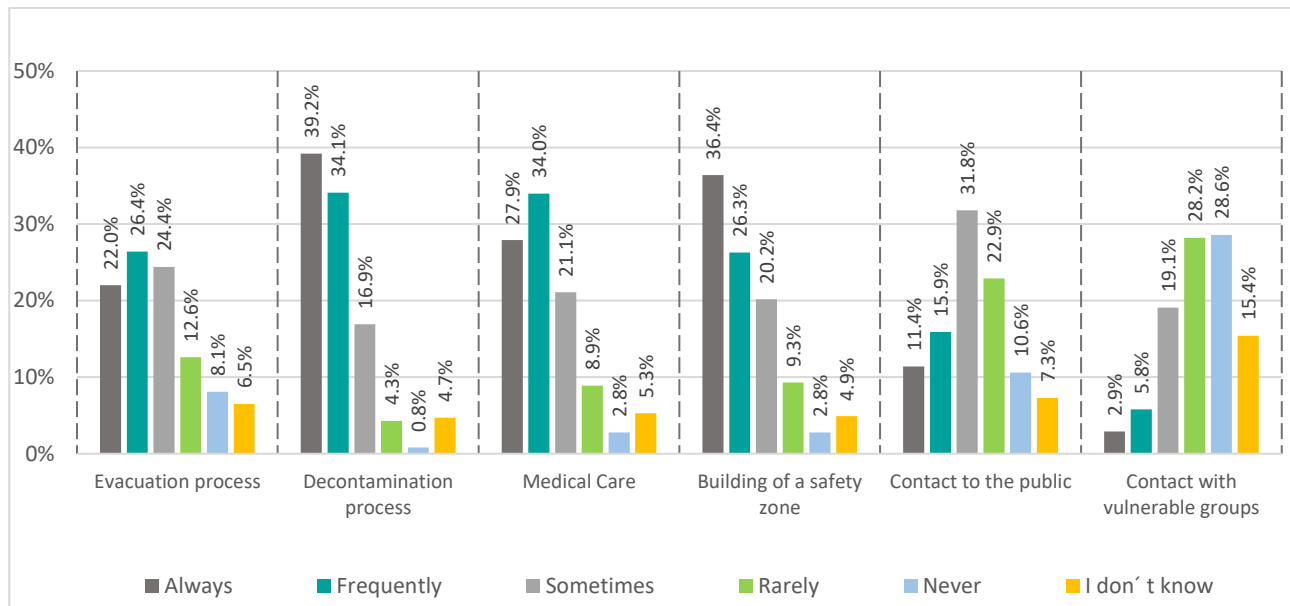


Figure 28: Reported frequency of topics addressed in CBRNe exercises in which the respondent's organisation has been involved in the last ten years (Evacuation process: n=246; Decontamination process: n=255; Medical Care: n=247; Building of a safety zone: n=247; Contact to the public: n=245; Contact with vulnerable groups: n=241).

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. Another French interviewee provides more details:

"Big exercises like this there are 2 per year per defence zone and in France we have 7 defence zones so normally we have 14 exercises per year. And depending on where you are there are not the same means, it's not the same people involved... the police officers who train in one zone during one exercise are not the same in the next exercise."

"Firefighters know how to equip themselves correctly with a CBRN suit, the health services as well, some Gendarmes (those who work with me) know. But the police officers at the last exercise... it was a catastrophe... which also allows us [...] to explain to them how to proceed correctly. But some police officers will go back home and will never put back a CBRN suit because they are not interested. So the little knowledge we give them will be lost in a few months."

(Interviewee #25, France)

A stage training structure is found in other countries. A Belgian participant explains in more detail that every team member passes a level one and a level two training (Interviewee #1, Belgium), a sentiment shared by other interviewees. 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 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 educational 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, 63.9% of the 402 survey participants indicate that their organisation has participated in exercises simulating a CBRNe incident at least once a year in

the last ten years. On the other hand, 26.1% of respondents state that their organisation does not regularly conduct such exercises. A comparison of the professional groups examined reveals that of 81 firefighters surveyed, 87.7% state that their organisation participates in CBRNe exercises at least once a year or more (see Figure 29). This also applies to 52.6% of the 171 LEAs surveyed, to 61.2% of the 67 healthcare workers and to 65.6% of the 32 participants working for a Civil Protection agency.

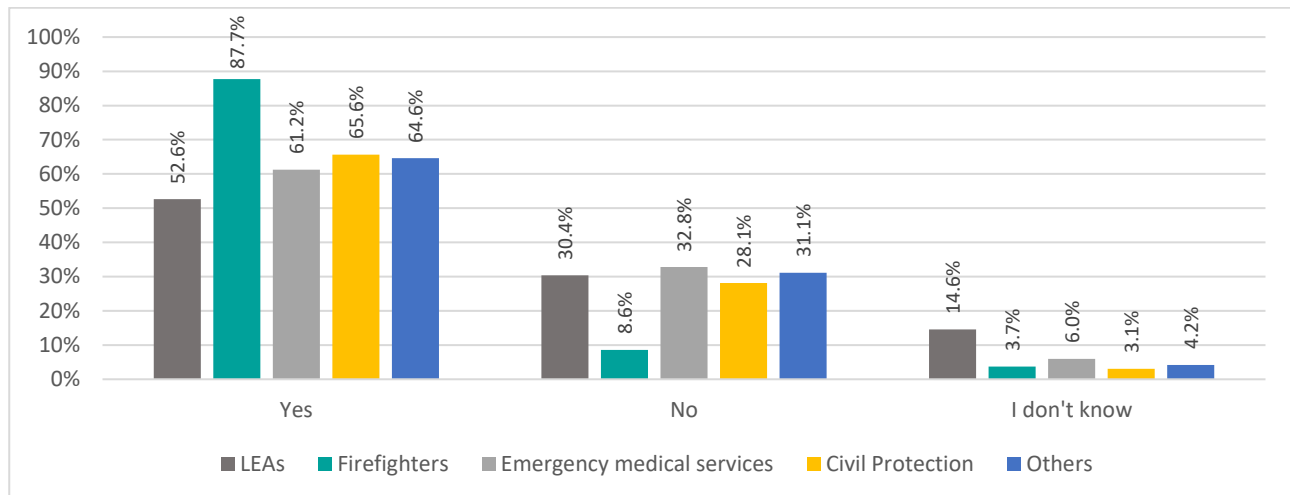


Figure 29: Involvement in CBRNe exercises by profession (LEAs: n=171; Firefighters: n=81; Emergency medical services: n=67; Civil Protection: n=32; Others: n=48)

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, more regular training is provided for police officers:

“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 training and the implementation of exercises that defines the necessary content, scope and regularity for all European CBRNe practitioners.

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 engage in exercises, a large number confirms that in addition to their organisation, LEAs, fire brigades and medical staff in particular also participate (see Figure 30). More than half of the respondents (51.5%) 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 75.0% and 62.9%. 42.8% of the respondents indicate that Civil Protection personnel participate to the same extent. In contrast, the same is reported for members of the public by only 16.1% of respondents. The proportion is even lower for persons who are

considered to be part of a vulnerable group (3.1%). Almost half of the respondents (44.7%) indicate that vulnerable persons are never involved in joint exercises. With regard to other members of the public, this is only true for 30.1% of respondents.

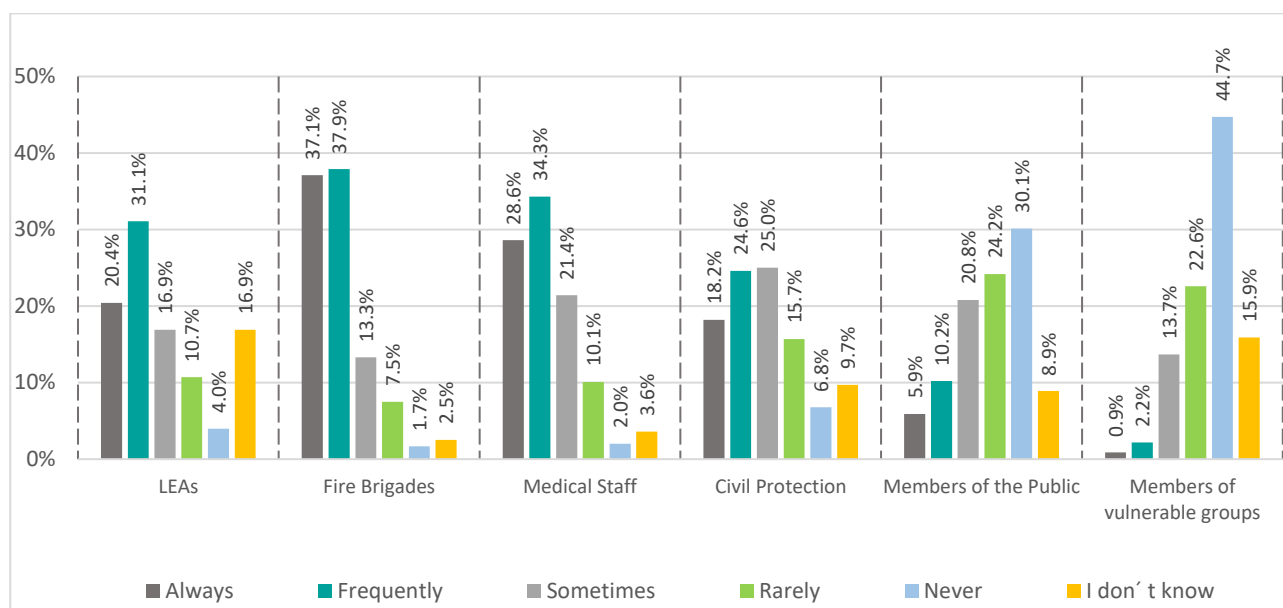


Figure 30: Involvement (frequency) of different actors in CBRNe exercises in the last ten years besides the own organisation (LEAs: n=225; Fire Brigades: n=240; Medical Staff: n=248; Civil Protection: n=236; Members of the public: n=236; Members of vulnerable groups: n=226)

The interviewees indicate that education and training is shared with 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 allow for mutual acquaintance with different skills and equipment of operational units (Interviewee #8, Ireland)¹³. 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.

“The meaning of this simulation, it was to test our capacity. To coordinate between firefighters and sanitarias and police persons, to test if we are able to fight this attack or not.” (Interviewee #12, Spain)

Through the benchmarking rating (see Table 5), it can be seen that there are large differences between countries concerning the quality of these joint exercises.

¹³ 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.

Table 5: Benchmarking rating for (joint) training

	1 absent/minimal	2 emerging	3 moderate	4 significant	5 outstanding
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 standardized.	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.
Belgium					
Cyprus					
Czech Republic					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Portugal					
Romania					
Slovenia					
Spain					
Canada					
Japan					
Lebanon					
Moldova					
Norway					
Turkey					
UK					
Ukraine					
US					

In the benchmarking rating respondents from Germany, Ireland and Turkey indicated that specific training in the area of CBRNe is very rarely conducted in their countries and that the trainings are not conducted with other CBRNe units (label ‘absent/minimal’ in the benchmarking matrix). Other respondents from Germany and Ireland indicated at least that joint trainings are rarely conducted (label ‘emerging’ in the benchmarking matrix). This classification was also made by respondents from Moldova and Cyprus. For Cyprus, CBRNe training was indicated to be usually limited to the own unit:

“Actually only 2 times we organised a national exercise regarding CBRNe. Each department organises its own exercises. From my point of view, because I’m a police officer and I’m very related with the fire department and also with the ambulance department, with those 3 services we are organising some common exercise.” (Interviewee #20, Cyprus)

According to an interviewee from France (#27), French CBRNe practitioners also tend to conduct training separately from each other. However, another French interviewee explains that there are collaborations and regular exercises, but from one exercise to another there are not the same units that are participating:

“...so at the exercise I attended the day before yesterday there were police, firefighters, health services (ambulance), demining services were also invited, we had the customs, the customs were really for the first time and also the veterinarian services.” (Interviewee #25, France)

In other countries, such as Belgium, Latvia, Norway, Portugal and Slovenia, participants indicated that CBRNe incidents are trained more regularly and that relevant CBRNe practitioners are involved in the exercises. However, the trainings are not included in the regular training schedule (label ‘moderate’ in the benchmarking matrix). Other participants from Belgium and Latvia, however, make a less positive classification by stating that joint trainings are rarely initiated. For Belgium, one interviewee (#22) explained that exercises with other national authorities are made that involve all the different services and always include a crime scene or a laboratory with CBRNe related products or a similar scene. Furthermore, cooperation with other countries is established to observe different SOPs:

“We cooperate with other countries. We also go on observe exercises in the UK because we have very good contact with the UK.” (Interviewee #22, Belgium)

However, there is a lack of targeted exchange with neighbouring countries with regard to Seveso facilities.

“And for those [Seveso exercises] we have a very good understanding and a very good compatibility between all the services [...]. So in between the services it goes well but the closeness to the neighbours is not the best.” (Interviewee #23, Belgium)

Respondents from Canada, France, Greece, Hungary, Japan, Lebanon, Lithuania, Romania, Ukraine and the USA give an overall positive picture. Some of them state that CBRNe management is common education practice in their country and is partially standardised. Moreover, according to the participants, the trainings sometimes include additional actors, such as media professionals or the general public (label ‘significant’ in the benchmarking matrix). Other participants from the above-mentioned group of countries even stated that a nationally standardised CBRNe training is regularly conducted in their countries and that the trainings often include additional actors (label ‘outstanding’ in the benchmarking matrix). Again, it is striking that in some countries (e.g. Italy and Spain) the ratings of individual participants differ greatly. One participant from Spain rated the joint training category as ‘outstanding’, while two other participants from Spain gave a much more negative rating (labels ‘emerging’ and ‘moderate’). Overall, it is remarkable that, as with the category ‘legal and policy framework for interagency collaboration’, negative ratings were given by participants from Germany, Moldova and Turkey, whereas participants from France, Hungary, Lithuania, Romania, Canada, Japan, Lebanon and Ukraine gave extremely positive ratings. Thus, the former group of countries can take lessons from countries such as Japan, France and Canada in order to improve in the area of joint training in CBRNe.

Alongside Latvia (#9), Greece (#6) and Ukraine (#17), interviewees from Poland (#11), Spain (#43), Czech Republic (#2), Norway (#38), Lithuania (#36), Greece (#29) and Ireland (#30) point out that joint exercises at least once a year are common practice in their organisation and country. However,

the scope of these exercises varies greatly between countries, ranging from table top exercises, to small scenarios to elaborate national and cross-national exercises:

“The bigger exercises for example, to coordinate the firefighters, 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)

“We usually go or attend a national training level with a military emergency unit once a year and they invite all police and CBRN teams at national level. That’s a good practice. When we make our own trainings, we usually invite other police services.” (Interviewee #43, Spain)

“Yes, each year we provide the one or two exercises or field exercises with the firefighter, medical service, policemen and owners of the factory. And we train, how to solve different problems.” (Interviewee #2, Czech Republic)

“Also on a higher level we have military-civilian exercises every year and we try to inject CBRN into those exercises as well, just to get the warning reporting going, with more luck some years, less luck in other years. [...] Then we have quite a bit of training on that with the Red Cross, with the local county facilitators, with the medical services and so on but it’s not particularly CBRNe related.” (Interviewee #38, Norway)

Lithuania conducts annual table top exercises in addition to joint exercises with neighbouring countries (Interviewee #36, Lithuania). Exercises also take place periodically in non-EU countries, such as the USA (Interviewee #48, USA) and Canada (Interviewee #19, Canada). For Canada, a huge exercise was reported:

“You know, there are different levels of exercises, as you are aware of, just regular table top exercises, but they do occasionally, for example a VRL. We participated in a huge exercise a few years ago with actors, with the media, with various emergency measures, people in a fire, the emergency medical service, the police, the intelligence units, the investigative units, with real actors, command centres, cameras to observe the events, debriefs and briefs before.”

(Interviewee #19, Canada)

However, the Canadian interviewee also points out that such exercises are very cost-intensive and therefore cannot be carried out every day. For Greece, an interviewee explains the different intensity of training depending on the agency:

“Actually, there is a lot of training but it’s not that often a joint training. About twice a year. It’s at least once a year, maximum 3 times per year for all of us to conduct common training and exercises. But each one of the agencies, I know they conduct training very often. At least, in the army we do this thing every day. Also the fire department, also the police department.” (Interviewee #29, Greece)

An Irish interviewee (#32) states that very few police officers in Ireland are especially trained in CBRNe whereas he assumes the percentage of police personnel in the UK to be higher. There are measures undertaken to increase the number:

“So what we do here from the fire service side of this, is we bring in the CBRN management team from the Garda. We run one course for instructors every year and that would be hazmat response instructors, but we’d spend maybe a day set aside for CBRN, where we bring in the army and we bring in the Garda and it would be mainly just to show the equipment and how they would respond from their perspective, but there would never be a major big exercise on the CBRN side of us.” (Interviewee #30, Ireland)

In the UK, cross-institutional exercises are carried out several times a year which reflect the threat assessment for the respected 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)

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).

In the survey, when asked about the overall value of the exercises in preparing their organisation for a CBRNe incident, almost three quarters (73.0%) of the responders indicate that the exercises are perceived to be "extremely valuable" or "very valuable" (see Figure 70Att.). Only 6.7% assess the exercises to be "slightly valuable" or "not valuable at all" in preparing their organisation for a CBRNe incident. Comparing the experienced with the inexperienced group, slight differences in the evaluation become apparent (see Figure 71Att.). Thus, 75.7% of respondents with CBRNe experience state that for them the exercises were "extremely valuable" or "very valuable" in preparing for a CBRNe incident. On the inexperienced side, this percentage is only 57.5%. A comparison between European countries shows that the participants predominantly indicate an extreme or great value of CBRNe exercises (see Figure 31). About half of the participants in all countries consider the exercises to be "extremely" or "very valuable", except Finland and France which show more reserve (more answers "somewhat valuable").

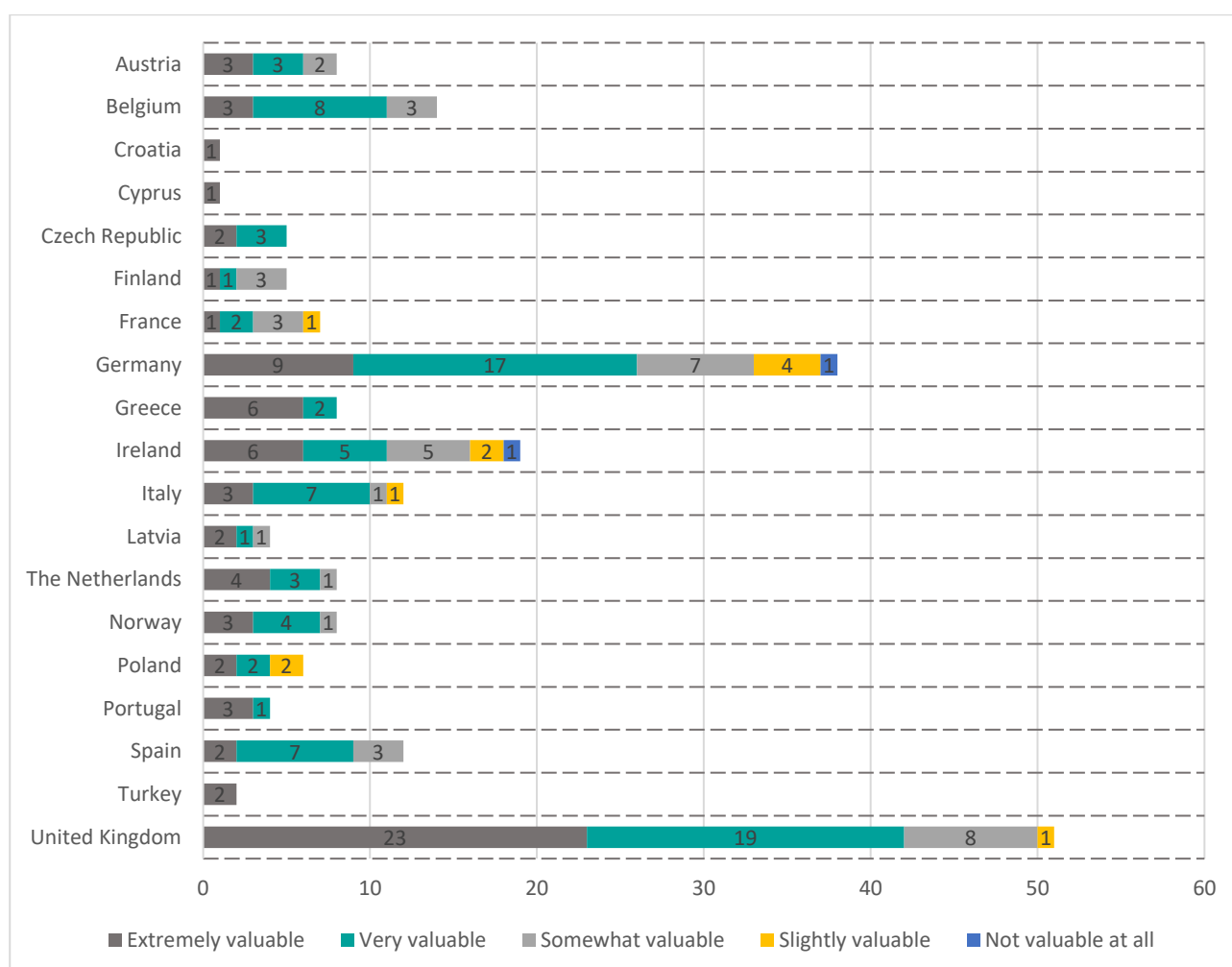


Figure 31: Perceived value of CBRNe exercises in which the own organisation has participated over the last ten years to prepare the organisation for a CBRNe incident by country (Austria: n=8; Belgium: n=14; Croatia: n=1; Cyprus: n=1; Czech Republic: n=5; Finland: n=5; France: n=7; Germany: n=38; Greece: n=8; Ireland: n=21; Italy: n=12; Latvia: n=4; Norway: n=9; Poland: n=6; Portugal: n=4; Spain: n=12; The Netherlands: n=8; Turkey: n=2; United Kingdom: n=52)

Although a comparison by country group reveals that a higher proportion of non-EU countries consider the exercises to be “extremely valuable” (see Figure 32), it appears that overall, education and training is very suitable to prepare CBRNe practitioners for such future incidents.

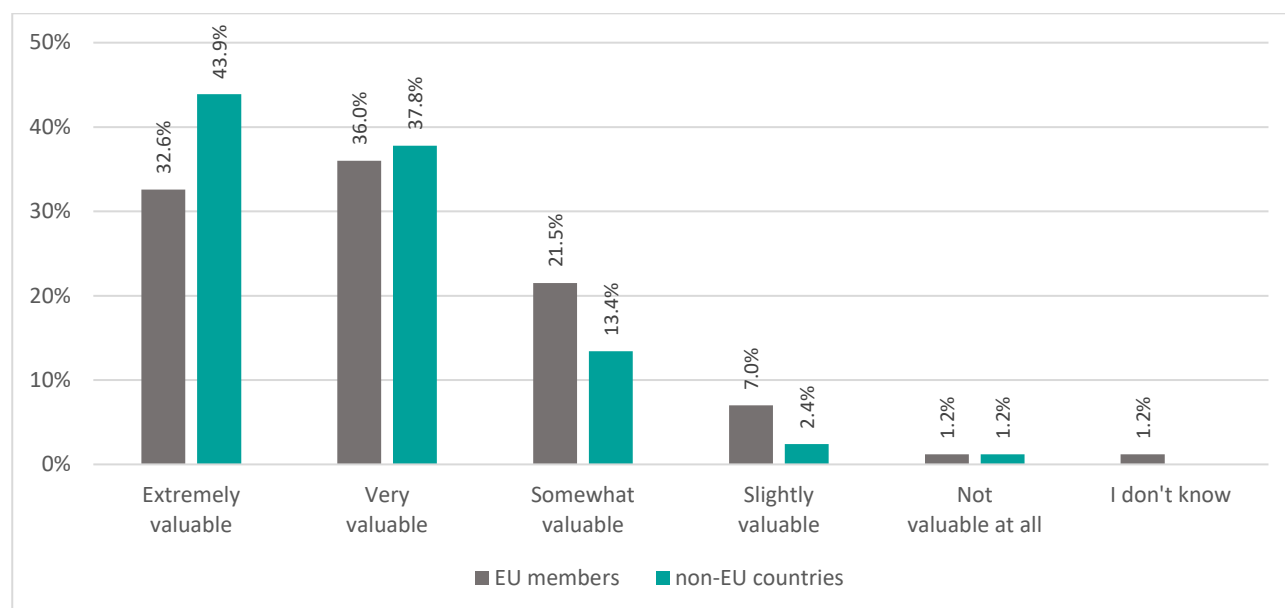


Figure 32: Perceived value of CBRNe exercises the respondent's organisation participated in the last ten years to prepare the organisation for a CBRNe incident by country group (EU members: n=172; non-EU countries: n=82)

7.2.3. Organisational equipment for a CBRNe incident

The equipment for CBRNe responders can vary greatly depending on the professional category (e.g. LEA, firefighter, emergency medical service), the type of operation (underlying CBRNe agent), the location (e.g. outdoor public space, indoor ventilated space, railway station, etc.) and the object of operation (e.g. explosives, aerosol). Therefore, the equipment includes the personal clothing of the CBRNe responders, the medical equipment, detection robots, sensors or shelters available on different infrastructures and much more.

Figure 72Att. illustrates the extent to which participants rate their organisation's equipment as sufficient in the context of a CBRNe incident. 48.8% of the respondents perceive their equipment to be "completely" or "rather sufficient". Another 18.8% indicate a medium degree of sufficiency. However, 25.0% assess the equipment to be "rather insufficient" or even "completely insufficient". Considering only respondents with previous experience with CBRNe incidents, it becomes obvious that a smaller proportion rated the equipment as "rather insufficient" or "completely insufficient" (19.3%). In contrast, 56.6% of these respondents rated the equipment as "rather sufficient" or "completely sufficient". In comparison, only 31.7% of the respondents who have not yet experienced a CBRNe incident give this rating. A larger proportion of these respondents (36.5%) rate the equipment as "rather insufficient" or "completely insufficient" (see Figure 33).

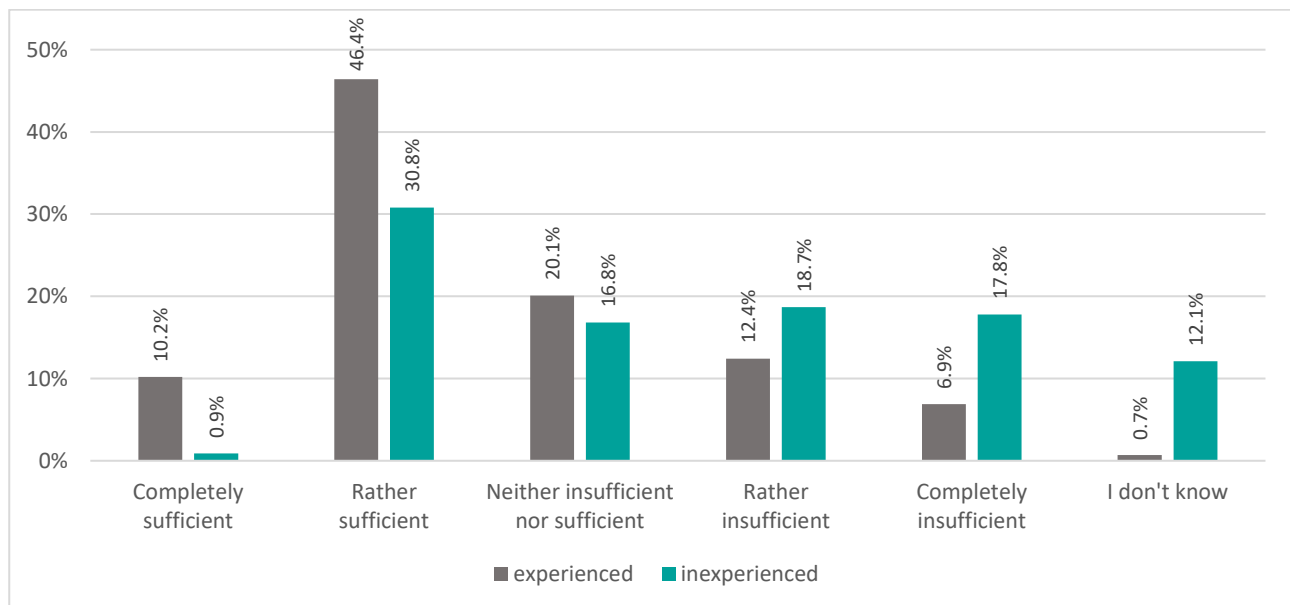


Figure 33: Assessment of the organisational equipment for a CBRNe incident by experience with CBRNe incidents (experienced: n=274; inexperienced: n=107)

A comparison of the professional groups reveals clear differences regarding the equipment. Almost three quarters (71.6%) of the surveyed firefighters rate their organisations' equipment for a CBRNe incident as "completely sufficient" or "rather sufficient" (see Figure 34). In contrast, only 4.9% of those respondents classify the equipment as "rather insufficient" or "completely insufficient". 63.3% of the emergency medical services consider the equipment to be "completely" or "rather sufficient", whereas 22.0% of respondents assess their equipment to be "rather" and "completely insufficient" to adequately respond to CBRNe incidents. Of the representatives of Civil Protection agencies, 46.9% referred to the higher rankings, whereas 21.9% state that the equipment is "rather" or "completely insufficient". For LEAs, the percentage for the "rather sufficient" or "completely sufficient" category

is lowest at 33.1%. A higher proportion of respondents rated the equipment as "rather insufficient" or "completely insufficient" (36.6%).

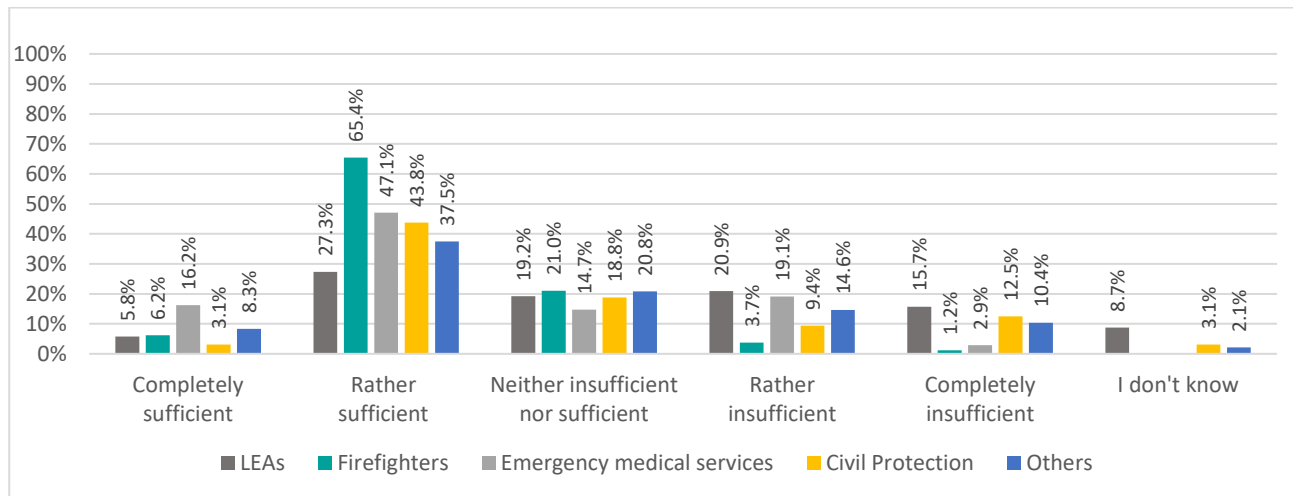


Figure 34: Assessment of the organisational equipment for a CBRNe incident by profession (LEAs: n=172; Firefighters: n= 81; Emergency medical services: n=68; Civil Protection: n=32; Others: n=48)

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)

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.

7.2.4. Cooperation approaches of CBRNe practitioners

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 cooperation with other practitioners involved, such as firefighters 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 towards cooperation is also evident in the quantitative study. Out of 403 survey participants, 72.7% state that there are written cooperation agreements between their organisation and other organisations (e.g. LEAs and fire brigades) for major emergencies, specifying the distribution of tasks and the cooperation during these incidents. In contrast, 11.4% of the respondents do not have cooperation agreements and 15.9% indicate that they are unaware of such approaches or do not want to indicate this. It is noteworthy that of those respondents who have already been involved in a CBRNe incident, a higher proportion indicate that their organisation seeks cooperation with other organisations (78.8% to 58.9%) (see Figure 35). The findings imply that cooperation plays a very important role, based on the experiences gained in previous CBRNe incidents.

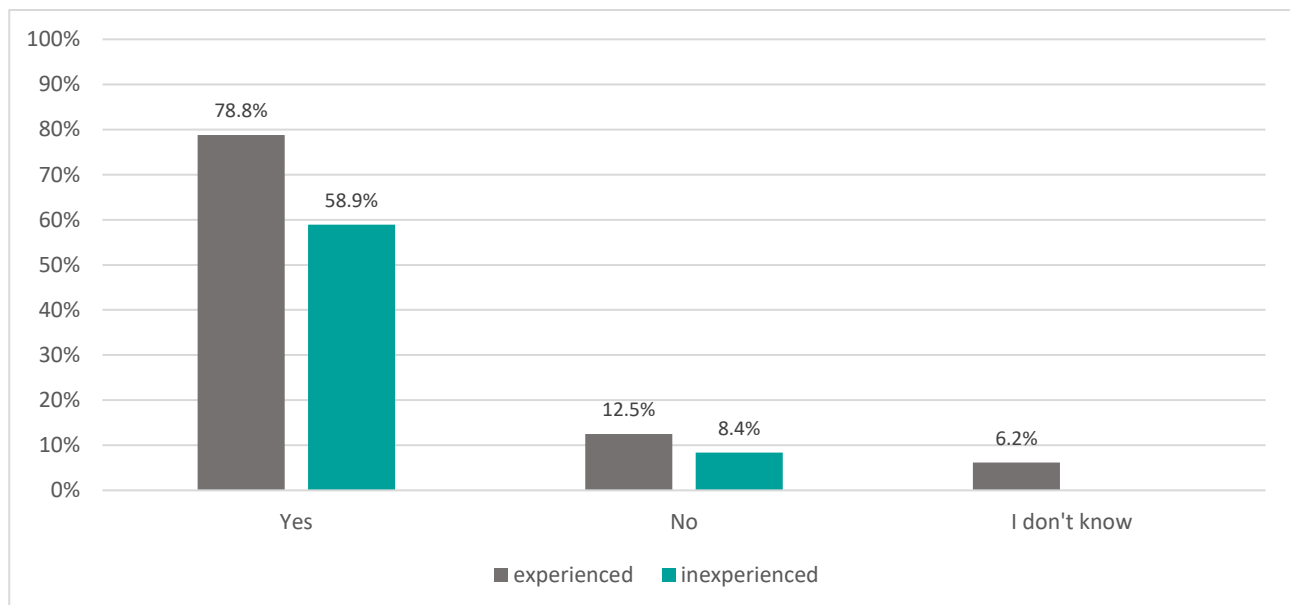


Figure 35: Written cooperation agreements of respondent's organisation with other practitioner organisations (e.g. LEAs and Fire Brigades) for major emergencies by experience with CBRNe incidents (experienced n=273; inexperienced n=107)

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 (69.1%) state that the agreements were "extremely helpful" or "very helpful" for the cooperation during those past events

(see Figure 73Att), whereas only 3.4% of the respondents perceive the agreements to be "slightly helpful" or "not at all helpful".

Good practice example

International Cooperation during a CBRNe incident: the Beirut Blast

On 4th of August 2020, an explosion occurred due to the unsafe storage of ammonium nitrate in a warehouse in Beirut and led to the death of at least 218 people (Al-Hajj et al., 2021; El Sayed, 2020). The explosion itself was felt even beyond the borders of Lebanon in Cyprus and northern Israel:

"It was a catastrophe for us. However, so many allies from Europe and from the region responded and supported us during these events" (Interviewee #35, Lebanon)

Following the incident, an EU project entitled "Technical assistance for CBRN risk mitigation in Lebanon" has been funded. It aims to enhance the technical capacities of Lebanese first responders (Armed Forces, Civil Defence, firefighters) as well as the Office of the Prime Minister and their coordination in case of a CBRNe incident. They are being assisted by, among others, the Ministry of Defence of Italy, the German police and the French firefighters and Gendarmerie in order to put in protocols for such incidents.

It also showcased the importance in having protocols in place between neighbouring countries, in this case Cyprus, Greece, Israel and Syria:

"We have to start as soon as possible regional collaboration among these countries in order to better respond to such unfortunate events." (Interviewee #35, Lebanon)

Another compelling reason for international cooperation cited were neighbouring radiological risks. Indeed, if ever there was an accident at an Israeli nuclear power plant, given certain wind conditions the radioactive smoke plume could fall upon Lebanon

When looking at the countries individually, it becomes clear that in all countries at least 50% of the respondents rate the cooperation agreements as "extremely helpful" or "very helpful" (see Figure 36). In general, only a few responders perceive joint cooperation to be of no support. The same tendency appeared in the comparison by country group. Due to the predominantly positive experience with cooperation, these efforts are to be intensified.

In this regard, one interviewee from the UK points out that the overall effectiveness of inter-agency collaboration is not limited to CBRNe but to pre-existing institutional rivalries:

"London suffers in my opinion from a very serious rivalry between the fire brigade and the police." (Interviewee #46, UK)

A similar statement was made by the Portuguese interviewee (#39). Due to the superior position of police and military, cooperation is not often sought to enhance the overall management of incidents. Instead, he describes a rivalry to be the best agency represented in media.

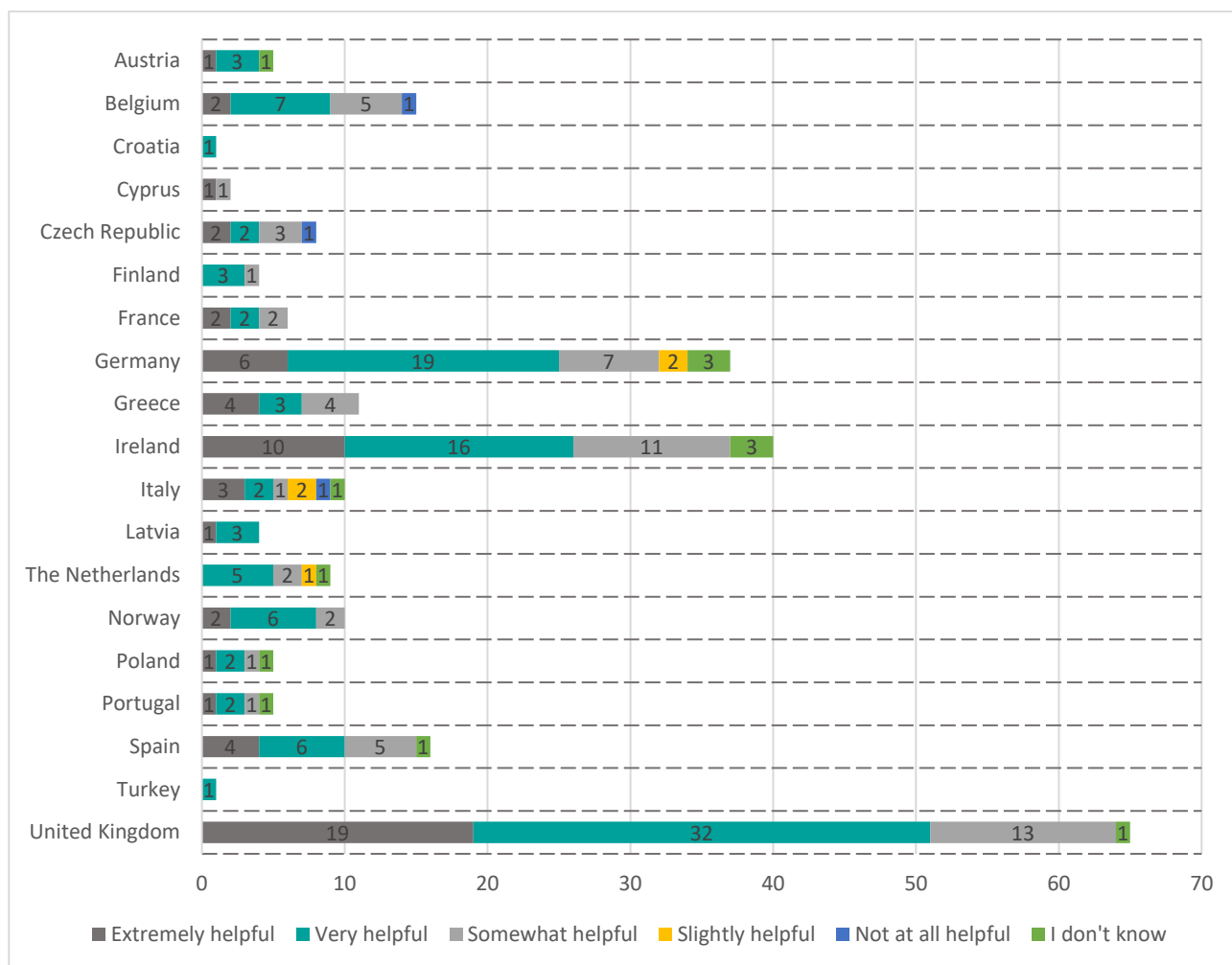


Figure 36: Perceived helpfulness of cooperation agreements for major emergencies for cooperation during these incidents by country (Austria: n=5; Belgium: n=15; Croatia: n=1; Cyprus: n=2; Czech Republic: n=8; Finland: n=4; France: n=6; Germany: n=39; Greece: n=11; Ireland: n=40; Italy: n=11; Latvia: n=4; Norway: n=10; Poland: n=5; Portugal: n=5; Spain: n=16; The Netherlands: n=9; Turkey: n=1; United Kingdom: n=65)

The interview study revealed that cooperation between specialised CBRNe first responders and other practitioners is also important. For example, LEAs, fire brigades, emergency medical services and civil protection agencies do not cooperate only among themselves but also with other practitioners which are directly involved in an incident. The transport sector is one example of critical sector which can be highly affected by CBRNe incidents (as also shown in Chapter 7.1.3 some countries have higher risks in this respect). Therefore, private and public transport bodies, railway companies, logistic operators and other such transport stakeholders are expected to develop close cooperation with highly trained first responders and to have a minimal level of CBRNe training themselves. This is essential in case their services or infrastructure premises are the subject of an accident or attack and they would need to be involved in emergency response along the first responders. Below we identified some lessons learned in this respect.

Good practice examples from transport practitioners

Challenges and lessons learnt in the railway transport sector

Good practices in Japan: Tight cooperation between railways and specialised first responders

Japan is one of the first countries in the world to have experienced a chemical attack in a public mass transit setting (the Tokyo metro sarin attack in 1995). As indicated by Interviewee #34, Tokyo “is a very big area, maybe around 50-to-70-kilometre radius and the total number of population is around 38 million, and 80% of the people use public transport and there are 90 lines and over 1.500 stations in that area”. “There are stations where 1.7 million customers transit daily”.

To respond to the challenge of large and congested metropolitan areas, the railway and other public transport operators in Japan (around 200 operators, most of them private companies, among which about 30 major ones) developed very tight and divided cooperation with the first responders in much smaller local areas.

“[At Japan East Railways] we have 12 branch-offices, and each branch office has to connect, communicate with a lot of fire departments. Each branch [of the railway company] will cooperate with its local fire department.”
(Interviewee #34, Japan)

“We don’t have a direct contact with them [the railway police], but on local level we collaborate, we cooperate with them for preventing terror attack and a chemical attack, and to rescue the victims of the disaster.” (Interviewee #34, Japan)

This cooperation also exists in the rural and more remote areas, despite their lower security risk.

The long distances between the large metropolitan areas are challenging for the railway companies which operate high speed trains and which prepare special measures in case of a disaster or attack, in particular with respect to evacuation:

“High-speed rail has a few stations, from Tokyo to Aomori it takes about 4 hours. The fastest train will stop at 3 stations, so most of the time it’s running and is closed. We have to introduce other measures for high-speed rail than for some metro train because the metro stations are closer (roughly every 2 kilometres) and passengers can evacuate easily. We prepare the evacuation route and we can give a good guide. Drivers in the station staff and the maintenance engineers will support on evacuation of passengers if we have a terror [attack] or something but rural areas and the high-speed rail is quite different.” (Interviewee #34, Japan)

In case of a natural or man-made incident, the railway operators have an open and transparent communication with the passengers and send detailed information via their smartphone App and SMS notification system (the same information which is sent to all the railway staff). Therefore, nowadays “few passengers go to the station staff and the driver in order to get a personal information but maybe 90% or 95% of the passengers can decide their action from our information.” (Interviewee #34, Japan)

Lastly, in Japan there is a strong belief that minor crime and major terrorist attacks are related. In order to contribute to public safety, railway companies have zero tolerance for minor crimes such as graffiti, vandalism or pick pocketing.

“Everything of the minor crime lead to the very big crimes. [...] We don’t operate the train with graffiti or scratching because the passengers are getting worried about that. That’s why we can reduce the very big crime. There are a few minor crimes and reducing the minor crimes is a very important key for prevention of terror attacks.”
(Interviewee #34, Japan)

Lessons learnt in France: The case of the Paris Metro

Some European countries seem to have learnt something from the Japanese experiences, although the examples in the transport sector are scarce and the adoption of good practices is quite recent. In France, the Paris public transport and metro operator (RATP) now have trained people in CBRN and relevant equipment as part of their security division. The preparedness process started around 10-12 years ago after some meetings between RATP and the CBRN cell of the French Gendarmerie which helped realise the importance of this threat.

However, the French public communication strategy on the CBRNe topic in the public transport setting is quite different from the one in Japan and is still focused on the approach in which: “we don’t want to create panic and the simplest way is not to communicate about *Attention! You can have attacks with chemical substances.*” (Interviewee #25, France).

“If we think of the sarin attack in Tokyo, if there is the same happening in the Paris metro next week, nobody will say Oh, it’s probably like Tokyo because there were previous communications saying Attention if you are in the metro and you start having strange symptoms don’t do this, do this, and so on.” (Interviewee #25, France)

The proposed solution is quite straightforward: include slightly more information on CBRNe in the existing security public information campaigns without creating panic but moving away from the outdated “panic myth”:

“In France we have the plan VIGIPIRATE. It could also say that a terrorist attack alert it’s not just explosives or people with a knife or armed people, it could also be something else. We should not create paranoia, but we should have a minimum level of preparedness.” (Interviewee #25, France)

The case of training on dangerous goods in Turkey

From a railway perspective, CBRNe events are not only about attacks on passenger terminals, but also about the safety and security of dangerous goods and hazardous materials which can be transported by rail.

As indicated by Interviewee #45, Turkey operates under a national regulation and the coordination of the Presidential Disaster Management Office (AFAD). This entity coordinates all disasters and decides the responsibilities of the Ministries (e.g. Health, Transport). In turn, the railway company (TCDD) operates under the Ministry of Transport. There is a national regulation on CBRNe. It authorises AFAD for CBRNe scenarios, but this is not the direct responsibility of TCDD. When an incident occurs, TCDD have only the evacuation responsibility. In addition, there is a civil defence unit in TCDD which is involved in response.

There are no specific CBRNe trainings in TCDD but there are well developed trainings on the transport of dangerous goods. In a part of this training programme, disasters such as Chernobyl and Fukushima are mentioned but there are no specific recommendations on CBRNe attacks. Additionally, there are informative signs in the company and other facilities which indicate for e.g. what to do in case of a nuclear attack. As a measure of improvement, Interviewee #45 recommends the inclusion of CBRNe elements in security trainings and dangerous goods trainings.

7.2.5. Organisational level of preparedness for a CBRNe incident

The following section outlines the overall CBRNe preparedness in Europe. It has become apparent that the overall allocation of responsibilities within and between CBRNe organisations is very clear. Furthermore, all identified CBRNe threats are addressed in trainings. The CBRNe-related information material is overall considered to adequately prepare CBRNe responders for their work. The same applies to exercises. Differences were found regarding confidence in the CBRNe equipment. Here, differences between the groups become apparent. However, none of the groups seem to feel inadequately equipped in general. 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, 41.6% of the survey participants indicate a "very high level" or "rather high level" (see Figure 74Att). A further 29.2% of participants assess the level of preparation for a CBRNe incident in their organisation as "medium", and about a quarter (25.5%) of all respondents consider the level of preparedness to be "very low" or "rather low".

Of those practitioners that already experienced a CBRNe incident during their career, more than half indicate a "very high" or "rather high level" of preparedness (see Figure 37). Another 28.5% feel at least moderately prepared. Only 19.0% seem to express a strong wish for improvement. Great differences appear in regard to those respondents that have not yet been involved in an incident. Only 18.7% feel "very or rather" highly prepared to adequately respond to such an incident. While another 29.9% perceive the level of preparedness to be "medium", 27.1% feel rather unprepared.

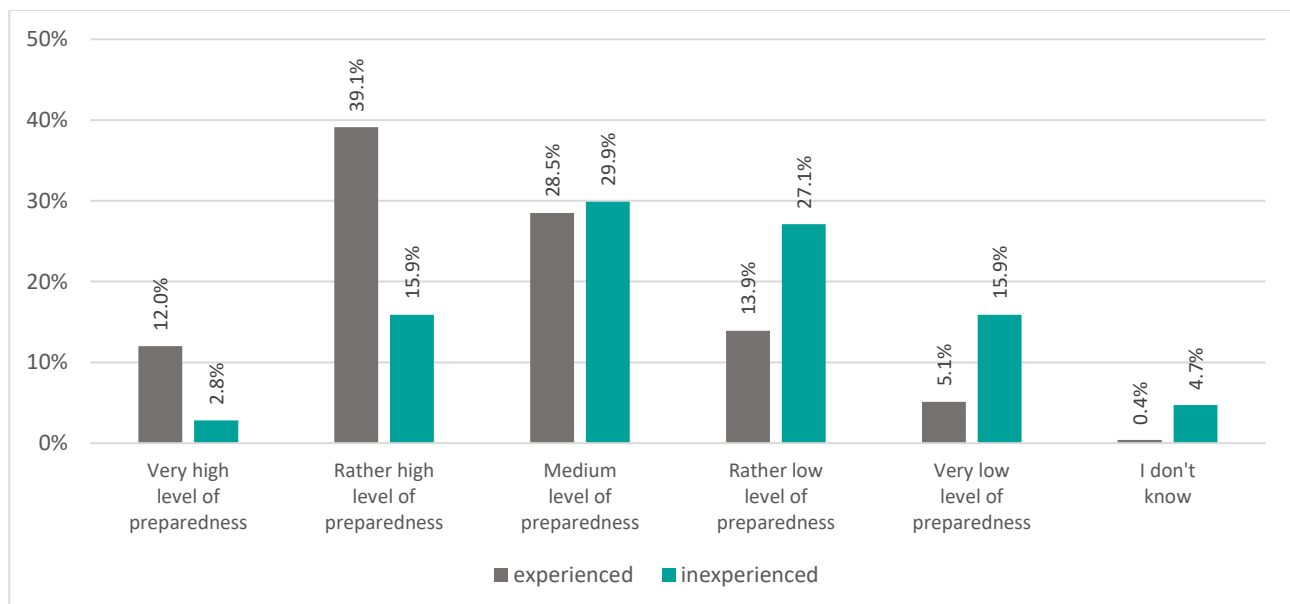


Figure 37: Perceived level of preparedness for a CBRNe incident by experience with CBRNe incidents (experienced n=274; inexperienced n=107)

Similarities emerge in the comparison of European countries (see Figure 38); however, it is noticeable that in Croatia, Cyprus, Ireland and Turkey, a majority of respondents indicated a "rather low" or "very low level of preparedness" for a CBRNe incident. In this context, however, it must be mentioned that the validity is limited due to the low number of cases for Croatia, Cyprus and Turkey.

In Ireland, it must be stated in this regard that a large proportion of the respondents are representatives of a law enforcement agency, who rate the level of preparedness for a CBRNe incident as rather low compared to other professional groups.

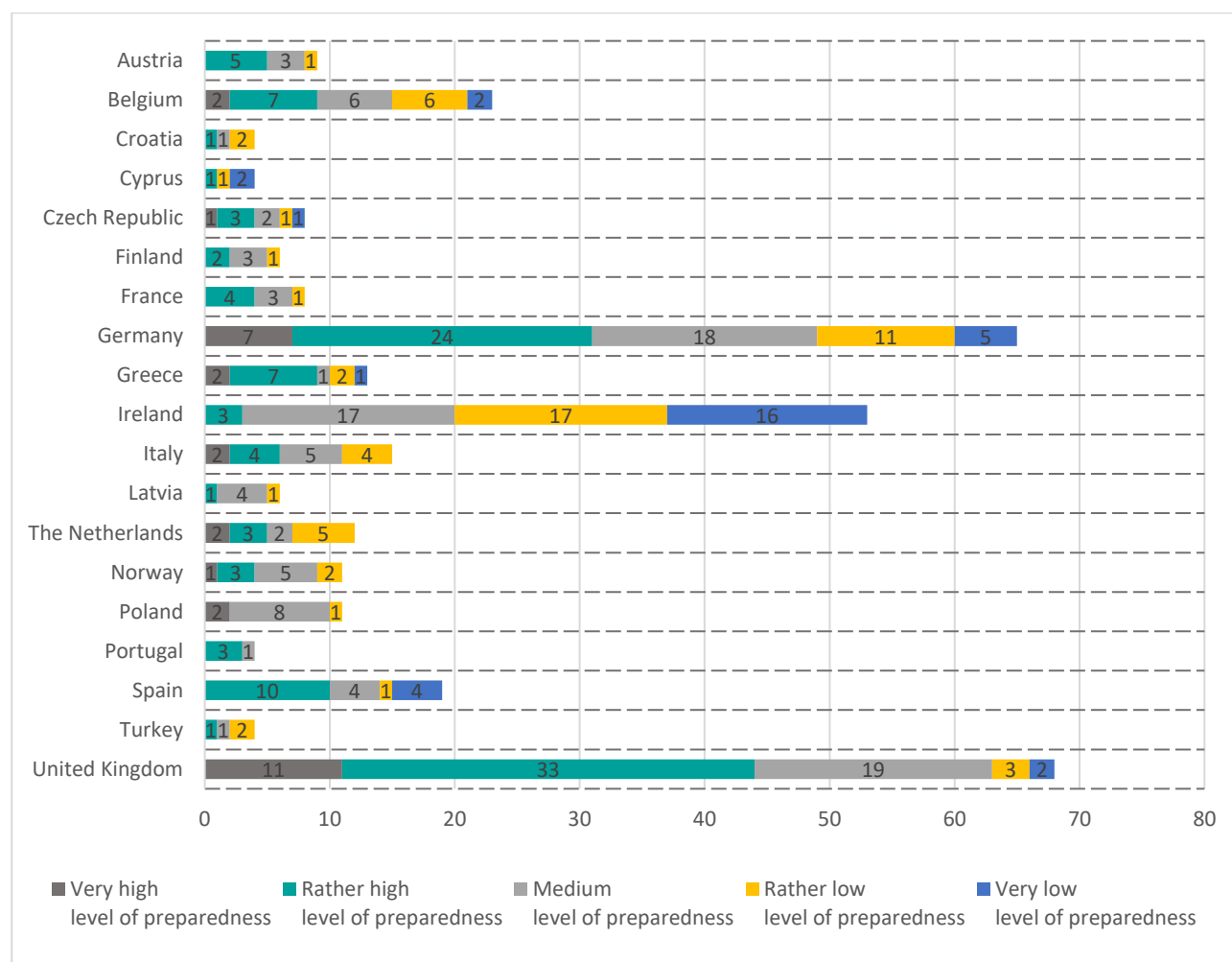


Figure 38: Perceived level of preparedness for a CBRNe incident by country (Austria: n=9; Belgium: n=23; Croatia: n=4; Cyprus: n=4; Czech Republic: n=8; Finland: n=6; France: n=9; Germany: n=66; Greece: n=13; Ireland: n=57; Italy: n=15; Latvia: n=6; Norway: n=11; Poland: n=11; Portugal: n=5; Spain: n=19; The Netherlands: n=13; Turkey: n=4; United Kingdom: n=68)

A comparison of the country groups shows that in the group of EU Member States a higher proportion considers the current level of CBRNe preparedness to be “rather” or “very low” (see Figure 39). In comparison, the proportion in the non-EU group is higher in the “very high level of preparedness” range.

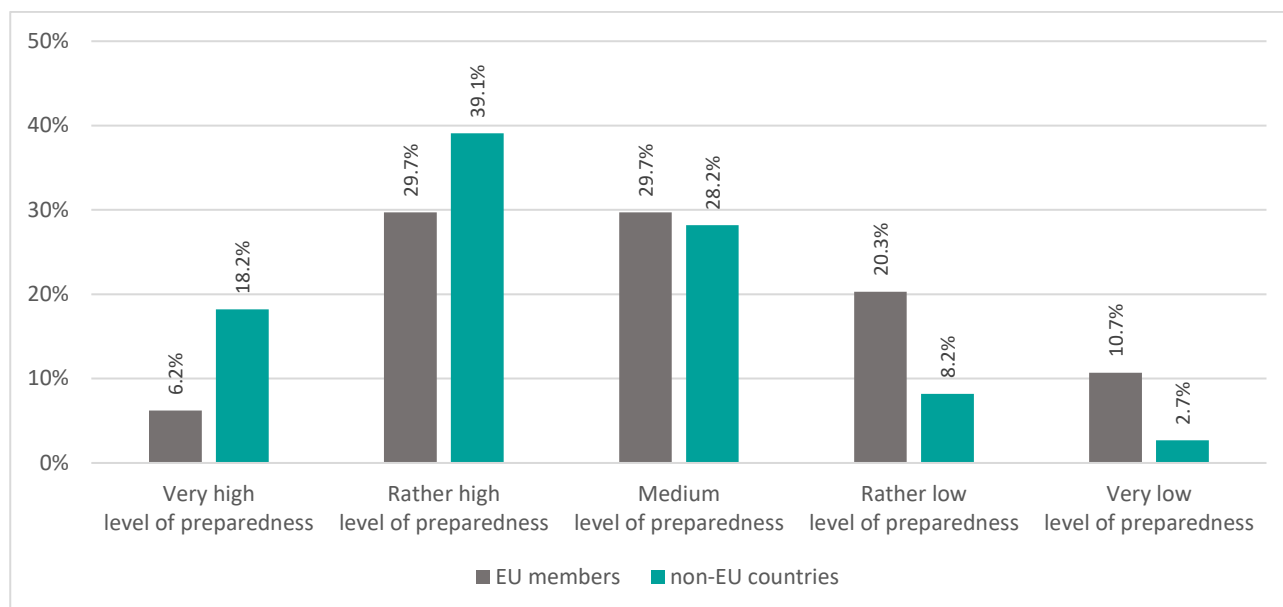


Figure 39: Perceived level of preparedness for a CBRNe incident by country group (EU members: n=290; non-EU countries: n=110)

Looking at the level of preparedness by profession, 55.6% of the surveyed firefighters indicate a "very high" or "rather high level" (see Figure 40). Another 32.1% see a "medium level of preparedness" and only 11.1% a "rather low" or "very low level". In comparison, the assessment for the last two ratings is 25.1% for Civil Protection staff, 26.5% for emergency medical services and 31.4% for LEAs. In general, LEAs seem to feel rather unprepared. Only 32.0% of the respondents indicate a "very high level" or "rather high level". Another 32.0% of respondents rate their preparedness as "medium".

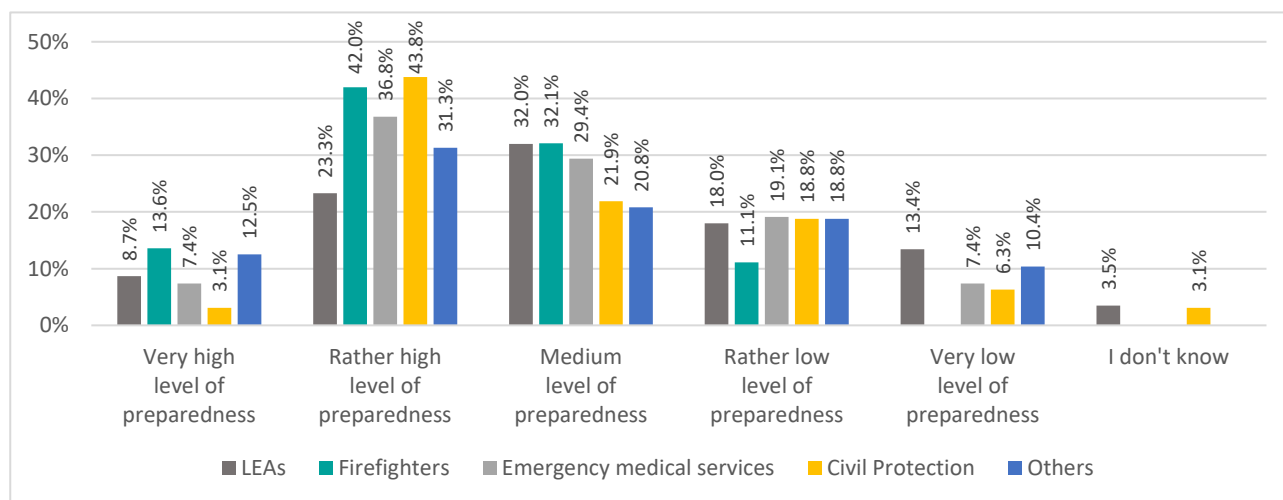


Figure 40: Perceived level of preparedness for a CBRNe incident by profession (LEAs: n=172; Firefighters: n=81; Emergency medical services: n=68; Civil Protection: n=32; Others: n=48)

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 (Table 6).

Table 6: Benchmarking rating of evaluation and capacity building¹⁴

	1 absent/minimal	2 emerging	3 moderate	4 significant	5 outstanding
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 recognize 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.
Belgium					
Cyprus					
Czech Republic					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Portugal					
Romania					
Slovenia					
Spain					
Canada					
Japan					
Lebanon					
Moldova					
Norway					
Turkey					
UK					
Ukraine					
US					

Participants from Germany, Moldova, Spain and Turkey indicated that specific evaluation of CBRNe incidents is rarely conducted in their countries (label “absent / minimal” in the benchmarking matrix).

The interviewee from Moldova (#37) explains that although each agency should have an evaluation plan, there is no written document for training or capacity building. Other participants from Germany and Spain stated at least that there are debriefing protocols after significant CBRNe incidents to identify strengths and weaknesses during the management of the incident (label “emerging”). This

¹⁴ The respondent from Latvia preferred not to select any option in this rating. This is indicated in the benchmarking rating by all options being marked in grey.

classification was also made by participants from Cyprus, Hungary, Ireland, Norway, Portugal, Romania and Slovenia. Similar to Moldova, the lack of clear documents in Cyprus causes problems in the evaluation process:

“Each department and each representative has its own orientation and sometimes it’s very difficult to find a common orientation and a common framework” (Interviewee #20, Cyprus)

It is noticeable that compared to the first two benchmarking categories, more participants gave the rating “absent / minimal” or “emerging”. According to participants from Italy, Japan and Lebanon, debriefing protocols are also used in their countries. However, there are individual SOPs in this framework that take into account the needs of specific vulnerable groups. This approach, however, is not nationally consistent (label “moderate”). One Spanish interviewee also sees a moderate evaluation of CBRNe incidents in his country. He explains that;

“When we attend the national training with the military emergency unit, the last day is the one we take for lessons learnt. [...] In all the training that we make, we try to evaluate what things we do and what things we could have done, that’s continuously” (Interviewee #43, Spain)

Exchanges between different CBRNe units beyond the evaluation of significant CBRNe incidents are taking place in Belgium, Lithuania, the United Kingdom and Ukraine, according to participants. According to the respondents, CBRNe preparedness and emergency management plans as well as SOPs are evaluated periodically in the respective countries (label “significant”). In general, evaluation seems to play a big role in Belgium:

“Every service was around the table at the national crisis centre and we made lessons learnt, we did an evaluation to see how we can manage it and we also made a case study for the different services on first line, how they should do in a proper way when they have a similar incident. We try to make evaluations with the services on the field, at this moment. It’s very important.” (Interviewee #22, Belgium)

Evaluation mechanisms via the national crisis centre were also confirmed by another Belgian interviewee (#21). However, another participant from Belgium saw this less positively (label “moderate”). Participants from Canada and Ukraine see the area of evaluation and capacity building in their country as very positive. According to the participants, there are regular (short time period) evaluation routines as well as evaluation mechanisms after CBRNe incidents to promote institutional learning. CBRNe preparedness and emergency management plans as well as SOPs are regularly updated (label “outstanding”) according to the participants. The same classification was given by participants from the Czech Republic, France, Greece and the USA. The interviewee from the USA (#48) for example explains that in his country, evaluation and capacity building is performed in an all-community approach “to fill capability gaps and help to inform communities” and that there is “very robust after-action review that is conducted following each exercise”. However, other participants from these countries rated the area of evaluation and capacity building as emerging to moderate. This again shows the partially different assessment of participants from one country with regard to the CBRNe management in their country. In France for example there are clear debriefings, but they occur almost always within a single organisation, which explains some of the lower ratings:

“The only interventions we did with other units are gendarmerie units so at the end of an intervention we obviously debrief but it remains an internal debriefing. I suppose that the day we’re going to have a mission with the firefighters we will obviously have a debriefing with them but for now I haven’t seen it.” (Interviewee #25, France).

An interviewee from Norway (#38) points out that it is not so much the evaluation of exercises that makes a difference, but rather the experience gained from previous real operations.

“So there is not much to learn from because you only learn so much from an exercise because an exercise, the whole scenario is really just guesswork compared to the real thing. I do think we have learned quite a lot from the Skripal incident in England. England has really been very forthcoming in sharing their finds. So that is an exception.”
(Interviewee #38, Norway)

Sharing lessons learned among countries appear to be very important, especially for countries in which evaluations in the area of CBRNe management are insufficiently carried out and which lack experience with CBRNe incidents (see Chapter 7.1.1).

Lesson learned

Challenges in applying good practice from other countries

It is apparent from the interviews that many CBRNe practitioners turn to lessons learned and good practice from other countries for inspiration in order to improve their preparedness and response to such incidents. As a Norwegian practitioner shares,

“So, the best examples, best practices [...] we have learned quite a lot from the Skripal incident in England.” (Interviewee #38, Norway)

“It’s better to look abroad and to see what’s working over there.” (Interviewee #23, Belgium)

However, due to the myriad national differences in implementing CBRNe, it is often not possible to directly transpose a good practice example from one country to another.

Another example is Ireland that has turned to the UK example of JESIP (Joint Emergency Services Interoperability Programme). However, a main issue in applying JESIP to Ireland has been the fact that contrary to the UK, Ireland does not have a national fire service.

“...but the fire service, it’s a national service delivered locally. So, we have 26 different authorities delivering in different ways. So, there is not a definitive answer for anything within the fire service” (Interviewee #32, Ireland)

Acknowledging that they do not have to reinvent the wheel, Belgian practitioners have looked towards France for good practice examples. That said, an interviewee from Belgium points out the following:

“But the main difficulty with that one is that we have such a specific situation here in Belgium that it’s not always that easy to just take over their good practices and make a Belgian version of it.” (Interviewee #22, Belgium)

In Spain, they have tested out good practice examples from other countries during trainings and then evaluated whether or not to implement the good practice example.

“[During] our last training with chemical training, we tried one thing that we saw the Portuguese [do], and finally we decided that it was not practical for us to do it like they were doing. We prefer to do it the way we are doing it instead of changing.” (Interviewee #43, Spain)

As such, being able to adapt good practices to each individual country’s situation is key for improving CBRNe preparedness and response.

In the field of evaluation and capacity building, it appears these processes can differ greatly from agency to agency. This is seen, for example, in the interviews with Irish practitioners:

“We do debriefings of all kind of significant incidents, not just specifically CBRNs. So, we would have a good debriefing procedure here in the fire service. We had a chemical incident in the last 12 months and we have involved the Garda and the ambulance in our debriefing system. So, we are trying to push the inter-agency debriefing all the time but not just specifically for CBRNe.” (Interviewee #30, Ireland)

In the area of police, the evaluation process was described less positively. According to an interviewee from the police, there is a lack of both financial and time resources to carry out extensive evaluations (Interviewee #32, Ireland). For the military, a Norwegian interviewee considers the limited personnel and time resources to be the reason for insufficient evaluation measures.

“There is the time issue and the man issue, we are spread very thin. So, we use a lot of resources to organise and then go through with the exercise and then we have to do all the things that we didn’t do in this period and so it’s a find every time that we are not particularly well-equipped to do the debriefing and to really record what we should have done after the exercises.” (Interviewee #38, Norway)

A Canadian interviewee finally points out another important issue related to evaluation and capacity building: The challenge of ensuring that the knowledge acquired actually gets access to everyone and eventually leads to change:

“But definitely, after the exercise there are the debriefing mechanisms that are all put in place, basically every participant has to do a debrief and it’s all accumulated, what went well, what could be improved, what are the best, is there anything that should be changed, and opportunities that we can look at for the future, any policies or procedures that need to be changed. And also the challenges, what were the challenges. I think a big part of it is trying to keep that corporate knowledge, to ensure to keep on continuing. I guess the biggest challenge is implementing it in the framework. That we ensure what we learn gets transmitted to future training, to say this happened and we should review. And then basically make sure that all the participants are aware of the challenges or changes in best practices and to share across and to make sure it’s implemented into the future pattern. So those are, I guess, the biggest challenges, it’s the sharing and the knowledge transfer.” (Interviewee #19, Canada)

Overall, we observe that sharing information and good practices from countries with a high level of CBRNe preparedness to those with a lower level of preparedness is an essential element but is not always a straightforward one. International capacity building programs can play a key role in this process such as the NATO trainings which facilitate the transfer of knowledge and skills from the military into the civil domain and between various countries.

7.2.6. Recognition of vulnerable citizens in CBRNe preparedness

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

Vulnerable citizens in CBRNe-related SOPs

Figure 41 illustrates that more than one-third (33.5%) of respondents who report having CBRNe-related SOPs note that the SOPs do not take into account vulnerable groups. For those SOPs that recognise vulnerable groups, 32.3% of respondents indicate that they focus on children. Other vulnerable groups, such as people with mobility restrictions (30.4%) and older persons (29.6%) are considered to a similar extent. Medium consideration is given to pregnant women (20.4%), people with insufficient skills of the national language (19.6%) and visually impaired people (18.8%). Hearing impaired people (17.3%), people with mental health conditions (16.2%) and ethnic minorities (13.5%) are least likely to be included in the SOPs.

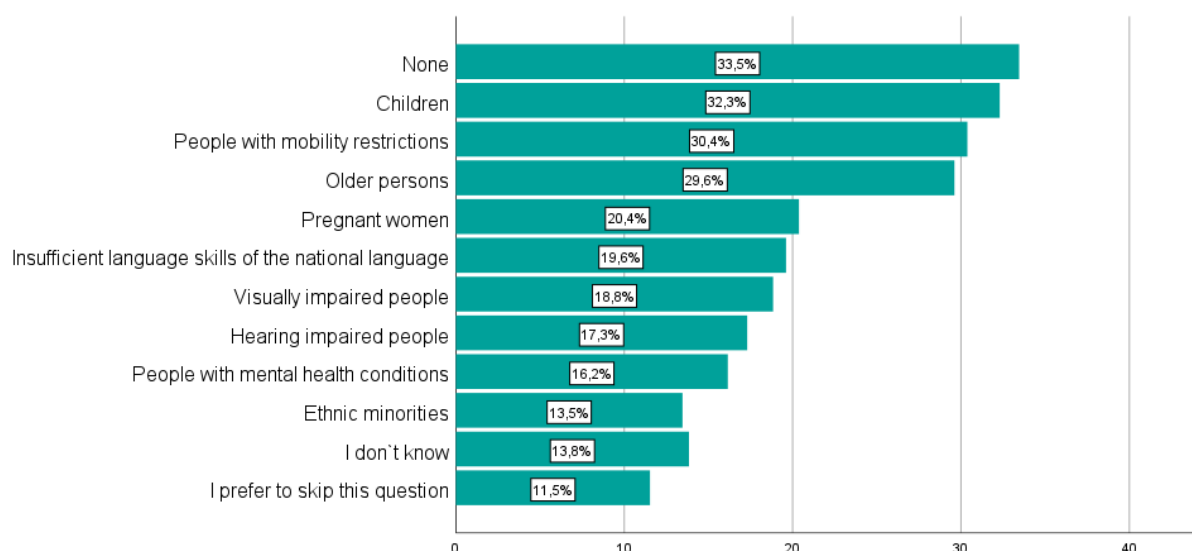


Figure 41: Vulnerable groups considered in CBRNe SOPs of the respondents organisation; multiple selection option (n=260)

A country comparison also shows an unbalanced ratio in the consideration of certain vulnerable groups. In Greece, Ireland, Spain and the UK, primarily persons with mobility impairments, children and older persons are taken into account (see Figure 75Att.). However, a large proportion of respondents from the UK also state that their SOPs do not consider vulnerable persons at all. This is however more pronounced in Austria, Germany and Norway where more respondents indicate that no consideration is given to vulnerable groups. In contrast, Ireland shows similar numbers as the United Kingdom. 48.3% of the respondents in the UK reported that the SOPs consider persons with mobility restrictions whereas this is true for only 11.4% of the German respondents (see Figure 75Att.). A similar picture emerges for the group of children (UK: 41.7% / Germany: 17.1%) and older persons (UK: 40.0% / Germany: 14.3%).

The insufficient consideration of vulnerable groups in security measures for CBRNe incidents is also reflected in the benchmarking rating (Table 7). For example, respondents from Germany, Ireland, Latvia, Lebanon, Moldova, Spain and Turkey indicated that basic security measures for CBRNe

incidents exist in their country, but no specific plans for dealing with vulnerable groups are in place (label “absent / minimal”). Similar statements were made by other respondents from Germany and Spain, who at least indicated that there are planning documents for dealing with a diverse population in general (label “emerging”). The same classification was also made by participants from Belgium, Portugal, Romania, Slovenia and Norway. Participants from Canada, Cyprus and Japan, among others, used the “moderate” label to describe the situation in their country with regard to security measures in the area of CBRNe. Individual SOPs, according to the respondents, take into account the specific needs of certain vulnerable groups, but this is not nationally consistent. The Canadian interviewee (#19) sees especially a lacking in SOPs for exercises where vulnerable people are not necessarily identified. Differences again emerged between respondents from individual countries. While respondents from France, Greece and the UK indicated that SOPs in their country take into account certain vulnerable groups at national level (label “significant”), other respondents from these countries did not share this assessment (label between “absent / minimal to emerging”). One reason for these differences could be that individual respondents are not aware that vulnerabilities are currently considered in single SOPs in their country. One British interviewee (#46) points out that twenty years ago, no one was concerned about vulnerable people in CBRNe management, as the topic of CBRNe developed from the military sector, where generic thinking and homogeneous demographics are more common. In the interviews it became clear that some respondents still have no contact with the topic of vulnerability at all. In addition to respondents from France, Greece and the UK, respondents from Hungary, Lithuania and Ukraine also made the classification “significant”. Respondents from the Czech Republic and the United States, among others, rated the security measures category most positively, stating that there is a consistent consideration of specific needs of vulnerable groups in all national SOPs in the area of CBRNe in their country (label “outstanding”). However, it should also be added here that other participants from these countries made other classifications.

Table 7: Benchmarking rating of recognition of vulnerable people in SOPs

	1 absent/minimal	2 emerging	3 moderate	4 significant	5 outstanding
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 recognize the special needs of a certain vulnerable group; how ever 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.
Belgium					
Cyprus					
Czech Republic					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Portugal					
Romania					
Slovenia					
Spain					
Canada					
Japan					
Lebanon					
Moldova					
Norway					
Turkey					
UK					
Ukraine					
US					

The fact that vulnerable groups are rarely taken into account in organisations' preparedness measures for a CBRNe incident has been further revealed in the interview study. 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)

A Portuguese interviewee (#39) further explained that in his country, there is actually not "this vulnerabilities thinking" and that practitioners usually treat the public as a whole. In the interviews, participants mention only in very rare cases that the needs of vulnerable groups are taken into account to a considerable extent. For Ukraine, 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)

However, challenges were also raised that impede the greater involvement of vulnerable people in SOPs:

"We have SOPs, we think a lot about the victims and we think we don't give enough attention [...] the people disabled, persons for example who are deaf, persons who can't see. [But] We have only 2 options: The normal standard citizen and he can do everything that a normal person can do or you are a victim lying on the ground and you can't do anything. We don't have any in between." (Interviewee #23, Belgium)

Only for the USA, one interviewee sees a strong recognition of vulnerabilities in respective SOPs due to the country's former experiences and the demographic situation.

"Special needs, we have a lot of experience with this, especially when we go with national disasters or other disasters, large scale disasters, we are taken care of this vulnerable, whether it is folks that is, we have aging population" (Interviewee #48, USA)

In regard to the different professional groups (see Figure 42), especially LEAs (40.6%), Civil Protection staff (39.1%) and firefighters (36.1%) indicate that they lack SOPs that consider vulnerable groups. This applies less often to emergency medical services (20.0%). Emergency medical services mostly consider children (48.9%) and people with mobility restrictions (44.4%). Those groups are followed by older persons (42.2%). It is least common for emergency medical services that their SOPs recognise hearing impaired people, people with no or insufficient knowledge of the national language and ethnic minorities (all 22.2%). A similar trend emerges for firefighters, although the percentages are smaller. On the part of the Civil Protection authorities, special focus is also placed on children (34.8%) and older persons (34.8%). In contrast, hearing impaired people (13.0%), visually impaired people (13.0%) and people with mental health conditions (8.7%) are the least likely to be included in CBRNe SOPs. Overall, LEAs are considerably less likely to report taking vulnerable groups into account. Children are mentioned most frequently (22.6% of respondents). LEAs are least likely to report that SOPs consider people with mental health conditions (10.4%) and ethnic minorities (7.5%). Likewise, visually impaired people (13.2%), hearing impaired people (12.3%) and people with no or insufficient knowledge of the national language (12.3%) are rarely taken into account. There is a need for improvement in this respect for all professional groups.

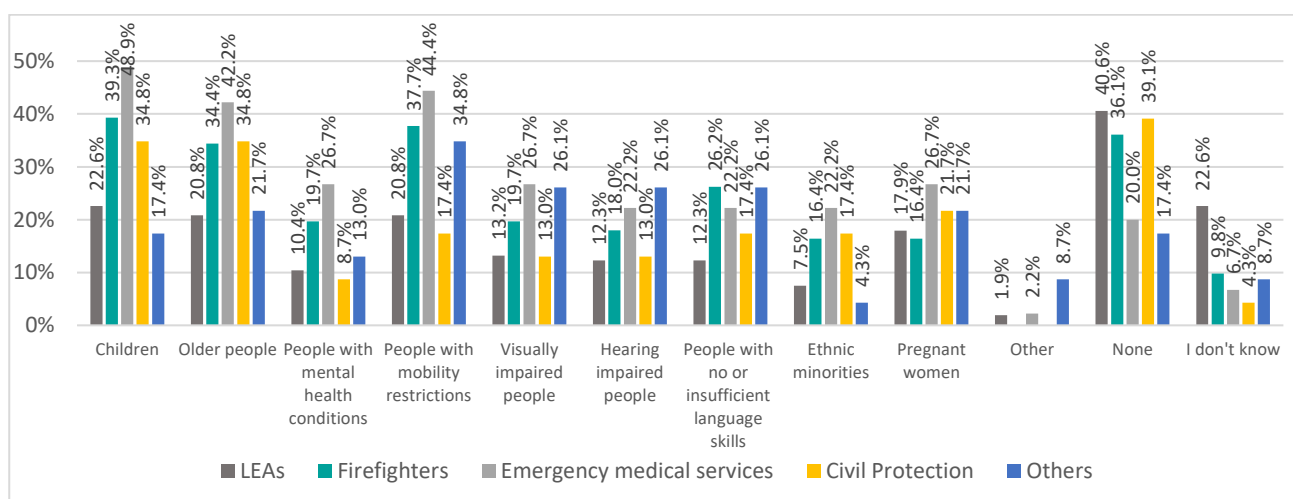


Figure 42: Vulnerable groups considered in CBRNe SOPs of the respondents organisation by profession; multiple selection option (LEAs: n=106; Firefighters: n= 61; Emergency medical services: n=45; Civil Protection: n=23; Others: n=23)

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.

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 (34.0%), the information resources do not consider vulnerable groups at all (see Figure 43). The groups that are most frequently taken into account are again people with mobility restrictions (28.1%), children (28.1%) and older persons (27.7%). 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 (15.8%), people with insufficient skills of the national language (15.5%) and ethnic minorities (9.9%).

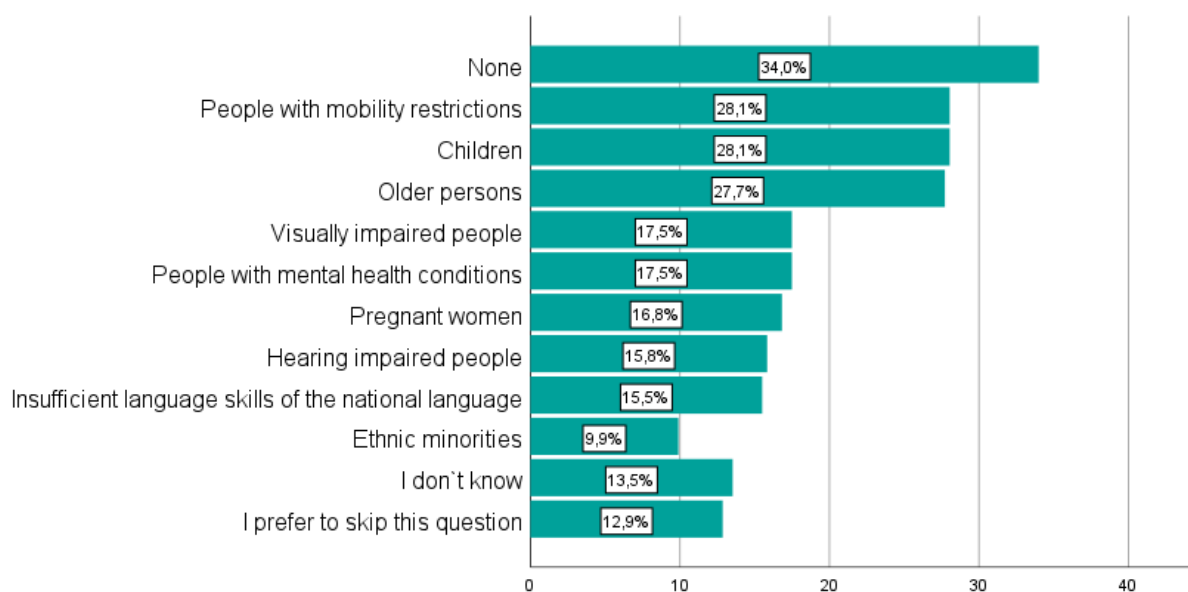


Figure 43: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident; multiple selection option (n=303)

With regard to the country comparison, similar trends can be seen as for the consideration of vulnerable groups in CBRNe SOPs (see Figure 75 and 76Att).

The low consideration of vulnerable persons in information materials is also reflected in all professional groups (see Figure 44). Especially LEAs seem to lack adequate information material. When recognising vulnerable groups, the information material of firefighters, Civil Protection responders and emergency medical services 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.

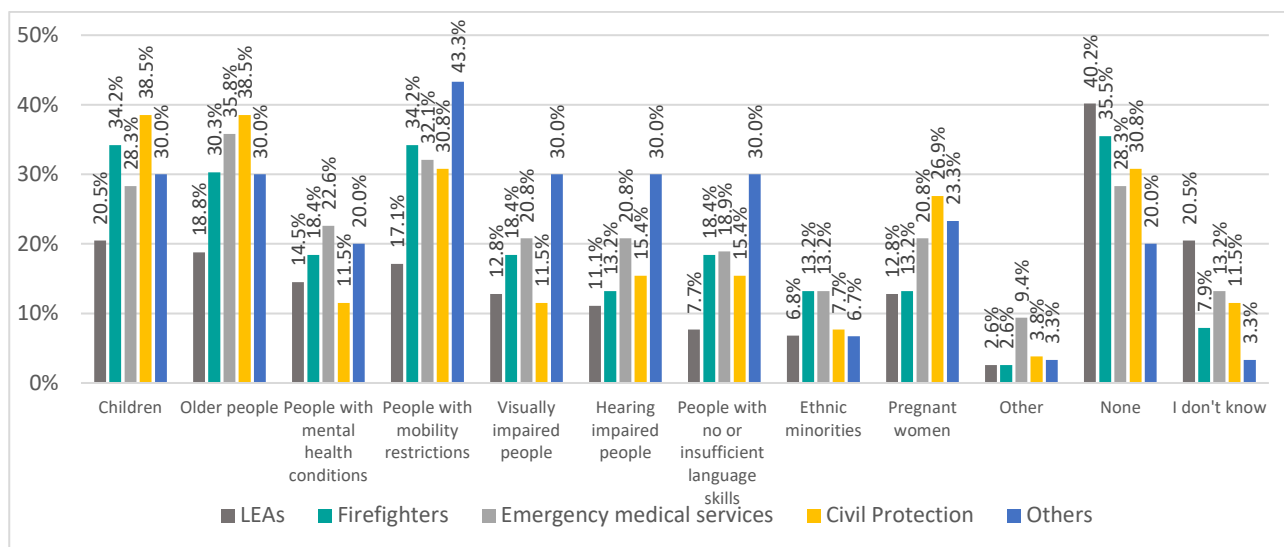


Figure 44: Focus on vulnerable groups in the information resources organisations provide for their personnel to prepare for a CBRNe incident by profession; multiple selection option (LEAs: n=117; Firefighters: n=76; Emergency medical services: n=53; Civil Protection: n=26; Others: n=30)

Overall, in informational materials for CBRNe practitioners to prepare for a CBRNe incident, there should be more focus on vulnerable groups so that the special needs of vulnerable groups can be better addressed in an emergency.

Exercises that focus on vulnerable groups

Apart from adequate information material, awareness can also develop through training exercises. Chapter 7.2.2 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 11.4% of the cases while 10.6% of the respondents further negate any training in this regard. Even less frequently, vulnerable groups are particularly considered in exercises. Only 8.7% of respondents confirm regular training whereas 56.8% 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 picture emerges. Especially in the UK, contact with citizens seems to be an integral part of CBRNe exercises (see Figure 77Att). Almost half of the respondents (45.3%) state that this is a regular part of the training of CBRNe responders and almost one third (30.2%) state that this topic is taught at least from time to time. A similar frequency distribution is found for Spain and Ireland. In Germany, only 5 out of 35 respondents state that they regularly train contact with the public. Another 8 train this topic at least from time to time. However, 10 participants state that the contact is never addressed and 12 participants do not have information on this topic. In Belgium, moreover, none of the respondents indicate that contact with the public is trained on a regular basis. For the other countries, the samples 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 45). The extent of this varies from country to country. 7 of the 53 participants from the UK state that they regularly train CBRNe responders in dealing with vulnerable persons, and another 17 at least argue that their

organisation sometimes addresses this topic in CBRNe exercises. Such training is part of the JESIP model. 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 Belgium, Spain and Ireland. In addition, in Spain and Ireland, it is worth noting that a certain percentage of respondents indicate that contact with vulnerable groups is trained on a regular basis.

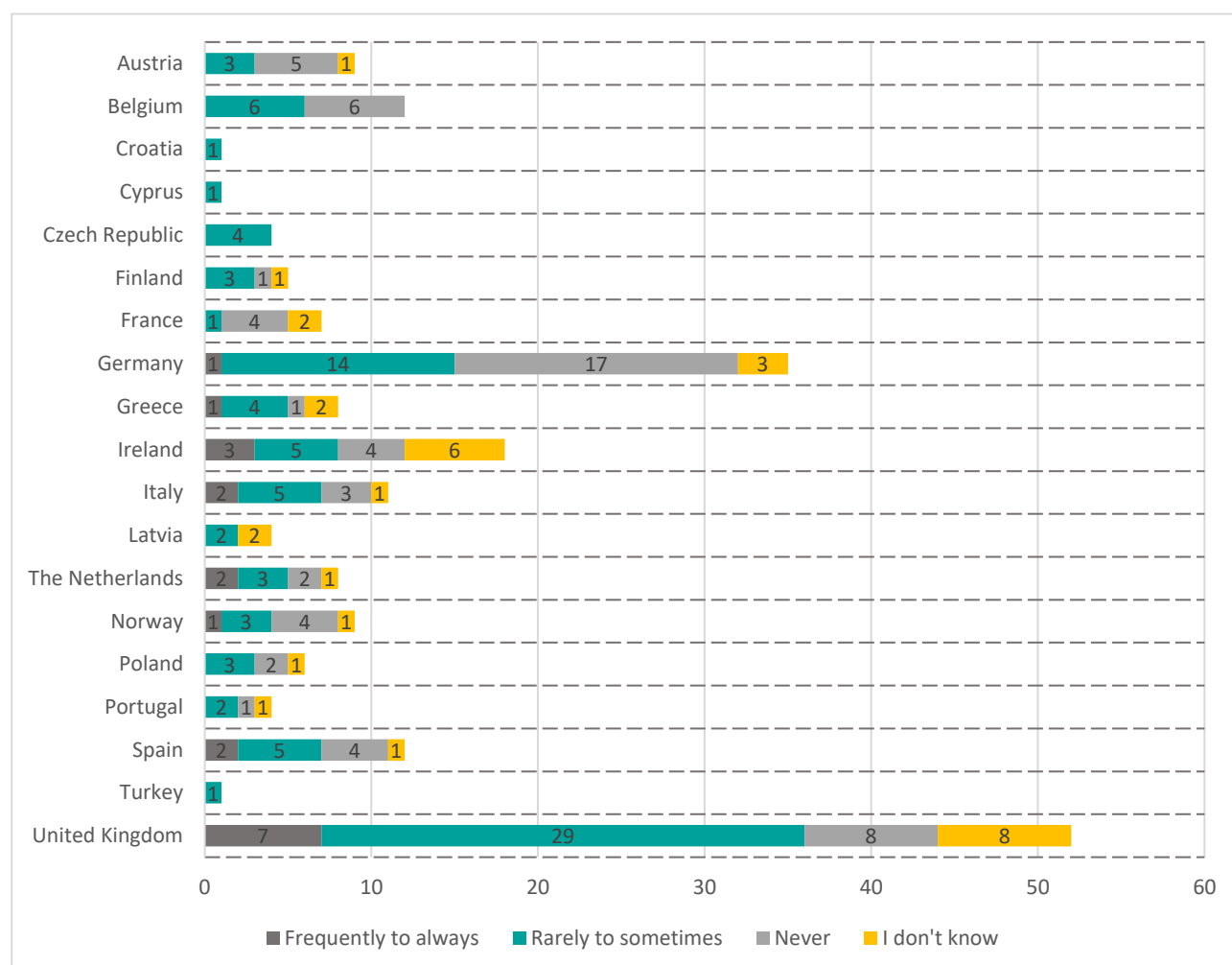


Figure 45: Contact with vulnerable groups during CBRNe exercises involving own organisation in the last ten years by country (Austria: n=8; Belgium: n=12; Croatia: n=1; Cyprus: n=1; Czech Republic: n=4; Finland: n=5; France: n=7; Germany: n=35; Greece: n=8; Ireland: n=19; Italy: n=11; Latvia: n=4; Norway: n=9; Poland: n=6; Portugal: n=4; Spain: n=12; The Netherlands: n=8; Turkey: n=2; United Kingdom: n=53)

Differences also emerge when comparing EU members and non-EU countries. Thus, 11.1% of respondents from non-EU countries indicate that contact with vulnerable groups was "frequently or always" trained as part of the CBRNe exercises in which their organisation had participated in the last 10 years. On the side of respondents from the EU, this percentage is only 7.5%. The difference is even more pronounced for the answer category "rarely to sometimes" (55.6% to 42.8%). A similar trend can be seen for contact with the public during exercises in general (see Figure 46).

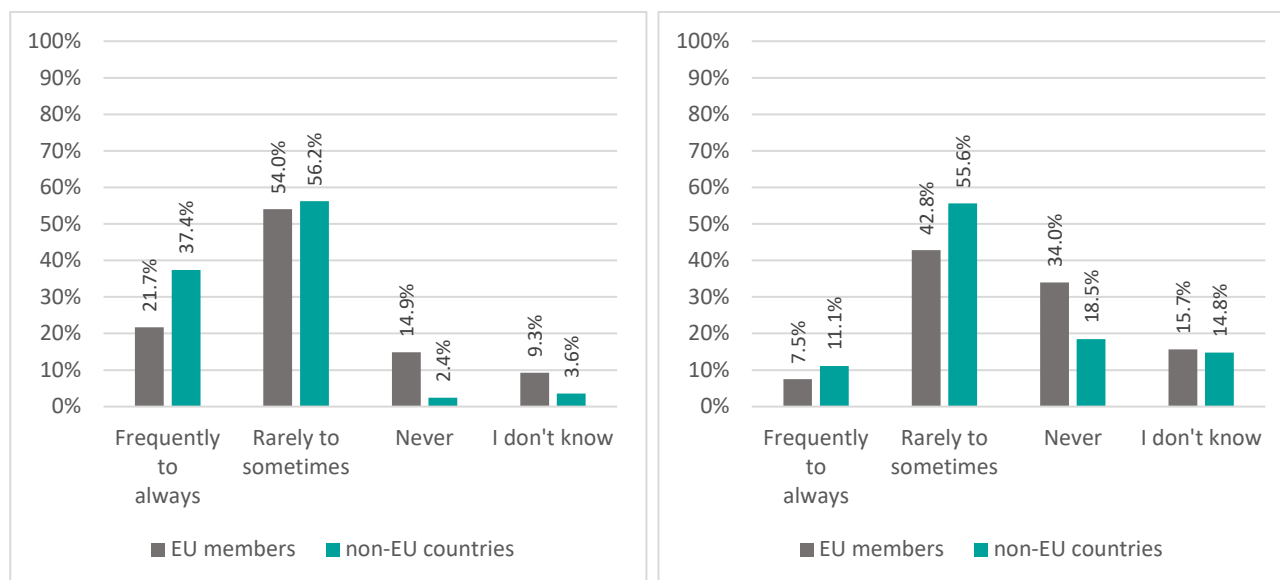


Figure 46: Contact with the public (left) and with vulnerable groups (right) during CBRNe exercises in which respondent's organisation was involved in the last ten years by country group (EU members: n=161/n=159; non-EU countries: n=83/n=81)

A look at the individual professional groups also shows that contact with citizens generally takes place rather irregularly, however, it is important to note that at least 40% of the representatives of a Civil Protection authority state that contact with the public is trained on a regular basis (see Figure 78Att). Between 50-65% of the participants in all professional groups state that they train at least sporadically on this topic. Emergency medical services are least likely to include this topic in CBRNe exercises. Only 18.9% say that it is a regular part of their exercises. The percentage for LEAs (28.0%) and firefighters (27.1%) is higher.

The proportion of participants who deny consideration in CBRNe exercises is much higher with regard to particularly vulnerable groups (see Figure 47). Accordingly, participants from all professional groups only rarely state that this is a permanent component of their exercises. However, 60.8% of the firefighters state that they train contact with vulnerable persons from time to time. This also applies to 50.0% of the surveyed Civil Protection staff, 45.9% of the emergency medical services and 38.9% of the surveyed LEAs.

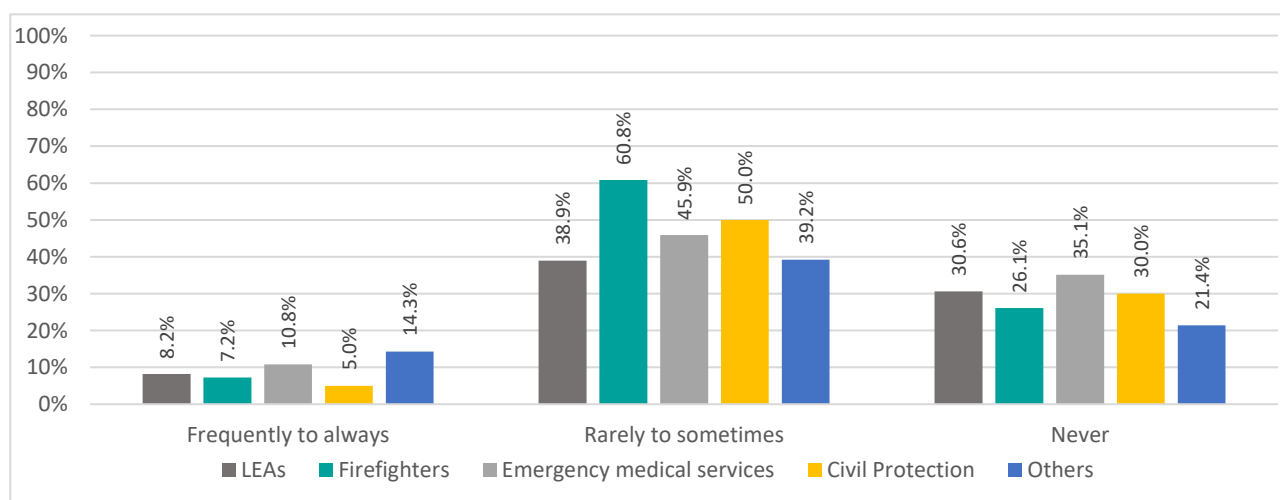


Figure 47: Contact with vulnerable groups during CBRNe exercises involving respondent's organisation in the last ten years by profession (LEAs: n=85; Firefighters: n=69; Emergency medical services: n=37; Civil Protection: n=20; Others: n=28)

Looking at the involvement of the public and in particular the vulnerable civil society in CBRNe exercises, in only 16.1% of cases respondents indicate to regularly include citizens. The proportion is even lower for especially vulnerable citizens (3.1%). Whereas 30.1% of respondents indicate that the public is excluded from CBRNe exercises, 44.7% of the respondents indicate this in regard to vulnerable groups. The country comparison reveals major differences between Germany and the UK. Only 17.6% of UK respondents said that the CBRNe exercises in which their organisation had participated in the last 10 years had never involved citizens. For Germany, this value is much higher at 42.9%. Belgium and Spain have similar numbers as Germany. Comparatively high figures are shown for the UK and Ireland for the response categories "frequently to always". Thus, 27.5% of the respondents from the UK stated that citizens were "frequently to always" involved in the exercises. In Ireland, a quarter of respondents indicated this (see Figure 79Att). Lower numbers are found for the inclusion of vulnerable persons (see Figure 48). Only respondents from Croatia, Italy, and the UK indicated that vulnerable groups were "frequently to always" involved in exercises.

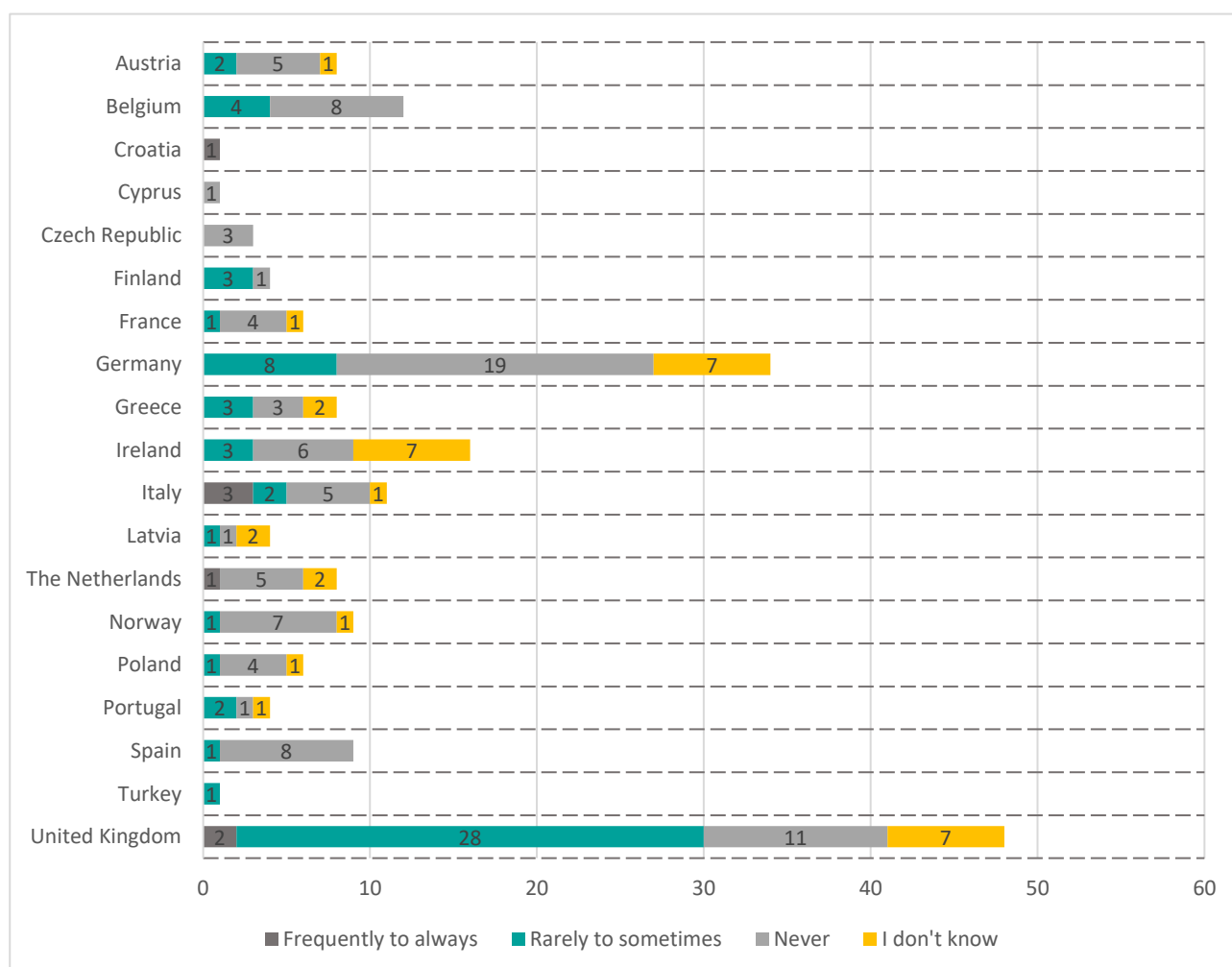


Figure 48: Involvement of vulnerable groups in CBRNe exercises by country (Austria: n=8; Belgium: n=12; Croatia: n=1; Cyprus: n=1; Czech Republic: n=3; Finland: n=4; France: n=6; Germany: n=34; Greece: n=8; Ireland: n=16; Italy: n=11; Latvia: n=4; Norway: n=9; Poland: n=6; Portugal: n=4; Spain: n=9; The Netherlands: n=8; Turkey: n=1; United Kingdom: n=48)

This infrequent inclusion of vulnerable groups in CBRNe exercises is also evident when comparing EU and non-EU countries (see Figure 49). Differences between the groups can be seen in the response category "rarely to sometimes". 53.3% of respondents from non-EU countries indicate that

vulnerable groups have been involved at least "rarely to sometimes" in the CBRNe exercises in which their organisation has been involved in the last 10 years, whereas for the other group this applies to only 27% of respondents. Regarding the general participation of the public in CBRNe exercises, it is striking that a considerably larger share of respondents from non-EU countries stated that the public was "frequently or always" involved in the respective exercises (24.7%, comparative value EU countries: 11.7%).

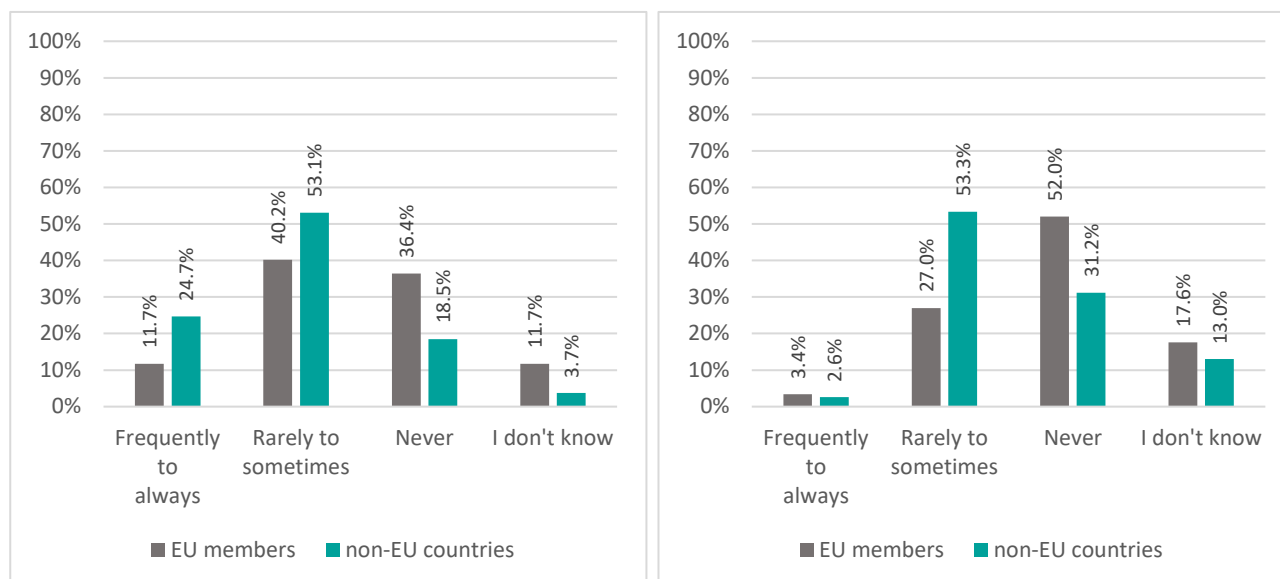


Figure 49: Involvement of the public (left) and vulnerable groups (right) in CBRNe exercises by country group (EU members: n=154/n=148; non-EU countries: n=81/n=77)

The fact that vulnerable groups are rarely involved in CBRNe-related training is also evident in the interviews. There is no involvement of people with special needs and disabilities in trainings and exercises in the Lebanon yet (Interviewee #35, Lebanon). The same statements are made in regard to France, Belgium and Spain:

"This is very simple: absolutely not. Even on an exercise I have never seen somebody arriving in a wheelchair or someone who would be blind or deaf, I never saw one exercise to take this into account. Even at the procedure level I have never seen a line of text saying pay attention to people with mobility restrictions. [...] In France I saw only one time the actual integration of civilian to play the role of the public." (Interviewee #25, France)

"We don't often deploy or interact with the normal civilians. I think that that gap needs to be closed." (Interviewee #22, Belgium)

"In CBRN incidents, at this moment we haven't had a training organised by us including civilians, no." (Interviewee #43 Spain)

In the UK and the Czech Republic, interviewees report that school children are involved in single exercises. In addition, the interviewee from the Czech Republic refers to a programme for older people focusing on behaviour during a CBRNe incident.

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

"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)

In other countries as well, there are occasional approaches to involve vulnerable people:

"They had people within vulnerable groups and they wanted to see how they react to it." (Interviewee #19, Canada)

"We also use actors, civilians in exercises like that, and media." (Interviewee #29, Greece)

However, some interviewees (#26, France; #20, Cyprus; #31, Ireland; #19, Canada) point out that the inclusion of citizens in CBRNe exercises is proving to be problematic due to ethical and confidentiality issues.

"Definitely you have to be careful with the ethical issues. There was the legal requirements of people could actually even get injured or some things can happen that, you know always things happen that you don't expect."
(Interviewee #19, Canada)

"Yes, we tried to do this once but it was very difficult [...] I think it was to get the approvals from high levels, from the strategic level, from ministers and all this to include civilians in this. [...] They think that the legislation cannot cover us to use civilians and disabled people in these exercises" (Interviewee #20, Cyprus)

An Irish interviewee (#31) further adds, that citizens were not included in trainings because of the excessive cost. In contrast to these issues, the interviewee from Lebanon sees the participation of vulnerable people in exercises as just the beginning of what needs to be done:

"I prefer to involve civilians and especially people with special needs, such as deaf, blind people, autistic individuals, and people with Down-Syndrome [...] not only as victims in the drills. We must involve them deeper. [...] They must be involved in the command, in the post-command because they can give advice for first responders on how to deal with their colleagues or whatever during a drill." (Interviewee #35, Lebanon)

A comparison between the categories of CBRNe practitioners also shows that it is almost never stated that vulnerable groups are "frequently to always" included in CBRNe exercises. The percentage for these two response categories ranges from 0 to 10.7% for the professional groups. Half of the respondents from a Civil Protection agency indicated that vulnerable groups were "rarely to sometimes" involved in CBRNe exercises in which their organisation had participated in the past ten years. A slightly lower proportion of firefighter respondents (41.7%), followed by emergency medical services (37.2%) and LEA respondents (34.2%) stated the same (see Figure 50).

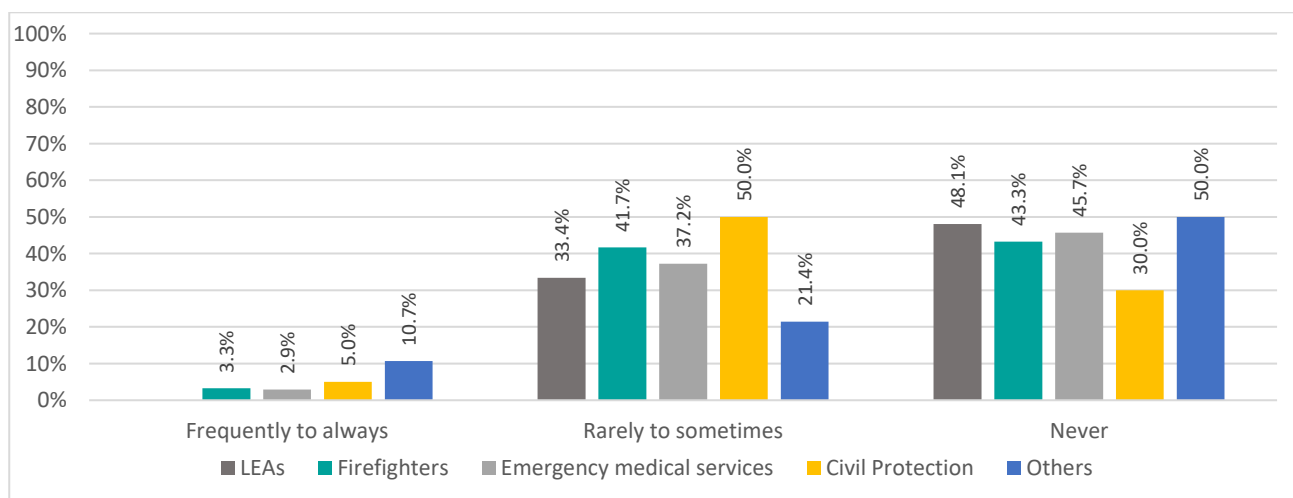


Figure 50: Involvement of vulnerable groups in CBRNe exercises by profession (LEAs: n=81; Firefighters: n=60; Emergency medical services: n=35; Civil Protection: n=20; Others: n=28)

Low numbers are also seen in relation to the general involvement of members of the public (see Figure 80Att). Overall, the proportion of CBRNe responders who report a regular involvement of citizens in their exercises is low across all groups (see Figure 80Att). Civil Protection employees are the most likely to report this (30.0%) and firefighters the least (13.8%). All groups indicate a predominantly sporadic involvement. Here too, Civil Protection employees are in the lead with 55.0%, followed by firefighters (52.3%), LEAs (41.0%) and emergency medical services (40.5%).

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 401 respondents, only 14.5% indicate that their organisation cooperates with such organisations to address CBRNe incidents. The majority of the respondents (47.4%) state that no such cooperation has been initiated in the past. Furthermore, more than one-third of the respondents (34.2%) 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: In addition to specialists in epidemiology and infectious diseases, CBRNe responders can draw on the knowledge 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 firefighters 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 firefighters 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. This cooperation can facilitate engagement with affected members of the vulnerable civil society.

Key Takeaways Chapter 7.2

CBRNe SOPs

- The majority of respondents indicated that their agency has specific SOPs for CBRNe events.

Clarity of responsibilities in case of a CBRNe incident / Inter-agency collaboration

- The clarity of responsibilities within an organisation for a CBRNe incident was rated higher by respondents with CBRNe experience than by respondents without CBRNe experience.
- Most respondents agree that a specific legal framework helps to identify roles and responsibilities, which is key to synergising efforts at the CBRNe incident site.
- A number of respondents indicated that sharing of information between organisations is a significant issue due to legal constraints especially within European Countries.
- The Joint inter-agency service (JESIP) in the UK and the Belgian CBRNe expertise center were identified as good practice examples for inter-agency cooperation in the case of a CBRNe incident.

Education and Training of CBRNe practitioners

- Education is considered a crucial component of an effective CBRNe response.
- The majority of organisations offer exercises / trainings to prepare their staff for a CBRNe incident. Furthermore, briefing notes and online learning platforms are very often used for CBRNe education.
- The focus in the CBRNe materials is primarily on accidents / technical emergencies and on terrorist attacks.
- The respective organisations place different emphasis on the type of events in their CBRNe materials: LEAs with a special focus on terrorism, Firefighters with a special focus on natural hazards and Civil Protection agencies and Emergency Medical Services with a special focus on accidents / technical emergencies.
- Regarding the substances addressed in CBRNe materials, the focus is primarily on chemical, biological and radiological substances.
- The majority of respondents rate CBRNe exercises as extremely valuable or very valuable in preparing their staff for a CBRNe incident.

- It must be noted that exercises are conducted more frequently in areas where there is a higher perceived risk of a CBRNe event.
- The majority of organisations rely on joint-training exercises.
- However, responders indicated a lack of targeted exchanges in the area of CBRNe with neighbouring countries in Europe.
- A large proportion of responders stress the importance of joint or (inter-agency) exercises (developing mutual acquaintance, sharing skills, equipment and coordination strategies).

Equipment for a CBRNe incident

- Existing / required CBRNe equipment is very dependent on the following:
 - Professional capacity or organisation (especially firefighters operate in the hot zone of a CBRNe incident)
 - Type of material involved (chemical substances, biological substances, etc.)
 - Location (site of event)
- Firefighters in particular rated their organisation's CBRNe equipment as completely sufficient or rather sufficient, whereas this proportion was lowest in the case of LEAs surveyed when comparing the professional groups.

Cooperation approaches

- A majority of respondents indicated written cooperation agreements between their organisation and other organisations (LEAs, Fire Brigades, etc.) for major emergencies.
- Cooperation is a significant mitigating factor as organisations depend on each other especially in life/death type events such as a CBRNe incident.
- Respondents deem cooperation is very beneficial but it is acknowledged that inter-agency rivalries in a small number of countries impact on the collaborative approach at a CBRNe event.

CBRNe preparedness / Evaluation and capacity building

- Almost half of the respondents rated the level of CBRNe preparedness of their organisation as very high or rather high.
- In particular, respondents with CBRNe experience and Firefighters rated their organisation's level of preparedness for a CBRNe incident as very high or rather high.
- In the area of evaluation and capacity building, there are major differences between the countries under review. For example, several respondents (for example the respondent from Canada) stated that comprehensive evaluation measures are taken in their country as a result of a CBRNe incident in order to prepare for future CBRNe incidents. In other countries, such as Germany, this is less pronounced.
- Some respondents indicated that comprehensive evaluation mechanisms are problematic due to financial resources and time constraints.
- Often organisations draw on experiences / lessons learned (e.g. Skripal incident) from other countries. However, respondents pointed out the problem that lessons learned can sometimes not be transferred 1:1 from one country to another due to country-specific conditions.

Recognition of vulnerable citizens in CBRNe preparedness

- Only rarely are the needs of vulnerable groups addressed in CBRNe SOPs. Similar results are shown for CBRNe materials provided by response organisations to prepare their staff for a CBRNe event.
- In general, the study findings indicate that citizens are not segregated into different groups, some of whom may require special or additional attention and focus such as vulnerable citizens. This may be a result of responding agencies focusing primarily on the event and treating all victims homogenously.
- When the needs of vulnerable groups are considered in CBRNe SOPs, the needs of children, people with mobility restrictions and older people are most often addressed. Very rarely are the needs of people with visual impairments, hearing impairments, people with mental health conditions and ethnic minorities taken into account.
- The online survey showed that there is a greater focus on vulnerable groups in the UK (CBRNe SOPs) than in other countries.
- Contact with the general public is rarely trained in CBRNe trainings. For vulnerable groups, this is even less often the case. However, a number of countries do proactively engage with vulnerable groups, the UK is a good example.

- Contact with the public is most likely to be practiced in training sessions conducted by Civil Protection authorities.
- The inclusion of the public in CBRNe trainings was described as problematic by some respondents due to ethical and confidentiality issues.
- Only rarely do respondents confirm collaborations between response organisations and organisations representing vulnerable groups to address the issue of CBRNe incidents.

7.3. CBRNe response across Europe

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

7.3.1. Security measures in case of an assumed high risk of a CBRNe incident

In case of an assumed high 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.

Joint threat assessment

Depending on the initial situation for the threat (accidents/technical emergencies versus terrorist attacks), 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. But it is possible to make statements about the extent to which threat assessment in individual countries is characterised by a common approach of different CBRNe actors. The benchmarking categorisation as part of the interview study revealed different approaches.

According to the participants in the benchmarking rating, in some countries, such as Moldova¹⁵, Portugal and Turkey, the threat assessment in relation to CBRNe incidents is not characterised by a joint assessment undertaken by different CBRNe practitioners. While basic early warning systems and monitoring strategies to identify CBRNe incidents are in place to inform local CBRNe practitioners, there are no protocols for inter-agency threat assessment at the local, regional, and national level. A joint response to a CBRNe incident is characterised more by a reactive nature and is not based on a national threat assessment (label “absent/minimal”, see Table 8). However, another respondent from Portugal stated that there is at least a general common threat assessment in some parts of the country. A Portuguese interviewee (#40) further explains that although there is a general inter-agency threat assessment, this is only the case for regions with critical infrastructures. Therefore, the threat assessment is assessed to be inconsistent at regional and national level (label “emerging” in the benchmarking matrix). The same classification was given by respondents from Cyprus, Hungary and Lebanon. Moreover, the Norwegian benchmarking participant confirmed ongoing joint threat assessment and monitoring at the local level in Norway (label “moderate”). In other countries, such as Belgium, Germany, Ireland, Lithuania, Romania, Spain and the USA, respondents indicated this for the regional level. However, the threat assessment is inconsistent between different regions (label “significant” in the benchmarking matrix). Again, it should be noted that other respondents from some of the above-mentioned countries rated the issue of threat

¹⁵ For Moldova, the interviewee (#37) states, that no threat assessment is done officially for CBRN risks.

assessment in their country completely differently. For example, respondents from Belgium, Germany, Ireland, Spain and the USA selected the label “absent/minimal”.

Table 8: Benchmarking rating of (joint) threat assessment

	1 absent/minimal	2 emerging	3 moderate	4 significant	5 outstanding
L1 (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.
Belgium					
Cyprus					
Czech Republic					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Portugal					
Romania					
Slovenia					
Spain					
Canada					
Japan					
Lebanon					
Moldova					
Norway					
Turkey					
UK					
Ukraine					
US					

Other respondents from Spain, Lithuania and the USA gave an even more positive assessment. According to their assessment, their country is characterised by a nationally uniform threat assessment with regard to CBRNe incidents. Moreover, according to the respondents, protocols exist for inter-agency cooperation in the area of CBRNe threat assessment that encompasses the perspectives of subnational and national entities in the area of CBRNe (label “outstanding”). The interviewee from the USA (#48) explains that “especially following incidents like 9/11 there is a renewed focus in these areas, so from national standpoint we have a very uniform, generic threat assessment. A lot of information sharing between jurisdictions and the federal government organisations”. In addition to respondents from Spain, Lithuania and the United States, respondents from Canada, the Czech Republic, France, Greece, Italy, Japan, Slovenia, the UK and Ukraine made this classification. However, there is a disagreement between two French participants. According to

the interviewees #26 and #27, France has a very good joint threat assessment regarding CBRNe incidents. Different authorities involved in CBRNe are responsible for the threat assessment. According to interviewee #26, not only the local level, but also the regional and national levels are involved in threat assessment. It is striking that all respondents from the UK selected the label “outstanding”. In summary, it can be mentioned in this context that countries striving for a uniform joint threat assessment on a national level can learn from good practice examples such as the United Kingdom.

Lesson learned

Geographical aspects of CBRNe threat assessment

One aspect that many CBRNe practitioners considered very important when performing CBRNe threat assessments is the geography of a given country. Factors to consider include the size of the country, regional differences, urban and rural settlement patterns; even neighbouring countries can be important in this regard. As a practitioner from Cyprus puts it,

*“We are a small island, so the regional and the national level is actually the same due to our size.”
(Interviewee #20, Cyprus)*

For other countries, regional differences play a main role in CBRNe threat assessment and response. As a Norwegian practitioner explains,

*“We have 2 main rescue centrals that coordinate all major accidents, we have one in the South and one in the North.”
(Interviewee #38, Norway)*

Japan is another country which has a regional approach to threat assessment, similar to Norway, whereby each region has “quite [a] different profile,” (Interviewee #34, Japan). The profile reflects the proximity to the sea, the different climatic conditions, the altitude and other factors that recognise the diversity of the elongated country. Further to this, when assessing CBRNe threat levels, the threat assessment in Japan also takes into account how populated a given area is, as a Japanese practitioner explains,

“I think we have 2 types of surroundings. Metropolitan life is so congested [...] and a regional rural area is quite different. So, measures for preventing a terror attack and to rescue the victims is quite different.” (Interviewee #34, Japan).

Lastly, another aspect that some countries have taken into account is the critical infrastructure both at home and in neighbouring countries.

(Joint) alert systems and coordination approaches

Following the detection of an assumed high 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 a unique publicly known emergency number (e.g. 112 in Germany). Additionally, in some countries, the police have their own emergency centre, such as the National Police Coordination Centre in Spain (Interviewee #12, Spain).

Good practice example

Coordination centres for threat assessment

Some interviewees mentioned dedicated coordination centres for CBRNe incidents. For example, in the UK, a national CBRNe Centre provides advice and guidance to all emergency services when necessary and is available 24 hours a day, 365 days a year (Interviewee #15, UK). Similar CBRNe Centres were also mentioned for Norway (Interviewee #38), Cyprus (Interviewee # 20) and Belgium (Interviewee #21, #22). One Belgian interviewee (#21) described the threat assessment as sometimes problematic because Belgium, like Germany, has a federal structure. Therefore, the coordination unit for threat assessment, CUTA, enhances the joint threat assessment by bringing together different services:

“In Belgium we have a national coordination centre, CUTA, the coordination unit for threat assessment, where the different services work together and it’s really a platform, a good environment. We have spent a lot of efforts and time in specifically threat assessment.” (Interviewee #22, Belgium)

According to the interviewee, the CUTA stays in close contact with the already introduced CITRA to enhance the overall threat assessment of CBRNe incidents:

“So, there are two ways of doing threat assessment. There is one on the national crisis centre itself [CITRA] on the critical infrastructure and protection of soft targets, for instance, and they do threat assessments on civilian level on a national level. And then we have the other side, purely terrorist related threat assessment with CUTA. It’s really a well-working organisation. We have a lot of meetings together, so it’s really good for all the risks in Belgium.” (Interviewee #22, Belgium)

Such an approach is also applied in non-EU countries such as Canada:

“On institutional level or government level we have the Canadian Integrated Terrorism Assessment Centre, which does threat assessments of any kind of special events” (Interviewee #19, Canada)

This demonstrates a strong added value for the establishment of such Coordination Centres.

In addition to CBRNe centres that deal specifically with this kind of incidents, there are also approaches to integrate individual CBRNe practitioners into the threat assessment system.

Good practice example

Inclusion of CBRNe practitioners in threat assessment system

In Ireland, dedicated CBRNe dispatchers are situated alongside the general emergency dispatcher (Interviewee #8, Ireland). A similar approach was found in Canada:

“The Antiterrorism Advisory Committee of Montreal [...] informs the civil security, the unit in charge of the public safety even during non-criminal events in the city. Just to be prepared if anything ever happens, they are embedded within the command center and basically maintain the service in coordination of all the services. And in the command center for example they work on the flow of information, including things like transporting dangerous material, evacuation, even of the city in the event of a crisis, the deployment of police officers” (Interviewee #19, Canada)

According to a Greek interviewee, Greece even goes one step further; to identify CBRNe threats, there is a specialised CBRN unit based in different agencies:

“Actually, there are CBRN teams among agencies, like in the army or the fire department or general secretariat for public health. Each one has a specialised CBRN unit.” (Interviewee #29, Greece)

This was also emphasised by another interviewee from Greece (Interviewee #28, Greece). Such an integration of CBRNe experts can facilitate the identification of CBRNe incidents and enhance the quick implementation of further dedicated CBRNe measures, especially in cooperation with CBRNe Centres.

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 CBRNe events. This three-stage system divides assumed threats into the categories “basic”, “moderate” and “advanced”. According to the respective stage, the equipment and the level of action of the fire brigade can be adjusted (Interviewee #2, Czech Republic). A three-stage categorisation is also mentioned for Germany (Interviewee #5, Germany) and the UK (Interviewee #14, Interviewee #15). If the threat level changes, the security 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). A similar statement was found in regard to Cyprus:

“As you can imagine, each service has its own perspective and its own procedure and its own point of view regarding to threats.” (Interviewee #20, Cyprus)

The interviewees from Norway and the UK especially 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 7.2.1 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 further CBRNe response. In Ireland, the Irish interviewee explains, CBRNe dispatchers have specific 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 Ukraine (relevant response and evacuation plans) (Interviewee #18, Ukraine). The interviewee from Latvia #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 their own instructions. A German interviewee (#5) introduces dedicated flowcharts created according to the expected security level and threat category (small, medium 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 explored ways to harmonise these SOPs on a European level (Gavel et al. 2021).

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).

(Joint) Mobilisation approaches

Another aspect of early response is the reinforcement of the emergency services for CBRNe response. The quantity and quality of the responders (see especially Chapters 7.1.1, 7.1.2 and 7.2.2) 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 firefighters. This is our major challenge now. In a state of major crisis, our volunteer firefighters 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)

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 from 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 7.2.4). 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 of these experts depends strongly on the nature of the 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) in order to meet the necessary self-protection standards, and to correspond to the unfolding tasks to be completed.

The better the selected equipment meets the identified security level, the more likely the CBRNe responders will trust it (see Chapter 7.2.3). 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 7.2.3.

7.3.2. Key tasks of CBRNe response

The interviews show that CBRNe practitioners perform a broad variety of tasks in CBRNe response. In particular, LEAs undertake lead coordination, containment and evacuation of affected citizens, detection of CBRNe agents, criminal investigation, crime scene investigation and ensuring of public order and safety. Firefighters and emergency medical services complement the CBRNe response, covering key tasks of disaster control (e.g. firefighting, rescue, triage, decontamination, technical assistance, recovery) and on-site medical treatment. Depending on the different allocation of responsibilities among European countries and the nature of the CBRNe event regarding agent, trigger and location, different stakeholders are involved to perform those key tasks. In this regard, other organisations can be involved such as public transport operators, rail stakeholders or infrastructure managers if the attack occurs in railway environments or specialised units trained for specific CBRNe agents.

“So each stakeholder has a different background. For example, the Lebanese Red Cross and the Ministry of Health are better in injuries than the Lebanese armed forces. So each one has its role.” (Interviewee #35, Lebanon)

Nevertheless, the responsibilities of certain professional groups can overlap, making it hard to distinguish certain responsibilities among different professional groups. Therefore, it is not possible to provide an in-depth overview of the key tasks performed by LEAs, firefighters and emergency medical services in the different European countries at this point. A more detailed examination of SOPs that focus on CBRNe incidents was conducted in PROACTIVE Deliverable D2.4 (Gavel et al. 2021). In the following, the general approach of CBRNe responders across Europe will be presented in order to understand the above-mentioned key tasks and the respective responsible stakeholders. In this context, general differences and commonalities will be identified.

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 phase, CBRNe responders will define the hot zone of the CBRNe incident and create a cordon in place as quickly as possible.

Respondents 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). One British interviewee also stresses that other units are involved in threat assessment including local authorities (Interviewee #47, UK). For other countries such as Germany, interviewees further indicate the possible involvement of specialised CBRNe laboratory units that are part of some professional fire brigades, the German railway or research institutes such as the Robert Koch Institute (#4, #5).

The technical possibilities for detecting certain agents also differ between European countries. An interviewee from Poland illustrates 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 was mentioned (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.

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 can be one or two kilometers. Additionally, the perimeter has to be adjusted (Interviewee #8, Ireland). The interviewees do not reveal major differences in the set extent of the hot zone. Regarding citizens 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).

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. There are varying degrees of police responsibility. Whereas in some countries the police assist evacuation, in countries like Norway the police are the main responsible agency for evacuating people (Interviewee #38, Norway). In Spain the responsibility can change: in general, the local police are responsible for evacuating people, locking down buildings and detaining people inside. But the agency in charge of evacuating is the fire brigade (Interviewee #43, Spain):

"If people have no problem, police is going to evacuate them but if there is any kind of problem with them because they are for example have a broken leg, or they are blind, it is firemen, who are going to evacuate these people, not us"
(Interviewee #43, Spain)

Criminal investigation and crime scene investigation

Besides the detection of the agent, LEAs are engaged in the criminal investigation and the prosecution of suspects that may have caused the CBRNe incident (Interviewee #9, Latvia).

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

Ensuring public order and safety

One interviewee stresses the importance of measures to ensure public order as a key task of LEAs in CBRNe response. Alongside the already mentioned site containment, these measures include regulating traffic in the perimeter of the hot zone. This key task is also primarily the responsibility of the LEAs. None of the interviewees explicitly mentioned the involvement of military units.

Medical treatment

Medical treatment is seen as a major key task undertaken by emergency medical services. 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 focused on 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.

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). Scientific research suggests that the decontamination of hazardous contaminants is mainly in the responsibility of firefighters, special trained emergency medical services 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, disrobing, decontamination and the subsequent after-care, a range of CBRNe response management strategies exist that are not necessarily 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 sectors, greater harmonisation should be implemented (Gavel et al. 2021).

Good practice example

Animal decontamination SOP

In France, the Gendarmerie Nationale developed a decontamination protocol for canine units. If needed, this SOP can be also applied for dog pets or guiding dogs of blind persons:

“Regarding pets, one of my colleagues developed a decontamination protocol for the dogs, which originally wasn't planned for the blind people dogs but it's done for sniffer dogs. But we have a decontamination protocol for animals. Then, obviously, if we are on the spot and we observe a guiding dog of a blind and the firefighters don't know what to do with it then we can handle it. It's what we call “situational intelligence”. The same colleague should have further developed this protocol for horses because we also have the republican guard which is mounted. Finally, it hasn't been done but he should have continued with it.” (Interviewee #25, France)

More interestingly, they had the initiative to extend the SOP to larger animals such as horses, a project which was not finalised. This is the only example of this kind that we encountered during this study.

7.3.3. Communication with the public

Especially after September 11, 2001, crisis communication experienced a rapid boom (Glik, 2007). 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. 2018). 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 between three different types of communication¹⁶: **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. **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, **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 are 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 practitioners 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. For relevant findings on crisis, disaster and continuity communication in scientific literature, looking particularly at CBRNe incidents, see Rubin et al. 2012 and Ruggiero & Vos 2015.

The report focuses on risk communication in regard to a high level of 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 the media in disseminating information, the provision of further information material and the subsequent assessment of the effectiveness of overall communication with the public.

¹⁶ On the subject of risk communication, see, among others, Lundgren & McMakin 2013.

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 404 survey participants, 73.5% indicate that their organisation has a communication strategy for major emergencies. In contrast, 9.7% of the respondents negate this and 13.4% of the respondents state that they are unaware of such a communication strategy. The interview study also revealed that even if there is a strategy, it is not always known and applied:

“There is a communication strategy but it’s not really practiced and there is a lot of people who know nothing about it”
(Interviewee #38, Norway)

An important proportion of the online survey respondents (29.3%) further state that their organisation does not provide information resources to the public on how to deal with a CBRNe incident (see Figure 83Att). However, not all organisations need a communication strategy for the public, since not all are equally involved in 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)

“But we as CBRN unit we don’t have any protocol to deal with blind people or people who doesn’t hear or things like that because we are not in charge of working with them.” (Interviewee #43, Spain)

In this respect, one interviewee from Germany explains that the long distances of his unit to the hot zone mean that they no longer have any contact with the people affected after their arrival. He further stresses the clear division of responsibilities between communication tasks and response tasks (Interviewee #4, Germany).

In some countries, there is a very narrow and specific way in which communication is performed, particularly linked to the risks associated with nuclear power:

“Honestly in this area the only communication that I see is really very specific in particular for the people who live close to a nuclear power plant. In a specific range they have documents explaining what happens during a specific alarm sound, etc. Other than that, I have never seen distributed documents.” (Interviewee #25, France)

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 the event of a crisis, successful communication can only be achieved optimally through a networked and coordinated information policy. 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 firefighters 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 of an 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). In Greece, "the only one who is authorised about communication for a CBRN incident is the general secretariat of public protection, not even the army, not the fire department or the police officers" (Interviewee #29, Greece).

Also, the Latvian interviewee (#9) refers to a specialist of the public relations 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 of 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, 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 is 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.

Communication strategies in case of a high-level risk of a CBRNe incident

Regarding the communication strategy applied in the situation of an imminent threat, 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 high 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.

An interviewee from Poland 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)

Some interviewees still regard TV and radio¹⁷ 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; #9, Latvia; #11, Poland; #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. 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, according to the interviewee.

Besides the traditional alarm channels, modern mobile devices are widely distributed throughout the population in many parts of the world, especially Europe. 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 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 (9.3%) indicate that their organisation uses mobile applications to inform the public (see Figure 83Att). Those responders who already experienced a CBRNe incident during their professional career more often indicated that their organisation is using mobile apps to inform the public about a threat

¹⁷ 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.

situation. Whereas 11.9% of CBRNe practitioners in this group indicate the use, only 3.8% of respondents with no operational experience do so (see Figure 51). Looking at the different professional groups, firefighters most frequently involve mobile apps in their communication strategy: 16.3% of firefighters, 10.6% of emergency medical services, 9.4% of the Civil Protection staff and 4.7% of the surveyed LEAs make use of apps (see Figure 52). Regarding the provided content regardless of the communication channel, by the individual professional groups, emergency medical services are least likely to provide pre-incident information (28.3%) whereas the organisations of 56% of the Civil Protection staff surveyed, 54.1% of the firefighters and 49.6% of the LEAs surveyed provide such information (see Figure 51). 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 citizens with relevant information (Interviewee #5, Germany).

Good practice example

Mobile applications & SMS – Different notification systems in and beyond Europe

Both mobile apps and SMS are used in order to send warnings to citizens in the case of CBRNe incidents. In Belgium, a mobile application is combined with an SMS notification system. The BE-Alert system is an online system with 2 options:

“You can subscribe and then you can tick the boxes for which regions you want to be kept up-to-date.”
(Interviewee #23, Belgium)

“But, our BE-Alert service has also the possibility to contact people without their being subscribed to the BE-Alert App. So we can send messages or we can do communication towards persons, who are not directly related to our system.”
(Interviewee #22, Belgium)

The system is handled by the fire department or via the police (Interviewee #1, Belgium). For the phone providers, the departments can see who is in the neighbourhood of the sending tower:

“Then they can send a text to everyone within a radius of a kilometre, for example. So we can alert a lot of people.”
(Interviewee #23, Belgium)

This is similar to the Ukraine, France and Poland, who 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)

Further, the interviewee from Norway (#10) indicates that the country is also working on the introduction of an alarm system via cell phones.

In Spain a mobile application is used as a direct communication tool:

“One year ago, we made like a project. 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] and can stay in touch with the police coordination centre 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)

Mobile apps are also being used successfully for CBRNe incidents outside Europe.

In Japan, the national early warning system (J-ALERT) is a system that transmits high-priority emergency information, such as emergency earthquake information, tsunami information or even missile launch information, as soon as possible to the public. In addition, a mobile application has been set up particularly for public transport security, which can network with various agencies.

“In 2011, 2012 we started to deliver smartphone applications and we will give a detailed information to the passengers and on a website we installed. Measures are spread in the station. We will give the cause of the destruction, terror attacks or something and the passenger will have that information and that information is equivalent to our staff, the same information. Now we can deliver the specific information by SMS at the same time.” (Interviewee #34, Japan)

Japan is working to expand the usage of the system, by increasing the number of organisations that receive J-ALERT information, as well as ensuring that areas such as fire departments, town offices and local government offices, public highschoools, hospitals and weather observatories receive information directly.

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 timelines of a CBRNe incident: 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 use of 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.

Communication strategies during a CBRNe incident

A majority of those (75.7%) whose organisations have a communication strategy state that crisis communication during a CBRNe incident focuses on general communication topics (see Figure 81Att). One interviewee explains that the governmental agencies provide some highlights or advice of how to react and confront this situation:

“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 (72.0%) and post-incident information (65.9%). In more than half of the cases, the topics of medical care (55.7%) and decontamination (50.3%) are addressed. In slightly less than half of the cases, the strategy covers traffic information (45.3%). Traffic information is, for example, public information about temporary traffic restrictions after a terrorist attack with CBRNe substances (e.g. deviations, closed roads, closed metro lines). At least half of all respondents across all groups indicate that their organisation provides information on evacuation and post-incident information (see Figure 51).

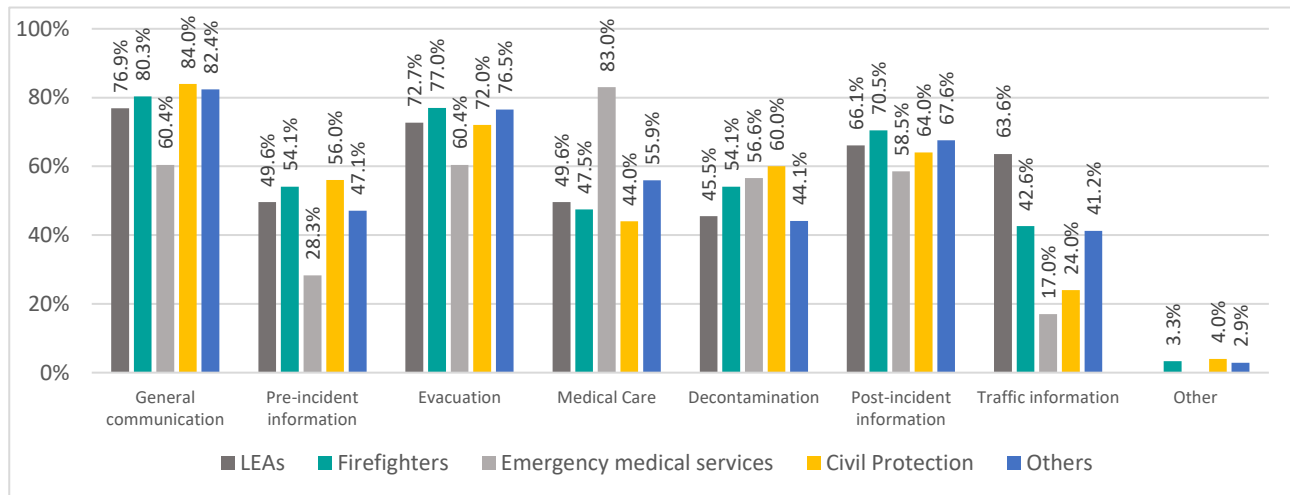


Figure 51: Topics of the organisation's communication strategy for major emergencies by profession; multiple selection option (LEAs: n=121; Firefighters: n=61; Emergency medical services: n=53; Civil Protection: n=25; Others: n=34)

The comparison of the different professional groups partially reflects the joint communication approach which allocates specific content to certain CBRNe practitioners. Information about medical care is predominantly provided by emergency medical services (83.0%), whereas information about evacuation (72.7%) and traffic information (63.6%) are mainly considered by LEAs as part of their key tasks (e.g. public order).

The communication strategy is reflected in the information resources provided to assist the public in coping with a CBRNe incident (see Figure 82Att). 86.1% of the survey participants whose organisations provide related information resources state that these resources cover general information on CBRNe. In addition, 61.3% of the respondents indicate that the information resources address the issue of evacuation during a CBRNe incident. In slightly less than half of the cases, information resources address the topics of medical care (45.9%), decontamination (44.8%), post-incident information (40.7%) and pre-incident information (38.1%). Less frequently, traffic information (24.2%) is taken into account in the information resources. It is interesting to note that while individual professional groups indicate that they pay attention to certain topics in their overall communication strategy, these topics appear to be covered less frequently in the related information material (see Figure 52). However, the trends among the groups still apply.

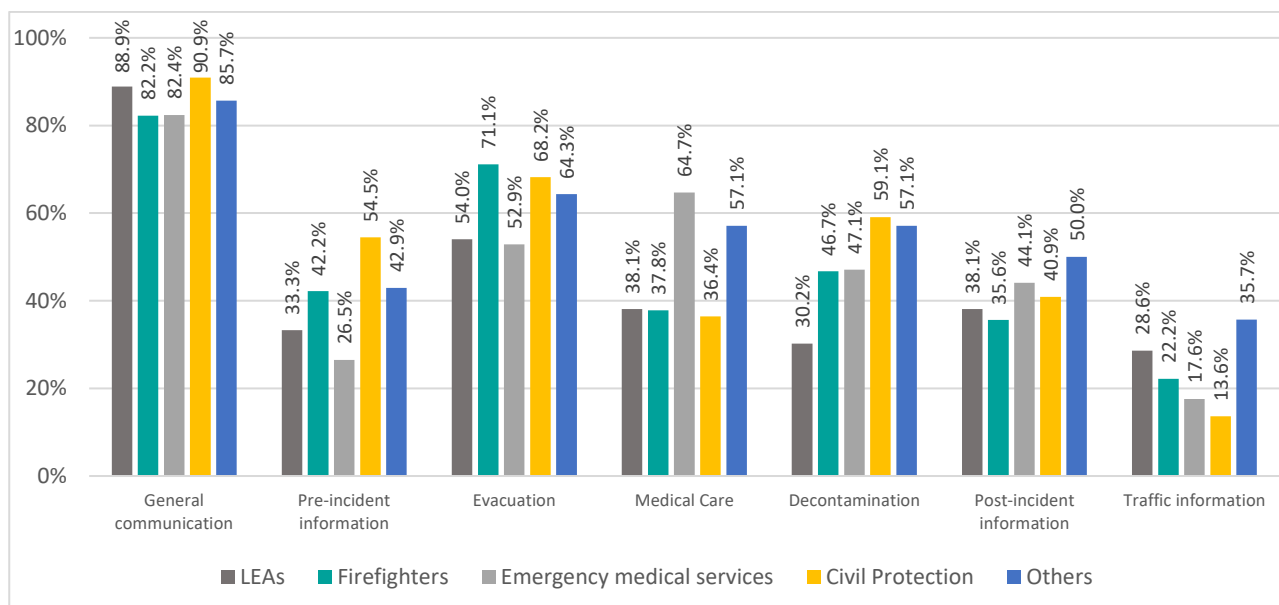


Figure 52: Topics covered in information material for the public on coping with a CBRNe incident by profession; multiple selection option (LEAs: n=63; Firefighters: n=45; Emergency medical services: n=34, Civil Protection: n=22; Others: n=28)

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 of and not only 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 does not work since not everybody can be reached at once. 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. Furthermore, not all members of the public actively participate in the communication process to the same extent, such as children or homebound older people. Those hard-to-reach members of the public should be considered in communication strategies. Since some regions will have higher or smaller rates 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.

The role of the media in communication with the public

As far as public relations are concerned, the media are of great influence in today's world. Arguably, one of the most promising ways of assessing crisis communication 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 (e.g. Neuner et al. 2019, Reissová et al. 2018) 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 members of the public often assess the event based on the information the media provide. They rarely 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. Therefore, a dedicated spokesperson must be assigned during and following an incident that is present on the media.

“You know, journalists are everywhere, social media is everywhere. However, there is no spokesperson. A lesson learnt from Beirut for example, I have seen after the blasts, ministers talking on TV and politicians talking. In many countries no one believes these people. So, the spokesperson must be a technical person, to speak with the population because they focus more on it and they trust it more than politicians.” (Interviewee #35, Lebanon)

According to the interviewee, this person should not necessarily be in the media for long hours, but should have a brief frequent presence to be continuously visible. He further states that in his country efforts are now underway to fill this gap. A similar advice was found in the interview with a Norwegian practitioner in regard to the over- and under reaction of media communicators:

“I think also in my advice to my politicians and my leaders we need to give the correct information and we need to not treat it as a 3rd World War, which is often the case with CBRN, because an over-reaction is just as dangerous as an under-reaction because it stops whole society and it induces so much fear and panic kills.” (Interviewee #38, Norway)

As a consequence, the media play an important dual role for CBRNe practitioners: They communicate trust-building information and at the same time maintain trust by giving information. However, one interviewee points out that parts of the media are not part of the solution, but a problem, because their reporting is focused on sensationalism (Interviewee #33, Italy).

With the ease and speed of access to the 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. 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 (41.2%), the TV (38.7%), personal contact (28.9%), partner websites (23.2%) and the mail (19.1%) are used much less frequently than digital and social media (see Figure 53).

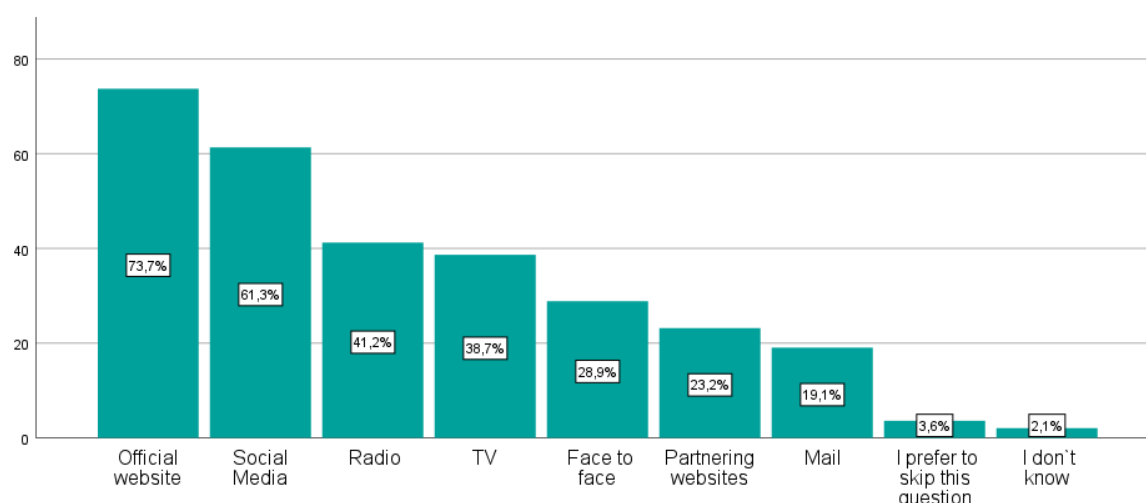


Figure 53: Information channels used by respondent's organisation to disseminate CBRNe-related information to the public; multiple selection option (n=194)

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). Overall, 9.5% of respondents say that their organisations share TV material, and for audio material the figure is 7.0%. (see Figure 83Att). Considering former experience with CBRNe incidents, far more respondents with operational experience indicate the use of TV and audio material: for TV material the ratio is 11.5% to 5.7% and for audio material 8.9% to 1.9% (see Figure 54). For the individual professional groups, the highest value for the response TV material can be found for the category "Others" (this category includes, for example, military personnel and employees of transport companies) (12.5%) (see Figure 55). In comparison, the numbers are lower for LEAs (9.4%), Civil Protection staff (9.4%), emergency medical services (9.1%) and firefighters (8.8%). 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. 73.7% of respondents whose organisations provide CBRNe information to the public say they use their official webpages to disseminate CBRNe-related information. In total, 31.1% of respondents report provision of online material (see Figure 83Att). In the group of operationally experienced responders, this even applies to 36.7%, whereas the number is considerably lower for those who have not yet been involved in such an incident (16.0%) (see Figure 54). In terms of digital information, especially Civil Protection authorities provide material to the public to cope with a CBRNe incident (53.1%). For emergency medical services, this percentage is 36.4% and for firefighters and LEAs, it is 27.5% or 27.1% (see Figure 55). 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).

A mix of traditional media and the Internet offer the most efficient means of quickly disseminating information to a large number of people. Glik (2007) states that during a crisis situation, the use of media sources increases exponentially. For example, immediately after the September 11 attacks, the number of daily visitors to online news sites doubled from 6 million (before the attacks) to 11.7 million (after the attacks) in the United States. 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** (61.3%) are indicated somewhat less often than the organisation's websites to provide relevant information about the current situation (see Figure 53)¹⁸. 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)

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 as compared to traditional communication technologies. One interviewee from Ireland (#8) remarks, that these days social media is very important to get information out to the general public quickly.

There are similar voices in the UK. One interviewee (#15) elaborates that most emergency organisations have relied on 'traditional' methods such as radio and TV broadcast. The interviewee perceives those technologies as much weaker compared to social media. Although the emergency organisations in the UK are still considerably weak, according to the interviewee, 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 the 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)

Overall, we observed that there is not a perfect consensus among practitioners regarding the preferred platforms to communicate with the general public. While some prefer their official websites and social media accounts, others seem to be more focused on traditional media such as the TV and radio. These differences could be cultural or generational, caused for example by the age of the respondents in the study. The key lesson learnt is that any message should be clearly and consistently transmitted across different channels.

¹⁸ On the use of social media during major emergencies, see for example Hornmoen & Backholm (2018); Subba & Bui (2017) and Wendling et al. (2013).

The provision of information materials to prepare for a CBRNe incident and to be informed during an event

The CBRNe topic is largely unknown to the public. According to the interviewee from Lebanon (#35), many do not even interpret simple signs correctly. As previously mentioned, some members of the civil society will have preferences or even special needs regarding the communication design. This includes the use of certain formats like journals, books or TV material to get informed about CBRNe-related topics.

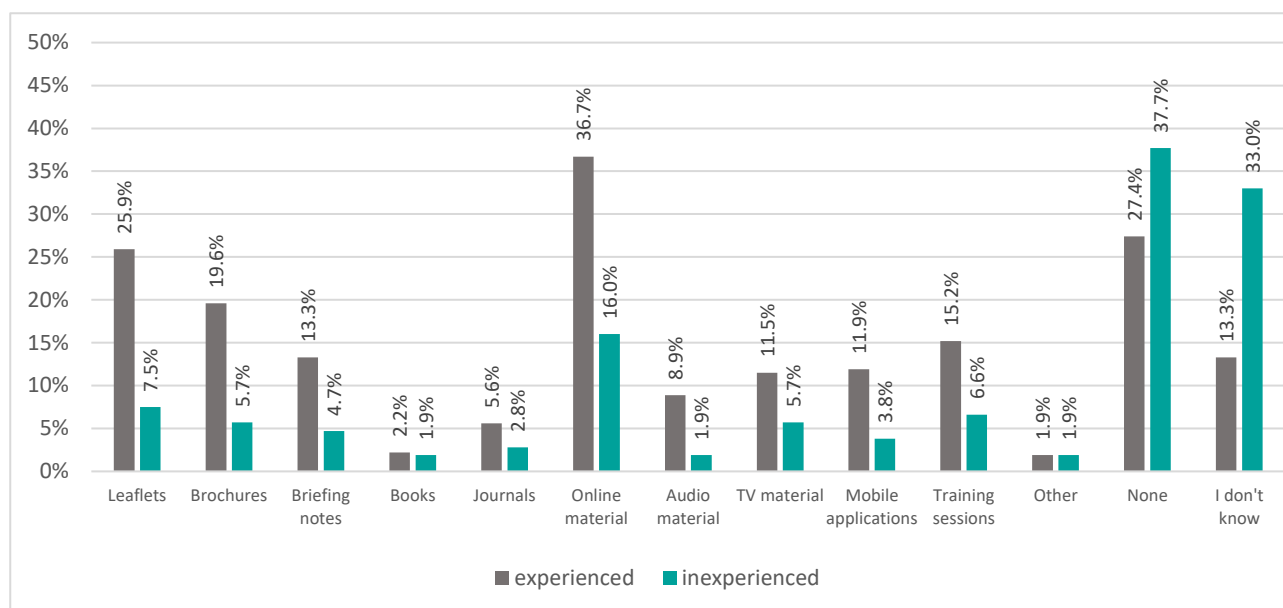


Figure 54: CBRNe-related information resources respondent's organisation provides for the public to cope with a CBRNe incident by experience with CBRNe incidents; multiple selection option (experienced n=270; inexperienced n=106)

In addition to TV, audio and online material, organisations provide mainly **leaflets** (20.1%) and **brochures** (15.8%). Very rarely do organisations offer audio material (7.0%), journals (4.8%) and books (2.3%) with CBRNe-related information (see Figure 83Att). Differences were found among those with and without operational experience (see Figure 54). Thus, for all response categories, respondents with CBRNe experience are more likely to indicate that their organisation provides appropriate CBRNe materials to the public. The difference is particularly pronounced for online material (36.7% to 16.0%), leaflets (25.9% to 7.5%) and brochures (19.6% to 5.7%). But it should be noted that about one third (33.0%) of the online survey respondents with no experience are unaware which information resources their organisation provides to the public to deal with a CBRNe incident.

Differences were also found between professional groups. Especially employees of Civil Protection agencies stated that their organisation provides online material to the public in the area of CBRNe (53.1%). This is less frequently the case for emergency medical services (36.4%), firefighters (27.5%) and LEAs (27.1%). A highlighted position of Civil Protection agencies is also evident in the "brochures" response category. 37.5% of the Civil Protection responders indicated that their organisation provides CBRNe-related brochures to the public, whereas this is true for only 21.3% of the firefighters. The percentage is even lower for emergency medical services (16.7%) and LEAs (9.4%). LEAs were also the least likely to provide CBRNe-related leaflets to the public (14.7%),

whereas Civil Protection responders were the most likely to do so (31.3%). For LEAs, however, it should be added that the percentage of respondents who had no knowledge of whether their organisation provides CBRNe-related information to the public was the highest (31.8%) (see Figure 55).

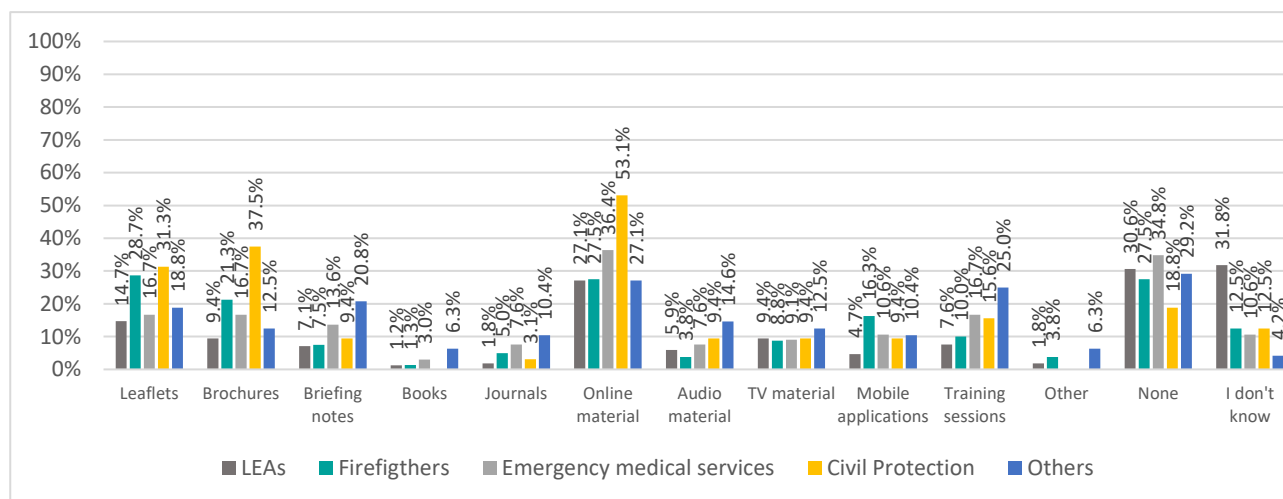


Figure 55: CBRNe-related information resources respondent's organisation provides for the public to cope with a CBRNe incident by profession; multiple selection option (LEAs: n=170; Firefighters: n=80; Emergency medical services: n=66; Civil Protection: n=32; Others: n=48)

Effectiveness of communication with the public

An examination of the attributed suitability of the overall communication strategy for major emergencies reveals that about half of the respondents (42.2%) consider the communication strategy "extremely suitable" or "very suitable" for responding to CBRNe incidents (see Figure 84Att). Furthermore, 37.1% of the respondents perceive the strategy to be "somewhat useful" to respond to CBRNe incidents and only 9.2% of the respondents indicate that they perceive the communication strategy as "slightly suitable" or "not suitable at all". A country comparison also shows that the participants are predominantly "extremely or very satisfied" with the existing communication strategy (see Figure 56). Only in Finland, France, Germany, Ireland, Norway and Poland do less than 50% of the respondents say that they are "extremely or very satisfied" with the communication strategy. However, the smaller samples must be considered with caution. A comparison between EU and non-EU countries does not reveal any major differences.

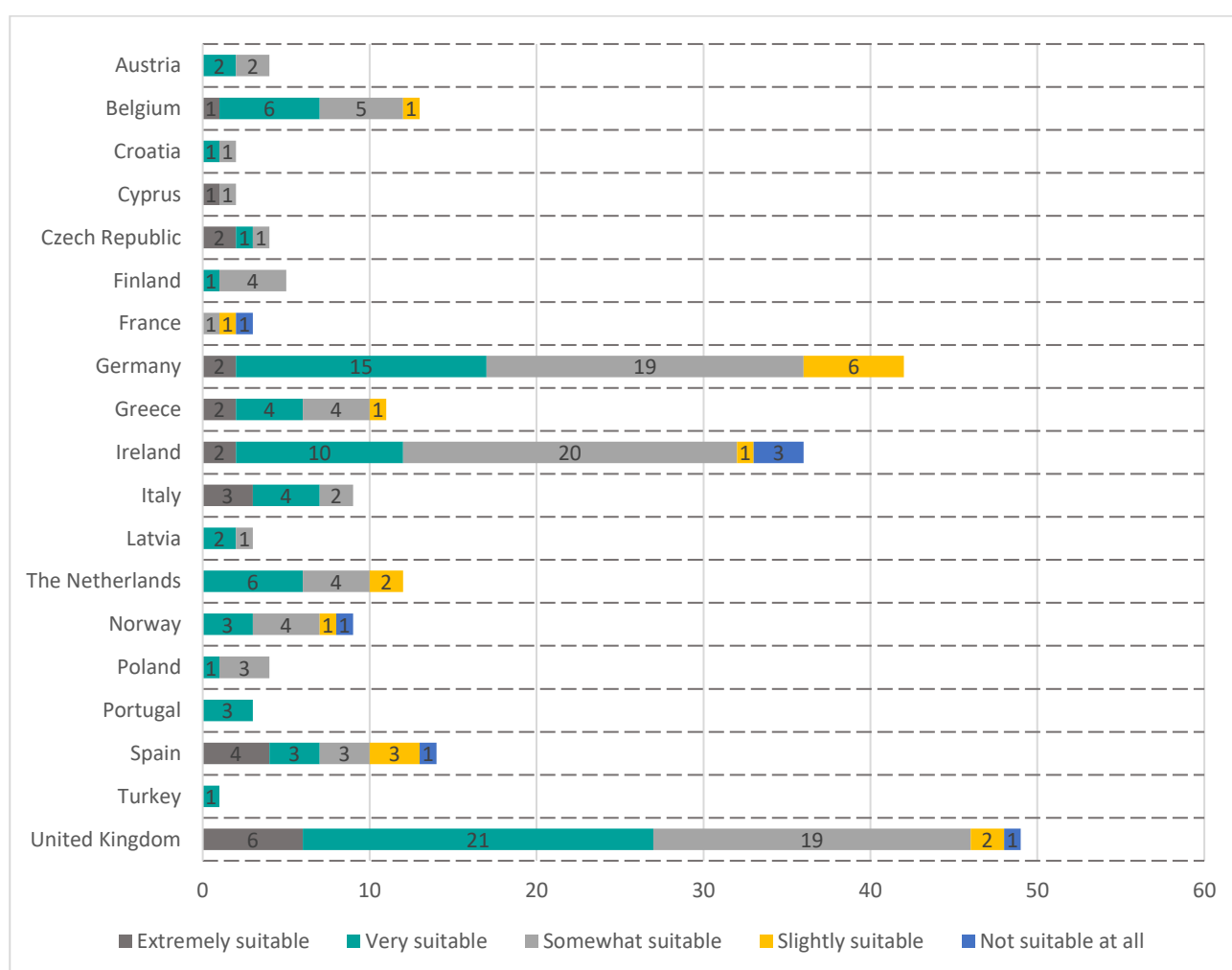


Figure 56: Perceived suitability of the organisation's communication strategy for major emergencies to respond to CBRNe incidents by country (Austria: n=4; Belgium: n=13; Croatia: n=3; Cyprus: n=2; Czech Republic: n=5; Finland: n=5; France: n=4; Germany: n=44; Greece: n=12; Ireland: n=46; Italy: n=9; Latvia: n=3; Norway: n=11; Poland: n=5; Portugal: n=4; Spain: n=15; The Netherlands: n=12; Turkey: n=3; United Kingdom: n=54)

The interview study revealed that some practitioners would like to see more targeted plans for individual CBRNe agents.

“Actually, there is no plan for CBRNe, but there is a plan for mass-destruction events [...], a mass-destruction communication plan. [...] We need a different communication plan because some agents, for example RN agents, they need special treatment. They are very easy when you identify that you have an RN situation, it's very easy to manage it. But it's probably very hard to restore the situation, especially if you have a long half-life.” (Interviewee #20, Cyprus)

Asking respondents to assess the effectiveness of information resources for the public shows that more than a third of the respondents (34.4%) attribute "very high effectiveness" or "rather high effectiveness" to information resources (see Figure 85Att). In contrast, 37.4% of the respondents consider the effectiveness to be "medium" and 15.9% of the respondents classify the effectiveness as "rather low" or "very low".

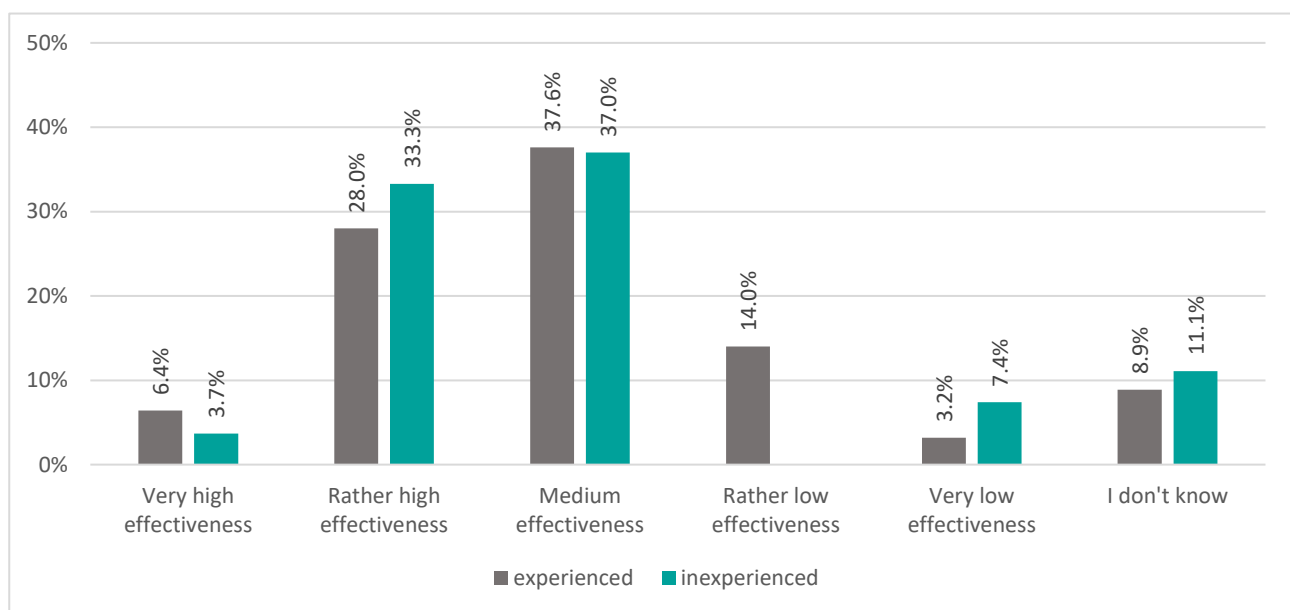


Figure 57: Perceived effectiveness of information material for the public by experience with CBRNe incidents (experienced: n=157; inexperienced: n=27)

Taking into account the experience with CBRNe incidents, no major differences could be found between the inexperienced and the experienced group (see Figure 57). It is striking that in the experienced group 14% of the respondents selected the answer category "rather low effectiveness", whereas this answer category was not selected by any of the respondents from the inexperienced group. In return, however, a larger percentage of respondents from the inexperienced group rated the effectiveness of the information materials for the public to cope with a CBRNe incident as "very low." A country comparison shows that in almost all countries (exception Cyprus) at least 50% of the respondents classified the effectiveness of the information material between "medium" and "very high" (see Figure 58). For the United Kingdom, it is interesting to note that more than 50% of the respondents even rated the effectiveness of the information materials as "very high" or "rather high".

In this respect, it is not surprising that more respondents from non-EU countries (42.9%) indicate that the information material provided to the public is of "rather high or very high effectiveness" to deal with a CBRNe incident compared to the respondents from EU Member States (28.7%) (see Figure 59).

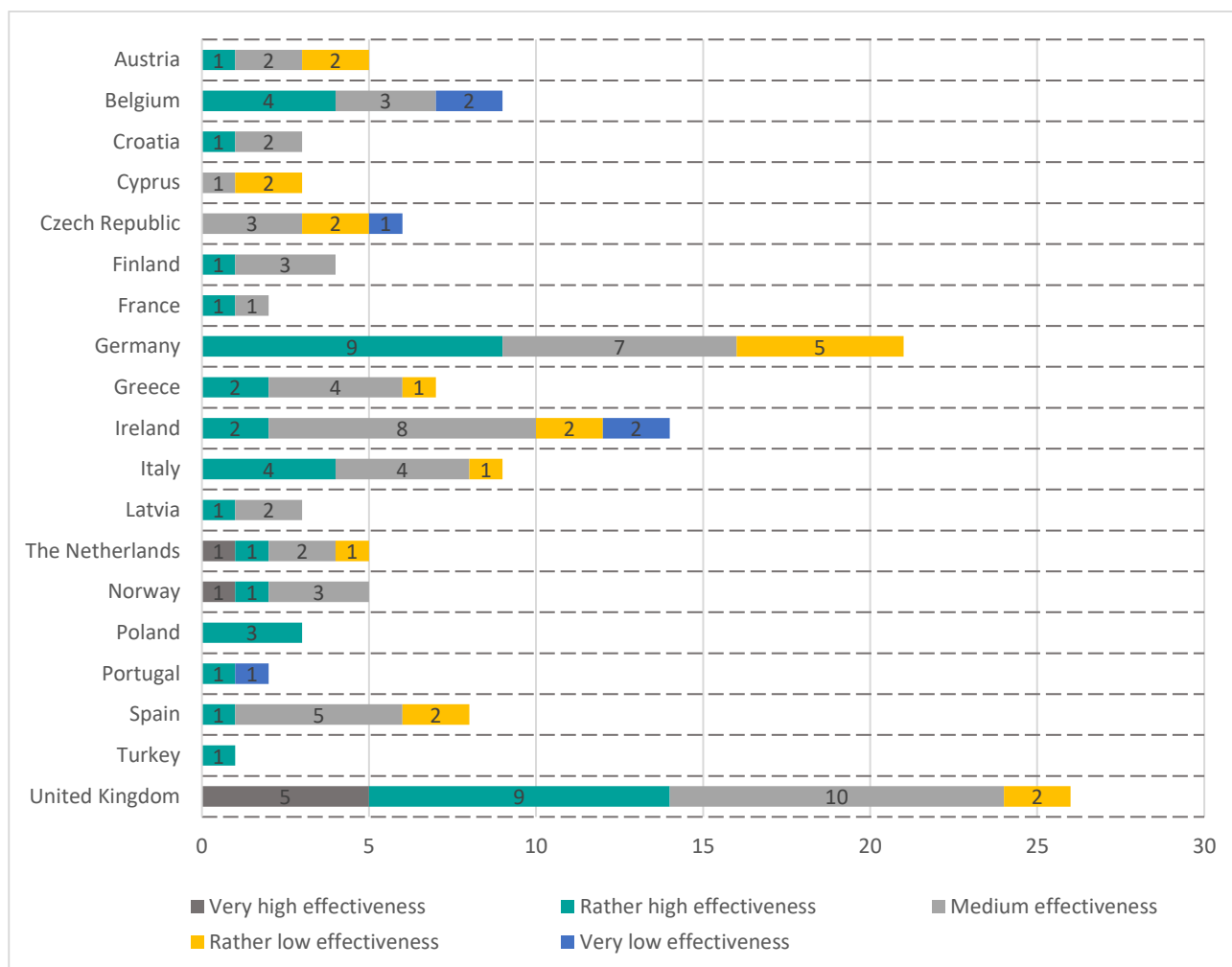


Figure 58: Perceived effectiveness of information material for the public by country (Austria: n=5; Belgium: n=9; Croatia: n=3; Cyprus: n=3; Czech Republic: n=6; Finland: n=4; France: n=2; Germany: n=23; Greece: n=7; Ireland: n=15; Italy: n=9; Latvia: n=3; Norway: n=7; Poland: n=4; Portugal: n=2; Spain: n=9; The Netherlands: n=8; Turkey: n=2; United Kingdom: n=32)

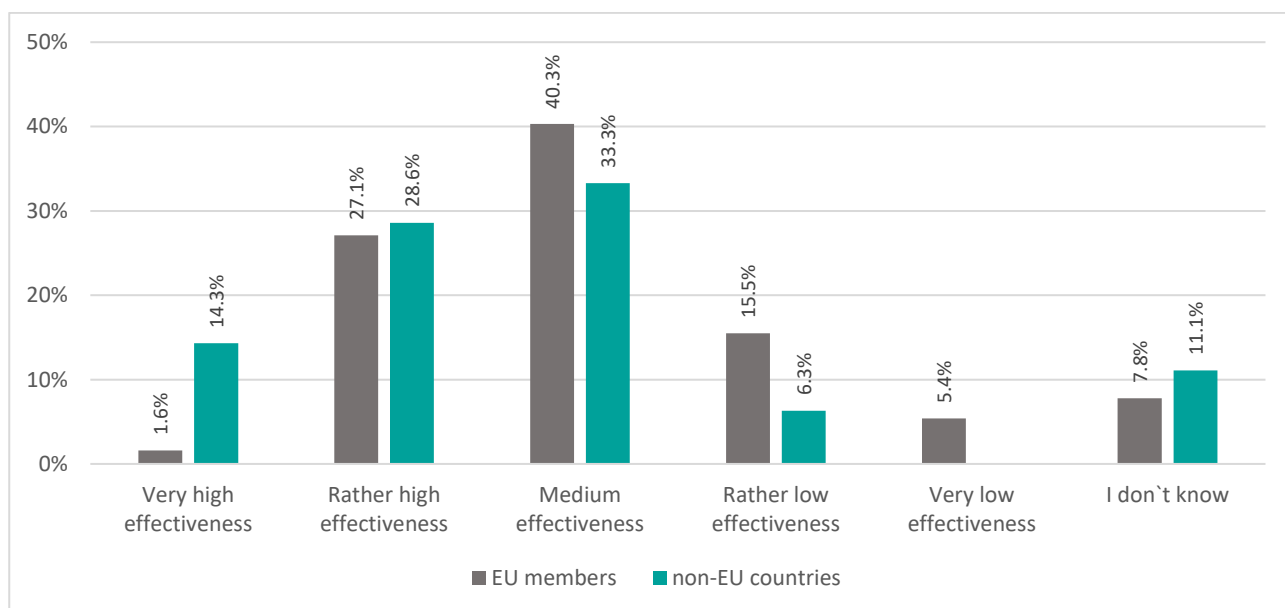


Figure 59: Perceived effectiveness of information material for the public by country group (EU members: n=129; non-EU countries: n=63)

7.3.4. Consideration of vulnerable citizens in CBRNe response

The following chapter examines the awareness of vulnerable groups in CBRNe incidents in terms of their respective consideration in the CBRNe response.

Identified challenges in dealing with diverse groups of citizens

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 noted that in their area of responsibility, they do not come into contact with citizens requiring special treatment in the event of a CBRNe incident, since as LEAs they are more concerned with combating the threat itself. A Portuguese interviewee (#39) expressed a similar perspective on vulnerabilities. Another interviewee from Germany (#4) states that vulnerable people are not be included in a designated response plan because the police have to be prepared for all situations or groups in a broader focus. However, he further explains that these plans have to be designed with special focus and sensitivity towards the operational situations.

For other CBRNe practitioners, certain challenges in dealing with diverse groups of citizens are apparent. Interviewees from countries such as Ireland and the UK note crucial points of contacts between LEAs and vulnerable citizens that have to be explicitly considered in CBRNe response. Especially in the context of key tasks such as containment, evacuation and decontamination, the interviewees emphasise special challenges associated with different categories of vulnerable citizens. One interviewee refers to 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 and Belgium, 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 firefighter, 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)

“We also work on the decontamination of people who are not able to walk on transport. But it's not really in standard operation procedures and that is something in the future we need to work on.” (Interviewee #22, Belgium)

In the course of the interviews, a number of interviewees also commented on likely challenges in dealing with CBRNe situations. Those comprise the lack of understanding of the topic CBRNe, the spread of misinformation, the resistance of citizens to follow given instructions by the first responders and issues concerning the interaction between citizens and first responders who wear PPE. Furthermore, one interviewee addressed the topic of decency regarding the decontamination process (i.e. disrobing) and the challenge of dealing with people with mobility restrictions. In the following part, these five main challenges will be examined in more detail. These are: (1)

misinformation, (2) non-compliance, (3) PPE induced-fear, (4) decency during decontamination and (5) challenge of dealing with people with mobility restrictions.

1. Lack of understanding of the topic CBRNe and spread of misinformation

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 7.3.3). 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. According to one interviewee, a media representative should demonstrate certain characteristics such as trustfulness (Interviewee #7, Ireland).

One interviewee additionally refers to the great impact of social media that at the same time poses new challenges for 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)

Faulty 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, lack of knowledge is a considerable challenge for CBRNe responders. He explains that even 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 citizens 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 special information needs that have to be taken into account 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. 2018). Appropriate risk communication prior to a CBRNe incident can raise awareness of this issue and help educate the public, and especially members of the vulnerable civil society, about disaster hazards and appropriate 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 PPE such as face masks, self-protection measures). Parts of the population will even have dealt with these specific challenges in depth. On the other hand, misinformation about the spread of the virus and vaccination has also increased. Future research

should focus on the success of specific communication strategies used during the Covid-19 pandemic to provide relevant insights for future CBRNe-related incidents.

2. Non-compliance

If the public does not trust the authorities, this can lead to the validity of the information being ignored. One interviewee (#14, UK) assumes that one could only speculate how individual citizens will behave in the specific case of a CBRNe scenario. In general, interviewees from the UK assume compliance with the orders of the 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 citizens, an interviewee criticises that even if responders are able to test some aspects that might become a challenge during a CBRNe incident, it is still not real. He further explains that during a real CBRNe incident, if vulnerable citizens are exposed to something that burns or blisters their skin or otherwise makes them feel unwell, they might be far more compliant because they want help. Some of the problems one might expect do not occur in reality because people know they need help. (Interviewee #15, UK). In this context, an exchange of knowledge between those practitioners 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 7.1.1 and 7.2.2). The interviewee further argues that initially, most of the citizens would simply be afraid. As soon as this fear disappears, however, he expects two different types of behaviour: those who are directly involved in the situation would behave differently than those who witness the situation as outsiders (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 non-compliance (regarding non-compliance see for example Bradley et al. 2016, Saha & James 2017) 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 concerns, among other things, the impact on **children** and **people with mental health conditions**.

3. Fear-inducing character of PPE

With regard to the psychological effects of the PPE on the population, no clear tendency can be identified in 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 responders. If citizens look at somebody dressed in a CBRN protection suit, it looks very serious. Furthermore, he imagines, that some citizens 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 PPE 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 PPE.

"If you got CBRNe specialists 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 neutral feedback regarding PPE.

"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 in the context of the decontamination process. When instructing those affected to remove their clothes in front of people, the interviewee expects incomprehension for certain groups who do not want to remove their clothing. In certain religious groups, it is particularly problematic for **women** and some **ethical minorities** to disrobe in some public context and in particular when men are around. Additionally, the mixing of women and men during the showering process is expected to lead to problems. 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.

Good practice example

Involvement of female CBRNe responders in Lebanon to address ethical needs during CBRNe incidents

In Lebanon, efforts are currently being made to specifically include female CBRNe responders in the units in order to improve the management of heterogeneous groups of citizens:

“Females must be involved and recently I knew that a dozen of females from the Lebanese army joined the CBRN regiment and they are under training right now. I am very happy because you know, in some countries, for example, in the Gulf area and in the Muslim countries, women do not accept to take their clothes off in front of any first responder if he is a male. So, females must be involved. You know in Germany you have so many Muslim refugees. They do not accept a male to ask her “please dress off, I want to wash you”. She will never do it. Okay, that’s why females must be involved.” (Interviewee #35, Lebanon)

5. Challenges of dealing with vulnerable citizens with restricted mobility

Only one interviewee addresses the challenges of dealing with **vulnerable citizens 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.

The Lebanese interviewee further addresses the need to address the handling of service dogs in CBRNe related SOPs to support **blind and visually impaired people**.

“First responders must also know how to decontaminate service dogs because some blind individuals use service dogs and you cannot separate them, so you have to know some techniques on how to keep this dog quiet, close to his owner and try to decontaminate it.” (Interviewee #35, Lebanon)

Consideration of vulnerable groups in communication strategies

When asking for the general consideration of vulnerable citizens in communication strategies, about a quarter of the online survey respondents (25.8%) state that their organisation's communication strategy for major emergencies does not take vulnerable groups into account (see Figure 60) and more than a quarter of respondents (30.3%) are not aware if vulnerable groups are considered in their organisation's communication strategy. When vulnerable groups are taken into account, the communication strategy **mainly** focuses on **people with mobility restrictions** (22.9% of respondents), **older persons** (22.9%) and **children** (19.9%). Compared to the other vulnerable groups, these three groups are also the most frequently addressed in the information resources that organisations provide to their personnel to prepare for a CBRNe incident (see Chapter 7.2.2). Visually impaired people (indicated by 12.5% of respondents), hearing impaired people (12.2%), pregnant women (12.2%), people with mental health conditions (11.8%) and ethnic minorities (6.6%) are very rarely considered in communication strategies.

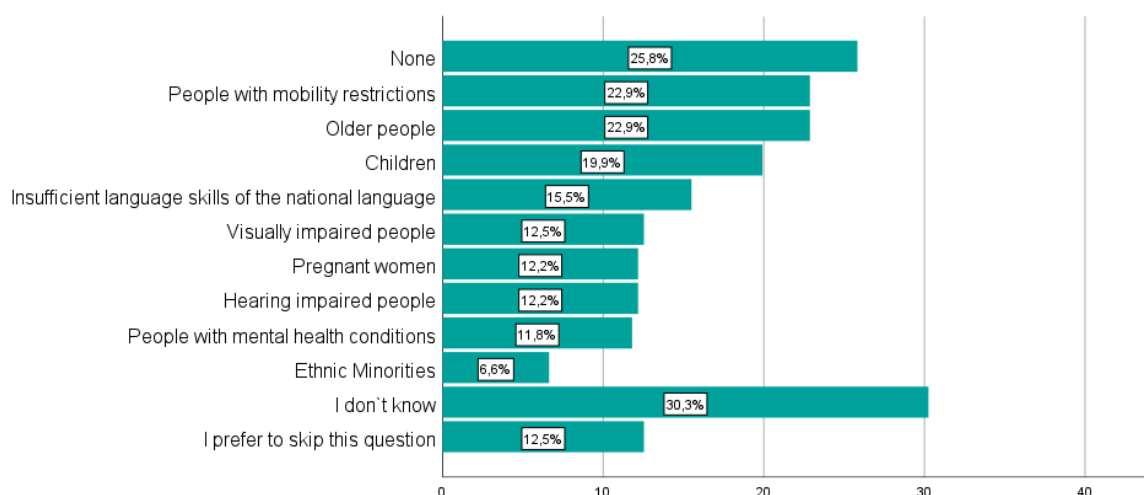


Figure 60: Reported focus on vulnerable groups in respondent's organisation's communication strategy for major emergencies; multiple selection option (n=271)

A country comparison shows that in Germany, Greece, Spain and the UK, **children, older people and people with limited mobility** are the main groups considered (see Figure 86Att.). A similar result emerges for the categories Civil Protection, firefighters, emergency medical services and LEAs (see Figure 61). The highest proportions were found for the Civil Protection category. 33.8% of the Civil Protection respondents stated that children and older people are specifically included in their organisation's communication strategy for major emergencies. For people with mobility restrictions, this was indicated by 23.8% of respondents. Among the firefighters surveyed, the percentage for this group is slightly higher at 26.3%. However, the percentage for older people (26.3%) and children (24.6%) is considerably lower in the firefighters group. Children are least often included in the organisational communication strategies of the emergency medical services surveyed (12.8%), whereas this proportion is slightly higher (17.4%) among LEAs. Older people (19.1%) and people with mobility restrictions (21.3%) are more frequently considered in the organisational communication strategies of the emergency medical services surveyed. Similar proportions emerge for the LEAs (older people: 20.0% and people with mobility restrictions: 19.1%). For the LEAs, it must also be added that a large proportion of respondents could not indicate whether vulnerable groups are considered in their organisation's communication strategy (40.9%). Also striking are the comparatively high values for the category "Others," which includes scientists, railway operators,

and military personnel, among others. Thus, 35.7% of these respondents stated that people with mobility restrictions are taken into account in their organisation's communication strategy for major emergencies. A similarly high percentage was found for hearing impaired people (32.1%) and people with no or insufficient skills of the national language (32.1%).

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 the communication process should be intensified.

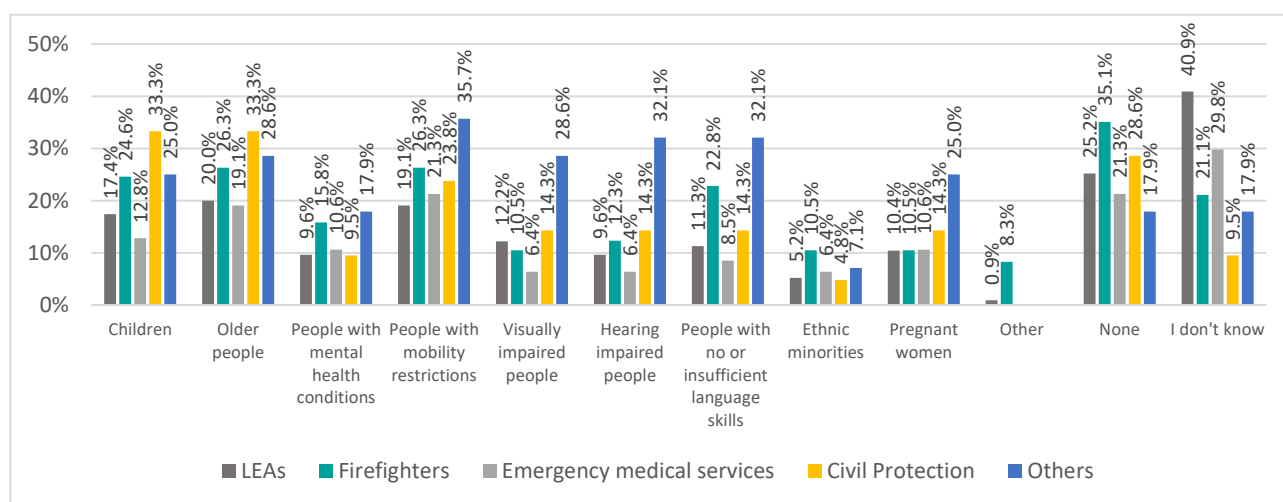


Figure 61: Consideration of vulnerable groups in the organisation's communication strategy for major emergencies by profession; multiple selection option (LEAs: n=115; Firefighters: n=57; Emergency medical services: n=47; Civil Protection: n=21; Others: n=28)

Similar results are found in the interview study. The majority of interviewees do 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 that consider vulnerabilities (Interviewee #4, Germany and #5, Germany). One German interviewee (#4) explains that in his area of responsibility, a CBRNe incident is only about removing the people 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, Spain and even Canada 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)

"And I also I guess in the communication aspect I have never really seen anything particular when we are talking about communicating with these groups." (Interviewee #19, Canada)

However, the benchmarking rating reveals considerable differences among communication strategies across Europe (Table 9).

Table 9: Benchmarking rating of communication with the public

	1 absent/minimal	2 emerging	3 moderate	4 significant	5 outstanding
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.
Belgium					
Cyprus					
Czech Republic					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Portugal					
Romania					
Slovenia					
Spain					
Canada					
Japan					
Lebanon					
Moldova					
Norway					
Turkey					
UK					
Ukraine					
US					

The categorisation also reveals that vulnerable groups are rarely considered in communication strategies for CBRNe incidents. In many countries, respondents indicated that a general public communication plan is applied to CBRNe preparedness and response. This plan does not specifically focus on vulnerable groups (label “absent / minimal”). The above classification was made by respondents from Cyprus, Hungary, Ireland, Italy, Lebanon, Moldova, Portugal, Romania, Slovenia, Spain, Turkey and the UK. Compared to the other benchmarking categories, it is striking that a large number of country representatives selected the label “absent / minimal”. In some countries, however, there is disagreement about the optimal communication strategy to be used. For example, participants from Ireland, Spain and the UK indicated that there is at least a general communication strategy for CBRNe preparedness and response in their country (label “emerging”). However, participants agree that vulnerable groups are not taken into account. The Spanish interviewee (#12) also negates any specific tools for communicating with vulnerable citizens. However, he implies that there is at least already an awareness for improvement. One British

interviewee (#47) explains that although single communication plans consider some vulnerable groups, vulnerable citizens are not involved in the development of these plans. The “emerging” label was also awarded by participants from Lithuania, Canada and Norway. In other countries, such as Belgium, Japan and Ukraine, vulnerable groups are at least included in protocols designed to facilitate communication between CBRNe practitioners and vulnerable populations in the event of a CBRNe incident (label “moderate”). An interviewee from the UK criticises that the communication strategy taught in the trainings of the respective organisations only provides a framework, but no 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 specific measures in regard to all vulnerable groups are mentioned. Standard communication strategies that provide general SOPs for CBRNe practitioners regarding vulnerable groups during a CBRNe incident exist in Greece and the United States (label “significant”), among other countries, according to benchmarking participants. However, these communication strategies do not seem to be consistent at the national level, as other participants from these countries do not share this assessment (categories “absent / minimal” to “moderate”). A nationally consistent communication plan that addresses the specific needs of vulnerable groups before, during, and after a CBRNe incident is reported for the Czech Republic, France and the United States, according to the respective participants. This plan is continuously updated (label “outstanding”). With regard to the USA, an interviewee from Ireland gives the following description:

“In the USA last year, in 2019, when a storm warning came in, it was absolutely brilliant to see that every TV-, radio station came in with a high-pitched noise followed by a special announcement. It was a weather-related one, it wasn’t CBRN, but I was questioning locals afterwards, because I was very interested, and they told that’s it’s there for everything.” (Interviewee #30, Ireland)

However, there are major differences in this rating level within the same country. Other participants from these countries only assigned the label “absent / minimal”. The large differences can presumably be explained by the fact that some of the participants in the interviews stated that the area of communication does not fall within their area of responsibility and that they are therefore only able to make limited statements about this area. These benchmarking ratings and interviews underlines that there is still a need for action in the field of communication strategies that recognise vulnerable groups. But there are also positive examples like in the interview with a Swedish practitioner reveals:

“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). Besides Sweden, even though the benchmarking rating for Belgium shows only a moderate level, the interviews with various Belgian practitioners showed that the country has already implemented a number of measures to improve.

“We already provided some information for vulnerable groups in our national nuclear emergency plan. [...] We have people from our communication service, who really work on vulnerable groups, on communication towards vulnerable groups.” (Interviewee #22, Belgium)

Currently, the CBRNe centre is hiring staff especially to communicate with vulnerable groups (Interviewee #23, Belgium).

In conclusion, 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. Furthermore, first responder organisations should take vulnerable groups more into account in their communication strategies and include them in the creation of respective communication plans and communication materials.

Accessibility of CBRNe-related information material

Amongst others, Savoia et al. (2013, 171) stress 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 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 194¹⁹ online survey respondents, more than one half (53.1%) indicate that their organisation provides CBRNe-related information resources in additional languages. 32.5% of the respondents negate this, and 12.4% of the respondents indicate that they do not know whether their organisation provides information resources in additional languages.

The interview study also confirmed that in a large number of countries, CBRNe-related information is provided in at least two languages. In the UK, pre-prepared materials exist in a variety of languages (Interviewee #15, UK). Countries which are characterised by multilingualism have a higher linguistic diversity in emergency communication. Belgium already covers three 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. Beyond Europe, the USA as a country of diversity, also takes the linguistic diversity of its population into account in its communication.

"We have very a diverse population, so not everyone is English speaking so the messages are prepared in a variety of different languages as necessary. We have very robust relationship with the local media, which is able to get those messages out as well." (Interviewee #48, USA)

¹⁹ In this case, only individuals who indicated that their organisation provides CBRNe-related information to the public were surveyed.

With regard to **all vulnerable groups**, it is also of interest whether organisations offer CBRNe-related information in special formats (see Figure 62). 71.6% of the survey respondents indicate that their organisation uses **plain language**. 38.1% state that the respective organisation uses **pictorial language** to distribute the information.

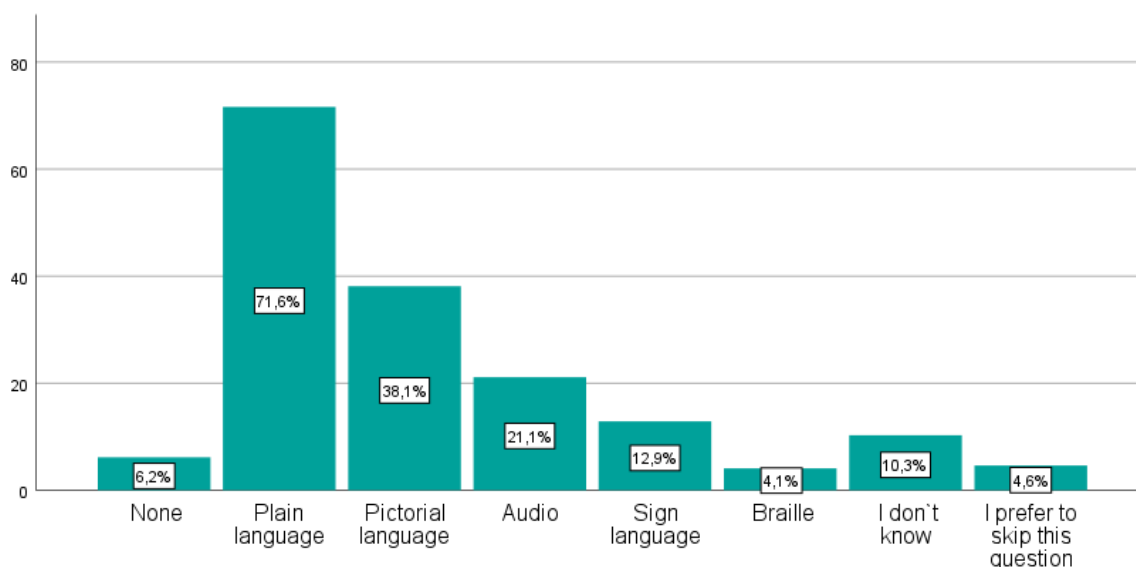


Figure 62: Special formats used by organisations to provide CBRNe-related information to the public; multiple selection option (n=194)

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 triangles, with different colours (Interviewee #6, Greece). Another one (Interviewee #15, UK) comments that most of the communication with the public relies on pictorial information like when 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 (Removement of hazardous substances). It comprises infographics and is designed in a very simplistic way for the general public to understand the topic. If citizens 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 remarks that former events have shown that it is even better if there is someone that the public can trust and follow, but the campaign allows citizens to do it on their own if they have too.

Audio messages (named by 21.1% of respondents) and **sign language** (12.9%) are rarely used to provide information. However, some of the interviewees point out that sign language for **hearing 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). Two interviewees from the UK (#14) and Ireland consider loudspeakers as a further way of communication with **hearing impaired citizens** on site:

“We have a policy of the Garda that would look after the evacuation, through loud speakers, mobile loud speakers in the police cars [...] but there is not guarantee that these messages are getting through to the vulnerable people.”
 (Interviewee #30, Ireland)

Another already proven approach in dealing with deaf people comes from Lebanon. During recent incidents, first responders in Lebanon should use hand signs to support deaf people in understanding the situation because they are able to see the situation and the reaction of other affected people around them but they sometimes did not understand what happened (Interviewee #35, Lebanon). This method was combined with the use of smartphones: responders should send an SMS on the mobiles of those affected within the hot zone to let them read and understand the important information and orders. The overall use of mobile applications in European countries and beyond was already discussed in Chapter 7.3.3.

Braille (4.1%) appears to be the format least likely to be used by LEAs and first responders to communicate with the public. 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)

In contrast, measures that address the needs of **deaf 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 use sign language or an adaptation of sign language with mentally disabled persons, autistic people; especially children; and foreign people.” (Interviewee #3, France)

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, 6.2% 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.

Key Takeaways Chapter 7.3

Security measures in case of an assumed high risk of a CBRNe incident

- Depending on the initial circumstances and available threat information (accidental / technical emergencies versus terrorist attacks), threat assessment requires a collective and collaborative approach by all emergency response stakeholders.
- The initial and on-going threat assessment is influenced by geographical factors especially proximity to high-density population areas, country size, urban vs. rural areas, etc.
- Threat assessment considerations depend significantly on the quality of information, which supports/challenges the credibility and likelihood criteria of a CBRNe event.
- While most countries use a joint (inter-agency) assessment, it is not common for all studied countries (e.g. Moldova and Turkey).
- The UK is a very good example of a national, uniform threat assessment framework. A protocol for inter-agency collaboration is in place that facilitates a CBRNe threat assessment that incorporates the subnational and national perspectives of different agencies.
- Following the confirmation (detection) of an assumed high risk of a CBRNe incident, the relevant authorities are informed.
- A small number of countries have established dedicated CBRN centres with predetermined responses determined by threat level criteria / protocols.
- On arrival of the first responders to a suspected CBRNe incident, the threat will be assessed and determined. In collaboration, different agencies undertake different subsequent security mitigation measures. Depending on the identification of substance / material and associated risks, the core responsibilities may alter or rotate to the pre-response phase actions.
- Mobilisation of resources to combat / respond to a CBRNe event is challenging and occasionally Voluntary Emergency (Civilian) responders may be requested to supplement the state responding organisations.
- Availability and proper maintenance of equipment is critical to any mobilisation & response.

Key tasks of CBRNe response

- All responding organisations undertake a variety of tasks during a CBRNe event, with skillsets and expertise overlapping in some circumstances, but they respond in a collective and complementary manner with each other.
- LEAs often undertake the lead concerning coordination, containment and evacuation of affected citizens, detection of CBRNe agents, criminal investigation, crime scene investigation and maintaining of public order and safety. Firefighters and emergency medical responders complement the CBRNe response, covering key tasks of disaster control (e.g. firefighting, rescue, technical assistance, recovery and decontamination) and on-site medical treatment as well as transfers to medical facilities.
- Containment is critical to mitigate the threats posed at the scene, cordons are established and the area is zoned out to prevent injury/loss of life.
- Depending on the substance and the national SOPs, a variety of decontamination strategies are deployed. These range from hand washing to dry decontamination and chemical showers.
- Crime scene investigation and subsequent judicial prosecutions are key weapons in the future prevention of CBRNe events.

Communication with the public

- Communication with the public is crucial for effective CBRNe management.
- Communication in the area of CBRNe can be divided into three phases:
 - Communication before a CBRNe incident (Education, Pre-Incident preparedness, etc.)
 - Communication during a CBRNe incident (Managing the effects of a CBRNe incident, etc.)
 - Communication after a CBRNe incident (Recovery, etc.)
- The majority of organisation representatives confirm that their organisation has a communication strategy for responding to major emergencies. The communication strategies often focus on general communication and evacuation. Less often, the focus is on medical care and decontamination.

- In general, it is acknowledged that most emergency response organisations engage in CBRNe communication. However, there are differences between countries. A number of organisations have dedicated communication departments. Furthermore, noticeable differences exist in communication engagement levels. In some cases, CBRNe communication is authorised or transmitted from Regional Centres. In other cases, National Centres are responsible for this task.
- Respondents emphasised the need for early warning and information messages in the event of a CBRNe incident. Early warning mechanisms include sirens and loudspeaker announcements, as well as warnings via radio and TV.
- Newer forms of communication are also becoming increasingly important in the area of CBRNe communication. These include mobile warning apps such as Katwarn in Germany or the Be-Alert system in Belgium.
- Organisations provide CBRNe related information to the public primarily through their official website as well as social media, with Twitter and Facebook being the main ones used.
- Civil Protection authorities, in particular, provide CBRNe-related information to the public to help them cope with a CBRNe incident. However, it must be noted that overall about one-third of respondents indicated that their organisation does not provide CBRNe-related information to the public.
- When information materials are provided, these are primarily online materials, leaflets and brochures.
- The media plays an important role in communication during a CBRNe incident. However, some parts of the media are not seen as part of the solution but as a problem (sensationalism, etc.).
- A central spokesperson who communicates honestly and whom people trust should be appointed in the case of a CBRNe incident.
- Overall, less than half of the respondents indicated that they consider their organisation's communications strategy for a major incident to be extremely suitable or very suitable to respond to a CBRNe incident.

Consideration of vulnerable citizens in CBRNe response

- Vulnerable people when involved or impacted by a CBRNe event require specific attention or information to assist them cope with or respond to the particular circumstances of the event. For example, vulnerable persons may rely on special communication formats (Braille, sign language, etc.).
- Different phases of a CBRNe incident can also be particularly challenging for vulnerable groups. For example, the decontamination process can be particularly difficult for females from certain cultural backgrounds due to religious constraints (issues of being naked in public). The decontamination process (decontamination shower) may also be particularly challenging for persons with mobility impairments.
- Particularly challenging for vulnerable groups can also be the Personal Protective Equipment (PPE- suits and masks) of the emergency responders (fear-including character of protective gear).
- Furthermore, a CBRNe incident can be especially challenging for people who do not speak the respective national language.
- Vulnerable groups are rarely considered in the communication strategies of the respondent organisations for major emergencies.
- The needs of persons with mobility impairments, children and older persons are most likely to be considered in the communication strategies.
- Civil Protection agencies are the most likely to take into account vulnerable groups, however this remains rare.
- In the online survey, approximately half of respondents indicated that CBRNe-related informational material from their organisation is provided to the public in at least one additional language.
- Emergency response organisations rely heavily on plain language as well as pictorial language in their CBRNe-related information materials for the public. Very rarely, however, do emergency response organisations use sign language and Braille in their CBRNe-related communication.
- Overall, it can be concluded that the specific needs of vulnerable groups in the event of a CBRNe incident / in the context of CBRNe communication are not yet sufficiently taken into account and, in this respect, emergency response organisations should increasingly consider the specific needs of vulnerable groups in future CBRNe events.

8. OUTLOOK ON COVID-19 AND ITS IMPLICATIONS FOR OTHER CBRNE INCIDENTS

It can be assumed that the global Covid-19 pandemic has influenced practitioners' perceptions of CBRNe incidents, particularly those triggered by biological agents. In the first interview study phase, 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 second phase of the interview study, the pandemic was directly addressed. The following chapter describes the findings of both parts of the study.

Shift in threat assessment

In the online survey, when asked about the context of experiences with previous CBRNe incidents, 7.0% of respondents additionally cited pandemics as a specific threat they had experienced during their professional life (see Chapter 7.1.1). The interview study also found that the perceived likelihood of a CBRNe incident, particularly a B-incident, increased after the outbreak of Covid-19, although the overall threat level of CBRNe incidents varies between countries. For Spain, the likelihood of a CBRNe incident was assessed to be very low until Covid-19 (Interviewee #12, Spain). In Sweden, although the threat level was already previously considered high, the pandemic still affected the current assessment:

"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)

Greater awareness of vulnerabilities

While parts of the population had not previously been the focus of practitioners' measures, the experience of the Covid-19 pandemic has contributed to a greater focus on the vulnerabilities of certain groups. The various vulnerabilities became more visible, demonstrating the need for more comprehensive measures:

"[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 fact, I think the pandemic highlighted, in sort of a spotlight on vulnerable population within our country. [...] It has really highlighted the importance of equality and ensuring that we are working in attention to these vulnerable populations and that we ensure they receive the services." (Interviewee #48, USA)

In this context, the use of joint measures was also mentioned. In Lebanon, brainstorming efforts were adapted to involve different stakeholders to help autistic patients to undergo vaccination in the hospital (Interviewee #35, Lebanon).

Restrictions of joint training activities

Because of the pandemic, education and training activities had to be restricted, postponed or even cancelled:

“So, we are just beginning to work as before the pandemic [...] and we are trying to find our classical training. It was quite complicated, everywhere in the world, to maintain the classical activities.” (Interviewee #24, France)

This had a corresponding impact on efforts already underway to involve vulnerable people to a greater extent:

“Throughout the pandemic we have been forced to not include civilian counterparts from the first responders because it’s just too difficult but we are getting back in play now.” (Interviewee #38, Norway)

The time after the pandemic will show whether new possibilities can be established in this regard.

Good practice example

Modifying SOPs for persons with autism

In the beginning of the pandemic, before Covid-19 testing was widely available, CBRNe practitioners together with the Lebanese Red Cross were able to develop a new SOP for transporting potentially infected autistic patients from their residences to the hospital via ambulance for PCR testing.

Key elements of the new SOP included:

- Arrival at residence
 - Wear transparent PPE so that the autistic individual can see you clearly
 - Do not touch the autistic individual
 - Maintain eye contact with the autistic individual
- During transportation
 - Do not use ambulance sirens as loud noises are disturbing for most persons with autism
- At the hospital
 - Where possible, perform the test within the ambulance to avoid crowded hospital areas, which could be disturbing for most persons with autism
 - Have staff teach the parents or caretakers to perform the PCR test
 - Allow parents or caretakers to give the test to the autistic individual

This new SOP was successfully applied twice.

Adaptation of SOPs

The pandemic further identified weak points in CBRNe-related measures and the need for adaptation of the corresponding SOPs. For France, the crisis showed that its evaluation and capacity building was not perfect at all (Interviewee #24, France). But capacity building efforts are already underway:

“But maybe things will change now because of the pandemic, of the mask, of the logistic of the organisation for the vaccines.” (Interviewee #24, France)

“It has definitely put a structure in place, if there was ever a CBRN event where you could control, there is a lot of control measures put into place now, isolation areas, etc.” (Interviewee #30, Ireland)

“So the communication towards people is really evaluated and they are now working on a, like a standard operation procedure in circumstances like Covid-19, but not only in CBRN circumstances, also in other circumstances, to have a better communication towards the vulnerable citizens.” (Interviewee Belgium, #22)

Improved communication

According to a French interviewee (#27), the Covid-19 crisis showed that the authorities in France are not well prepared for communication in case of a CBRNe incident. The Belgian interviewees (#22 and #23) assessed communication during Covid-19 as the biggest improvement brought by the pandemic, especially in regard to people who do not speak the same language. Interviewee #22 further adds that the pandemic resulted in new projects to enhance visual communication and the creation of dedicated SOPs, among other things.

The interviews further revealed two lessons learned regarding communication. First, abbreviations proved to be problematic since not everybody understands the same information (Interviewee Belgium, #22). Second, the communication of scientific information by politicians partially resulted in misinformation.

“Covid-19 has shown that politicians struggle with communicating technical, scientific information to the public. We have seen that in every major sort of incident here. Also, scientists, the people who really do understand the issues really struggle with communicating this to the public. [...] We do have these scientists who are actually quite good at explaining science. We need to get them to explain all this.” (Interviewee #46, UK)

He further explains that politicians consistently made mistakes and the public either take them seriously and do something wrong or they do not take the information seriously and just do not know what to do. 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. In this regard the use of certain scientists as communicators of scientific knowledge should be evaluated. During the pandemic, some countries used such mediators, who were known throughout the country. Examples include Dr Brian Cox (UK), Dr Anthony Fauci (USA) or Dr Christian Drosten (Germany).

Better understanding of CBRNe-related measures and enhanced compliance

But it is not only the awareness of the practitioners towards the vulnerable population that has increased. There is also a greater awareness and understanding of CBRNe-related measures and appropriate behaviour during such a pandemic.

Since the Covid-19 outbreak, partial aspects of CBRNe such as information related to biological hazards have become omnipresent through the (social) media. The interviewee from Cyprus (#20) comments that although the public is not expected to understand the relation between CBRNe and the pandemic, they are now well aware of what a biological threat means. In this context, the general understanding of how bacteria and viruses can be transmitted has increased. Not until the pandemic did face-masks as hygienic protection become a new normality in European countries as well:

“Here in Spain, it is completely normal seeing people with face-masks. They know they have to use a face-mask to protect themselves and they know that it’s effective.” (Interviewee #43, Spain)

The same perception is expressed by interviewees from Lebanon (#35) and Moldova (#37). As a result, in case of a future CBRNe incident, one of the Spanish interviewees (#43) predicts that it would be easier to tell people to use PPE than in the past. A similar statement was found in the interview with an Irish expert:

“I think now people have taken to the new extra measures, people take directions more, people are expected to cue in an orderly fashion, they are listening more to regulations by the Garda, the hospitals, where to cue, not to cue, etc.”
 (Interviewee #30, Ireland)

Consequently, basic knowledge about hygiene concepts, hospital capacities, containment policy and even the epidemiological calculation of incidence levels is perceived to be far higher than ever before (Interviewee #15, UK). Parts of the population will even have dealt with these in depth. Moreover, interviewees from the UK (#15), Ireland (#30), Greece (#29), Cyprus (#20), Spain (#43) and Lebanon (#35) confirm that familiarity with protective equipment used by CBRNe first responders has increased in their countries due to the crisis. An interviewee from Ireland (#30) further sees an improvement in the understanding of evacuation processes. However, one interviewee from France is quite pessimistic about the long-lasting effects of all Covid-19 related measures:

“Unfortunately, I think that the effects won’t last. As soon as they can, people will forget, it’s like a classical terrorist attack using an explosive. You have a bomb exploding in the metro then everyone pays attention, everyone is paranoid during two weeks and then in the end they forget and they don’t care anymore. I would be surprised to see that there are reflexes that will continue to be applied when this pandemic will be over.” (Interviewee #25, France)

Every incident is different

The interviewee from Norway (#38) further points out that the origin of the pandemic had a strong influence on the effectiveness of all measures applied.

“If we look at Covid-19 as a B-incident, [...] it’s not something that a terrorist has done. That would change the situation a lot because then it would be malice involved or evil, which would create panic. But Covid-19 has not created a panic, due to also a good communication plan but it would be a lot more complicated if this was a terrorist attack.”

(Interviewee #38, Norway)

Therefore, the findings can only be partially transferred to a future pandemic with a different background or a bio-terrorism scenario. Nevertheless, future studies will be able to provide more concrete and detailed information on the impact of the current pandemic on practitioners as well as citizens. These will also address the management deficits the pandemic has highlighted and possible lessons learned to be included in SOPs to continuously improve the CBRNe management.

²⁰ He further explains that the Covid-19 pandemic cannot be seen as a real B-incident because it's caused by a virus spread.

9. STRONG POINTS AND LIMITATIONS

The study reported in this deliverable represents a substantial extension of the research described in PROACTIVE Deliverable 2.3 (Carbon et al. 2021a). Based on the second opening of the online questionnaire, inclusion of the benchmarking matrix and inclusion of additional interviews, this new deliverable significantly expanded the comparative study with CBRNe practitioners to include a much larger sample and inputs from more countries, even beyond Europe.

After the second research period, the new study included 405 answers to the online survey coming from 47 countries, while the interview study involved 48 practitioners from 22 countries. The larger corpus of quantitative and qualitative data allowed us to identify commonalities and differences in CBRNe management between different practitioner types across EU Member States and associated countries. It also helped highlight some noteworthy good practices from EU Member States and non-EU countries.

However, over the course of the second research period, both the quantitative and the qualitative part have revealed some limitations.

The survey questions and the method of responding (online) were similar to the first phase; in the second phase of the quantitative study, therefore, limitations similar to those in D2.3 became apparent to some extent. Since the questionnaire was uniformly provided in English, language difficulties may affect the answers themselves and the response rate compared to a questionnaire offered in the respective mother language of the participants. For this reason, DHPol, with the support of the entire PROACTIVE consortium, has tried to formulate the questions in such a way that they are easy to understand. The same limitations due to the language barrier apply to the second phase of the qualitative interviews²¹. To ease the interview process, all participants received the interview guideline in advance to facilitate their preparation.

The interviews of the second study phase provided information on six key topics. There are thematic overlaps with the first study phase (see Chapter 3.3.2). However, by using two slightly different interview guidelines over the course of the two study phases, it was not possible to directly compare all results. This is not a major shortcoming, since the aim of the interviews was to provide more in-depth information on the core themes of the survey, provide national insights, and illustrative examples. Nevertheless, statements on the same topics could be directly compared. In addition, more of the information covered in the quantitative survey could now be examined in greater detail using qualitative data.

Due to the broad spectrum of CBRNe management, not all interviewees were able to contribute to every single topic. Furthermore, the benchmarking matrix itself only reflects a personal assessment which is based on the experience gained within the CBRNe management in the respective country. However, it is also dependent on factors such as the age of the respondent and his/her work experience, position and area of responsibility. Especially for countries with more than one

²¹ In one case, a translator supported the interview, which was conducted in English.

participant, the matrix demonstrates that it is possible that contrasting opinions on the same topic do exist. Thus, the matrix can only support the data from the quantitative study and can serve as a basis for more detailed grounded interviews, not as an individual study detached from the overall study. The individual variables must be considered as possible confounding factors.

Since the pandemic began during the first phase of the study, many of the practitioners that made up the target research group were intensely involved in the pandemic response and this translated into lower number of participants in our first phase. The second phase helped to increase participation; while the pandemic continues, many aspects of life have returned to normal in Europe, thus allowing our target research group to take the time to answer the questionnaire. That said, there were still many challenges for this new recruitment phase, mainly: the continuing of the pandemic, the low level of direct local contacts in some countries and the exhaustion of distribution channels already used in the first phase (PSAB, social networks, consortium partner contacts). The language barrier also made it difficult to find appropriate mail contacts in countries that do not usually offer a website in English. However, by involving the entire consortium, at least one contact could be identified in each European country (see Chapter 4.1).

Further, due to these participant recruitment challenges compensated by a wide dissemination strategy, it should be noted that the questionnaire study used convenience sampling, which means that results are based on a self-selecting sample.

In general, all research objectives have been successfully covered. Differences and similarities between countries in the phases of preparedness and response were identified. In addition to the comparison of individual countries, the report also focused on the comparison country groups (EU members versus non-EU countries), professional groups (LEAs, firefighters, emergency medical services, Civil Protection and other practitioners) and participants' level of experience with CBRNe incidents. The extent to which the vulnerable groups are considered in CBRNe preparedness and response was also explicitly examined (see Chapters 7.2.6 & 7.3.4).

The interview study showed that comparisons between countries have to include the specifics of each country and that therefore lessons learned and good practice examples cannot be easily transferred from one country to another. This makes specific recommendations for all CBRNe practitioners difficult. Therefore, the report can only offer fundamental recommendations, which need to be further adapted by the respective practitioners in their respective countries according to their needs. That said, applying these generic recommendations will enable practitioners in Europe and beyond to better take into account the needs and expectations of vulnerable groups when preparing for and responding to a CBRNe incident.

10. CONCLUSION AND RECOMMENDATIONS

In this chapter, 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, this chapter also features recommendations for practitioners to increase their effectiveness in CBRNe situations and especially in handling vulnerable persons.

10.1. Main findings on the research questions

This chapter summarises the key results of the report. The quantitative study with 405 participants from 47 different countries identified commonalities and differences in CBRNe management between CBRNe involved practitioners in European countries and non-EU countries with a track record in CBRNe preparedness and response. The report also provided an up-to-date picture of the state of CBRNe preparedness and response concerning the awareness of the needs of vulnerable citizens in CBRNe management. The complementary benchmarking and interview study with 48 CBRNe practitioners from 22 countries further revealed differences and commonalities regarding ‘(joint) threat assessment’, ‘legal and policy framework for inter-agency collaboration’, ‘(joint) training’, ‘evaluation and capacity building’, ‘security measures’, and ‘communication with the public’. It is difficult to compare countries, as conditions in and between the countries studied sometimes differ greatly due to different geographical or cultural conditions, state structures (centralism vs. federalism), different levels of government (local /regional/national), responsibilities of the professional groups involved in the field of CBRNe, legal regulations and other factors. However, general statements in the field of CBRNe could be identified.

Almost seventy percent of all respondents have been involved in at least one CBRNe incident during their career (especially accidents and technical emergencies), whereby the proportion is noticeably higher for respondents in non-EU countries (see Chapter 7.1.1). Thus, eighty percent felt very or rather familiar with CBRNe which is also reflected in the country comparison (see Chapter 7.1.2). The interview study provided a diverse picture regarding CBRNe-related **threat assessment** (see Chapter 7.1.3). Whereas some of the interviewees (e.g. 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 most interviewees consider 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. To address such future CBRNe incidents, in the following the report answers the research questions with regard to CBRNe preparedness and response.

Research question 1: *To what extent do measures of preparedness and response differ among CBRNe practitioners across European Member States and beyond? And which lessons learned can be found in non-EU countries with a significant track record in CBRNe incident preparedness and response?*

Both studies revealed that most respondents assumed that their organisation is well or very well **prepared for a CBRNe incident** regarding preparedness and response measures (see Chapter 7.2.5). A comparison of country groups showed that among EU members, a higher proportion rated the current level of CBRNe preparedness as rather low or very low. This assessment was based on the evaluations of several topics. Regarding the perceived **level of internal allocation of responsibilities**, respondents among all surveyed countries primarily indicated a medium to very high level of clarity of responsibilities (see Chapter 7.2.1). In general, especially firefighters appeared satisfied with the clarity of internal responsibilities. Members of the Civil Protection and emergency medical services were less satisfied. Concerning the **external clarity of responsibilities** between different CBRNe related agencies, the country comparison revealed that participants mainly indicated a very high to rather high or at least a medium level of clarity. Participants from Cyprus, Greece, Ireland, Latvia and Slovenia stated that inter-agency collaboration policies and SOPs are in place to facilitate this external clarity of responsibilities. For Belgium, the Czech Republic, France, Hungary, Lithuania, Norway, Portugal, Romania, the UK and Ukraine, this framework was described as even more detailed and extensive. The five principles to enhance inter-agency collaboration in the UK called JESIP were cited as a good practice example. According to the assessment of responders in Germany, Italy, Moldova, Spain and Turkey, there is still need for improvement in the concretisation of inter-agency collaboration. Lessons learned include the influence of the federal system that can lead to a fragmentation of agencies, the difficulties to include the military within the borders and the sharing of classified information between different agencies. A good practice for inter-agency collaboration was found in the Belgian CBRNe expertise centre. Similar centres were mentioned for Cyprus and Spain. However, challenges were identified in applying those from one country to another.

In addition to the clarity of responsibilities, the success of CBRNe preparedness was also measured by the quality of training, cooperation with other agencies and equipment. Most respondents consider the **internal education material** to be relevant to prepare their organisation for a CBRNe incident (see Chapter 7.2.2). As part of their education, almost three quarter of respondents confirmed the involvement in **CBRNe exercises**. CBRNe exercises usually focus on decontamination, building a safety zone and providing medical care. Especially firefighters indicated being involved in such exercises over the last 10 years. Besides their own organisation, participants indicated the involvement of other agencies during joint exercises, especially fire departments and emergency medical services. The interview study highlighted that such joint exercises contribute to better coordination between different agencies. Almost three quarters of all survey respondents and about half of the respondents in each country indicated that exercises are considered valuable for preparing their organisation for CBRNe incidents. Moreover, some interviewees expressed the wish to conduct such inter-institutional exercises more regularly. Participants from Belgium, Cyprus, Germany, Ireland, Latvia, Slovenia, Moldova and Turkey saw a need for improvement in joint training, as they felt that little effort was being made in their countries. For Italy, Portugal, Spain and Norway, a medium level was indicated. In contrast, respondents in the Czech Republic, France, Greece, Hungary, Lithuania, Romania, the UK and Ukraine were satisfied since comprehensive joint training approaches exist. Almost three quarters of respondents further indicated the existence of written **cooperation agreements** between their organisation and other agencies (see Chapter 7.2.4). A good practice of cooperation was found in the international cooperation in Lebanon

following the Beirut Blast in 2020. Overall, half of all respondents in all surveyed countries rated the cooperation agreements to be helpful. Most respondents were overall satisfied by the **quality of equipment** for a CBRNe incident (see Chapter 7.2.3). In the online survey, almost half of the respondents rated their organisation's equipment for a CBRNe incident to be rather sufficient as opposed to one quarter who assessed the equipment to be rather or completely insufficient. In particular, firefighters were satisfied with their organisations' equipment, whereas LEAs gave the least positive ratings. The equipment of the fire brigades appears to be much more comprehensive for this type of task than the equipment of the police.

To evaluate the level of preparedness, participants from Belgium, the Czech Republic, Greece, Lithuania, and the Ukraine confirmed a moderate to outstanding **evaluation and capacity building** routine (see Chapter 7.2.5). In contrast, participants from Cyprus, Germany, Hungary, Ireland, Moldova, Norway, Portugal, Romania, Slovenia, Spain and Turkey indicated that specific evaluation of CBRNe incidents is rarely conducted in their countries, Practitioners from France and Italy referred to a medium level of evaluation in their countries. Two good practice examples were found abroad: in Canada, capacity building is performed in an all-community approach to enhance the overall management of future incidents; and in the USA, a comprehensive debriefing mechanism provides clear instructions on how to proceed with evaluation and capacity building after each exercise.

Concerning CBRNe response, not all countries indicated a **joint threat assessment** strategy in CBRNe (see Chapter 7.3.1). Whereas respondents from Cyprus, Hungary, Portugal, Moldova and Turkey reported only basic measures within their countries, respondents from the Czech Republic, Greece, Lithuania, Romania, Slovenia, the UK and Ukraine indicated considerable efforts to harmonise the threat assessment process. No clear standardisation was found for Belgium, France, Germany, Ireland, Italy, Norway and Spain. A lesson learned when performing CBRNe threat assessments was the consideration of the distinctive geography of a given country (e.g. size, climatic conditions, neighbouring states, location of critical infrastructure, urban or rural character of the area, etc.).

Joint alert systems and coordination approaches is a good practice example found in dedicated coordination centres for threat assessment in Belgium and Canada. In addition, good practice from Canada and Greece showed the value of including CBRNe practitioners in the general threat assessment system. Across all interviewed countries, similar measures of **(joint) mobilisation** were found. Furthermore, **similar key tasks of CBRNe response** (detection and containment, evacuation, criminal and crime-scene investigation, ensuring public order and safety, medical treatment, decontamination) were mentioned across all countries, although the allocation of responsibilities strongly depends on the organisations involved in the CBRNe response in each country (see Chapter 7.3.2).

Regarding **public communication**, it became evident, that not all professional groups participate equally in this process (see Chapter 7.3.3). 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. While some respondents seem to prefer traditional media like the TV and radio, websites and social media were indicated as information channels used by most first responder organisations to disseminate CBRNe-related information to the public. Amongst all professional groups, especially practitioners from Civil Protection provide CBRNe information material. Good practices identified were the mobile

applications and SMS notifications like the BE-Alert system in Belgium and the J-ALERT system in Japan. In the interviews, both advantages (building and maintaining trust) and perils (sensationalism, misinformation) in dealing with the media were addressed. In terms of effectively communicating with the public, three quarter of respondents confirmed the existence of communication strategies that often focus on evacuation and post-incident information rather than pre-incident communication. General information and evacuation are the two main topics addressed in information material for the public.

However, only about half of the respondents rate the communication strategy as a whole as suitable for managing CBRNe incidents. This was especially true for respondents from Finland, France, Germany, Ireland, Norway and Poland. In addition to the communication strategy, slightly more than a third of respondents in all countries (and mainly respondents from non-EU countries) perceived information material for the public to be effective.

Research question 2: *To what extent do CBRNe practitioners consider the special needs of vulnerable citizens in measures of preparedness and response across European Member States and beyond? And what lessons learned can be found in non-EU countries with a significant track record in CBRNe incident preparedness and response?*

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 7.2.1, **SOPs** are necessary to prepare for a CBRNe incident. The online survey showed that most organisations have specific SOPs for CBRNe incidents. However, these SOPs rarely consider the needs of vulnerable groups, especially those of ethnic minorities, people with mental health conditions and hearing and visually impaired people (see Chapter 7.2.6). According to the respondents from Belgium, Germany, Ireland, Italy, Latvia, Lithuania, Moldova, Norway, Portugal, Romania, Slovenia, Spain and Turkey, vulnerable people are not at all or only slightly addressed in security measures and SOPs. For Cyprus, France, Greece and the UK, moderate efforts are reported. Only respondents from the Czech Republic, Hungary and Ukraine indicated comprehensive measures in this regard in their countries including a consistent approach to deal with vulnerabilities. Regarding the different professional groups, especially LEAs, members of the Civil Protection and firefighters indicated a lack of SOPs that consider vulnerable groups. This applied less often to emergency medical services. The interview study also revealed that the needs of vulnerable groups are rarely considered in organisations' preparedness measures for a CBRNe incident including education and training (see Chapter 7.2.2). About a third of the survey respondents stated that vulnerable groups are not at all considered in the CBRNe **information resources** provided by the first response organisations to educate their staff for CBRNe incidents. The categories considered most often are persons with mobility restrictions, children and older persons. Other groups are barely present. Furthermore, the **practitioners' contact with members of the public** and especially with vulnerable persons is an element rarely addressed in CBRNe exercises. However, occasional training in this regard is indicated to a certain extent, especially by members of the Civil Protection. The interview study revealed that such training is part of the British JESIP system. Looking at the **involvement** of the public in CBRNe exercises, less than twenty percent of respondents indicated this regarding citizens in general and only three percent for members of the vulnerable civil society. Among all professional groups, especially members of the Civil Protection and fire brigade indicated sporadic involvement of citizens in exercises. Reported difficulties include

ethical and confidentiality issues and resulting costs. When it comes to **cooperation** with civil society organisations representing vulnerable groups, less than fifteen percent confirmed such agreements. Similar results were found in the interview study.

Concerning CBRNe response, it became evident that not all CBRNe practitioners have contact with members of the vulnerable civil society during a CBRNe incident (see Chapter 7.3.4). However, the interview study identified **five major challenges in dealing with diverse groups of citizens** including a certain lack of understanding of the topic of CBRNe and the spread of misinformation, non-compliance, the fear-inducing character of PPE, decency (especially in regard to certain religious groups and women) as well as challenges in dealing with people with mobility restrictions. Several good practices were identified to address some of these challenges, such as the example from the Lebanon about the larger involvement of female CBRNe responders.

One fourth of the survey respondents indicated that vulnerable people are not addressed in **communication strategies**. Similar to the findings on CBRNe related SOPs, vulnerabilities recognised in such strategies mainly considered the needs of people with mobility restrictions, older people and children. Very rarely, however, the needs of people with mental health conditions, visual and hearing impairment, pregnant women and ethnic minorities are taken into account. This was true amongst all professional groups. Similar results were also found in the interview study. Most respondents rated the communication with the public to be only minimal or emerging including only generic strategies to engage with the public. Whereas none of the country representatives who took part in the benchmarking study clearly considered the communication strategy in place to be consistent and comprehensive, respondents from Belgium, the Czech Republic, France, Germany, Greece and Ukraine saw at least some moderate efforts being made. Therefore, there is still need for improvement to address vulnerabilities in general in SOPs and communication strategies as well as those groups that especially lack recognition. When looking at the **accessibility of information** for all citizens, more than a half of all surveyed 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 offered at least one bilingual option. Nevertheless, there were differences between the countries: while the English-speaking countries focused primarily on English, multilingual countries like Belgium considered the diversity of their population in the provision of information materials. In this regard, the United States can be seen as a good example since multilingual information is used to address the whole diverse population despite being an English-speaking country. 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. Of those who acknowledge the needs of vulnerable citizens by providing special language formats, almost three quarters offered information in plain language, and pictorial language was provided in almost forty percent. The importance of using pictorial language was emphasised in the interview study as well. In this respect, the needs of individuals with dyslexia can be served. In addition, only around twenty percent of respondents confirmed that audio material is offered for visually impaired people. For Braille, the figure was even lower, at only five per cent. For hearing impaired people, only a bit more than ten percent confirmed the availability of sign language. The interview study revealed that this format is often limited to certain broadcasting times and special TV programmes. Therefore, improvements need to be made to provide those vulnerable groups with the information they need to cope with a CBRNe incident. Thus, as reflected in the communication strategy, the needs of hearing impaired people and visually impaired people are far less frequently taken into account compared to other vulnerabilities such as limited language proficiency. With

regard to people with certain mental health conditions, interviewees from different countries like Greece, Ukraine and the Czech Republic stated that psychologists are involved in CBRNe response.

In conclusion, awareness of the needs and vulnerabilities of particular groups is relatively low among CBRNe responders across Europe. Consequently, the actual consideration of these needs in planning and response measures is likely to be even lower. Therefore, as a basis for stronger future consideration, the general understanding of vulnerable contexts and marginalised groups must be improved.

Bonus findings: *Outlook on Covid-19 and its implications on other CBRNe incidents. Lessons learnt during the pandemic and transferrable lessons to biohazards and other biological threats in the CBRNe spectrum.*

Besides the two main research questions, the study further revealed that Covid-19 has also brought attention to biological threats which are part of the wider cluster of CBRNe. The Covid-19 pandemic resulted in greater sensitivity to CBRNe incidents, greater awareness of vulnerabilities, adaptation of SOPs, improved communication (scientists as communicators of scientific knowledge), better understanding of protective measures (e.g. wearing PPE), and enhanced compliance with given health measures. While Covid-19 brought these issues to the forefront, our study suggests that some of these considerations may partially apply to CBRNe incidents in general. The pandemic also showed that every incident is different. This is why today's CBRNe management with its lessons learned and good practices can only be partially transferred to future CBRNe incidents. However, basic recommendations can be derived from the findings described to enhance the effectiveness of CBRNe management.

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. While some of the past research on crisis situations already highlighted some of these critical points in various contexts or in reference to other CBRNe events, the Covid-19 pandemic revealed how many of these principles are still ignored at a wide scale, for example the imminence to raise awareness of the needs of vulnerable groups in CBRNe situations.

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 recommendations below comprise the following 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 stand-alone and inherently consistent and can be further extracted and adapted individually from the document. References within individual recommendations to others make it easier for stakeholders to address corresponding recommendations.

The following recommendations arise from the findings of the report:

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

Identified gap	<p>Overall, too little attention is paid to vulnerable groups in CBRNe incidents (e.g. measures of response, communication strategies).</p> <p>In particular, ethnic minorities, hearing impaired persons, and people with mental health conditions are insufficiently considered in SOPs.</p>
Recommended actions	<ul style="list-style-type: none"> • 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 of particular vulnerable groups (especially CSOs representing ethnic minorities, hearing impaired persons and people with mental health conditions). (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)
Best practice example	<ul style="list-style-type: none"> • Modifying SOPs especially for persons with autism (e.g. Lebanon). • Involvement of female CBRNe responders to address ethical needs during decontamination (e.g. disrobing) in Lebanon.

Responsible stakeholders	Policy makers and all practitioners involved in CBRNe management with support of CSOs representing vulnerable groups.
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Recommendation 2: *Vulnerability should be addressed more intensively in CBRNe-related discussions to raise awareness of the needs, expectations and challenges in regard to vulnerable members of the civil society in CBRNe incidents.*

Identified gap	Vulnerability is too rarely addressed in CBRNe SOPs, CBRNe exercises, CBRNe communication strategies, etc.
Recommended actions	<ul style="list-style-type: none"> • LEAs and first responders should use existing or create new communication platforms with other practitioners and CSOs to raise awareness on vulnerability in CBRNe management (e.g. conferences, seminars, trainings, e-libraries with relevant research and guidelines). • 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). • 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 practitioners involved in CBRNe management with support of CSOs representing vulnerable groups.

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

Identified gap	Cooperation approaches with CSOs representing members of the vulnerable civil society needs to be intensified. Such cooperation was confirmed by less than 15% of respondents. Furthermore, vulnerable persons are insufficiently involved in relevant training exercises. As a result, first responders may lack the knowledge to adequately address the needs of vulnerable citizens in CBRNe operations. This creates an urgent need for CBRNe practitioners to implement cooperation agreements with CSOs. During CBRNe response, there is an insufficient inclusion of translators, psychologists and psychiatrists in networks of LEAs and first responders.
Recommended actions	<ul style="list-style-type: none"> • LEAs and first responders should (more regularly) involve members of CSOs in joint exercises. (see Recommendation 5) • Unforeseen challenges in dealing with vulnerable citizens might be overcome 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 citizens should be firmly discussed to reduce stress symptoms. (see also Recommendation 6) • LEAs and first responders should include translators, psychologists and psychiatrists into their networks to facilitate interaction with specific 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.). A clear cooperation goal should be formulated, as well as approaches to achieve this goal. Furthermore, evaluation mechanisms seem to be useful in order to check the effectiveness of the approaches.
Responsible stakeholders	All practitioners involved in CBRNe management and CSOs representing vulnerable groups.

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, inter-agency exercises should be conducted more regularly to create an understanding of the responsibilities of other involved practitioners during a CBRNe incident.*

Identified gap	Our survey data indicated that firefighters regularly engage in exercises (almost 90%), while only about 50-60% of LEAs, emergency medical services and members of Civil Protection do. Furthermore, 73% of the responders indicate that the exercises are extremely valuable to prepare the response to major incidents.
Recommended Actions	<ul style="list-style-type: none"> • 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 Recommendations 5 & 6) • LEAs and first responders should engage more regularly in training exercises that focus on interaction with the public. (see also Recommendations 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. These exchanges could make use of: <ul style="list-style-type: none"> ○ 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). (see Recommendation 2) • The relevance of such trainings should be stressed among first responders (e.g. via seminars, information materials).
Conditions for implementing the proposed actions	<p>The following points should be discussed prior to joint trainings:</p> <ul style="list-style-type: none"> • Recruitment issues. • Legal obligations / confidentiality obligations when including external people. • Logistical/tactical issues to be considered.
Responsible stakeholders	All practitioners 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.

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	As with other preparedness measures for a CBRNe incident, the online study has shown that vulnerable groups are very rarely included in CBRNe exercises. 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. 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	<ul style="list-style-type: none"> • 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). (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) (see Recommendation 2) • The relevance of such trainings should be stressed among first responders (e.g. via seminars, information materials). • 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	<p>The following points should be discussed prior to trainings involving vulnerable groups:</p> <ul style="list-style-type: none"> • Recruitment issues. • Legal obligations / confidentiality obligations when including external people. • Logistical/tactical issues to be considered. • Ethical obligations in including vulnerable people.
Responsible stakeholders	All CBRNe practitioners involved in CBRNe management, but especially practitioners operating in the hot zone, relevant CSOs, schools and nursing homes.

Recommendation 6: *In particular, the topics of “containment”, “evacuation”, “decontamination” and contact with (vulnerable) citizens should be trained during CBRNe exercises.*

Identified gap	Drawing on the insights of the interview study, the ‘containment’, the ‘evacuation’ and the ‘decontamination’ of diverse groups of citizens were noted as expected processes that cause profound stress especially for vulnerable citizens. In this context, interviewees mentioned intimidation of citizens by the PPE ²² , the issue of decency in the frame of decontamination and challenges in dealing with people with mobility restrictions. Respondents indicate in only half of cases that exercises “always” or “frequently” focus on the topic of evacuation during a CBRNe incident. However, the contact with citizens in general and with vulnerable citizens in particular is still not trained enough.
Recommended actions	<ul style="list-style-type: none"> • LEAs and first responders should more regularly focus on challenges of the disrobing and decontamination process during exercises. • Identified challenges of the disrobing 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) 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). (see Recommendation 2)
Responsible stakeholders	All practitioners involved in CBRNe management, but especially practitioners operating in the hot zone.

²² Although Covid-19 is expected to improve the understanding of CBRNe and thus of PPE.

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 sharing of responsibilities between the individual organisations (fire brigades, LEAs, etc.) in the event of a major incident.

Identified gap	Cooperation agreements, SOPs, etc. seem to be missing or to insufficiently outline clear responsibilities within and between LEAs and first responder organisations in the event of a major incident. 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.
Recommended actions	<ul style="list-style-type: none"> • 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). • 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”.
Lesson learned	<ul style="list-style-type: none"> • National unity of agencies can facilitate inter-agency collaboration and harmonise CBRNe management. • Inclusion of military within borders can be helpful (e.g. knowhow, resources, etc.) but needs clear and simple collaboration policies.
Best practice example	<ul style="list-style-type: none"> • The JESIP model: Joint Doctrine for interoperability framework in the UK.
Responsible stakeholders	All practitioners involved in CBRNe management, but especially practitioners operating within the hot zone.

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	The survey participants reported: 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. 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.
Recommended actions	<ul style="list-style-type: none"> • 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 exchange knowledge about communication procedures with relevant practitioners (e.g. other blue light organisations, municipal authorities) 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). • LEAs and first responders should use networks with other practitioners and interested/relevant CSOs to exchange “lessons learned” and “best practices”.
Best practice example	<ul style="list-style-type: none"> • Mobile applications can work as a valuable notification and information system for general or particular communication goals (e.g. BE-Alert in Belgium; national public alert system in the USA; J-ALERT system and railway App in Japan, etc.)
Responsible stakeholders	All practitioners involved in CBRNe management.

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

Identified gap	<p>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. 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). Additionally, they are insufficiently addressed in the overall communication strategy. Survey respondents indicated to a large extent that their organisations' communication strategies, especially those for major incidents, do not consider vulnerable groups. Where vulnerable groups are considered, 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.</p>
Recommended actions	<ul style="list-style-type: none"> • 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). In this regard, in particular the needs of hearing 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 regarding 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 citizens to identify gaps and insufficient coverage of the peculiarities of CBRNe incidents. If needed, 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). (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	<p>All practitioners involved in CBRNe management.</p>

Recommendation 10: There should be a stronger development of systems of joint cooperation. These include joint-threat assessment and joint-coordination centres (*see Recommendation 7*)

Identified gap	In some countries, the clarity of responsibilities among the different involved CBRNe agencies and the exchange of relevant information appears to be expandable. A common system that brings all stakeholders together can improve the inter-agency collaboration and create a more efficient preparedness and response management.
Recommended actions	<ul style="list-style-type: none"> • LEAs and first responders should foster existing inter-agency collaborations and pursue new collaborations to create a broad network. • CBRNe practitioners should engage with political and government officials to discuss the possibility of creating specialised CBRNe centres. • LEAs and first responders should exchange knowledge with practitioners from other countries in terms of joint collaboration systems. • LEAs and first responders should use networks with other practitioners to exchange “lessons learned” and “best practices”. • LEAs and first responders should cooperate with other potentially relevant practitioners and vulnerable critical infrastructures in their countries (e.g. the transport sector) and involve the respective operators (e.g. public transport, train stations, airports, shopping malls, etc.) in the joint collaborative process.
Lessons learned	<ul style="list-style-type: none"> • Regional geographical differences in threat assessment should be recognised and merged (e.g. climatic conditions, location of critical infrastructures, urban or rural, etc.) • (Regional) challenges in applying lessons learned and best practice examples from other regions or countries should be addressed
Best practice example	<ul style="list-style-type: none"> • Coordination centres for threat assessment like CUTA in Belgium • Inclusion of CBRNe practitioners in overall threat assessment structure (e.g. single CBRNe experts in Greece; dedicated linked departments in Canada)
Responsible stakeholders	All practitioners involved in CBRNe management including other practitioners dealing with critical infrastructures such as railways and airports, relevant municipal authorities and private security companies.

Within this chapter, **10 recommendations** for CBRNe first responders and other practitioners were presented that cover different phases of CBRNe management. These recommendations have been further specified in a complementary PROACTIVE study with representatives of the vulnerable civil society (see Deliverable 3.4; Carbon et al. 2021b). 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 contribute to the visibility of vulnerable groups in the event of a CBRNe incident.

11. SYNERGIES WITH OTHER WPS AND TASKS

Within project PROACTIVE this work relates to the other WPs and tasks in the following way:

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. Moreover, the PSAB strongly contributed to the findings and recommendations in D2.5 by participating in the survey and sharing the survey within their networks.

WP3: The recommendations of D2.3 and of this update in D2.5 entail certain needs for action on part of practitioners. They were further explored and made concrete in D3.4 in which the (perceived) needs and expectations of the vulnerable civil society were examined. In this process, the observed shortcomings on the part of practitioners are analysed with a view to the specific 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 and WP5: Moreover, the outcomes of D2.5 will feed into the development of the toolkit for LEAs and security policy makers in WP4 and the toolkit for the civil society in WP5. The App will pay particular attention to the identified shortcomings. In this regard, the App will use some of the recommendations formulated in D2.5. The findings of D2.5 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). This gap needs to be closed. In this regard, the App 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 D2.5 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). 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 D2.5 will further feed into the development of the joint field exercises in WP6. Following the influence of this deliverable on the toolkit for practitioners in WP4 and civil society in WP5, selected tools and procedures will be evaluated in the exercises to determine their effectiveness in improving the interaction between practitioners and vulnerable citizens. Furthermore, the outputs from D2.5 will inform 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.

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13. APPENDIX A – FIGURES

Figures

APPENDIX A

Figures of Chapter 7.1.1.

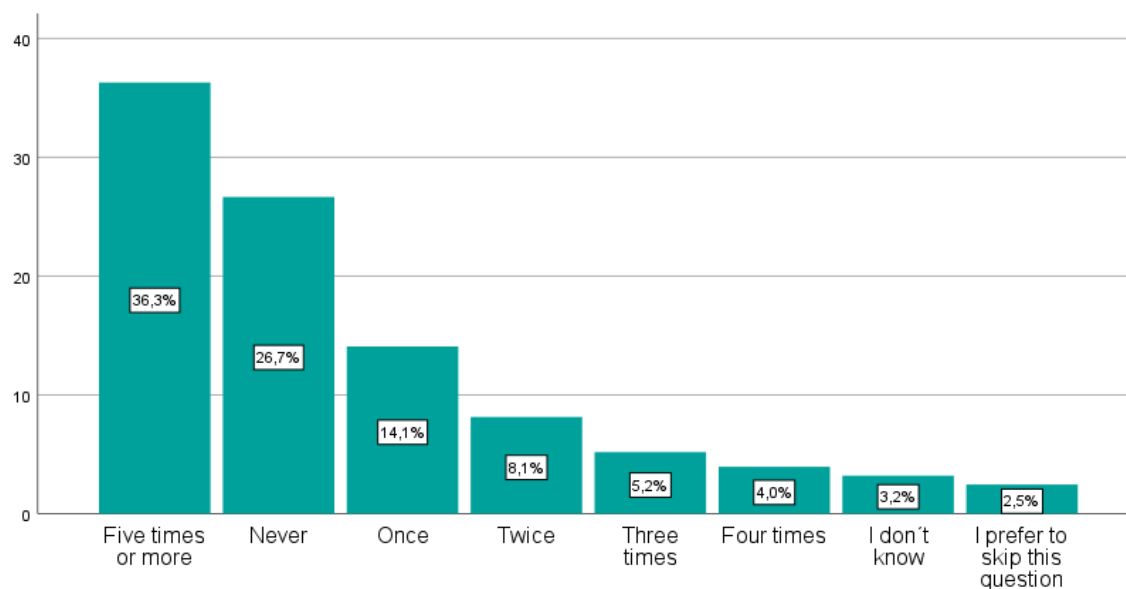


Figure 63: Frequency of survey participants' involvement in a CBRNe incident during their professional life (n=405)

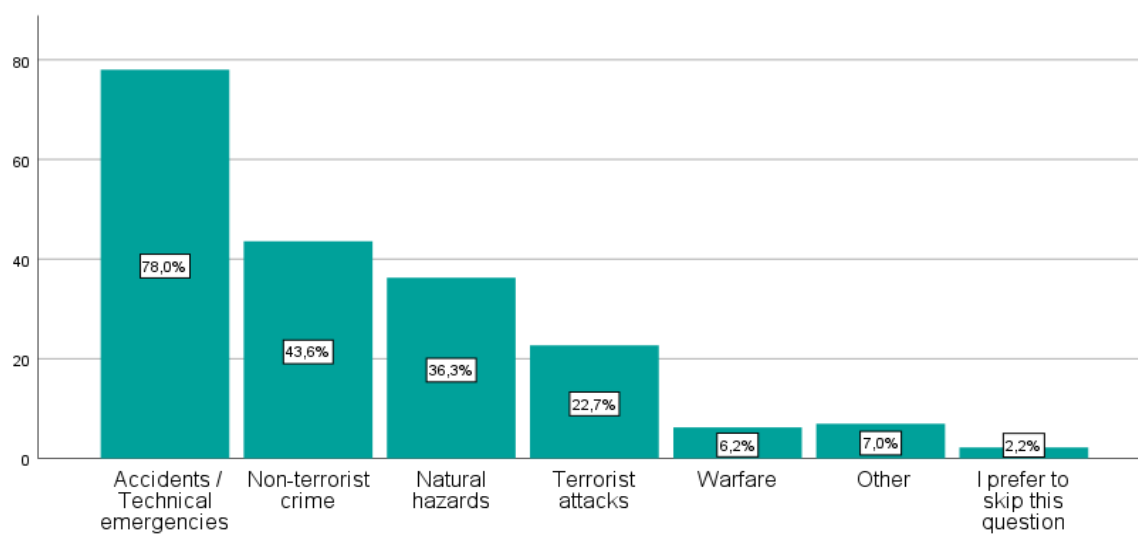


Figure 64: Context of CBRNe incidents in which survey participants were involved during their professional life; Respondents with experience only; multiple selection option (n=273)

Figures of Chapter 7.1.2.

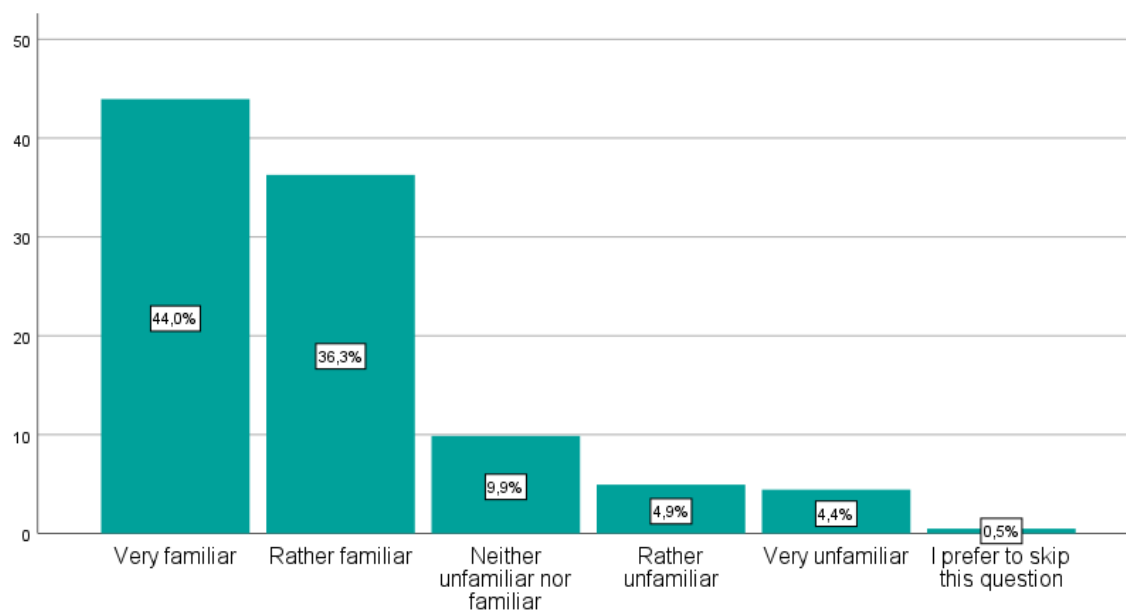


Figure 65: Familiarity of survey participants with the topic of CBRNe (n=405)

Figures of Chapter 7.2.2.

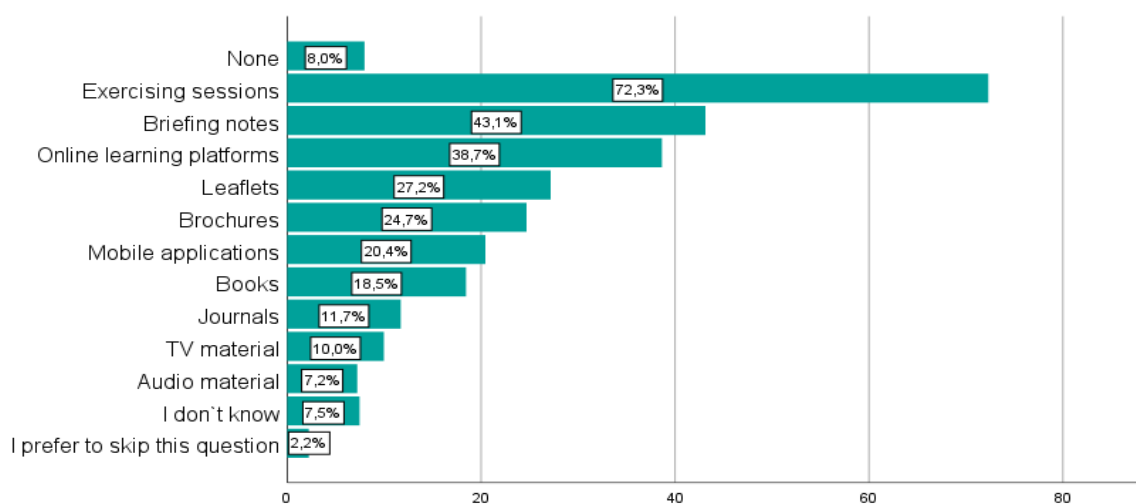


Figure 66: Information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident; multiple selection option (n=401)

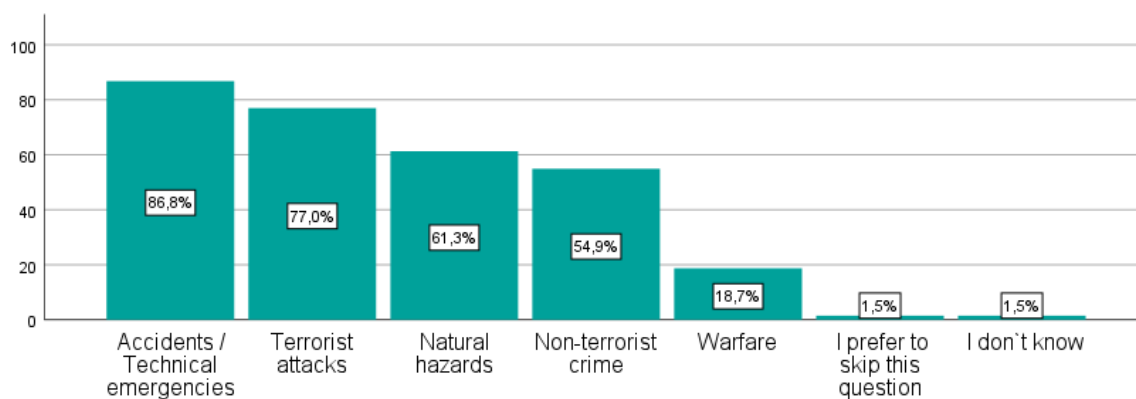


Figure 67: Topics of information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident; multiple selection option (n=326)

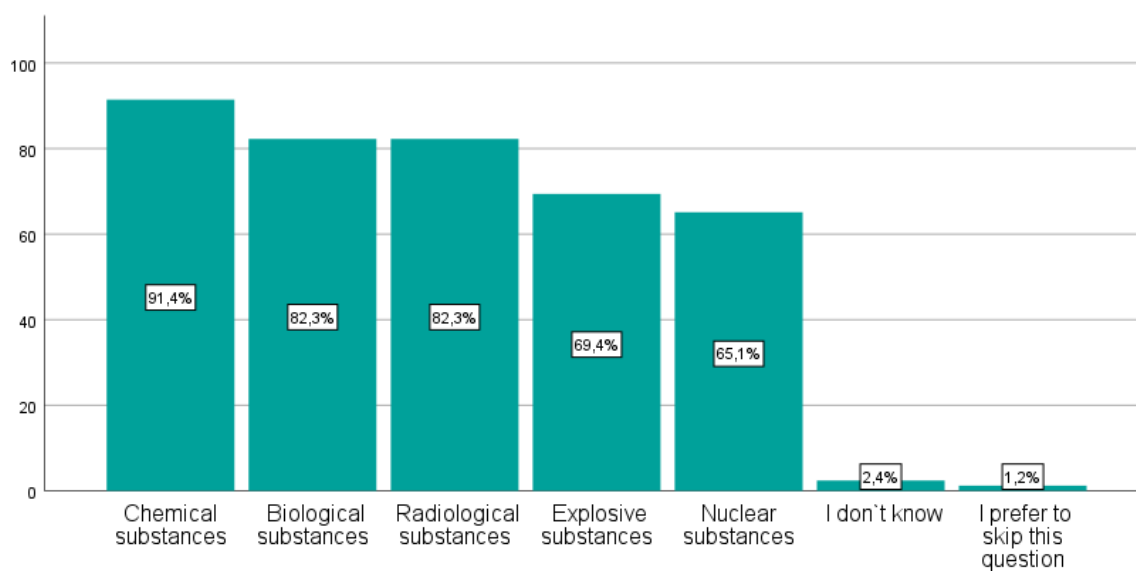


Figure 68: CBRNe substances addressed in information resources provided by respondent's organisation to its personnel to prepare for a CBRNe incident; multiple selection option (n=327)

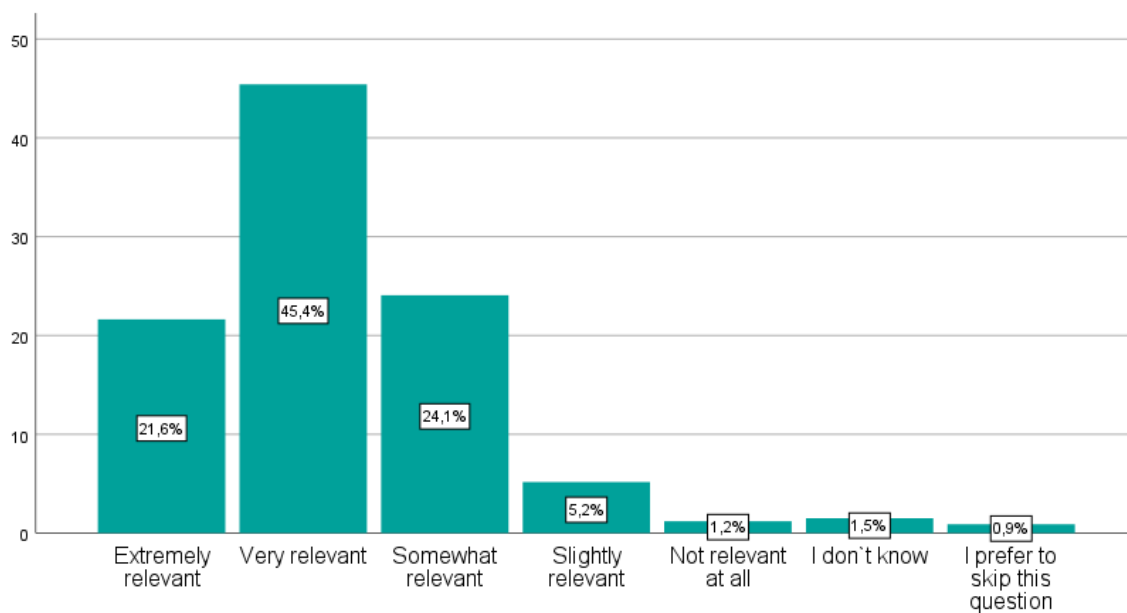


Figure 69: Perceived relevance of the information resources organisations provide for their personnel to prepare for a CBRNe incident (n=328)

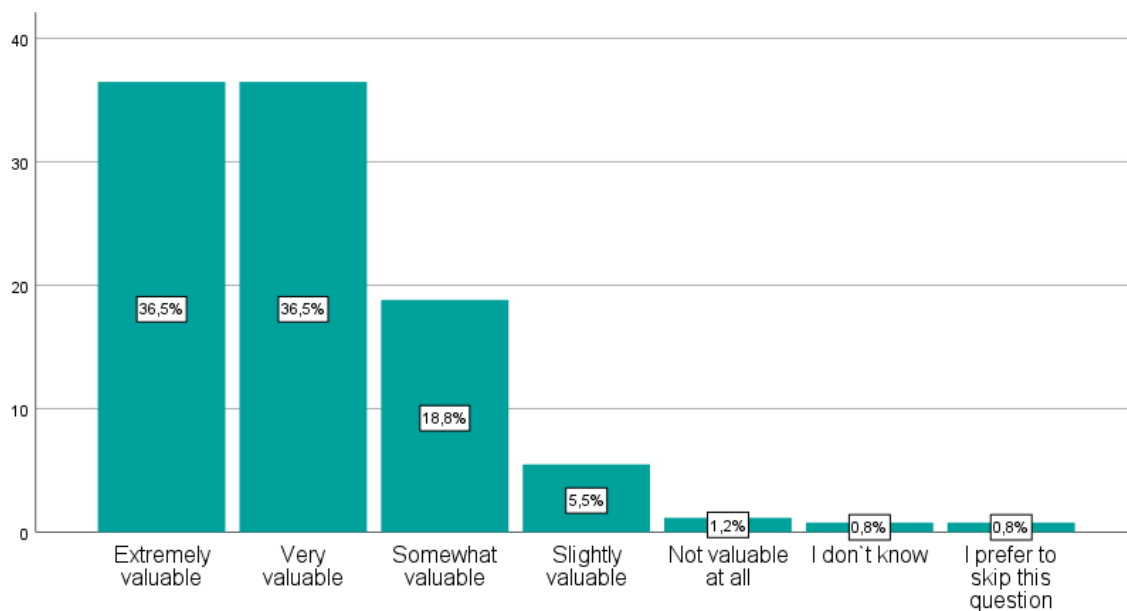


Figure 70: Perceived practical value of CBRNe exercises in which respondent's organisation has participated in the last ten years to prepare for a CBRNe incident (n=255)

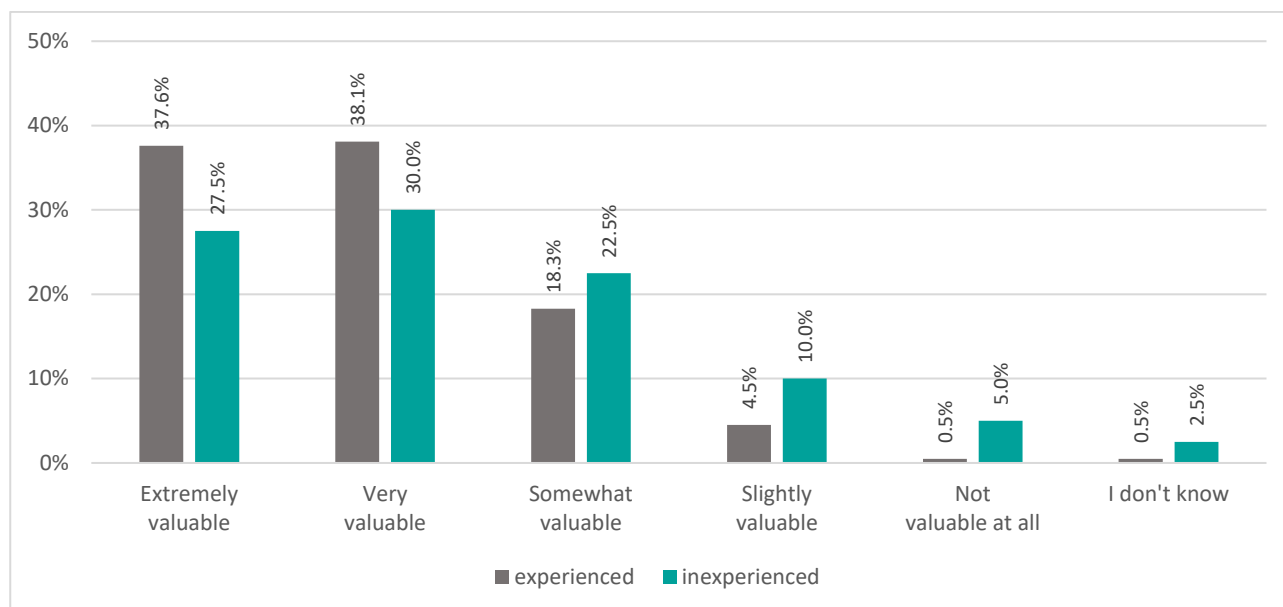


Figure 71: Perceived practical value of CBRNe exercises in which respondent's organisation has participated in the last ten years to prepare for a CBRNe incident by experience with CBRNe incidents (experienced n=202; inexperienced n=40)

Figures of Chapter 7.2.3.

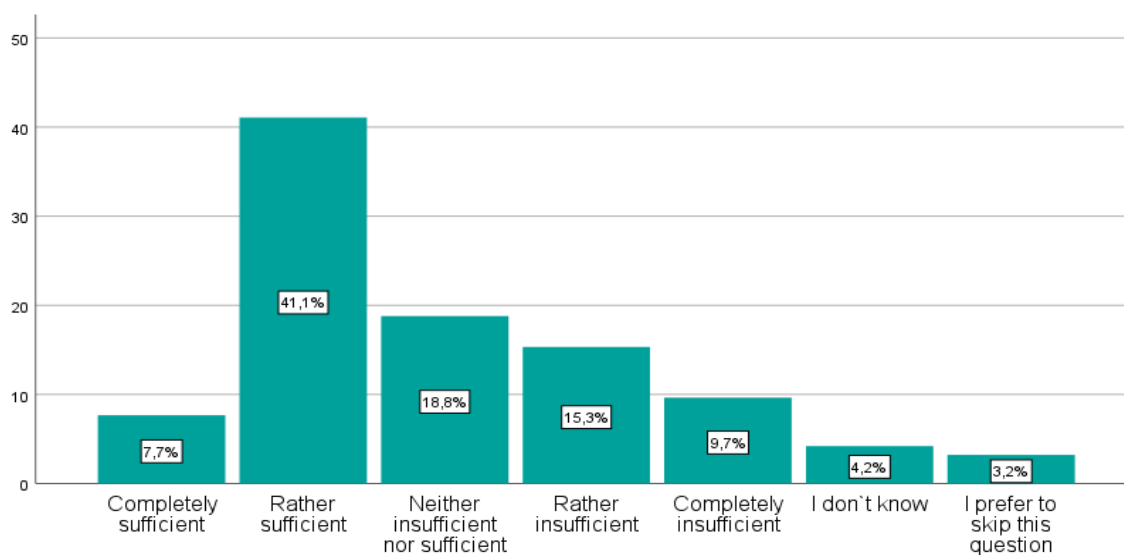


Figure 72: Assessment of the organisational equipment for a CBRNe incident (n=404)

Figures of Chapter 7.2.4.

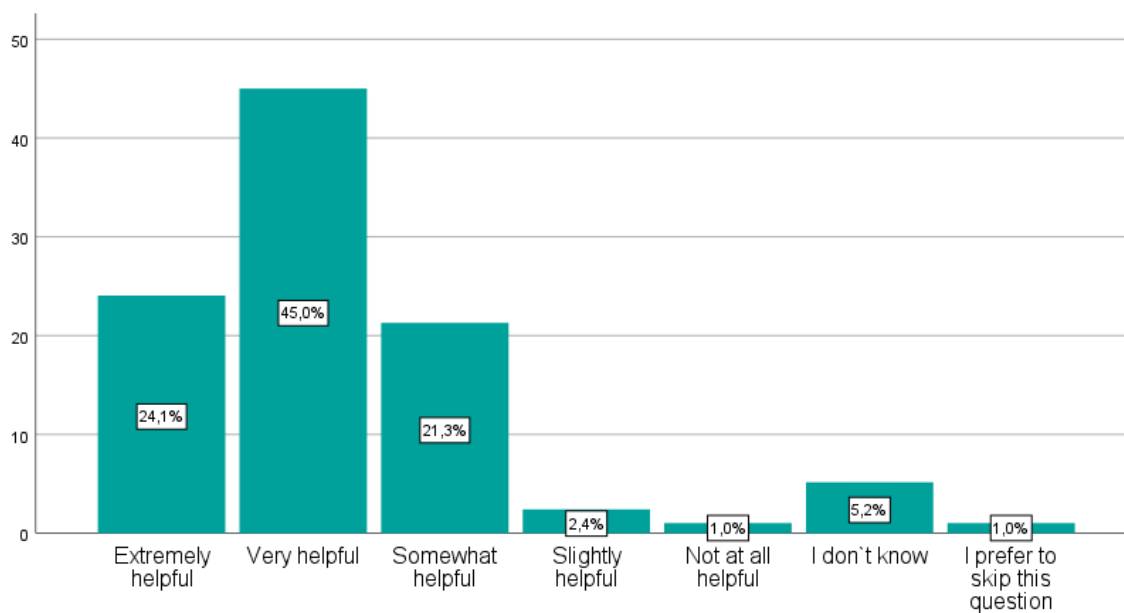


Figure 73: Perceived helpfulness of cooperation agreements for major emergencies for cooperation in these events (n=291)

Figures of Chapter 7.2.5.

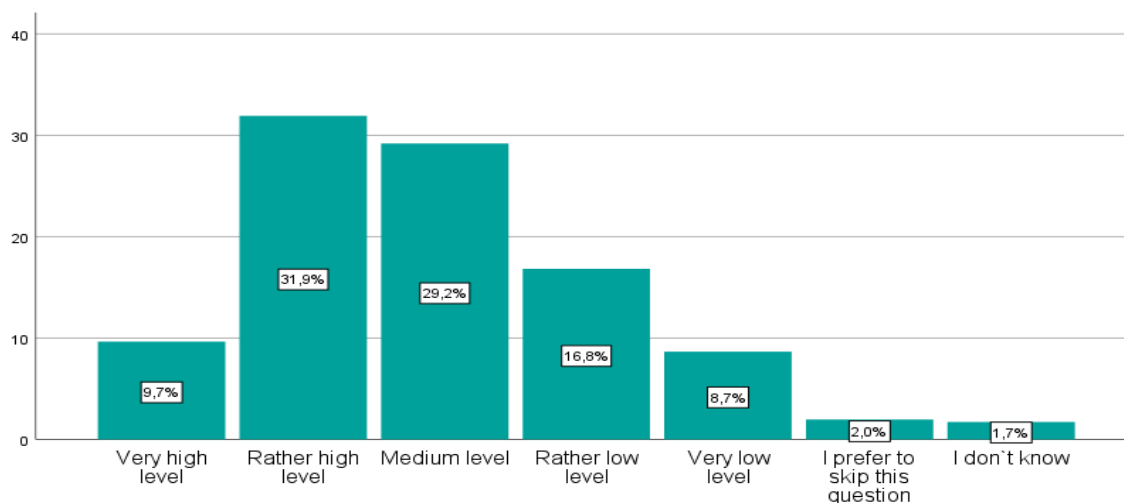


Figure 74: Assessment of the organisational level of preparedness for a CBRNe incident (n=404)

Figures of Chapter 7.2.6.

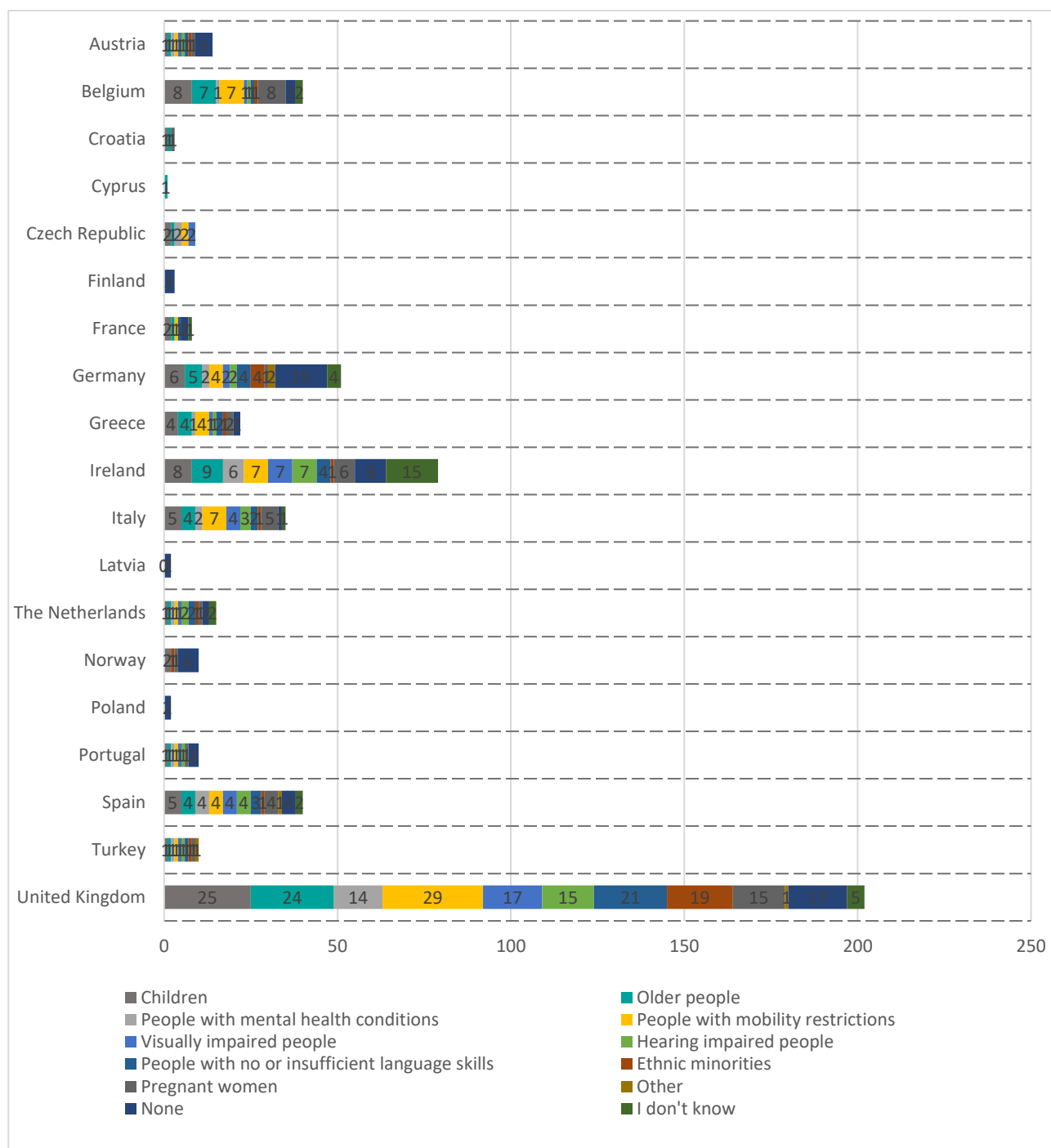


Figure 75: Vulnerable groups addressed by the respondent's organisation in CBRNe SOPs by country; multiple selection option (Austria: n=7; Belgium: n=15; Croatia: n=1; Cyprus: n=1; Czech Republic: n=3; Finland: n=5; France: n=7; Germany: n=35; Greece: n=9; Ireland: n=32; Italy: n=13; Latvia: n=3; Norway: n=8; Poland: n=2; Portugal: n=4; Spain: n=14; The Netherlands: n=7; Turkey: n=2; United Kingdom: n=60)

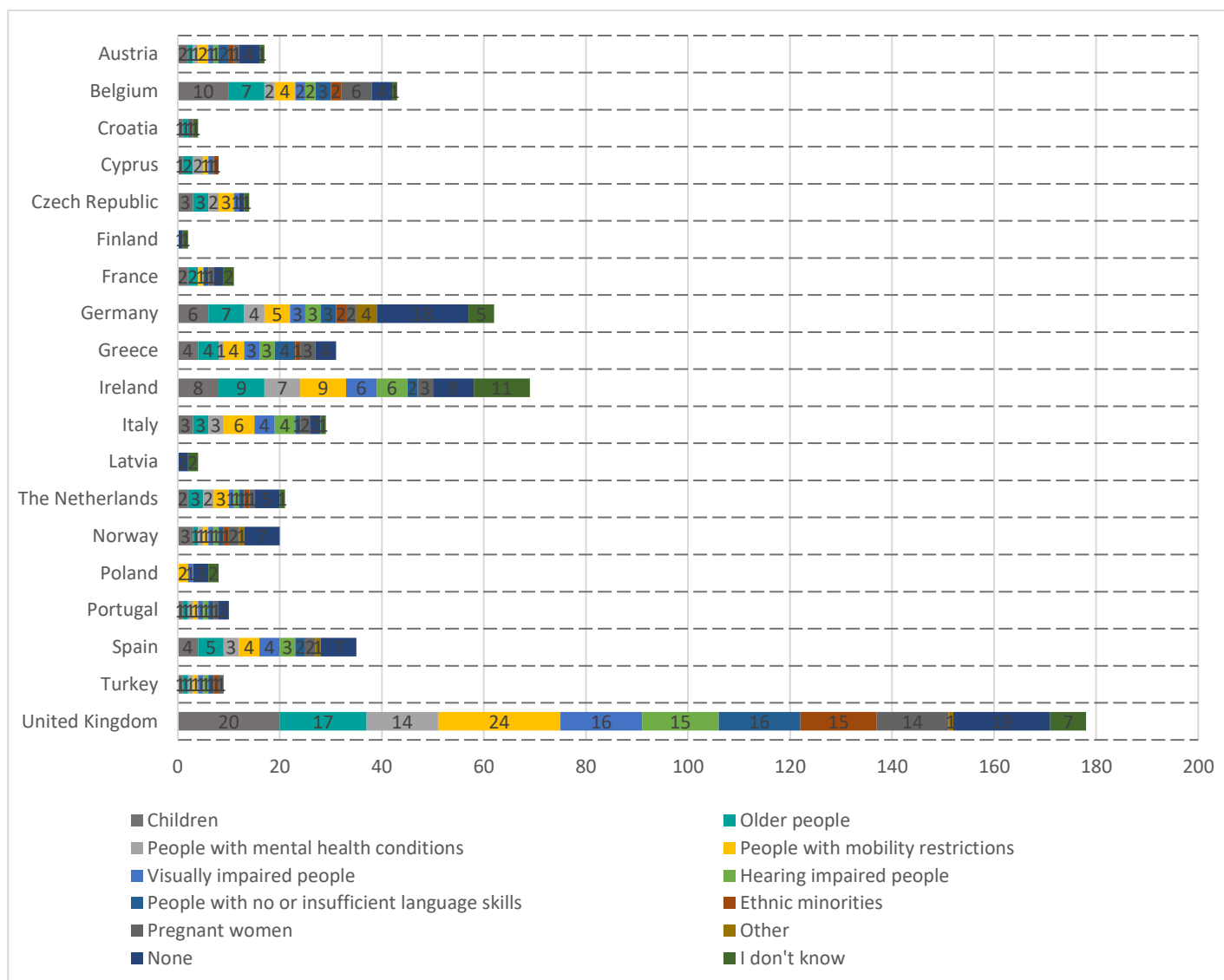


Figure 76: Focus on vulnerable groups in information resources organisations provide for their personnel to prepare for a CBRNe incident by country; multiple selection option (Austria: n=9; Belgium: n=16; Croatia: n=2; Cyprus: n=2; Czech Republic: n=7; Finland: n=5; France: n=8; Germany: n=46; Greece: n=11; Ireland: n=30; Italy: n=12; Latvia: n=5; Norway: n=10; Poland: n=9; Portugal: n=3; Spain: n=14; The Netherlands: n=10; Turkey: n=2; United Kingdom: n=61)

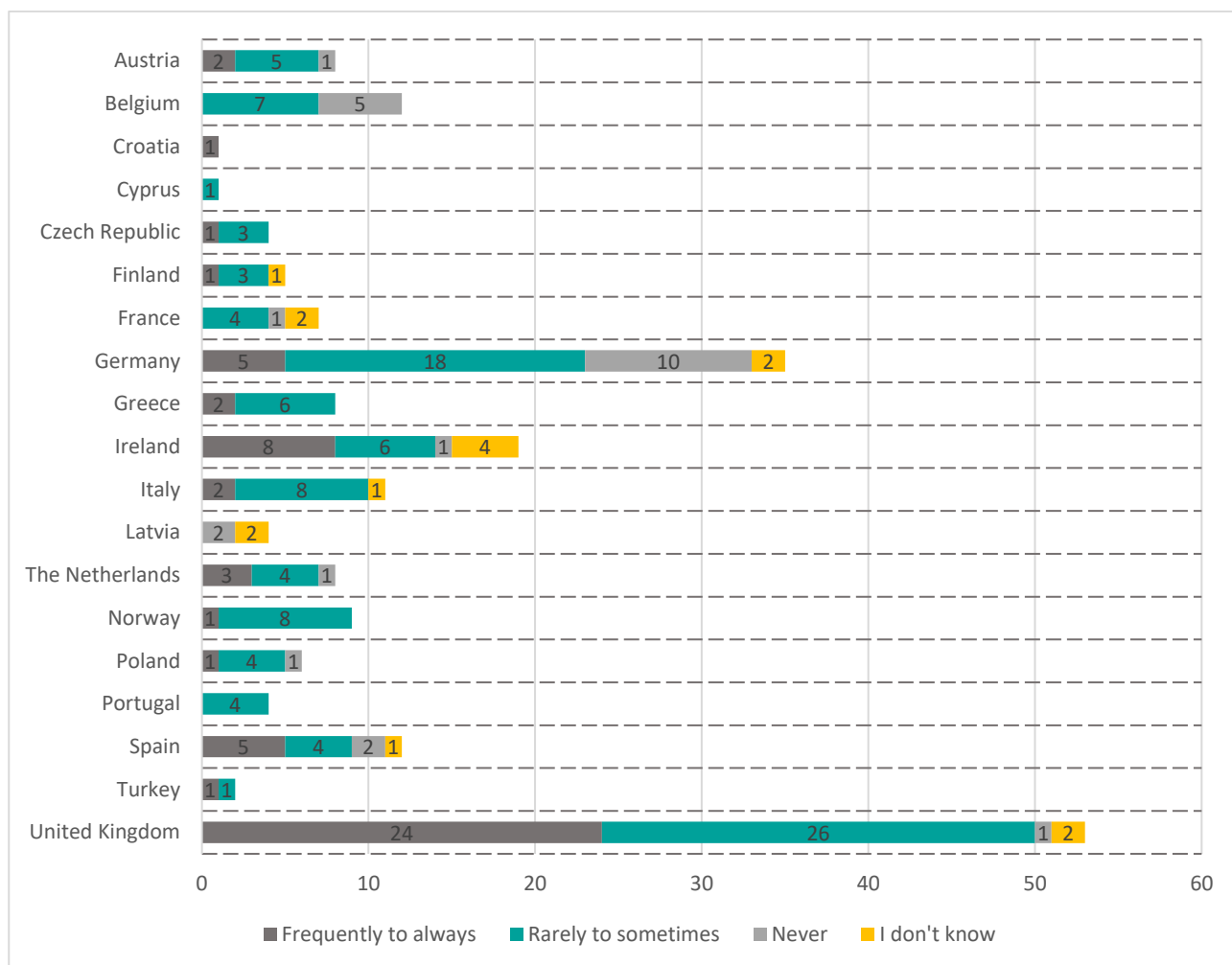


Figure 77: Contact with the public during CBRNe exercises in the last ten years in which the respondent's organisation was involved, by country (Austria: n=8; Belgium: n=12; Croatia: n=1; Cyprus: n=1; Czech Republic: n=4; Finland: n=5; France: n=7; Germany: n=35; Greece: n=8; Ireland: n=19; Italy: n=11; Latvia: n=4; Norway: n=9; Poland: n=6; Portugal: n=4; Spain: n=12; The Netherlands: n=8; Turkey: n=2; United Kingdom: n=53)

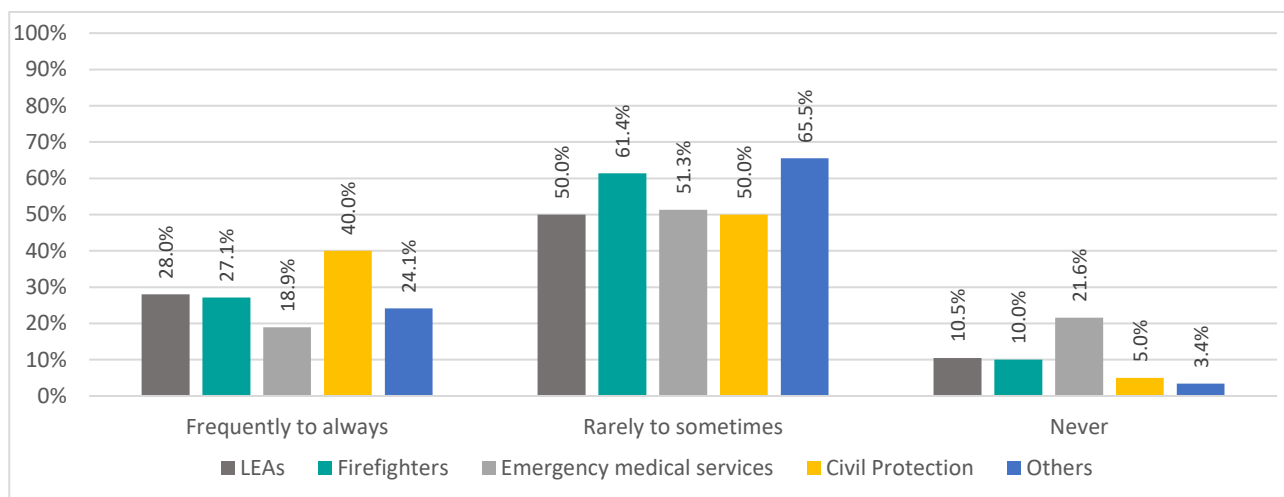


Figure 78: Contact with the public during CBRNe exercises in the last ten years in which the respondent's organisation was involved, by profession (LEAs: n=86; Firefighters: n=70; Emergency medical services: n=37; Civil Protection: n=20; Others: n=29)

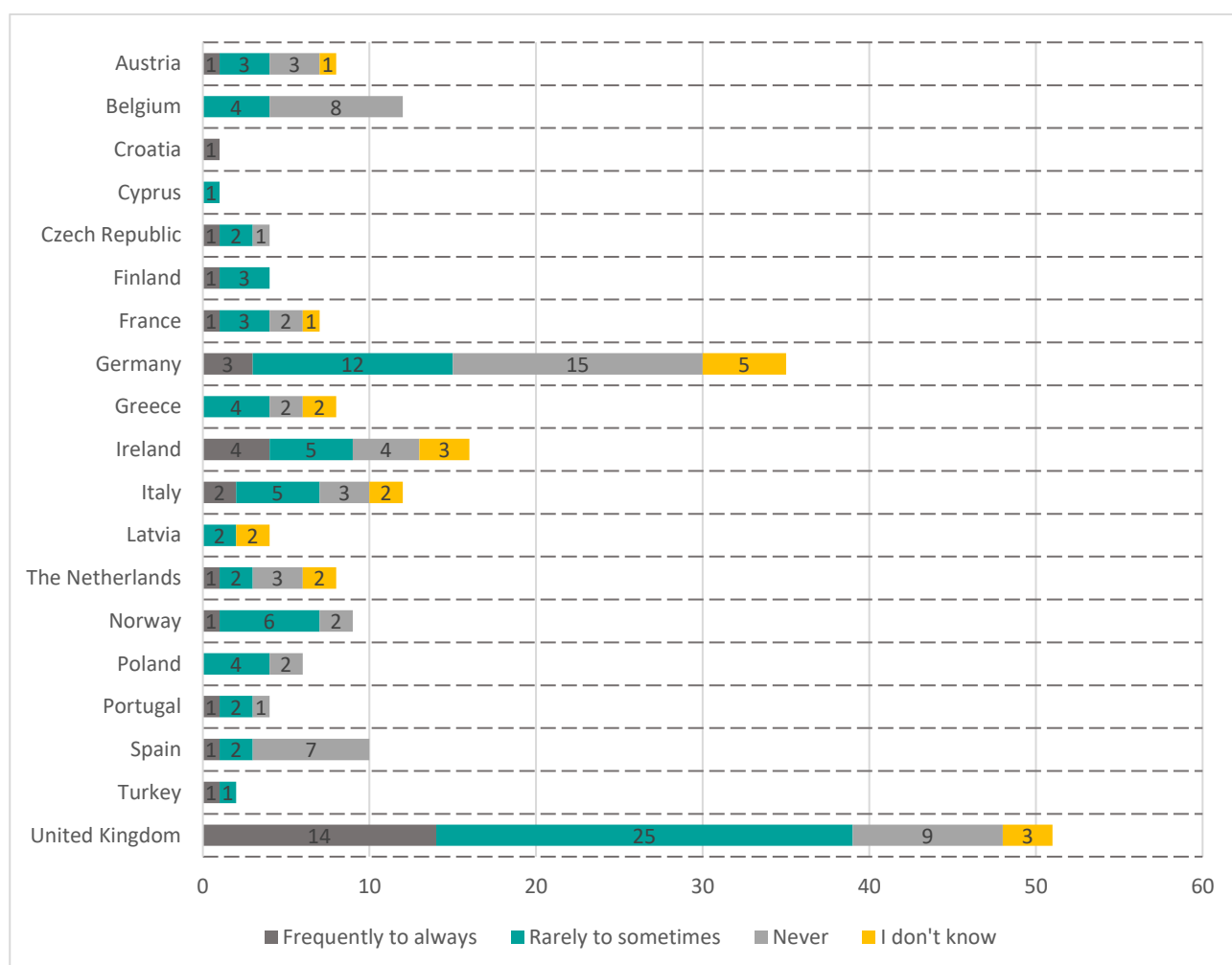


Figure 79: Involvement of the public in CBRNe exercises by country (Austria: n=8; Belgium: n=12; Croatia: n=1; Cyprus: n=1; Czech Republic: n=4; Finland: n=4; France: n=7; Germany: n=35; Greece: n=8; Ireland: n=16; Italy: n=12; Latvia: n=4; Norway: n=9; Poland: n=6; Portugal: n=4; Spain: n=10; The Netherlands: n=8; Turkey: n=2; United Kingdom: n=51)

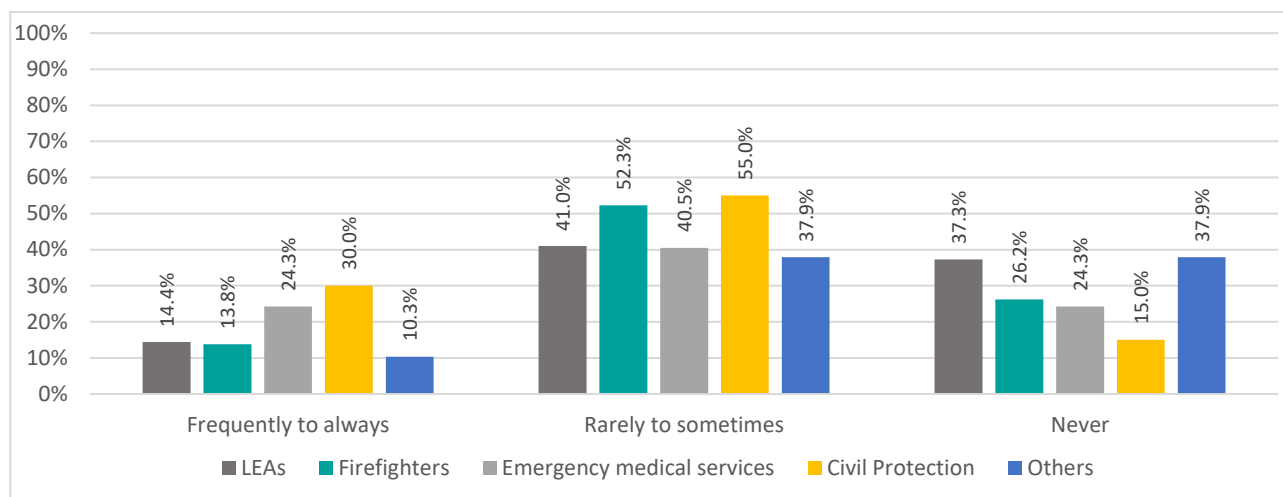


Figure 80: Involvement of the public in CBRNe exercises by profession (LEAs: n=83; Firefighters: n=65; Emergency medical services: n=37; Civil Protection: n=20; Others: n=29)

Figures of Chapter 7.3.3.

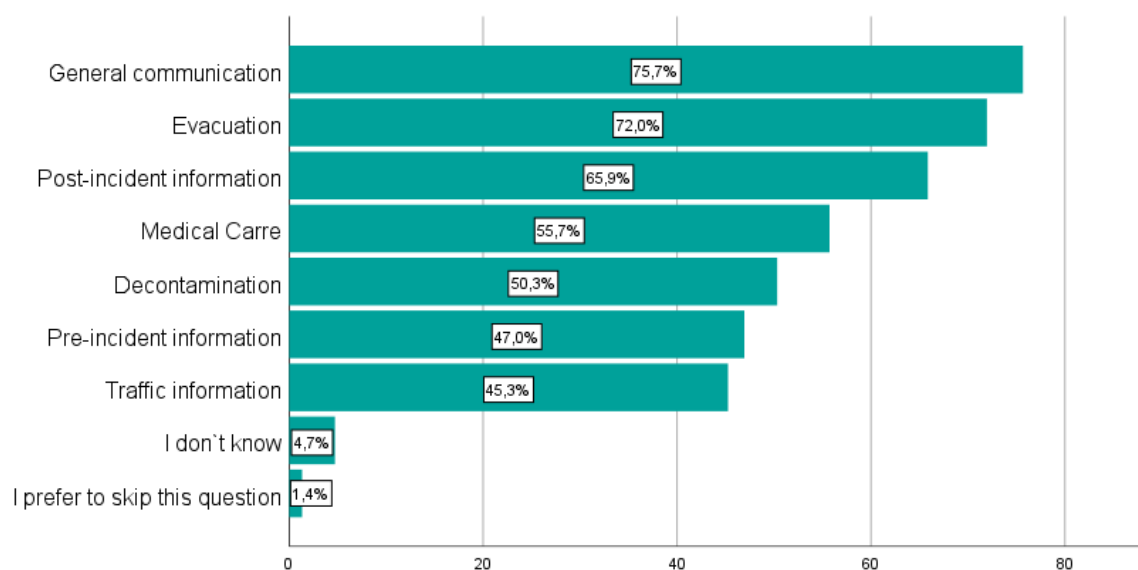


Figure 81: Topics of the organisations' communication strategy for major emergencies; multiple selection option (n=296)

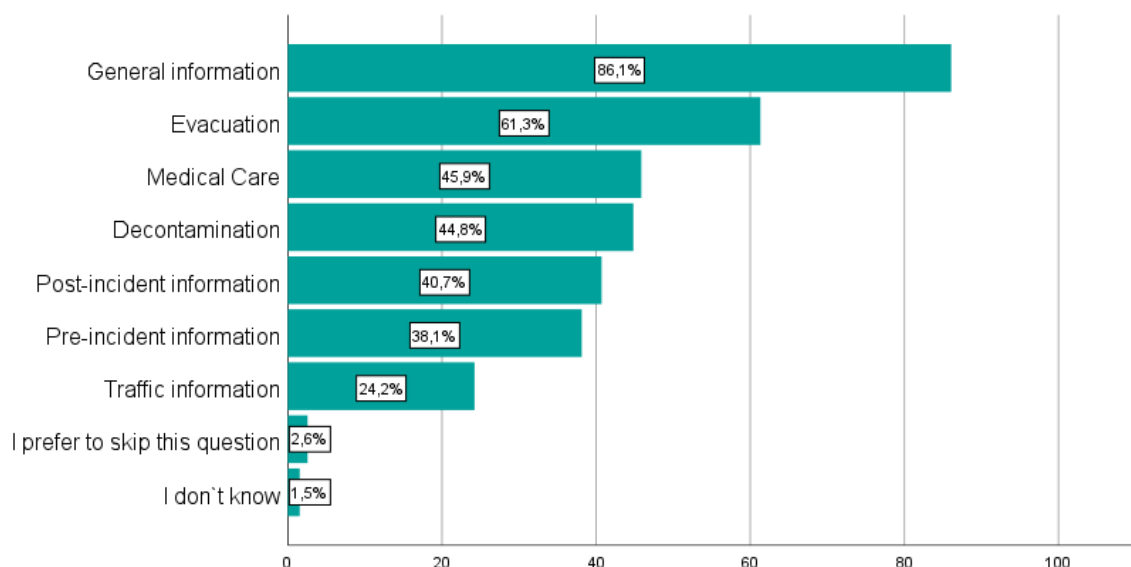


Figure 82: Topics of information resources respondents' organisations provide for the public to cope with a CBRNe incident; multiple selection option (n=194)

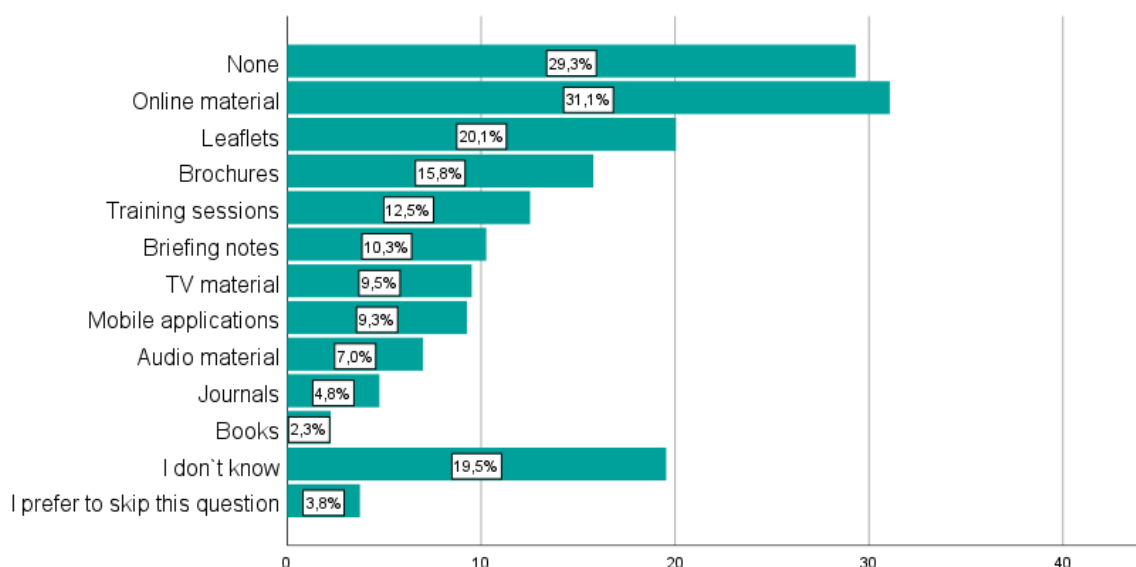


Figure 83: CBRNe-related information resources that the respondent's organisation provides to the public to cope with a CBRNe incident; multiple selection option (n=399)

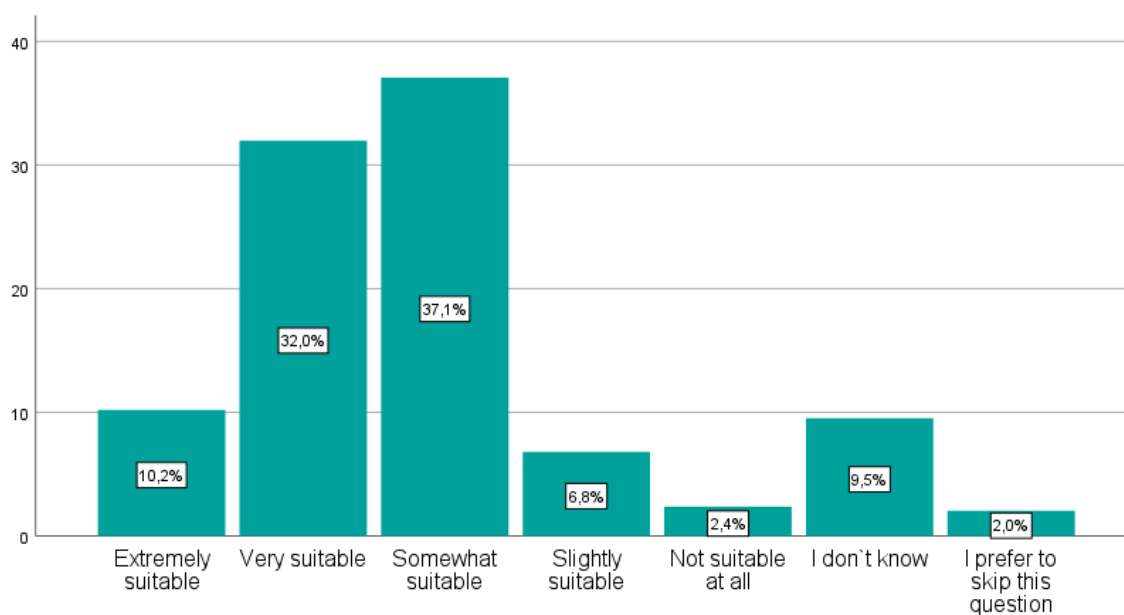


Figure 84: Perceived suitability of the organisation's communication strategy for major emergencies to respond to CBRNe incidents (n=294)

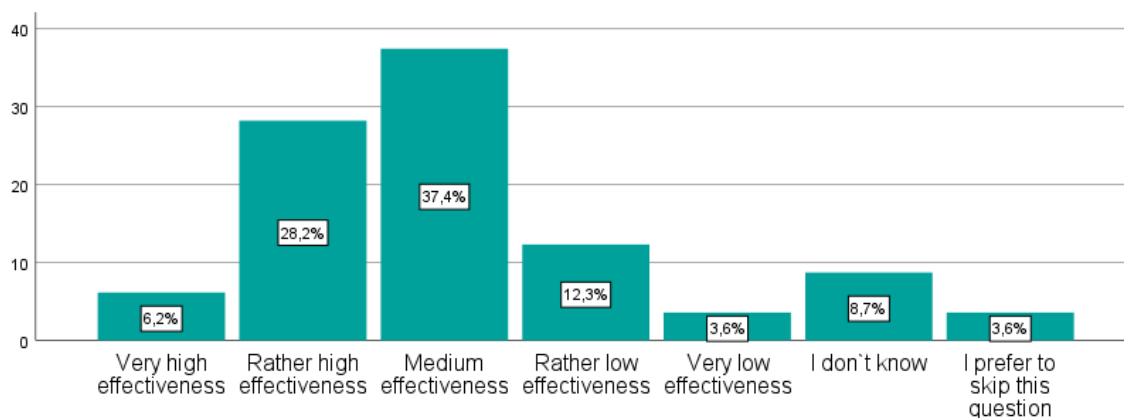


Figure 85: Assessment of the effectiveness of the information resources organisations provide for the public to cope with a CBRNe incident (n=195)

Figures of Chapter 7.3.4.

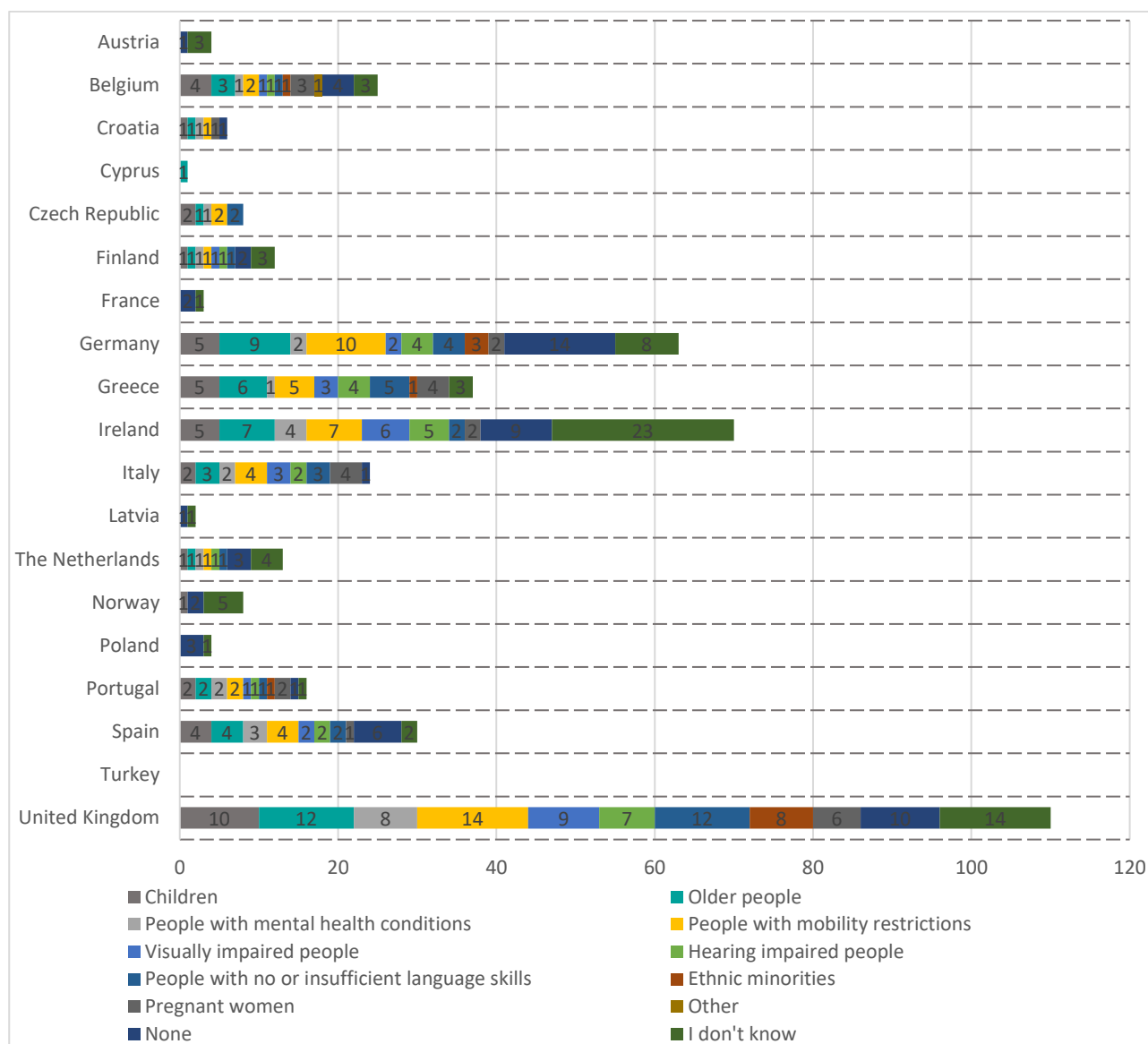


Figure 86: Consideration of vulnerable groups in respondent's organisation's communication strategy for major emergencies by country; multiple selection option (Austria: n=4; Belgium: n=12; Croatia: n=3; Cyprus: n=2; Czech Republic: n=4; Finland: n=6; France: n=3; Germany: n=40; Greece: n=11; Ireland: n=42; Italy: n=8; Latvia: n=2; Norway: n=9; Poland: n=4; Portugal: n=4; Spain: n=14; The Netherlands: n=10; United Kingdom: n=50)

14. APPENDIX B – INVITATION LETTER OF QUANTITATIVE SURVEY

Invitation letter of quantitative survey

APPENDIX B



Dear colleague,

Chemical, Biological, Radiological, Nuclear, & Explosive (CBRNe) incidents, whether accidental or terrorist-based, can have a high impact on society. The German Police University (DHPol) as partner of the EU funded project **PROACTIVE** would be very grateful if you could participate in our online survey on key tasks and phases of CBRNe incidents. The survey analyzes commonalities and differences of CBRNe preparedness and response between countries from the perspective of CBRNe Practitioners such as Law enforcement agents (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. In case CBRNe preparedness and response is not your responsibility, we would be grateful if you could forward this message to the appropriate person in your organisation.

PROACTIVE aims to increase the effectiveness of practitioners in managing large and diverse groups of people in a CBRNe environment. It will provide profound research data to facilitate the interaction of LEAs and first responders with the vulnerable civil society.

This survey follows up on a previous survey (report can be downloaded from our project homepage <https://proactive-h2020.eu/>) and aims at broadening the perspective by including more practitioners' views from a larger number of countries. Attached we provide you with a detailed information sheet.

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 28th, 2021**.

Please feel free to circulate this message to your colleagues. Also, please note that your responses to the questionnaire are strictly confidential and will be handled in accordance with the GDPR. For any queries, 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:



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



15. APPENDIX C – QUESTIONNAIRE OF QUANTITATIVE SURVEY

Questionnaire of quantitative survey

APPENDIX C

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire Brigades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical Staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Civil Protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Members of the Public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Members of vulnerable groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

	Frequency				
	Never	Rarely	Sometimes	Frequently	Always
Evacuation process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decontamination process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building of a safety zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contact to the public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contact with vulnerable groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

CBRNe Response

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

16. APPENDIX D – INVITATION LETTER OF QUALITATIVE STUDY

Invitation letter of qualitative study

APPENDIX D



Dear colleague,

The German Police University (DHPol) as partner of the Horizon2020 project **PROACTIVE** (<https://proactive-h2020.eu/>) is conducting a benchmarking study with Law Enforcement Agencies in and beyond Europe. We would be very grateful if you could support us in our study.

The first part of the study comprises a rating in regard to six topics on CBRNe preparedness and response. A focus is paid to the consideration and awareness of the needs of vulnerable citizens. The rating will take less than **5 minutes**. After filling out the document, we ask you to send it to us by mail. Deadline for submission is **June 28th, 2021**.

For the second part, DHPol is searching for interviewees who are willing to participate in a follow-up interview session to discuss the ranking of the six topics. All interviews will take place on agreed dates in **June 2021**. The interview will take no more than **15-20 minutes**. If you are interested, we are more than happy to forward further information.

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@dhpil.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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17. APPENDIX E – INTERVIEW GUIDELINE OF QUALITATIVE STUDY

Interview guideline of qualitative study

APPENDIX E



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	Which position do you currently hold?
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(Joint) Threat assessment

Discussion of the Benchmarking assessment for the category "(Joint) Threat assessment"	Question about improvement potentials / question about "best practice" examples (domestic / foreign)
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Legal and policy framework for inter-agency collaboration

Discussion of the Benchmarking assessment for the category "Legal and policy framework for inter-agency collaboration"	Depending on the benchmarking assessment, question about the alignment (content) of the interagency collaboration protocols / question about information sharing routines (regular exchange rounds, etc.).
	Question about improvement potentials / question about "best practice" examples (domestic / foreign)

(Joint) Training

Discussion of the Benchmarking assessment for the category "(Joint) Training"	Depending on the benchmarking assessment, question about inclusion of vulnerable groups in trainings. How often? Dealing with ethical and security issues / Recruiting of participants, etc.
	Question about potential for improvement / question about "best practice" examples (domestic / foreign) / If point 5 is selected in the benchmarking matrix, can concrete "best practice" examples be named?
	Have training contents changed as a result of experiences with the Covid-19 pandemic?

Evaluation and capacity building

<p>Discussion of the Benchmarking assessment for the category "Evaluation and capacity building"</p>	<p>Depending on the benchmarking assessment, question about information sharing routines.</p> <p>Question about potential for improvement / question about "best practice" examples (domestic / foreign). In case of selection of point 3-5, question about concrete "best practice" examples.</p> <p>Inclusion of Covid-19 experiences in evaluation processes (e.g. of SOPs)? During the crisis, the particular vulnerability of older people became especially apparent. Has anything changed in the SOPs in this respect?</p>
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Security measures

<p>Discussion of the Benchmarking assessment for the category "Security measures"</p>	<p>Depending on the benchmarking assessment, question of which vulnerable groups are taken into account. And how (examples; information materials in different language formats, etc.)?</p> <p>Question about improvement potentials / question about "best practice" examples (domestic / foreign).</p> <p>Has the Covid-19 pandemic increased the focus on specific vulnerable groups, and if so, to what extent (e.g. addressing special needs of older persons in CBRNe SOPs)?</p>
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Communication with the public

<p>Discussion of the Benchmarking assessment for the category "Communication with the public"</p>	<p>Depending on the benchmarking assessment, question about the focus of the communication strategy (information materials for the public, which information materials, etc.), question about which vulnerable groups are taken into account.</p> <p>Question about potential for improvement / question about "best practice" examples (domestic / foreign) especially with regard to the consideration of special needs (sign language interpreters, etc.) of vulnerable groups in CBRNe situations.</p> <p>Do you perceive a change in the public's perceptions of CBRNe-related measures as a result of the Covid-19 pandemic, and if so, to what extent (e.g. familiarity with protective equipment used by CBRNe first responders has increased)?</p>
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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

18. APPENDIX F – BENCHMARKING MATRIX

Benchmarking Matrix

APPENDIX F

	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. citizens, media). 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 citizens.	There is evidence of standard communication strategies that provide CBRNe practitioners with generic SOPs in regard to vulnerable citizens during a CBRNe incident; however, this is not nationally consistent.	A nationally consistent communication plan addresses the special needs of vulnerable citizens prior, during and after a CBRNe incident. The strategy is continuously updated.